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Your truly,
Thomas Bates

THE FARMER'S MAGAZINE.

VOLUME THE TWENTY-FIRST.

(SECOND SERIES.)

JANUARY TO JUNE, MDCCCL.

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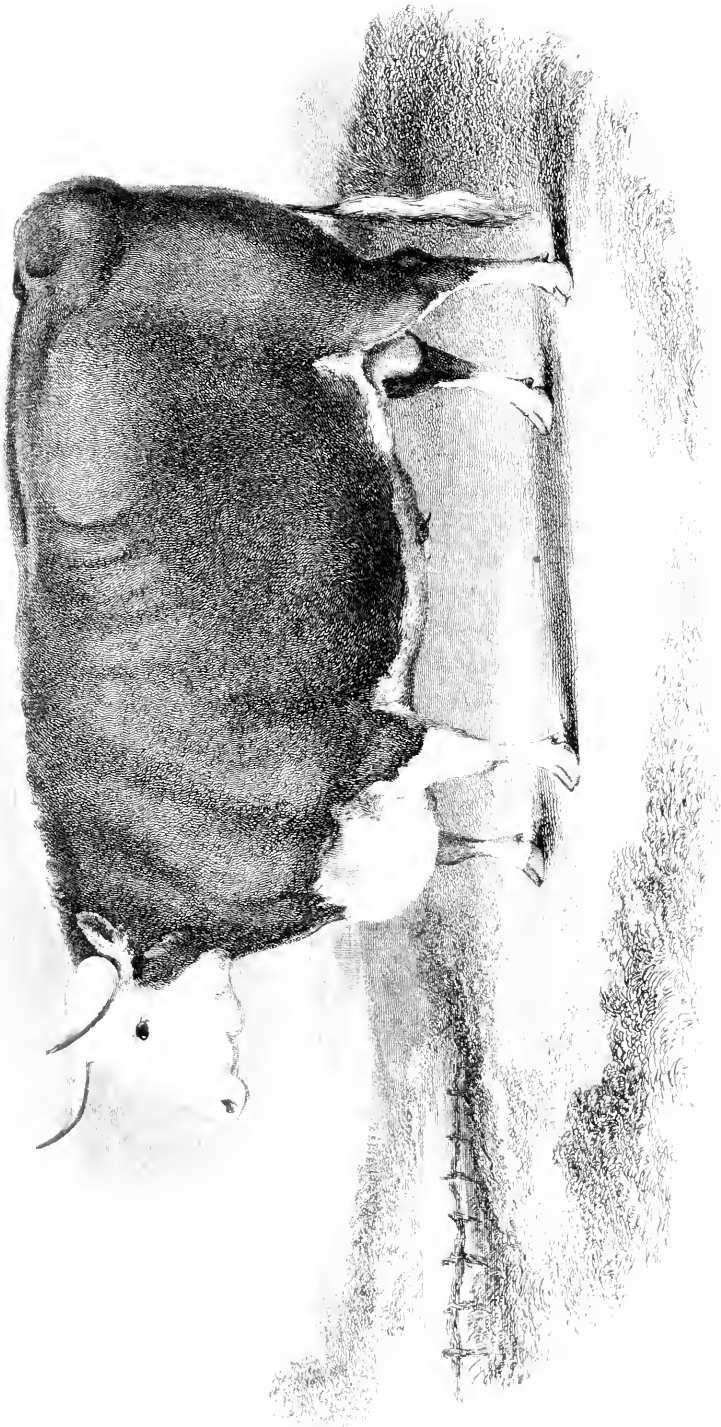
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THE FARMER'S MAGAZINE.

JANUARY, 1850.

No. 1.—VOL. XXI.]

[SECOND SERIES.

PLATE I.

PORTRAIT OF THE LATE THOMAS BATES, ESQ.

PLATE II.

AN HEREFORD OX.

The subject of our second plate was bred by Mr. Davis, of Milton, near Pembridge, Herefordshire; was purchased by his Royal Highness Prince Albert, and fed and exhibited by him at the Smithfield Club Cattle Show in 1848. The first prize of Thirty Sovereigns was awarded to his Royal Highness; and the Silver Medal to Mr. Davis, as the breeder. The animal was purchased by Mr. Pawsey, of Bath, and weighed 198 stones 3 lbs., Smithfield weight.

It cannot fail to be satisfactory to the agriculturists of this country to see the interest taken by his Royal Highness Prince Albert in practical farming; and which, as regards the feeding of stock, has proved successful upon several occasions at the Smithfield Club Show, and also at the exhibition of the recently established Society at Birmingham. We hold it to be a matter of national importance that the individual occupying the elevated position of his Royal Highness, should regard the cultivation of our native soil as deserving his personal attention. We should hope that his Royal Highness provides for the keeping of accurate accounts, as well of the cost of feeding his animals as of the expenses of his farms and the value of the produce raised at the ordinary market price. It would be extremely satisfactory that his Royal Highness should be made acquainted with the real condition of British Agriculture, as an investment, for capital by his own practical experience; and it will be admitted on all hands that the state of the account at the end of the year is the only true test.

MEMOIR OF THE LATE THOMAS BATES, ESQ., OF KIRKLEAVINGTON, NEAR YARM.

WITH A PORTRAIT.

On Thursday, the 26th of July, 1849, died the subject of this memoir; a man to whom, from his labours for a long series of years, agriculture is incalculably indebted, and who, to the very last, persevered in the cause with all the vigour and energy of youth. His career, too, brings honour co-equal to the services he rendered that pursuit to which he devoted himself, and leaves for him a character as clear and untarnished as that race of cattle was excellent and unsurpassed, which he himself left as a benefit to mankind.

Mr. Bates was born at Matfen, a village in Northumberland, in the year 1775; he was consequently at the time of his decease upwards of 74 years of age. At an early period in life he removed with his father to Haydon Castle, near Corbridge, and commenced his studies in a school at Haydon Bridge. He subsequently went to another establishment at Witton-le-Wear, and completed his education at the Edinburgh University.

directed towards the bar as a profession; this could not, however, have suited with his own taste, as he would seem to have engaged in the law with but little of that perseverance which became so striking a characteristic in his subsequent pursuits. His actual start in life, then, may be dated from his occupation of one of his father's farms, called "The Eeles," on the banks of the North Tyne, and near the town of Hexham. Still he did little more than commence here, for in 1800 we find him removing to Halton Castle, which he occupied for one-and-twenty years; thence to Ridley Hall, on the banks of the South Tyne; and at length into Yorkshire, to the Kirkleavington estate.

It was on the Halton Castle farm Mr. Bates laid the foundation for his celebrated tribes of short horns. His attention having been first called to this breed of animal by the late Mr. Waistel, of Burdon, generally acknowledged to be one of the best judges of short-horns in his day. Of the different races for which he is especially famous,

“the Duchess,” “the Red Rose,” or “Cambridge,” “the Oxford,” and “the Waterloo” are the most appreciated. From the first-named of these, in fact, came that progeny which brought him the bulk of his prizes, and of which he continued the produce in cows so far as to number them to Duchess 65th.

The origin of his Duchess stock was a cow bought by private contract of Mr. Charles Colling, in 1804, within a very few years, it will be observed, after his entry on Halton Castle. So pleased was Mr. Bates with this specimen of the herd that at Mr. Colling's sale at Ketton, in 1810, he determined to have, at any price, a heifer, then two years old, called Duchess, a grand-daughter of the cow he first possessed. Mr. Bates's instructions to the auctioneer on this occasion were that whatever sum any one might offer for Duchess, he was authorized to make a bid for him, of five guineas more, and ultimately he obtained the prize for the sum of one hundred and eighty-three guineas. She was by the celebrated Comet, her dam by Favourite, grandam Duchess, by Daisy Bull, &c., &c., as *vide* “Herd Book.”

From this animal, first crossed by a son of the old cow, came that produce which has earned for herself and owner not merely a local or even European, but really a transatlantic celebrity. Still, however, with the foundation laid at Halton, it was not until Mr. Bates' purchase of, and removal to, Kirkleavington, that the fame of his stock could be said to be fairly established, or that he could command those prices and prizes of which we shall now proceed to give rather a brief review than a recapitulation.

For upwards of a quarter of a century Mr. Bates did not exhibit at any of the shows; and, indeed, it is not until 1838, commencing with the formation of that society, that we find him successful at the first Great Yorkshire Agricultural Meeting. In the following year—also “an opening day” for the Royal Agricultural Society of England—he made a most brilliant display at Oxford, carrying off four prizes, and, in fact, winning everything for which he entered. The next month finds his stock again in the ascendant at the Leeds show, and, in 1840, at the Royal Society's gathering at Cambridge, he figures in the prize list with a cow of the “Red Rose,” more frequently called “the Cambridge,” tribe; as also with his bull, “The Duke of Northumberland,” the winner at Oxford. At Northallerton, in the same year, the excellence of his stock was as distinctly asserted; and, in 1841 his bull, “Cleveland Lad,” took the first prize at the Royal Agricultural Society's Meeting, at Liverpool; as also the first of the Yorkshire Show, held that year at Hull. The succeeding summer he won both the

bull and cow-prizes of the Yorkshire Society; the one with the “Duke of Northumberland,” and the other with his dam. In addition to these were very many other prizes taken at the Yorkshire, Durham, and different local exhibitions.

With an acknowledged excellence of this kind the Kirkleavington stock of course commanded proportionately high prices. Mr. Bates was constantly in the habit of letting his bulls at sums varying from one to three hundred guineas each, and of selling calves of but a few months old at 150 guineas, and even occasionally beyond that. Had his celebrated Duke of Northumberland ever been put up by public auction, there is but little doubt that he would have realized quite as much or more than the thousand guineas for which his ancestor, Comet, was once sold. It is, in fact, well known that Mr. Bates refused far more than a thousand, made by private offer for the Duke; and like Lord Westminster with his famed race-horse, Touchstone, appears to have deemed him too valuable to put a price on.

The opinion of other, perhaps less interested judges would seem in a great measure to corroborate this, the Duke of Northumberland being pronounced by all who saw him to be one of the finest bulls ever bred. He possessed the greatest amount of good properties, each reaching to the highest standard of excellence, perhaps ever found in one animal. For quality, size, substance, colour, and breed he was equally remarkable and superior. His stock, too, have been well worthy of him, and despite the in-and-in system of breeding, so much advocated and adopted by Mr. Bates, still retain all those good qualities for which the sort have been so long distinguished. In the opinion of a gentleman of acknowledged authority, who visited Kirkleavington this autumn, there never was collected, much more produced, from one herd such two-year-olds, yearlings, and calves as he then saw there. It is, we are aware, urged by some that in-and-in crossing must, and has in this instance, been followed by a loss of symmetry. We shall, however, for our own part be much mistaken if public opinion does not rank them in value, when sold, above the results of any sale of modern times. This, indeed, can scarcely be wondered at, coming as they do from the hands of a man, who, from his early intimacy with the brothers Charles and Robert Colling, had his estimate of the animal grounded in the best school, and who himself was imbued with a taste and judgment to still improve on and perfect a breed of cattle that now promises more and more every day to become the national one of this country.

Enough has already been said to show the high estimation in which Mr. Bates himself held his

favourite breed, and consequently how much in his ardour he might be willing to sacrifice to them. To prove, however, in every way the profit that may be, despite the readiness to dispute it, really attached to what is termed "fancy stock," we sub-join the following plain statement from a letter written by Mr. Bates but a short period previous to his decease:—

"In the spring of 1836, I had just sold a lot of three year old steers, which were re-sold in Leeds market at £34 each. And the late Mr. Fawell of Yarn, who was then an old man, and was brought up with farming, and had farmed a part of his own estate for many years, came to see these steers; and he pointed to the adjoining farm, and said—'I bought your first tenant's cattle at two years old, for above forty years in succession, and got the last lot in 1812, when you took the farm into your own hands, and I never (said he) but one year, paid as much as five pounds a head for those two years old steers. I have (said he) often taken the liberty of inspecting your stock, when you had the farm in your own hands, and those of your present tenants whose stock you bred immediately, and they now keep as many sheep and more than double the number of cattle that were on the farm when I used to purchase the two year old steers; and these two years old, although prices for stock are now lower than when I bought them, are worth more than double the value they then were. and (he added) twice two are four, therefore the return is full fourfold.' Now the same quantity of land is in grass as formerly, when it kept only half the stock. No small consideration to a tenant; and it proves the importance of good stock, in the most striking manner.

I may also just mention, that after occupying this said farm (Kirkleavington) from 1812 to 1826, I let it for three years to an industrious tenant, and during that time he never kept one half the stock I had done on this said farm for 14 years; and on his leaving at the end of the three years, in 1829, I again took it into my own occupation, and it kept immediately, and continued to do so, above double what the late tenant did. His were short-horns, such as are common in the district, from which he had been breeding for years before. I mention this as confirmatory of Mr. Fawell's remarks, of the vast difference there is in different tribes of short-horns, though all called by the same name; and it proves also the amazing difference in the return made for the food consumed."

The attachment of the late gentleman to his stock, and the return they manifested, make it almost painful to think how they, brute animals as they are, will feel the privation. He would go to the cows, and even young heifers, in the fields, pat them and talk to them, while they would immediately give up their grazing, and look intelligently as if listening, and even understanding his remarks; approaching, and licking his hand or his coat, with every mark of affection. He lived amongst them and loved them, and they were loving and grateful in return; it is difficult, indeed, to con-

ceive a man in a more estimable light than when we see his gentleness and kindness of nature manifesting itself in the treatment of the lower animals—"The righteous man regardeth the life of his beast."

As an agriculturist, or cultivator of the soil, Mr. Bates' character and "authority" were not altogether proportionate with his standing as a breeder; still he had much to contend with here that was not, and indeed is seldom, properly allowed for in making deductions of this kind. Sometimes his turnips were defective, or his bean stubbles not so clean as they might be; but the nature of the cold and sterile soil should be taken into consideration, and the difficulties of overcoming natural hindrances properly considered. We cannot give anything so interesting as an account of the struggles he had before he conquered the difficulties that opposed him, and we think we may now safely say that his is by far the best cultivated farm in the neighbourhood.

Before entering on the operations on his Cleveland or Kirkleavington estate, we will give a few passages in his early history as a farmer. It will be seen that the crops he grew in the fertile valley of Tyneside were of a very different character from what could be expected on the cold clay of Cleveland, hide-bound with poverty and exhaustion. Again giving his own words, he says:—

"I had not been long engaged in farming before I became thoroughly convinced that the atmosphere contained the great ingredients for the amelioration of the soil. This I discovered by seeing the good effects of the same surface being exposed to the atmosphere, as long time as possible, before turnip seed was sown; and that the fineness and openness of the soil being increased without changing the surface, was the grand desideratum. A field ploughed in October after oats, ribbed across in February, and then only worked with a scuffler afterwards, never again ploughed till drilled for turnips, produced the heaviest crop per acre of white turnips I ever saw, and this was in the year 1793; the year Mr. George Culley and Mr. Bailey made the survey of the county of Northumberland, for the Board of Agriculture. These two gentlemen examined that crop, and said they never before had seen so large a crop of turnips. Nor have I since then; they considerably exceeded 50 tons per acre, when they had stood till February. They were sown in June. I mention this fact to induce young men to attend to the operations of nature. I mentioned my views soon afterwards to an old farmer, and thirty years afterwards he acknowledged to me the benefit he received from my remarks, and that he never afterwards failed in obtaining a good crop of turnips. But till then he had kept working his land, and ploughing, and re-ploughing it again, and again, up to the time of sowing; and that the more he worked, the worse his crop; and that my remark had been many hundred pounds' benefit to him afterwards.

"I may also make a remark that may be service-

able to those who have found peaty earth mixed with new made dung highly beneficial, laying the same in layers 12 inches thick of peat earth, to 6 inches of dung, as new made; turning the heap over a few weeks before applying the same to the soil. I had seen this done in Ayrshire in 1805; I began the same on my return home, and was soon convinced of the benefit to be derived therefrom.

"In a distant part of the same farm, I had a very deep peat moss; and during the winter, I mixed it in the same way, with the new made dung; but on turning it in the spring, I saw no signs of the dung; the whole, as mixed, was applied to the turnip crop, and it was a complete failure. The barley sown after the turnips was not half the crop I had previously had on the same field, and the clover and seeds that followed were the same. I then applied 15 chaldrons of lime per acre, and ploughed it in for an oat crop. The crop was a very great one, and the field afterwards continued very productive; but not having then studied chemistry, I could not account for the deterioration, and then the after improvement; and this induced me to go to Edinburgh to study chemistry, to account for the change.

"The first trial I made of peat moss was free from oxide of iron; the latter, that did the harm, had a very large portion of that salt; this destroyed the dung and rendered it useless; but the application of a large dose of lime (15 chaldrons per acre) removed the bad effects of the oxide of iron, and converted it into a beneficial manure.

"This hint, costly to me in the first instance, may, I hope, be of benefit to others; and as such I have here detailed it fully."

The above gives ample testimony of the talent and determination with which Mr. Bates met his difficulties, as well as of that ingenuousness and fairness with which he adopted and tested improvements that might not, from their first blush, seem actually to be such.

To give an idea of the nature of the district in Yorkshire in which Mr. Bates settled in 1811, the year after he purchased "Duchess," we will give a short extract from the Royal Agricultural Society's prize essay on the North Riding of Yorkshire, written by Mr. Milburn, who being a native of that district, and a land agent, may be supposed to describe it accurately.

"The Clay District.

"We now come to the flat extensive vale of Cleveland, nearly the whole of which is a cold tenacious clay, resting chiefly on the blue lias, and being covered by a somewhat flat stratum of diluvium, principally, doubtless, dissolved lias; and this tenacious, plastic, impervious body spreads over the whole district a degree of exhaustion, wetness, and sterility, which gives it a peculiarly bleak and barren aspect, especially the lower portions, which are full of stagnant water.

* * * *

"The vale of Cleveland, once abundant in grass, and famous for its cheese and horses, has witnessed its grazing grounds piecemeal converted into tillage land, cropped as long as it would grow a corn crop

—little or no extraneous manure brought back to replace the loss, until lost in wet and adhesiveness; keeping little stock; making less and less manure; every third year a bare fallow, so that a few wet seasons once prevailing, the great mass of farms being totally undrained, there is nothing but starvation spread over nearly every parish. At one period lime was liberally used, and had beneficial effects, mechanical and otherwise; but this was disused, and since, the district has descended further and further in the scale of good cultivation. The improvements adopted may be classed under four heads:—*Draining, Artificial Manures, Green Crops, and Stock Feeding.* Various modes of draining have been tried, chiefly down each furrow, filling up with soil 20 to 25 inches deep, with horse-shoe tiles without bottoms; stones occasionally used, and in some cases the mole plough has been tried, and the drains are running successfully after an interval of 30 years. But the best instances of its success are upon the grass land, where it has been of very great benefit."

Here Mr. Bates took his short-horns—a place not naturally genial—and here he commenced farming. Any person may succeed with excellent land, but it requires skill and perseverance to overcome the difficulties of these tenacious clays. Mr. Bates—and we think it preferable to give his own words as often as available—thus describes them:

"When I commenced farming here, in 1811, now thirty-seven years ago, nearly the whole tillage part of the estate was under the *three* course of cropping, still so prevalent in this district, and so deteriorating, viz., that of *Bare fallow, Wheat, Oats.* No farm-manure laid upon any of the crops; and as a ton or cart-load of lime then cost 28s. in cost and expense of leading, it would not pay the outlay, and little or none was applied; the tenants were bound to lay what manure they made on their farms on the grass land: a system which the gentleman of whom I bought this estate told me he never would have departed from, and he was then advanced in years, and had lived all his life in the district.

"I began by applying all the farm-manure made on the premises to the tillage land, and as far as I could for turnips; and where the land was too strong, and difficult to procure turnips, I applied it to beans drilled at 27 inches asunder in the rows, as in turnips, and sowed grass seeds on the wheat crop succeeding the turnips, to lie one or two years, which refreshed the tillage. But this being a slow process, I began and bought as much manure as the farm made, and applied this to the bean crop, taking wheat after the beans; and having made the land clean by a bare fallow before I began this plan, it succeeded well for two rotations of beans and wheat; and finding in a year when the land, from the sudden dry season after a wet spring, could not be well wrought for beans, they failed, and the wheat also succeeding the beans, I changed the system, and after turnip fallow and wheat I then sowed red clover, on the wheat crop; and finding, contrary to my experience in Northumberland, that red clover on our Cleveland strong lands would stand two years, I adopted it; and fallowing after the second

year's clover, I found most excellent crops of wheat, without any manure applied for the wheat crop; but after being so repeated, at the interval of nine years, the first year's clover was good, but the second year was very inferior; I therefore changed my system to that of a twelve years' course, divided into two six years:—1st, fallow (turnips where they can be got); 2nd, wheat; 3rd, red clover; 4th, fallow (as before); 5th, wheat; 6th, beans (and if to be bare fallow the following year, I applied dung to the beans). Next six: 1st, fallow (as before); 2nd, wheat (on which was sown 5lbs. of cow-grass, 5lbs. of white clover, 2lbs. of hop clover, and 2lbs. of parsley with Italian rye-grass, $\frac{1}{4}$ bushel per acre); 3rd and 4th, sheep pasture; 5th, oats; 6th, beans, being the twelve years' course. Finding fero grass, in wet seasons, and couch, when any was in the land, began to increase by taking two crops after two years' sheep pasture, I have changed the succession of crops, but retain the same kind and number of crops as before in the twelve years, and I find this a more improving rotation than the last, and keeps the land cleaner and in greater heart, viz:—1st, bare fallow; 2nd, wheat; 3rd, sheep pasture; 4th, sheep pasture (second year); 5th, fallow (turnips if possible, and three tons of lime per acre); 6th, wheat; 7th, red clover; 8th, beans; 9th, turnip fallow (and again limed, do.); 10th, wheat; 11th, beans; 12th, oats.

“My wish is always to grow turnips twice in the twelve years, and Swedish turnips when they can be got in in time, if it be the turnips cannot be all led off the land early in the autumn, topped and tailed, and the roots stacked and covered with straw; the tops being all consumed by stock in the autumn as the roots are separated from the land, being led upon the old grass land, or over eaten fogs, but if this is not likely to be all done, then I would prefer sowing wheat (after the last bean crop), as the 12th in the rotation, and sowing an equal quantity of the turnip land with oats, instead of wheat; as if sown late, or in the spring, the wheat (as in crop of 1845) is inferior in quality to the autumn sown wheat, and also far less in quantity of bushels per acre; and as wheat can always be got in in time after beans, this enables us to have always three wheat crops in the 12 years, two bean crops in do., one oat crop in do.; and I consider on our soils that a bean crop sown at 27 inches asunder in the rows, and well horse and hand-hoed, to be an excellent green crop, and a crop after which wheat is always productive. In this twelve course as we have only 4 white crops (3 of wheat and one of oats), and 8 green or fallow crops, it is making 2 green crops for one white in the whole rotation. In the 8 first years there are only 2 white crops for six green crops with the fallow crop, or 1 white and 3 green. In the 4 last years, the white and green crop (or fallow) intervening, or 2 white and 2 green crops or fallow. And this system, after the various trials I have made, I consider the most improving system that can be followed on strong land, such as ours in Cleveland; the crops improve under this system with no additional dung to that made on the farm, even more so than when I bought as much manure as the farm made, applying the whole to the tillage

land. The red clover being only grown once in 12 years, is mown twice, and sometimes three times in the year. Beans after red clover are always a certain productive crop, and these two green crops leave the land in high order for the succeeding turnip crop, and being soon mown, and early removed, secure a good wheat crop. For the turnip fallow also after two years sheep pasture, the land in fine order, and being limed, 3 tons per acre, the turnips are as certain as can be expected on strong soils, and the only bare fallow is once in twelve years, and coming after two white crops with an intervening bean crop properly horse and hand-hoed, as well as manured for, leaves the land in high order for the commencement of the next twelve years' rotation.

“I began to remove turnips from the land early in the autumn when I farmed in Northumberland near fifty years ago, stacking them and covering them with straw, and sowing the land with wheat in the autumn; a practice I have ever followed since I first began to do so, and I never knew any year in which the turnips did not keep much better in the stacks than if left on the land. The soil was strong like Cleveland land, but more adapted for turnips, as I never failed in securing a heavy turnip crop, but in Cleveland while it remains undrained in a continued wet season, from sowing the turnips to removing them, the turnips are not only a failure, but the land greatly injured from being unable to work it properly, and the wheat fails, and the clover seed sown thereon (in which case beans are sown where the clover fails, or tares to cut green for draught horses, &c., in place of the red clover), but knowing that red clover, while the land is fresh and in high condition, will for one rotation, stand two years together, without injury to the land, it can be left to stand a second year. The clover land sown down, and failing a crop, can be ploughed and sown with beans; thus the number and kind of crops in the rotation are preserved, though relatively altered from such failure as I have named.

“If an act of parliament were made, not too expensive to prevent its being acted upon, neighbouring land owners could not in future prevent drainage through their estates, then all strong land might be effectually drained, which hitherto I have been prevented doing for want of such an act. I did drain so far as fall of water permitted, from 14 to 22 inches deep, with the mole plough, and though the improvement thereby was great, and I have about 850 acres out of 1000 acres so drained, yet it is not sufficiently deep. The grass land so drained with the mole plough is more benefited than the tillage land; but both will be benefited by a deeper drainage, which in due time I hope to see effectually done.”

He did not live, however, to realize his hopes; but his sound views and practical hints may, it is to be hoped, not fall quite unheeded before his successors, whoever they may be. In proof of the care with which his mole-plough drains were executed, we may state that they were lately observed running beautifully—equally, indeed, to Mr. Mechi's pipes—and that, too, in arable land, where they are by far the most apt to fill.

Mr. Bates thus sums up the rotation, which is a twelve course one, adopted on his farm, at the time of his death:—

“In a farm of 1000 acres, 600 in tillage, and 400 in grass land, each rotation in a twelve course is 50 acres; 150 in fallow or fallow crop is a $\frac{1}{3}$ part; one year in red clover, and two years in sheep pastures, is another $\frac{1}{3}$ of the tillage; two rotations of beans, 1 sixth of the tillage makes 8, and 3 of wheat, and 1 of oats, are $\frac{1}{3}$ white crop in the 12 course. No one can doubt before two rotations are completed, that the produce will be more than doubled in quantity, both for sale, and in the manure made, and that such increase will continue to go on *ad infinitum*.”

Under such a system it is quite clear any land must improve; and it could be only by some such means that Mr. Bates's farm could have ever been brought to its present standard.

To those who profess to have *discovered* the cooking of linseed as food for cattle, we beg to give Mr. Bates's experience several years ago. He says:—

“I tried in 1791, now 57 years ago, I found it excellent when turnips failed, and I have repeatedly used it at various times since then, particularly in the springs of 1804, 1818-19-20; but bran was low in those years, I exchanging a quarter of wheat (60s. per quarter), for a ton of bran (£3 per ton). At present the price of wheat is 52s. per quarter, and a ton of bran £6 (more than doubled). But my most successful trial of boiled linseed was in 1836, when I bought it and with conveyance (it being damaged by sea-water, and sold by auction, a great quantity together, it cost 1 $\frac{1}{2}$ d. per bushel; and I gave a bushel per week to fat cattle, I made a lot of excellent three years old steers, sold at £34 each, besides other cattle, and one cow improved for 20 weeks, £20, being 48 stones at 5s. per stone, £12, and in 20 weeks afterwards weighed 84 stone, and was sold at £32.

“The food given with the linseed was chopped straw, of little value by itself; the improvement of the animals was great, and the cost of keep, besides labour, was trifling; a return of 320 for 1, besides the straw and labour, to say nothing of the value of the manure so made.”

We cannot illustrate Mr. Bates's success as an agricultural improver, and so rescue him from those “high farmers” who question his system of cultivation, in any way better than by contrasting what he accomplished, with the management of the remaining half of the estate, which is about as dismal a fact as we have ever met with—also from the late gentleman's pen.

“You need not go out of this parish to view the contrast of management and its results. The year following my purchase here the other division was sold, and about 400 acres were occupied for ten years by the purchasers, who, by improvement rendered it more than doubly productive to what it was when they purchased it. They then sold it, and the farm was let to an active managing man, who kept cultivating it well for some years, when the failing crop (to less than have an average crop) in 1828,

reduced his means, so that he could no longer manage as he could have wished; and when he left the farm, the rent was greatly reduced to the ensuing tenant, who soon reduced the produce to one fourth of that it once was; and when he could no longer go on, it was let again to an industrious family, who are again leaving it, after making improvements, and would have continued to do so, had they been encouraged. But this falling off in rent and produce is less than on another farm, in an adjoining township, in the same parish. The farm consisted of 207 acres, and was let, since 1810, at £220 per year, for seven years; when the rent became reduced, and kept reducing, though twice in the owner's own occupation, till it came to £45 per year, and the tenant to expend £5 per year in manures. Having the half of the tithes of the whole parish, I can state, as I either let or drew the tithes, that one year the tithes of this farm made above £100, and they became reduced to £5 per year, and were lately commuted for on this farm at £17 5s. per year.

“The tithes drawn in this parish, on above three thousand acres, were commuted at near £450 per year; and the two first years I had the tithes they were near £1000 per year, more than double. Although no one farm has decreased so much as the one I have referred to, yet in many cases the rent has been reduced more than one half. And lands purchased in 1825, as now let, bringing in to the purchasers less than 2 per cent. per annum, for the purchase money, and notwithstanding that there has been an outlay in improvements, both by the owners and occupiers.”

Having so far sketched Mr. Bates's career as a breeder and a farmer, we now turn to an equally agreeable part of our duty, and proceed to give some notice of his character as a good man and a good neighbour.

As a man, there were few who enjoyed a wider range of popularity. The employment he gave to the poor did not more ingratiate him in their favour than the unvarying and unmingled kindness he at all times displayed, whether in providing for their cheap and comfortable shelter in his cottages or ministering to their wants in sickness, infirmity, or age. His kindness as a neighbour was beyond all praise. Scarcely one of the farmers, whose cold, barren clay farms surrounded him, but could bear witness to some act of disinterested sympathy; and a stranger would have witnessed with surprise the influence his name and his opinion had upon them; while his word would be more relied upon than many men's bonds. In hospitality to all comers he was seldom equalled; his house was open to every one of whatever grade, from the Peer or the Member of Parliament down to the small undistinguished farmer—and the longer the visitor stayed, and the more he partook of his liberality, the more welcome he was. On one occasion, two very celebrated short-horn breeders intimated a wish to spend a day at Kirkleavington and examine his

stock; he immediately wrote, in reply, that it was impossible for them to examine them thoroughly in one day, and that they must make up their minds to spend three with him. In fact, his house was the home of all who entered it. They had a welcome truly English; no pains nor unostentatious attention were spared to make them comfortable and happy; while his long stories, founded on bye-gone experience, of great breeders of the early part of his life—the dark ages of short-horns—were so amusing, that the time flew in his society completely unawares, and to no one did it do so more swiftly than himself. In fact but once set him on with his anecdotes, and there never seemed to be a termination, nor even a breaking place when the meeting could be separated.

However inconsistent with all this power it may appear, he was often in hot water with some of his opulent and influential neighbours, and has more than once driven the bench of magistrates from court to court at enormous expense. Amongst many of these he was looked upon as meddling, overbearing, and litigious; certainly the pertinacity with which he opposed many of their measures of a public nature, and the vast equal expenses he incurred, might seem to justify the opinion. But those who entertained this opinion did not understand Mr. Bates. The dispute was not private nor personal; it was of a purely public origin, and with him the course he took was looked upon as a great public duty, and one that he felt he would be false to himself to abandon. His litigiousness, therefore, was but a nice and discriminating view of public duty; and had the magistracy used a little conciliation due to a man so well disposed and time-honoured, they might have achieved any concession they required, consistent with great public responsibility, which Mr. Bates held with most scrupulous conscientiousness. On this point, perhaps, his judgment did not always equal his zeal and perceptions of right. Convince his judgment or appeal to his feelings, and he was gentle and yielding; but once rouse his opposition and he was as untiring in his warfare as he was staunch and unflinching in his character. As one instance of the general benefit arising from his exertions, we may name his procuring a clause to be inserted in the Highway Act, removing the power of electing surveyors out of the hands of the magistracy and placing it in those of the rate-payers.

His liberality was great, and the good he did was so far beyond his means that we believe we are betraying no trust and hurting no feelings in saying it was the means of encumbering his property.

At times, with a herd far beyond the capabilities of his farm, with an estate ill-calculated to grow turnips, and withal a necessity of feeding a

vast portion of his cattle on purchased and artificial food, he had an enormous outlay; and as his herd was never reduced but by purchase either for home or for abroad, it was within a range extremely varying. Still he was punctual in his payments, almost to ridiculousness; and was in the habit of giving in his subscriptions two years in advance, to societies which only demanded one.

He was fond of public life, and was not altogether free from a love of excitement. Once he risked the cost and labour of setting afloat a county contest for the representation; and had indeed great delight in addressing the public, using very strong language and always appearing in earnest. He wrote a vast number of letters to the newspapers, mainly on the politics of agriculture, and was always at his post at a county meeting or election, where anything agricultural was the subject of investigation or remark.

His writing, though not elegant nor classic, was terse and forcible, and he had a remarkable tact in making facts bear upon his propositions, as well as a wonderful readiness in calculation and mental arithmetic. It was, however, Mr. Bates's character as a Christian which gained him the large amount of respect he so generally secured; and an undeviating course of moral conduct absolutely untainted and unimpeachable, gave him a standing, which though it might for the moment excite the ridicule of the thoughtless, generally created a real respect in their minds. At a period when a profession of religion was by no means so fashionable as it is at present, he would dare ridicule and scorn, and indeed by his energetic support of the Bible Society, and his exertions to circulate the sacred volume, obtained the nickname of "Bible Bates." At a time too when it must have been very inconvenient in a pecuniary sense, he gave the land upon which to build a parsonage-house to endow a living in which he had no interest.

His zeal and liberality went hand in hand. On one occasion he heard that a living in a parish in which he felt concerned was about to be given to a clergyman whom he believed to be unworthy? and though the kindest man living, he was determined to prevent it. He wrote to the bishop and the arch-deacon, confronted the parties interested, and by dint of persevering opposition effected the rescinding of the gift, and obtained an appointment congenial to his wishes. His zeal, however, was not always tempered with thoughtfulness and discretion. We have heard that he made an offer of a thousand pounds to the Church Missionary Society to form an institution for the education of wives for missionaries, and that the Society returned him their best thanks, but said the difficulty

appeared to them to be to persuade the missionaries to marry them.

Mr. Bates himself was never married. Early in life, it is said, he formed an attachment to a young lady, and was on the point of marriage; but before the event he introduced a near friend to his intended bride, who supplanted him in her affections, and ultimately married her. This must have been a great stroke to so sensitive a mind, and was probably the cause of a resolve which a man of so much firmness of purpose was certain to keep.

Before closing this memoir, in which we have endeavoured to place the living person before our readers, both in his private and professional capacity, it may be expected we should give some account of his death. Robust in body, active in mind, temperate in his habits—nay, we may say abstemious, for he tasted no intoxicating liquors for some years before his death; and living almost in the open air he knew little of disease, and seldom, if ever, consulted a surgeon. In June last, however, his health began to fail, a disease of the kidneys became painful and harassing, and he went to Redcar to try the effect of the sea-air, but which so far from removing seemed only to increase the malady. It was sometime before he could be prevailed upon to

consult a medical adviser, and when he did he refused the greatest part of the medicine. Loving his favourite cattle, he reclined in the cow-houses near his companions, until compelled to enter his room—to leave it only a few hours after for the place appointed for all living.

His death struck a painful chord at the Yorkshire Agricultural Society's Meeting held very shortly afterwards, equalled only by the death of Lord Spencer, both of whom were constant and warm friends of the society; and at the dinner Lord Galway alluded to the event, expressing his regret at the death of a man who had always exhibited such splendid animals, and a hope that the other exhibitors would emulate his merits.

In him agriculture has lost one of her sons at a time of great difficulty and struggle, while we hope he is far beyond all these painful circumstances, in which, had he lived, he would have taken a deep interest, and is now doubtless so secure that

“Not one wave of trouble rolls
Across his peaceful breast.”

Since this sketch was written we have heard that the Kirkleavington herd of short-horns, consisting of upwards of seventy head, will be sold by auction by Mr. H. Strafford, in April or May.

GENERAL PRINCIPLES OF MANURING.

BY J. TOWERS, MEMBER OF ROYAL SOCIETIES OF AGRICULTURE AND HORTICULTURE.

In the article commencing page 379 of the number for November, I endeavoured to excite attention to an able paper by Mr. Newman *On the true office of the native earths*: to this the reader is referred in order to introduce the subject of *manures*, which, whatever may be the views of individual cultivators, are always added to the land as *fertilizers*. Mr. Johnson in his last article (p.p. 475-478) has done the cause of agriculture good service by pointing out the delusive notion that has been prevalent from time immemorial, of the agency of manures on plants. But before I enter upon the subject of fertilizers, it will be proper to retrace that of the four basal matters which constitute the staple of all arable lands. These, as before stated, are siliceous sand, alumina or pure clay, chalk, and oxide of iron. Without these four native earths, a perfect staple loam cannot exist; and all the modifications of texture and temperament are dependent chiefly, if not wholly, upon the relative proportions in which they combine. To render the position now assumed, and upon which Mr. Newman based his hypothesis, as simple as possible, it will be needful to imagine the case of a loam, or pure virgin earth,

utterly void of any trace of vegetable fibre, or of any particle of decomposable organic matter whatever. Now, as it appears that the above four earths are nearly insoluble in water, they *can* only be taken up by the absorbents of plants in the form of salts, which never will be produced, unless by possibility they come in contact with some acid, or alkaline solvent. Hence it is fair to conclude that the pure earths cannot of themselves produce or support the development of the vegetable structure. It is true, however, that earths, so free from decomposable matters as in the imaginary case above alluded to, can hardly exist in nature; yet there are facts upon record which seem to carry out the hypothesis of Mr. Newman. Thus, plants in pure washed sand have sustained vegetation for months; but here, the agency of water must be appealed to; and water, even after being distilled with the utmost nicety, contains two organic elements—oxygen and hydrogen: although the third, carbon, is absent.

Van Helmont, of Brussels—who flourished at the end of the sixteenth century, planted a willow weighing 50lbs in an earthen vessel with a known quantity of earth which had been previously dried

in an oven. He moistened it with distilled water, or with rain-water, and took care to prevent the entrance of any other earth. At the end of five years the plant was taken up and weighed; when the weight, with that of all the leaves, was 169½ lbs.; *that of the earth, only two ounces less than at first*—proving an increase of 119½ lbs., which could only be referred to the water with which the earth had been moistened. Hence it was inferred that *water is the sole food of plants*. Du Hamel placed some bulbs in moss or wet sponges, and they vegetated: beans and peas likewise, so treated, grew, and produced fruit. Bonnet, of Geneva, repeated the same experiment with a like result; and also, it is stated, obtained excellent grapes from vines by a similar treatment.

It was questioned by those who doubted the theory of the day, whether the plants which grew in water only received any *increase of carbon*; but De Saussure put it again to the test of experiment; he found that by drying 100 parts by weight of peppermint plants, they were reduced to 40 $\frac{20}{100}$ parts, which were proved to contain, within a fraction, 11 parts of charcoal. He then took a number of peppermint plants, and placed their roots in bottles filled with distilled water; exposing them to the sun on the outside of a window sheltered from rain. After ten weeks the 100 parts of mint so placed weighed in their green state 216 parts, and these were reduced by drying to 62 parts, showing that 21.71 of dried vegetable matter had been acquired. The quantity of carbon had also been augmented; for the 62 parts of dried vegetable substance yielded 15 $\frac{17}{100}$ of charcoal, being an excess of 4 $\frac{58}{100}$ above that of the first-cited experiment. The above, and other similar facts, are derived from Keith's *Physiological Botany*, vol. ii.; a work, though not modern, which yet comprises much that is worthy of the young student's serious investigation.

Keith adds—"While we maintain that *water is not the sole food of plants*, and is not convertible into the whole of the ingredients of the vegetable substance, even with the aid of vital energy, we must at the same time admit that plants, vegetating merely in water, do yet augment the quantity of of their carbon."

The physiologists of former days, however vigilant their researches, were little acquainted with the elements of water, or with the ammoniacal carbonaceous matters which even rain-water contained; they had still less suspicion of the absorbing power of the leaves through their oscular pores (*stomates*); hence, finding that many plants did not only live, but acquire a full green colour, and thrive (as common salads are familiarly known to do upon wetted flannel) in media which cannot be supposed to contain any element of nutrition, it was natural to con-

clude that water alone, even pure water, must be the sole and sufficient pabulum of life.

Quitting this theory of water, we return to the pure earths, and urge the question with which we started; namely, What are their chief and essential functions? And to this no other satisfactory answer presents itself, than that, if it were possible to detect such earths, free in the abstract from any particle of saline, vegetable, or animal manure, they could perform no other office than that of supporting or upholding a plant in that position which the form and structure of its roots individually should require. So far, then, it may be permitted to believe that pure earths are undecomposable and insoluble; consequently, that they cannot promote or extend operations which depend upon solution and decomposition. But here we must stop, since every species of loam which a farmer can trust as a staple does contain some alkali as a silicate, and some portion of vegetable fibre or tissue: again, that there is no such thing as pure water throughout nature; since every drop of rain or flake of snow, which falls must bring with it a portion of carbonic acid, carbonate of ammonia, and very likely a trace of some hydro-carbon. Earths, then—I mean loam of some kind and temperament—must contain, or receive from natural sources, more or less of nutritional elements; yet still in a form which requires the constant labour of man to work up, combine, and pulverise them, by one or other form of mechanism—by the spade and fork above all. By this labour, by adequate drainage where required, and by the removal of every wild, irregular, hedge and hedgerow-tree, man does all that he can to promote the fertility of natural land unaided by artificial appliances.

So far, Mr. Newman appears to have established his position; but after all, what does it amount to? Where is the difference in leading principles? Chemistry has so far triumphed, and great is its victory that no one, having like the wise man, "his eyes in his head," believes for a moment that the roots of any plant throughout creation really eat or drink the decomposable substances which we style manures. Davy was the first authority to point out this truth before the Board of Agriculture; and if any discerning cultivator will repeat the experiment which I made public many years since, and plant three or four clear, white-stemmed balsams, each in a small pot of the simplest loam he can procure, nursing them in a rather warm frame till 7 or 8 inches high, and with no other fluid than rain-water filtered through paper, he may then make use of any coloured infusion that I am aware of; as, for instance, decoction of log-wood, diluted ink, solution of salt of steel (sulphate of iron) &c. I employed such fluids during a fort-

night or more ; and to such an extent that the earths became tinged ; and that which was watered by the sulphate assumed the appearance of rust. The balsam plant in it became crippled, and its stem contorted ; but in none of the stems was any stain discerned ; neither did the juices in them, when cut, respond to any chemical test which could detect iron in the one or logwood in the other. Had the roots, indeed, been amputated before the plants were immersed, the vessels, even to the remote veins of the leaves, would have been tinged. Of both these phenomena the experimenter may satisfy himself ; as also that twigs and cuttings of apple and pear trees, &c., &c., will thus absorb coloured infusions ; a circumstance which has misled some, who by the result have thought they had thus discovered the channels of the ascending sap.

I find that I must reserve the minute consideration of agricultural manures for another opportunity, and now shall only add that chemistry has so far justified its pretensions as to have given proof of an analytic power, by which it has accurately determined the quality of each individual component of the soil, and to an astonishing degree of accuracy the quantities of such components ; it has proved that alkalies exist in some stones and loams, that the flinty coating of the stems of grasses depends upon the solution of siliceous matter in the soil, and, therefore, that flint must enter by the roots in the state of solution ; it has discovered the constituents of bones, bone-earth, guanos, and of many other chemical manures, and their specific applicability to many individual vegetables. It has thus entered the path of truth, and thus merits the utmost respect.

THE FORMATION OF SOILS.

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

It is ever an interesting and an instructive pursuit to trace the effects of natural causes in the phenomena of creation. It is only by imitating and facilitating these, in fact, that the farmer can successfully cultivate the earth, and stock it with useful, healthy, and thriving domestic animals. In this essay, then, let us endeavour to trace the action of the elements in the gradual formation of a soil ; always remembering that a soil is commonly composed (often in the very same proportions) of the same substances of which the substratum, or rock on which it rests, is constituted. In these inquiries we cannot adopt a safer course than to follow the chemist in his examinations. And this, commencing at the very beginning, was the course adopted by the late Sir H. Davy—the first chemical philosopher who directed to any very useful purpose his inquiries as to the chemistry of agriculture. Born amid the granite rocks of Cornwall, having there so carefully traced nature's operations, we need feel little surprise that he chose a bare granite rock for the foundation of his exposition of the way in which, even on that stubborn formation, a soil is gradually formed. In so doing (*Elements Agri. Chem.*, 1855), he told the farmers of his day that it is easy to form an idea of the manner in which rocks are converted into soils, by referring to the instance of soft granite, or porcelain granite, a substance consisting of only three ingredients—quartz, felspar, and mica. The quartz, as most of our agricultural readers are aware, is almost pure siliceous earth in a crystalline form. The felspar and mica are compound substances, both contain-

ing silica, alumina, and oxide of iron ; in the felspar there is usually lime and potash, in the mica, lime and magnesia. When a granite rock of this kind has been long exposed to the influence of air and water, the lime and the potash contained in its constituent parts are acted upon by water or carbonic acid ; and the oxide of iron, which is almost always in its least oxydized state, tends to combine with more oxygen ; the consequence is that the felspar decomposes, and likewise the mica ; but the first the most rapidly. The felspar which is at it, where the cement of the stone forms a fine clay, the mica partially decomposed, mixes with it as sand, and the undecomposed quartz appears as gravel or sand of different degrees of fineness. As soon as the smallest layer of earth is formed on the surface of a rock, the seeds of lichens, mosses, and other imperfect vegetables which are constantly floating in the atmosphere, make it their resting-place, and begin to vegetate. Their death, decomposition, and decay, afford a certain quantity of organizable matter, which mixes with the earthy materials of the rock. In the soil thus improved more perfect plants are capable of subsisting ; these in their turn absorb nourishment from water and from the atmosphere, and, after perishing, afford new materials to those already provided. The decomposition of the rock still continues ; and at length, by such slow and gradual processes, a soil is formed in which even forest trees can fix their roots, and which is fitted to reward the labours of the cultivator. If we follow such a soil still left to nature, we find in many cases, where successive generations

of vegetables have grown upon a soil, that unless a part of their produce has been carried off by man or consumed by animals, the vegetable matter increases in such a proportion, that the soil approaches to a peat in its nature; and if in a situation where it can receive water from a higher district, it becomes spongy, saturated with water, and incapable of supporting the vegetables useful to mankind. Liebig, too, has also traced this gradual formation of a soil: with his usual care he reminds us (Chem. p. 143) amid other very instructive notices, that the aluminous minerals are the most widely diffused on the surface of the earth, and that all fertile soils contain alumina as an invariable constituent. There must, therefore, be something in aluminous earth which enables it to exercise an influence on the life of plants, and to assist in their development. The property on which this depends is that of its invariably containing potash and soda. After stating the large proportion of these alkalis found in different rocks, Professor Liebig adds, "that if we calculate from these data how much potash must be contained in a layer of soil which has been formed by the disintegration of one Hessian acre (40,000 square feet) of one of these rocks to the depth of 20 inches, we find that a soil of

	Lbs.
Felspar contains	1,152,000
Clinkstone from..	200,000 to 400,000
Basalt.....	47,500 to 75,000
Clay slate	100,000 to 200,000
Loam	87,000 to 300,000

Potash is present in all clays, and is contained, according to Zuch, a German chemist, even in marl; it has been found in all the argillaceous earths in which it has been sought. Land of the greatest fertility contains argillaceous earths and other disintegrated minerals, with chalk and sand in such a proportion as to give free access to air and moisture. The land in the vicinity of Mount Vesuvius may be considered as the type of a fertile soil, and its fertility is greater or less in different parts, according to the proportion of clay or sand which it contains. The soil which is formed by the disintegration of lava cannot possibly, on account of its volcanic origin, contain the smallest trace of vegetable matter; and yet it is well known that when the volcanic ashes have been exposed for some time to the influence of air and moisture, a soil is gradually formed, in which all kinds of plants grow with the greatest luxuriance. This fertility is owing to the alkalis which are contained in the lava, and which by exposure to the weather are rendered capable of being absorbed by plants. Thousands of years have been necessary to convert stones and rocks into the soil of arable land, and thousands of years

more will be requisite for their perfect reduction, that is, for the complete exhaustion of their alkalis. Now, how are these great processes of nature taken advantage of, and aided by the operations of the farmer? and in what way does he assist the disintegration of the soil, or so shape his course of cultivation as to cease, when occasion requires, to draw from the soil the products of these great and quiet decompositions?" The fallow time, as Liebig continues, is that period of culture during which land is exposed to a progressive disintegration by means of the influence of the atmosphere, for the purpose of rendering a certain quantity of alkalis capable of being appropriated by plants. The effect of the atmosphere in gradually decomposing the surface of even granite rocks, may be readily traced in certain districts of the West of England, where the rock is exposed to the surface. This important operation of nature had attracted the attention of the late Professor Fownes (*Jour. R.A.S.* vol. iv., p. 500.) He traced the gradual state of decomposition of the granite from the sound, unaltered, felspar with its brilliant cleavage, to the dull earthy mass, so soft as to be cut with the utmost ease, although still showing its peculiar structure and the form of the crystals contained in it. It is from this source that all the fine white clay used in the manufacture of porcelain is obtained, by simply crushing the decomposed granite to powder and washing it over in a stream of water, whereby the coarser and heavier portions, the quartz and the mica, are separated.

Subjoined is the composition of one of the most celebrated clays of this description, which may be taken as an excellent type of the substance itself in its present form, namely, that employed in the Sevres porcelain works:—

Silica	48·3
Alumina	37·3
Potash	2·5
Water	11·4
	—
	100·0

The red and yellow clays of the secondary strata, which are alone of importance in connexion with agriculture, differ from that above described in containing a very much larger proportion of silica, not as sand, but in an impalpable state, in intimate union with the other constituents, and a large quantity of oxide of iron. The latter sometimes equals and even surpasses in amount the alumina, and has probably been derived from the decomposition of hornblende or augite—minerals rich in oxide of iron, and abundantly contained in basaltic rocks.

It must not be supposed, Professor Fownes continues, that anything like a pure clay, even of the last kind, is ever the subject of tillage; the heaviest

and stiffest clay soil contains probably, in most cases at least, half its weight of sandy matter, chiefly siliceous, easily separable by the process of washing: it is very surprising, indeed, how small a porportion of alumina suffices to confer great plasticity on such a substance. The most remarkable circumstance connected with such soils is the quantity of potash they appear to contain in an insoluble state, as one of the silicates of that base. In a soil of the kind mentioned, a stiff deep-red clay from one of the midland counties, the finely divided matter got by washing, contained $3\frac{1}{2}$ per cent. of potash in this condition, a thing quite unlooked for. We have reason to think that this potash plays a very important part in the nutrition of plants, and that the insoluble state is by no means without its use.

The effect, then, of the action of the common and the subsoil plough is to assist the action of the atmosphere, in not only cleansing, but in the decomposition of the soil. Professor Johnstone

sums up very briefly the result of the philosopher's researches in this respect, when he observes (*Elem. Chem.*, p. 67) "the general result of the comparison of the soils of various districts with the rocks on which they immediately rest, has been that in almost every country the soils have as close a resemblance to the rocks beneath them, as the loose earth derived from the crumbling of a rock before our eyes bears to the rock of which it lately formed a part." The conclusion, therefore, is irresistible, that soils, generally speaking, have been formed by the crumbling or decay of the solid rocks—that there was a time when these rocks were naked, and without any covering of loose materials, and that the accumulation of soil has been the slow result of the natural degradation or wearing away of the solid crust of the globe by the action of the atmosphere—a long continued gradual deepening of the surface soil, which the enlightened modern farmer on all occasions endeavours to accelerate.

TRANSPLANTING FULL GROWN TREES.

There are few things more desirable, and perhaps none which it is usually found more difficult to accomplish, than that of building a mansion on a bare knoll, and in the space of four or five years giving to it the character and effect which, by the ordinary process of nature in the growth of timber, requires a period of thirty years or more. Desirable as this undoubtedly is—difficult, impracticable, and wonderful as it may seem, it can be done.

Our readers are aware that within the last few weeks we have passed through some of the northern counties, and visited such gardens on our way as appeared to claim our attention. As one of those, we called at Kingston Hall, the seat of Edward Strutt, Esq., Kegworth, near Derby. Here, then, we were delighted to find the all-but-impossible thing to which we have referred above, realized to an extent very much exceeding what we had anticipated. In the early part of 1843 Mr. Strutt commenced the erection of Kingston Hall, selecting for its site the slightly elevated ground in the midst of the estate, where no house or tree existed before. In due time the mansion was reared, forming a structure, in the Elizabethan style, of very considerable extent, designed by the well-known and eminent architect, Mr. Blower. Nothing was done in the way of planting until the house began to show its bulk and general outline; and at this juncture doubtless not a few persons would gravely suspect that Mr. Strutt had committed a serious mistake in building a magnificent residence where

he could not reasonably expect to see trees much taller than himself during his own lifetime. How far Mr. Strutt, or those about him, foresaw the means of meeting this objection we are not prepared to say; but in October, 1844, a pair of large wheels was provided, in accordance with the well-known plan of Sir Henry Stewart, recommended by him in his celebrated work on the improvement of estates and the transplanting of large trees. By means of this machine about twenty trees of various sizes, from fifty feet downwards, were brought from St. Helen's, one of Mr. Strutt's estates near Derby, and that upon which he then resided, and planted at Kingston. It was found, in the course of drawing these trees so great a distance (thirteen miles) along the public highway, with many of the branches frequently trailing upon the ground, that the latter got seriously injured and broken; nor did the trees themselves, when replanted, succeed sufficiently to warrant any very extended operation upon this plan. A new machine was therefore constructed, upon a principle somewhat similar to one invented by Mr. Barron, who has conducted the works at Elviston with so much success. This new machine, which was therefore built by Mr. Mackay, Mr. Strutt's gardener, for the future operations of tree lifting at Kingston, is that represented in the accompanying engravings, and has therefore been employed at Kingston Hall, where, in the short period of four or five years, a bare knoll has been transformed into a grove.

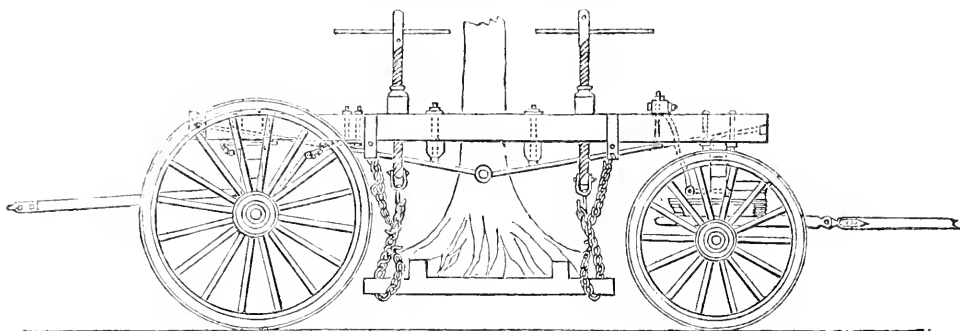


FIG. 1.—SIDE ELEVATION OF TREE LIFTER.

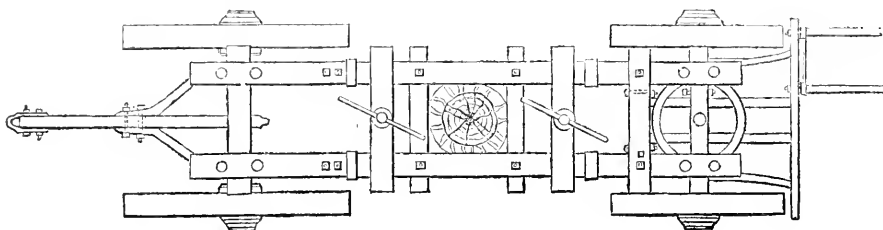
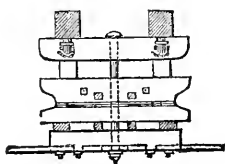
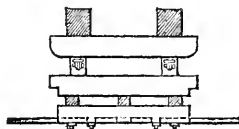


FIG. 2.—PLAN OF TREE LIFTER.



SECTION OF FRONT.



SECTION OF BACK.

During our visit at Kingston we saw some trees carried by this machine, which was drawn by nine powerful horses, and planted in a field near the entrance lodge. Two of these trees were the common broad-leaved elm. One measured over forty feet in height, and four feet one inch in girth in the stem; the other was less in height by three or four feet, but had a very broad, spreading head. The ball of earth which was raised and carried along with these trees measured ten feet in diameter, and about a yard in depth, weighing, tree and all, about ten tons. As represented in the subjoined engravings, the tree was carried perfectly upright, held so by four ropes tied to the stem, about 15 feet from the ground, and the opposite ends fastened "fore and aft" to the four corners of the machine. In this way these trees were removed without any other tie whatever, or without the stem or bark of the tree, or even a single twig of the top, being touched during all this ponderous and heavy operation. So complete is the machine, and so thoroughly experienced are the men and horses in

their performance of this great work, that we can see no other difficulty except that of time and expense to the removal of a 50 or 60 feet height tree from Land's End to John o'Groat's. We believe that when Mr. Mackay, under whose direction the planting here has been conducted, first had the machine made, he intended to use it for the transplantation of large evergreens only; but finding that it furnished him with a power which he did not at first foresee, he had it adapted to the removal of deciduous trees of large size, and the result has been that the pleasure grounds and park are now studded with plantations and single trees varying from 30 to 40 feet in height, and some as much as 50 feet. A large number of these trees are already so far established that none but persons specially conversant with trees would suspect that they had been transplanted within three or four years, and still less that they had been brought from a distant part of the country. We cannot in the present notice enter upon details; but we may state here that

several thousand trees of all sizes have been transplanted by this machine; and we were assured by Mr. Mackay, that not more than one tree in a hundred had failed to grow. To prevent a wrong impression with respect to the appearance of these trees and plantations, resulting from a supposed necessity of using props and stakes to keep the trees in a settled and upright position, we ought to say that no such thing is required; and although Kingston Hall stands upon the apex of a knoll in the centre of a vast plain, over which the eye can range for twenty miles or more, and exposed, as it is, on all sides without any shelter whatever, not more than six trees out of the whole number thus removed have been blown down, or even materially disturbed from the position in which they were left when planted. In our next number we shall specify the kinds of trees which have been transplanted, and some of the details connected with the latter operation.

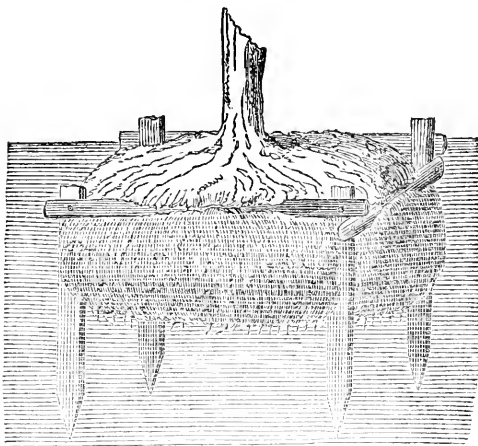
In our last week's number we stated that we had seen some elm trees at Kingston Hall, the seat of Edward Strutt, Esq., carried by the machine then represented, and replanted in another situation about three-quarters of a mile from the place where they had stood and grown for upwards of 30 years. We further stated that these trees were 40 feet in height, and weighed each, including the ball of earth and the machine, upwards of 10 tons, and that they were drawn by nine horses. We shall now therefore give the following details as to how this was accomplished. The trees, to which we now allude, were growing on the outskirt of a wood; the ground around the tree was cleared, and at 4½ feet from the stem of the tree a circular cutting was made to the depth of about 3½ or 4 feet, and about 2½ feet in width; this done, then on the most open side of the tree, a sloped cutting was made from the surface of the ground to the bottom of what may now be called the ball of earth, and a similar sloped opening was made on the opposite side of the tree. The first of these sloped cuttings was made for the purpose of drawing-out the tree up this slight incline to the surface of the surrounding ground. The circular opening in the earth around the tree, and the two sloping roads on each side being now prepared, the workmen commenced to undermine the ball of earth; this being done all around, four stout oak planks, long enough, were placed under this ball of earth in front and behind—that is, cross-ways to the direction of the machine; and under these two others were placed lengthways, with their ends in the direction of back and front of the machine. It will now be understood that these four oak planks under the ball of earth cross each other at their four extremities, and around their extre-

mities at each of the four corners four sets of strong iron chains are fastened. A reference to the diagrams given last week will assist in explaining this. The first set of chains brought into play were those attached to the bottom of the jack-screw. Being made as tight as possible over the ball of earth, they were then hooked on the end of the jack. The two jacks were then turned by two or four men each, as the case may require, until the tree and the ball of earth were raised from the ground about six or ten inches. The jacks were then permitted to rest, and what is called the side chains were then put in requisition. These, as we have already stated, are fastened to the planks under the ball of earth at the same point as the others—the opposite ends being made fast to the side beams, as shown in the engraving: this being done at the four corners, the jacks are then reversed and the first set of chains slackened, the weight of the earth and tree is then sustained by the side chains. The first set of chains are again adjusted and made as tight over the ball of earth as manual power can effect. The jack is again run down and again attached to the chain at the lowest point it will reach. The jacks are once more applied and run up till the end of the screw has been completely worked up to the underside of the cross beam on which it rests. By this second lift the jacks have probably gained upon the 6 or 10 inches which they made at the first lifting, and the bottom of the ball is now 15 or 20 inches from the ground. The side chains, which are now quite slackened by the second lift of the jacks, are again made as tight as possible; this accomplished, and all securely and equally fastened to the side beams again, the jacks are gently reversed till the weight is equally divided betwixt the side chains and the jack chains. The tree is now in a condition to be drawn out, unless it should still be necessary to give it a third lift with the jacks, so as to raise it still higher from the ground, and if so the side chains must always be attended to, as already described. They may be properly called the guard-chains, as they prevent accidents in the event of breakage of any of the jack-chains; when the former would take the weight of the tree and prevent its falling. About ten or fifteen feet up the stem of the tree four ropes extend from this point to the two front and two back corners of the machine, and this is all that experience has found necessary to preserve the tree in its perpendicular position during its transport on the machine to its future place of growth. The perpendicular position of the tree is, however, very greatly secured by the four side or guard-chains. We have now to describe the mode of introducing the stem of the tree within the machine. This is effected in the following manner: The machine is

drawn as near to the tree as circumstances will allow; it is then taken to pieces to by unscrewing the different parts—that is, the main horizontal beams are unfastened and thrown over the wheels on either side. The larger hind wheels are then placed in their proper position in the sloped cutting behind the tree, and the smaller fore wheels in the sloped cutting before the tree; the large beams are then lifted on to their places, one on either side of the tree, and made secure with the iron bolts and the requisite fastenings. The tree then stands with its stem betwixt the side beams, and with a pair of wheels behind and another before. The chains and jack are then applied as already described, and thus the process is complete. The next, and only point deserving further allusion, is that of planting or placing the tree where it is ultimately to grow, and this is effected in the following way: The hole, sufficiently large to receive the ball of earth, is dug the necessary depth; then, on the opposite sides of the hole sloped cuttings, wide enough to admit the machine to be drawn down and through it, is also provided. Into this cutting therefore the machine and tree are drawn, and through which the team of horses first pass. When the tree has reached the proper point the machine is permitted to rest, props of bricks or stones are then raised at the four corners immediately under the ends of the cross-planks. These props may be three or five bricks in height; and when all is prepared in this way, the jacks are reversed and the ball of earth gradually lowered down till the ends of the cross planks rest upon the corner props, and the tree has taken its proper perpendicular position, and this is effected by the raising or lowering of these corner supports. All being adjusted, any opening that may remain betwixt the bottom of the ball of earth and the bottom of the hole provided for the tree is filled up with earth; the whole being made firm around and under the roots of the tree. The brick or stone props are then struck and the planks removed; a process easily effected, as the tree now rests upon the earth which has been placed under and about it. These planks are, however, well ironed at each end, that in case of any difficulty in their removal a horse or horses may be readily yoked, and the planks withdrawn.

The tree is now planted; but how is a forty feet tree with a heavy head to be kept upright during the strong gales of March winds, and that, too, upon a comparatively bare, unsheltered knoll? This, too, is cleverly managed; and with far greater certainty and much less trouble than persons unacquainted with the subject would be likely to expect. The accompanying engraving will partly explain this. We may state, however, that four

rough stakes, about six feet long, made of larch or spruce poles, pointed at the lower end and sawn straight at the other, are driven down close by the side of the ball of roots; four other split or sawn rails of rough timber are laid over the ball of earth, and their ends fastened to the posts already driven into the ground. Five-and-a-half or six inch nails are used to fasten these rails at each corner, and besides this nothing further is required. For trees not over thirty feet in height, three posts instead of four are used, and found to answer every purpose.



Mr. Mackay, under whose direction all this has been done, used at first two or three guy or side ropes fastened from the top of the tree to some stakes driven into the ground at a distance from the tree; but further experience has proved this to be unnecessary or at least dispensable, and he now only uses what is called under-ground cradles, such as we have described, but which will be better understood by the accompanying engraving.—*Gardeners' and Farmers' Journal.*

A VERITABLE BALANCE SHEET.

SIR,—Your paper, week after week, is filled with assumed statements of profit and loss on farms of various sizes and different qualities: your readers are astonished with enormous pretended gains at Auchness, and frightened with losses upon some supposititious occupation in another place. These statements only give rise to arguments which do no good, because they are at the best vague, and I have never seen one of them embracing every source of receipt and expense on a farm; and it appears to me to be time that some practical farmer should come forward for the information of the community at large, and produce his actual balance sheet (for one fact is worth a thousand arguments), that the state to which we are reduced may be no longer a matter of doubt.

I offer myself for the unenviable task of exposing my

misfortune; but shall be amply repaid, if, by its meeting the eye of any of our rulers, it may awaken them to the injury which by their miserable legislation they have inflicted on the occupiers of land. Having the pleasure of your acquaintance, you can vouch that my statement is genuine; and I will only say, for the information of your readers, that I occupy a farm of 230 acres of excellent turnip land, without meadow, which I farm to the best of my ability; passing amongst my neighbours for, I believe, a *tolerably* good farmer; employing plenty of labour; keeping a most strict account; not sparing expense with my land; not being ashamed to allow the most critical judge an inspection of its cultivation; and believing, therefore, that my losses are from no fault of my own.

BALANCE SHEET.—CROP HARVESTED IN 1847.

	DR.	£	s.	d.
Rent and tithes	514	1	9
Labour	331	5	4 ³ / ₄
Parochial rates	73	15	8 ¹ / ₂
Tradesmen	142	18	4
Corn and seed sown and consumed, own growth	..	250	5	0
Corn, seeds, and manure purchased	210	13	9 ¹ / ₂
Incidental expenses	55	19	9
Horses purchased	44	0	0
Interest on £2,500 capital, at 8 per cent.	200	0	0
		£1,822	19	8 ³ / ₄
	CR.	£	s.	d.
Wheat crop, 63 acres	663	18	0
Barley, 40 acres	293	16	0
Oats, 10 acres	112	11	0
Peas, 7 acres	43	5	0
Tares, 1 acre	9	12	0
Seeds sold	30	7	3
Hay sold	19	6	6
Balance of sheep account	403	2	6
Ditto, cow, kept a short time	3	17	6
Ditto, pigs	88	10	1 ¹ / ₂
Incidental receipts, poultry, &c.	66	4	8 ³ / ₄
Loss	88	9	1 ³ / ₄
		£1,822	19	8 ³ / ₄

BALANCE SHEET.—CROP HARVESTED IN 1848.

	DR.	£	s.	d.
Rent and tithe	519	12	6 ¹ / ₂
Labour	290	2	7 ¹ / ₂
Parochial rates	62	16	0 ¹ / ₂
Tradesmen	113	18	11 ¹ / ₂
Corn and seeds sown and consumed, own growth	..	180	7	6
Corn, seeds, and manure purchased	225	14	3
Incidental expenses	60	0	0
Balance of horse account	25	10	0
Interest	200	0	0
		£1,678	1	11
	CR.	£	s.	d.
Wheat crop, 50 acres	402	14	3
Barley, 34 acres	219	18	6
Oats, 9 ¹ / ₂ acres	80	0	0
Tares, 2 ¹ / ₂ acres	22	0	0
Seeds sold	15	4	5
Hay sold	26	5	0
Balance of sheep account	268	11	3 ¹ / ₂
Ditto, cows	8	4	0
Ditto, pigs	133	18	7 ³ / ₄
Incidental receipts	45	18	5 ¹ / ₂
Loss	455	7	4 ¹ / ₄
		£1,678	1	11

I consume the whole of the hay grown except the small quantity sold, and make no charge for house-keeping.

Thus, sir, have I been robbed (and I use the word advisedly), in the last of these two years, of nearly one-fifth of my capital.

Now, sir, mine is not an isolated case; all my neighbours are in the same plight; and I have not heard a single farmer in this county calculate his loss last year at less than his rental.

I take not up my time or your space to argue on the cause of this ruin; no man can doubt that it arises from the abominable dogma of the arch-apostate Peel, yecept "*free trade.*" These two years are called the transition state. Is it to last thus? Certainly, for another year; and at its close I shall have to exhibit a balance sheet similar to the last. What, then, is the remedy? An appeal to Parliament? It is useless, constituted as it now is; and we have but one course open. Our disunion is a proverb, our apathy another, let it be so no longer; let us, to a man, adopt the following plan:—Petition the Queen to dismiss her present advisers; call to her aid men who will not allow the lazy foreigner, like a locust, to fatten on the sweat of the toiling Englishman; but let her dissolve her present Parliament, and appeal to the country whether this wretched policy shall continue. Having this opportunity, the fault will be our own if it is not remedied. But this, sir, must be done unanimously, and with such a moral pressure from without, as shall ensure its being treated with the attention it deserves. Let the 1st of January, 1850, be set apart by every occupier of land in the kingdom, to attend, with his labourers, and every other friend to agriculture, a meeting in his own county, where the proposed petition shall be adopted; let no county hold back; let the chairman of each county meeting form, collectively, a deputation to present the petition to her Majesty in person, and thus give no chance to a Home Secretary to smother it on its way. Let this petition be strong, but respectful; let her Majesty learn what at present is concealed from her—our wrongs and our sufferings; and if I know anything of the heart of our gracious sovereign, such an appeal will not be in vain. The preliminary arrangements may be easily carried out, no man better than yourself is capable of suggesting them, and no one knows better where to meet with the materials for completing them.

That such an appeal, respectful, strong, firm, and not capable of misrepresentation may be made, and may triumph, is the earnest prayer of your friend,

Dec. 5th, 1849.

EXPERIENCE.

—Mark Lane Express.

ON THE CONSTRUCTION OF THE WIRE FENCE.

BY COL. HORACE CAPRON, OF LAUREL.

SIR,—With every disposition to accommodate you, in your wish to lay before your readers a description of the wire fence I have lately had erected on my place, I found it out of my power to more than make a hasty sketch of it, with a statement of the proper manner to proceed in the construction.

The fence I have constructed is for an outside fence, to protect against all kinds of half-starved quadrupeds, long-nosed hungry hogs, by hundreds, included.

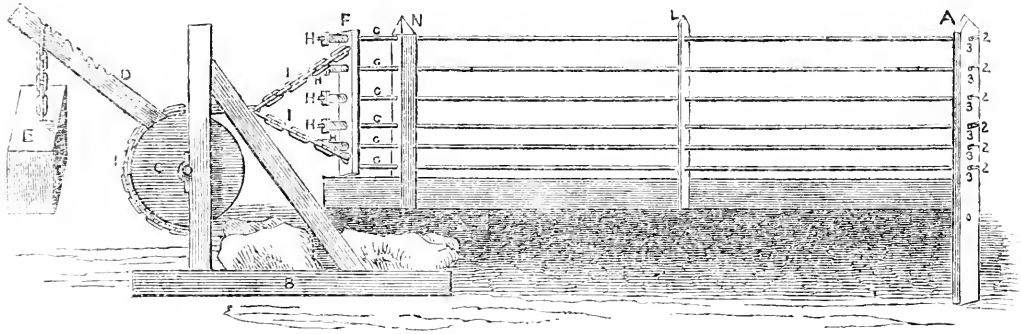
For a division fence, where it is only required to fence against horses, cattle, and sheep, a much more simple and cheaper fence may be made, and one more easily moved. For this purpose, the bottom boards and strips may be dispensed with.

I have put the permanent iron posts 150 feet apart. I think the distance should be from 75 to

100 feet, which would add a trifle to the expense, and make a more substantial, durable, and beautiful fence.

I have used No. 5 wire, as I wanted it, for hard usage. No. 7 wire will answer quite as well, in most places, and cost less per running foot. The wire which I used was made to order, at the telegraph wire factory, and in coils of 1000 feet in length—cost 8½ cents per pound. Good No. 5 wire can be purchased for 5½ cents per pound in lengths of about 50 feet. This would require to be joined, which I think can be better done than at the factory; as, in the joints made at the factory, the wire is twisted too short, more for looks than strength, and breaks easily at these points.

The accompanying sketch will give you an idea of the manner of constructing this fence.



The above cut represents an extension of wires in the section of fence, with bottom boards and strips for holding and supporting the same, &c.

A represents a side view of the permanent iron posts, made of flat bars of iron, 3 inches wide, ¾ inch thick. 3 3 3 3 3 3 are holes drilled through, about 1 inch from the outer edge, for the wires to pass through. 2 2 2 2 2 2 are slots cut into the bars, just over the holes, to slip the wires into their places. This slot is filled with a hard wood key, to keep the wires down, and trimmed off even with the post.

B is a solid frame work and lever with fixtures, for equalizing the tension of the wires, and to accommodate the contraction and expansion—keeping them always the same, under every change of temperature.

In the frame work B, c is a wooden cylinder, (in

this case, part of an old mill shaft) about 28 inches in circumference, 3 feet long, suspended in the wooden frame by gudgeons of 1½ inch round iron, driven into the ends, and secured by a band sunk into the wood to prevent splitting, and wedged. D is a strong oak lever, 8 feet long, 3 by 6. E is a granite stone, weight of about 150 pounds, with an iron strap over the lever to slide up and down as required, to give the proper tension to the wires, which also rises and falls to accommodate the contraction and expansion of the wires. G is a bar of iron, 1½ inch square, drilled out to match the holes in the iron posts. G G G G G are iron hooks, of half-inch iron, running through the bar F, and spiral springs H H H H H H H, and secured by nuts, as represented in the cut. This is for equalising the tension of the wires. These spiral springs may be made of 3-8 iron rods. I I is a strong log

chain, for attaching this iron bar to the cylinder c, by a bolt passing down through one of the links as represented, by which the chain may be taken up or lengthened, as desired. K K is a bottom board, 14 inches wide. L L are strips, 1 inch by 3, notched upon the wires, 8 feet apart, to support the bottom board.

With this powerful apparatus, the wires being in their places, and properly secured at the other extremity of the line, it is evident they can be drawn to any required tightness that the strength of the wires will permit, and the contraction and expansion of the wires be accommodated by the rising and setting of the lever and weight. This apparatus, in the fence I have constructed, takes up the expansion, and lets out for the contraction, for a line of fence of 3,500 feet, with one bend of about 30 degrees, and sundry inequalities in the surface or horizontal line.

For short lines of fence, this apparatus may be dispensed with, where hogs are not allowed to run. But, even in short lines, the wires may be so slackened, in a hot day, that a long-nose hog may wedge his way through. The apparatus itself, however, is easily constructed, and of little comparative cost.

To save trouble in the construction of this fence, I will give you a short direction how to proceed, which I have learned by experience, and may save others some useless expense, which the want of experience put me to.

Put your frame work down permanently in the ground, and secure both extremities of the line beyond the possibility of being moved.

Bore out, with a post auger, holes 2½ feet deep, 100 feet apart, on a perfect straight line, for your permanent posts.

Set the (iron) permanent posts in, and ram round well with stone, and pour in grout.

It is necessary to have one very strong post, N, (mine is a hollow cast iron, 5 inches square) about 8 feet from the cylinder, and stayed at top with wires or rods, made fast to the frame work, to hold the wires as they are stretched up, one at a time, during the construction. Stretch out one wire at a time, join it, and make it fast at the further extremity of the line; lay it into its place in the posts, and attach the chain to the end of it: then, by the use of the lever and cylinder, draw it to the desired tension, and key it there in the post N. So proceed until all drawn up. Then attach the spiral springs, hooks, and bars, to the wires and cylinder, by the chain, as shown in the sketch; hang on the weight, knock out the keys, in the permanent post N, and the work is done.

If the bottom board and strips are used, they can now be put on.

If large coils of wire are used they should be put upon a reel before they are unfastened, or they will kink up and give much trouble. In my case, I slipped the coil of wire on to the cylinder c, and put strong oak pins on each side of the coil, to keep it up snug; it then wound off without trouble.

To remove a line of this fence, knock out the keys 2 2 2 2 2 2 in the iron posts; through the wires out upon the ground; attach a horse or other power to the end of the wires, and haul them round to the new line; set in your frame-work and posts, and put in your wires. In this way two or three hands and a horse may remove a mile of fence in a few days.

Good oak, locust, or cedar posts will answer in place of the iron.

Very respectfully yours,

H. CAPRON.

—American Farmer.

ROTATION OF CROPS.

On the subject of the growing of wheat year after year, to which a recent leading article referred, we have received the following valuable letter from a gentleman whose name we mentioned in that article, and whose researches have been of the greatest value to the agriculture of his district. As the letter contains also practical matter on other subjects incidentally named, we beg to give it entire to our readers—

MY DEAR SIR,—I observe in the *Farmer's Magazine* of this month an extract from the *Farmers' Journal*, on rotations of crops, in which my name is mentioned as having tried the production of wheat successively on the same land. From your connexion with that paper, and the conversations which I have sometimes had with you

on the subject, I conjecture that you are the author of that article. In it you wish for information whether I have persevered in the system. In reply I beg to say that I tried it for six years consecutively; but having found that the *summer* weed was getting too absorbing, and wild oats encroaching too much on the legitimate crop, I this last year have had a crop of potatoes, in order to eradicate those undesirable visitors which injured the wheat. As for the wheat itself, the ears were fine and well fed, but, owing to the weed, was thin. The system that I now am going upon is, to grow wheat two years, and then every third year (or perhaps every fourth year) have either potatoes or turnips, so as to obtain a good clearing of the land, by which means the weed will be kept down. From my experience I should say that the great impediment to growing wheat successively is

the keeping the land free from summer-weed. The two greatest pests to me have been wild oats and a little blue flower, which runs along the ground, both of which shed their seed before the wheat is ripe. I feel confident that if the land could be kept free from summer-weed, good crops of wheat may be grown each year on the same land. You say, "We may supply every particle of salts and of materials the crop may remove, but we can no more restore those either in the same degree of fixation, nor so exactly diffused or concentrated, so pure or diluted, as the plant finds them naturally in the soil." Now, as all other cultivated crops also require potash, phosphoric acid, soda, &c., I do not see that this argument holds good, as, if correct, they also could not be benefited by the artificial application of those substances, which I cannot suppose you will maintain; and as for extracting them from the soil, the one crop must have the same difficulty or facility of doing so as the other. The plan that I have latterly adopted in the successive wheat crop has been to apply about two tons of lime, every other year, on the stubble, immediately after the crop was removed, and in about a week or a fortnight to pare with Ducie's drag, then harrow and clean, and afterwards plough and press. I sow broadcast, applying about three cwt. of guano per acre. By having a potato or turnip fallow every three or perhaps four years, I think I shall be able to overcome the greatest difficulty that I see in attempting to produce more wheat than is commonly done. In the *Gardeners' Chronicle and Far-*

mers' Gazette of last week there is a calculation of the cost of profit upon cultivating land on the four-course system, which I think is pretty correct, from which it appears that the crop from which the main profit is derived is the wheat. Your paper in the *Farmer's Magazine* of this month, on the proper quantity of seed, I think very judicious. I once tried the system of thin seeding, but on our strong land and in our cold climate it did not answer at all. I understand that a party at Heckmondwike, near Dewsbury, in the year 1848, produced 25 loads or 75 bushels per acre of Piper's thick-set wheat, by thick sowing and good tilling. It is a very short and stiff-strawed wheat, and can hardly become lodged, however thick sown it may be; but in a wet season it is apt to sprout, on account of the grain being so thick set in the ear. Our turnips are excellent this year, and a small plot of kohlrabi that we have is also good. This year I have been trying the plan of sowing swedes in the middle of April—they have done very well I imagine that by sowing early and stoving the bulbs in October and November, leaving the tops and roots to be ploughed-in, you will get an after-crop of corn almost as good as if the turnips were eaten off with sheep. It is a plan that I mean to try this year.

I remain, my dear Sir, yours very truly,

HENRY BRIGGS.

Overton, near Wakefield, Nov. 14, 1849.

—Gardeners' and Farmers' Journal.

STEAM CULTIVATION OF LAND.

Instead of working at the pump-handle, it seizes at once upon the sucker-rod, and drives it up and down. Instead of wasting time in the backward and forward action of our oar, it drives along the vessel by the continuous stroke of the paddle-wheel, or, still more simply, by the screw. But of all its triumphs the greatest and the most astounding was when the puzzling problem of the spinning-wheel presented itself! Here was the foot, the thumb, and the finger, the directing will—all at once, and all to be imitated and superseded: the very moisture of the skin requisite to the rolling and hardening of the twist, as it was pressed between the fingers. What an operation to attempt by the dead rollers of machinery! Under the full glare of such a precedent, what upon the same earth, it may be surely asked, declares that the act of inverting and crushing a clod of soil should present an insurmountable or unprofitable task to steam-driven machinery. I say, "inverting and crushing," for in those two acts lies the problem of cultivation. In a dry climate it is simpler than under our moist atmosphere, for we are obliged to chop the soil instead of crushing it. If we analyze the act of cultivation as performed by the spade, it is as follows:—The blade is pressed to the requisite depth into the soil, the handle is then bent down as a lever, to lift the slice, which is turned over and dropped into the trench; top downwards; the under surface thus exposed is then chopped

and out, in order to admit the atmosphere, which, in fact, after all, is the real fertilizer, and to expose the soil to which, as fully as possible, is the whole object of cultivation. It is hardly necessary to point out how imperfectly this is done by the plough. Instead of inverting, it turns the soil only half or three-quarters over: it goes through like a wedge, squeezing it from its bed, instead of raising and loosening it. It is true it breaks the soil if light, but it is the heavy soil that needs most breaking; and in proportion as the furrow slice is broken, it often drops back, and the inversion is incomplete. It leaves the surface weeds either actually peeping at the edge of the furrow slice, or if concealed, yet seldom sufficiently buried to be destroyed; but what is worse, it does all its work at the expense of the subsoil, which year after year is worn and sometimes polished to a case-hardened surface by the repeated pressure of the share, and the stamping of the iron-shod hoofs that drag it. What can offer a more forbidding and impenetrable barrier to the descending roots than such a pavement as this meeting the sponge-like fibres that are destined to find nourishment for the stem, and which begin to seek it at the greatest depths, just when the plant is in the latter stages of its growth, forming the grain in the ear? This evil the spade entirely avoids; it neither hardens nor loosens the subsoil; it leaves it in precisely its natural state, moderately stiff, a condition perhaps the safest

for plants of the grain tribe, which require a firm footing to carry their long stem, though for the more succulent tribe of root-crops a subsoil broken to a greater depth is desirable. The plough is certainly a better cultivator upon a light than upon a stiff soil. It is upon heavy and retentive clays that the superiority of the spade is pre-eminent. Here, therefore, is the great field for improvement: what we want upon the clays, which embrace so large a portion of Great Britain, is a mode of cultivation which may be accomplished without the treading of animals, or any traction at all of the implement of tillage across the worked land. In pursuing, therefore, the subject of cultivation by steam, the idea of the plough is a misleader. What we want is, not to plough the land, but to cultivate it; and if, as I have endeavoured to show, the plough and all its subsidiary implements are a mere substitute for the spade, and on stiff soils, in a moist climate, a very expensive, cumbersome, and imperfect one, the object of the inventive machinist will be better directed, as well as simplified, by discarding it altogether from his thoughts, and concentrating his attention on the action of the spade. The gardener

scarcely permits a dog to walk over a bed that has been newly worked, yet the farmer is obliged to let his whole team of horses, with all its heavy implements, pass over his land many times after the cultivation has been finished; and even after the sowing is done, the seed-harrows do but skim and film over the dismal work made in damp weather by the tread of the horses that draw them, and the previous implements. On heavy land, in a moist season, this is most pernicious; in fact, it limits the cultivation of such soils to seven months out of the twelve. Now, all attempts at cultivation by steam seem to have failed chiefly from this reason, that the experimentalist has set out with the idea of an instrument that is to be drawn backwards and forwards across the field like a plough, either by a locomotive or stationary engine. No such necessity exists. The spade is not drawn across the field: it acts perpendicularly upon the spot it is applied to; separating, lifting, and inverting each spadeful in succession, neither damaging by any farther pressure the soil it has once removed, nor hardening the subsoil underneath, in the act of moving it.—Chandoe Wren Hoskyns' History of Agriculture.

PEAT CHARCOAL.

TO JASPER W. ROGERS, ESQ.

SIR,—Although I have not the pleasure of being personally known to you, yet feeling very great interest in the condition of our unfortunate peasantry, I have carefully examined all the different plans that have from time to time been put before the public for the purpose of ameliorating their condition, and from the facts stated in the accompanying letter, which is a copy of one I sent the Poor Law Commissioners a few days since, and for which I received their thanks, you will see that I regard the Irish Amelioration Society as one which is eminently calculated to serve not Ireland alone, but England also; and indeed the inhabitants of every city and large town in the world. I feel the utmost confidence from my own knowledge of the properties of peat charcoal, of which this letter is a proof, that had the Sanitary Commissioners in London, instead of opening sewers and diffusing their noxious effluvia through the surrounding neighbourhood, employed *peat charcoal* in the first instance, thousands of lives and many thousands of pounds would most certainly have been saved. I need not say that this letter is fully at your service, and I trust that the facts stated in it may tend to advance the objects of the Society, and that we may soon see some of those advantages realized which in every sense is now so much to be desired.

Should you think it desirable to place these facts before the public, I will feel obliged by your sending me a copy of any paper in which they may appear, and as you cannot possibly know the character of your correspondent, I dare say that any man from Mayo, in London, will tell you who Dr. Burke is.

Wishing your Society the very fullest and speedy success,

I am, sir, your obedient servant,

Swinford, Mayo, Nov. 25.

ULIC BURKE.

TO THE POOR-LAW COMMISSIONERS OF IRELAND.

GENTLEMEN,—In consequence of my being in temporary charge of the Workhouse Infirmary of this Union, I have had the opportunity of seeing your circular of the 16th instant, No. 61,763, 1849; and I beg to state—and I trust that the information will not be considered unacceptable—that your recommendation of the employment of peat charcoal as a deodorizer has been, at my suggestion, anticipated; and, according to my directions, fully carried into effect, at the workhouse here, since the 3rd of May last, *with the most gratifying and satisfactory results.*

Having been called on that day to attend a meeting of the Board of Health, held at the workhouse, I was at once struck with the intolerable and sickening effluvia which, arising from the sewers, cesspools, and privies, pervaded every part of the establishment; and which, with the chlorine, which was being evolved in every direction for the purpose of correcting it, formed a compound of villanous smells, which no stomach but one accustomed to it could for a moment tolerate. Your very active and efficient inspector, Captain Hanley, told me that he had done everything that could be thought of, and had spared no expense to try and have the nuisance abated, but that all his exertions were useless. I then begged him to send down and purchase a few loads of peat charcoal, which were selling at the market; and having told the master how to employ it, the suggestion was at once adopted, and though the material was not of the best description, nor "*recently prepared*," in a very few hours the most delicate and practised nose could not have detected the slightest offensive odour.

Since then the master, with very praiseworthy atten-

tion, has had a large pit of the charcoal prepared every week, and by its occasional use through the grating of the sewers, and by sprinkling it over the nightsoil in the privies, the workhouse is, as far as entire freedom from every noxious and offensive effluvium, a model to every other in the kingdom.

In every respect the results have been most satisfactory. Instead of paying from five to ten pounds, every half year, for having the privies cleansed; and having itself and the whole surrounding neighbourhood at the same time poisoned for weeks by the intolerable stench; the establishment has that task now performed by the paupers, without the slightest reluctance on their part;—and the contents of the sewers, cess-pools, and privies are now collected into inodorous and innoxious heaps, or mixed with the other refuse of the workhouse until removed by the contractor; which, before, he absolutely refused doing, but which he now considers the most valuable portion of what he contracted for.

But the effects on the health of the inmates of the workhouse are very far more satisfactory. I find that the numbers registered during the half year ending 25th March last were 353, of these 132 (or one 26 11-13ths) died during that period. In the half year ending 29th September last, the numbers are respectively 4,262 and 68, or a mortality of one in 62.23-24ths, and of these 68.23 died between the 25th March and 4th of May—a period of little more than five weeks, before the charcoal was employed, while during the last four weeks in which I had the temporary charge of the Infirmary and Fever Hospital *but three deaths have occurred*; one from Phthisis, one from Variola, and the third, a poor bed-ridden idiot, from Chronic disease of the bowels. Giving the utmost credit to all the officers of the establishment for the extreme cleanliness and order which prevails throughout, the difference in the mortality of the two periods is so striking, and even startling, that I feel I am not assuming too much in attributing it principally to the improved and healthy state in which the atmosphere is maintained. It must also be recollected that the latter was the period during which cholera was so prevalent, and, though some rapidly fatal cases occurred in the town and neighbourhood, *not a single one presented itself in the workhouse*, where it was most likely and most dreaded to prevail.

From the abundance and consequent cheapness of the raw material—from the facile and inexpensive process of its manufacture—from the lightness which renders it easily portable—and from the small quantity necessary to produce a great amount of benefit; peat charcoal is calculated to become the greatest boon, both as to comfort and health, that has ever been offered to the inhabitants of cities and large towns; nor does the fact of its not being “recently prepared” militate against its usefulness, as, however long it may be exposed to the air, and thereby rendered in some degree inert, *all its valuable properties are at once restored* merely by heating it to redness in a retort, such as is used for the distillation of coal gas. Its introduction into general use would give the much desired employment to thousands of our destitute and laborious, but, at present, unemployed

poor, and tend at the same time to ameliorate our too humid climate by the drainage of those dreary wastes which now disfigure the whole face of the country.

Absorbing and retaining, in spite of all atmospherical influences, the ammoniacal, sulphuretted hydrogen and other gases, the exhalation of which render the proximity of night-soil so injurious to the health; but yielding them easily and gradually to the spongioses of the roots of the cereal and other crops, (of which they are the best aliment,) the mixture of charcoal and night-soil presents the farmer with a manure whose value cannot be too highly estimated—in my opinion, more than double in value to an equal weight of guano in fertilizing properties, and equally portable. But this is a subject on which I feel myself incompetent to speak as it deserves; and, merely stating the general fact, I leave the investigation to those to whom it more properly belongs.

I would have put the facts stated in this letter before the public through the medium of the Press, but I feared that they would appear too highly coloured, and be looked on as some of those thousand-and-one ephemeral statements in which the last four years have been so prolific, and which have been strangled almost in their birth by their equally short-lived successors. I cannot express the very sincere pleasure it affords me to see this matter, (which I firmly believe will do more good to this unfortunate country than any other single measure,) taken up by gentlemen who have the power to investigate and authenticate by the most rigid inquiry the facts I have stated—influence and means to circulate them to the greatest public advantage—and authority to enforce their recommendation in every part of the country, now that the benefit to be derived from their observance is no longer problematical.

I hope that it will not be for a moment supposed that I claim the slightest portion of the merit of the discovery of these valuable properties in peat charcoal. The power which prepared charcoal has of absorbing gases and disinfecting meat and water when tainted, has been long known to the meanest tyros in science and in the culinary world; but I believe that Mr. Jasper W. Rogers is entitled to the merit of the discovery of the truly valuable properties of *peat charcoal*, and I cannot help wishing him all the success he so richly deserves. The only merit I can have any claim to, is the very subordinate one of being, I believe, the first to introduce it into a public establishment in this country, and verifying the accuracy of the discovery by a six months' trial.

Apologizing for the length to which this communication has run, permit me to express the assurance of the very great respect with which

I have the honour to be, Gentlemen,
Your obedient servant,
Swinford, Mayo, Nov. 21, 1849. ULC BURKE.

TO THE COMMISSIONERS FOR ADMINISTERING THE
POOR LAWS IN IRELAND.

*Sanitary Engineering Offices,
88, St. James's-street, London,
29th November, 1849.*

Gentlemen,—Having read your Secretary's letter of the 16th instant, addressed to the Guardians of the North Dublin

Union Workhouse, enclosing a copy of one from Sir Robert Kane, upon the properties of peat-charcoal as a deodorizer and manure, which letters have been published in the Dublin papers, it has become my duty to address you; first, as regards the recommendation of your Board to the Guardians of Workhouses to use peat-charcoal in the privies and cess-pools; next, as to the misconceptions respecting its properties, appearing in Sir Robert's letter.

Permit me to state that the use of "Peat Charcoal" for deodorizing night soil has been secured under a Royal Patent, granted to me, for the special use of the Irish Amelioration Society; which I have happily been the instrument to establish, for employing and advancing the social condition of the Irish peasantry; and which Society has been incorporated under a Royal Charter, for carrying into effect the inventions and privileges secured by the Patent, and for ameliorating the position of the lower classes of Ireland.

I beg leave to offer to the Board my very respectful thanks for the support which its letter has given to the measure. It is, perhaps, impossible that a more desirable step could have been taken than drawing the attention of the Guardians of the Irish Poor to the preparation of Peat Charcoal; because in the direct ratio that excretory matter, which has hitherto produced so much evil, be made use of, as it now may, the cost of supporting the poor will lessen, the production of food may be doubled, and the labour necessary for the manufacturing of Charcoal for England will, I believe, ere long, leave to the kindly care of your honourable board only the aged, the maimed, and blind.

On a former occasion I had the honour to receive your official thanks for the plans which you sought from me for converting diseased potatoes into a wholesome food, and which I had the pleasure of carrying into full effect eventually, to the unanimously certified satisfaction of the Guardians of the North Dublin Union, I am happy to say, in such a case, without any pecuniary remuneration—therefore, you will not suspect me of mercenary motives now, when I inform you that the use of peat charcoal as a deodorizer in workhouses will be an infringement of my patent and subject those who use it to heavy responsibility, unless that charcoal be obtained from the Irish Amelioration Society. I feel it the more necessary to bring this fact at once before you, because Sir Robert Kane in his letter, transmitted with that of your Secretary, states:—"The property of charcoal to absorb gases and odorous vapour has long been known." Hence it may be assumed that I wrongly claim the discovery of the powers of Peat Charcoal as a deodorizer of night soil and feculent matter, in combination producing the most valuable manure known. But, in reality, Sir Robert is the best witness I can produce to prove that I am the discoverer, therefore the patent is secure to accomplish what I trust and believe it will, namely, the means to rescue the poor of Ireland from their misery, by supplying England with Irish Peat Charcoal.

Sir Robert Kane's admirable compilation, "The Industrial Resources of Ireland," perhaps the most elaborate and careful *resume* of all that others have done, not only as regards that country, but also of those arts and sciences which bear upon her capabilities—offering a very dictionary of all the things then known that could aid and help her on, and in which is contained a most accurate chapter on the manures—does not say one word of the peat charcoal, either as a fertilizer individually, or of excretory matter by itself, nor in combination with charcoal—proving, of course, that none of the "thousand and one" works from which he drew his store had published the facts I have brought forward.

Sir Robert does me the honour of stating "that the recep-

ture of the nightsoil of a large establishment may be disinfected, and the nuisance of fetid smells removed by charcoal, is a well-established fact." His publication was about six months previous to my first on the subject of peat charcoal as a fertilizer (1845-6), therefore he fairly bears witness; and what I have since suggested and practised, his book will prove was not set forth therein.

If further proof be required, Mr. Henry Newton of Mount Leinster, county Carlow, who supplied the Peat Charcoal to the Enniscorthy Workhouse, will state he did so under the directions contained in my publication, and from the several communications I have had the pleasure of holding with him. He will tell your Board, also, that "Peat Charcoal" individually is an admirable fertilizer for any crop; for I believe he has tried it on all the land produces. It is, in fact, the natural manure of Ireland, and better adapted to its soil, perhaps, than any other, except combined in proper proportions with excretory matter, which possesses a fertilizing power as yet unequalled.

From these facts, gentlemen, it will be plain that the use of Peat Charcoal in the workhouses of Ireland, for deodorizing night-soil, will be an infringement of my patent, and an injury reflected on "the Irish Amelioration Society," whose object is to employ the people in making that material on much cheaper terms than it can be done in any manner at present. The society, will, no doubt, happily supply the workhouses with charcoal, and, as I have before stated, will, perhaps, do more towards relieving them from the maintenance of the able-bodied paupers, than by any other means which can be adopted.

On this point it is unnecessary I should further trespass upon your Board, but, as other points have been raised by Sir Robert's letter, misconceived by him, and which will, no doubt, lead the Guardians astray, it is essential I should draw your attention to them.

Sir Robert Kane states, "What is indispensable to the success of disinfecting of excrements, by means of the charcoal is, that the charcoal shall be used before it has been exposed any time to the air..... Hence it is indispensable for permanent or real success in this matter to prepare the charcoal in the locality, and to use it immediately on being prepared." No doubt Sir Robert will feel happy that so severe a blow will not fall on the "Irish Amelioration Society," established to make peat charcoal in Ireland to be used in England, and paid for by English money. He has evidently taken his views from those chemical publications which assume that all charcoals are alike. This is erroneous. Charcoal of coal has, it may be said, no deodorizing property; neither has that of teak, lignum vite, and such woods, which I feel it right to state to your Board, as one of the Guardians of the North Dublin Union, recommending the use of wood charcoal. It is necessary to be understood also, that peat charcoal possesses the property of deodorization beyond anything yet discovered, and that it is not due alone to the carbon it contains, for all carbons do not deodorize. The diamond is the purest carbon, but I need not assert that her Majesty's regalia would have little effect at the Enniscorthy workhouse.

These facts are of such vital consequence, both to England and Ireland, that I feel obliged to dwell upon them to your Board, whose object is not alone to save the poor from starvation, but to save them from the workhouse.

If what Sir Robert states were fact, Irish peat charcoal would be useless in England; and, ere long, London alone will require perhaps 2,000,000 tons a year. But I am happy to say there are too many proofs here against such a theory. The peat charcoal, with which all my many trials have been given before the first scientific men of the country, lay for 4 months

in a heap, in an open store at Fort Crystal, Dublin; and was then sent in sacks or flour barrels by long sea to London. It was 7 or 8 months old before being used. There now lies on the council table of France, in equal parts, Excrement and Peat Charcoal, intermixed last week in Paris before scientific men. The Charcoal was the same as described, sent thither by common carriage. Peat Charcoal, exposed to a damp atmosphere, will, perhaps, take up 25 to 30 per cent. of moisture, but even then it will effect deodorization. I fear to say the very small proportion which accomplishes this happy result, but what I have set forth in my publication has, at the proportions I have found to produce the best manure for general purposes.

I can imagine how well pleased Sir Robert will be when he tests my statements, which, no doubt, his very arduous official duties have hitherto prevented.

Were he right, all the labour, time, and money expended in the establishment of the Irish Amelioration Society, would perhaps have been an utter loss; and all the good to be obtained by the amalgamation of trading interest between England and

Ireland, producing the circulation of, perhaps, some millions of pounds yearly, amongst the very poorest of the poor, would have been frustrated.

Pardon me, Gentlemen, for this lengthened communication, but I feel from my experience of the past, that the cause of the poor of Ireland is yours in truth and feeling; and that aught which tends to lessen poverty, where so much exists, will gain your willing ear.

Permit me to add, that I shall have great pleasure in transmitting to the Board, if desired (free of any charge) plans for the privies, &c., of the Workhouses. Their use will at all times preserve those places free from the slightest offensive odour—the effect of which, I need scarcely say, produces disease, and many times death.

I have the honour to be, with much respect, gentlemen,
your faithful servant,

JASPER W. ROGERS,

Directing Engineer

to the Irish Amelioration Society.

—Dublin Commercial Journal.

HARLESTON FARMERS' CLUB.

At a meeting of the club held on the 21st Nov., the subject for discussion was "J. J. Mechi's address to the Club upon their resolution of the 3rd of Oct., through the *Mark Lane Express*, dated the 22nd of Oct., 1849. The following resolution was unanimously adopted: "The Harleston Farmers' Club can but appreciate the good feeling with which J. J. Mechi has noticed the resolution of the club, as reported to the *Mark Lane Express*. And as mutual benefit and not loss should be the aim of all business operations, whether agricultural or commercial, they consider that bringing an unremunerative practice into comparison with an assumed position which would be attended with more loss, is no justification thereof."

Although J. J. Mechi states that he does not manure for the wheat crop beyond £3 per acre with guano, rape-cake, and salt (which he subsequently infers is scarcely sufficient), the club, in defending their resolution against the system of planting wheat in each alternate year, cannot lose sight of the loss of £150, admitted by him, in the consumption of purchased corn, which must be charged to one of the wheat crops. Now, taking them at 40 acres each, there would first be all the expense of tithes, rent, tithes, rates, carting the usual manure, &c., incident to the cultivation for the turnips or tares grown by him, which he calculates at £5 per acre beyond the value of the turnips or tares so grown; which £5 must be charged against the wheat grown instead of barley. Then would follow the £150 lost by the consumption of purchased corn, and the £3 per acre after beans for guano, rape-cake, and salt (20 acres equal £60) amounting to £210 (after correcting the error in the price of meat sold, as misunderstood by the

introducer of the question), or £5 5s. per acre to be charged to the wheat crop following the beans and hay, as the latter being consumed upon the farm at a free-trade price would barely defray the expense of rent, tithe, rates, tillage, seed, taxes, &c.

Thus, if they take the wheat at $4\frac{1}{2}$ qrs. per acre as at first presumed, it would amount to 23s. 4d. per qr. upon the entire crop; and if the seed and waste be taken at three bushels per acre, it will amount to 26s. 6d. per qr., leaving only 14s. 6d. per qr., or £3 per acre, being scarcely sufficient to pay for rent, harvesting, and delivering to market; and nothing to spare beyond the straw, chaff, &c., to pay for labour, tithe, rates, taxes, bills, wear and tear of implements and horses, management, interest of capital, &c. They, therefore, see no ground to depart from the resolution adopted on the 3rd Oct.

Wm. Shaw, Esq., of the Strand, then introduced the subject of Cattle Insurance, in which he pointed out the working of the Association during the past year; from which it appeared that the losses were far beyond the amount of premium received; showing the necessity of a considerable increase in the rates of insurance to secure the stability of the association. And, after a long and interesting discussion, the club adopted the following resolution:—"Mr. Shaw having again introduced the subject of cattle insurance, produced a balance-sheet, which shows a considerable loss upon those cattle which have been insured a year; he has, therefore, suggested such an increased rate as appears satisfactory to the club,"

FRANCIS DIX.

11th month 23rd, 1849.

IMPROVEMENT OF OLD LANDS BY GREEN MANURING.

Eight years ago, I tried the experiment of renovating a worn-out pasture-field by green-manuring, or the ploughing in of green crops. The highly satisfactory results of this experiment, and the general subject of improvements by this system of manuring, were so freshly brought to mind yesterday, in strolling over my field, that I now give you my experience, together with a brief collection of facts and principles touching the matter, from other sources.

The field which I experimented upon contains four acres; it is a light, thin, sandy loam, and is situated upon a high swell, over a mile from the barn, and difficult of access with a manure cart. It had been exhausted of all fertility by successive and injudicious croppings of rye, before it came under my management. A thin herbage, of little or no value, would show itself in the spring, only to be followed by a brown and most arid appearance at midsummer. For two or three years, I occasionally passed over this land, thinking that the next season should witness some exploit for its renovation; but the great difficulty that continually presented itself to my mind, was, how to commence an improvement where there was no possibility of carting on any fertilizing substance, at a reasonable expense. I finally decided upon the following course.

In the latter part of June, when the little vegetation which the land produced was at its greatest height, it was nicely turned under, and the field rolled. I was quite sure, to start with, that the usual depth of ploughing, namely, three to four inches, by which the skinning process is made finally complete, or receives its full finish, had been the practice here; and I therefore put the plough in to the depth of six inches, in order to expose a surface that had never before seen the day, which was thought to be of better quality than the first four inches. At any rate, it could not be poorer. Three pecks of buckwheat to the acre, were sown upon the rolled surface and harrowed in. The crop was permitted to ripen, and gave an average yield of eight bushels per acre. As I had laid a plan of operations which were to extend through more than one season, and as I wished to test the merits of green manuring, I concluded to take off whatever of a scanty crop the land would naturally produce, in order to compare it with another crop, to be harvested at the end of the course. Otherwise I should not have taxed this poor old pasture with a grain-crop, at all

In May following, one bushel of buckwheat was sown on each acre, and when the crop had attained its blossom, it was turned under. A heavy chain, with one end attached to the plough-beam, immediately forward of the mould-board, and the other to the off-end of the evener, lopped down the tender buckwheat stalks, so that the plough covered them up pretty well. The field was then rolled; the same quantity of buckwheat again sown, and the crop managed precisely like the preceding one. Late in September, one-and-a-half bushel of winter rye was sown to the acre. The following spring, the rye presented a remarkable appearance. It stood so thick and heavy upon the ground that it required some resolution to plough it under, especially when all outsiders were pronouncing it an improvident and injudicious procedure. The rye was turned under. On the 20th of June, one bushel of buckwheat was again sown on each acre, together with grass-seeds. It is risky sowing grass-seed at such a season of the year; but it was wet weather at the time, and we had a sufficient succession of showers through the summer to insure a good "catch" of grass. This crop ripened, and gave an average yield of 18 bushels per acre, being an increase of over 100 per cent. over the first crop. It is entirely safe to say, that one-half an acre has produced more value in feed since, than the four acres did previous to ploughing in the green crops. I shall never be at a loss to know what to do with similar fields hereafter.

A number of interesting communications upon the subject of green crops for manure, have been published in our agricultural journals. With your permission I will cite the following interesting facts from two of them.

In the 9th vol., *N. E. Farmer*, W. Buckminster, Esq., of Frammingham, Mass., states that in May, 1828, he ploughed up three-and-a-half acres of poor pasture. It had been so reduced by a former owner that 10 acres did not afford sufficient pasturage for one cow through the season. Immediately after ploughing, a bushel of buckwheat to the acre was sown, and in six weeks the crop was rolled down in the direction he intended to plough, and then turned under, and the field sown as before. In the latter part of August, the second crop was served like the first, and the land then seeded to clover, herds-grass, and red-top. The next season, the field was mowed, and although the grass was considerably winter-killed, it yielded a ton of hay to the acre. The field was afterwards pastured; and

he never had any pasture-ground yield so well before. He thought the green crops improved the land as much as a good dressing of manure.

In the 12th vol., *N. E. Farmer*, John Kelley, of Haverhill, Mass., gives an account of remarkable crops of rye, which he had raised by the use of green crops for fertilizing the soil. The land on which the experiments were made, is situated on the Merrimack river; the soil a sand, approaching to loam as it recedes from the river. It is altogether too light for grass. The crops found most profitable to raise on it were winter-rye and Indian corn; the crops of rye ordinarily yielding 8 to 12 bushels, and of corn 13 to 30 bushels to the acre.

The land on which he raised a premium crop of rye, in the season of 1832, had, for three or four years previous, been planted to corn; and owing to the extent of his tillage land, had not received more than four or five loads of manure to the acre, each season. The weed commonly called charlick (charlock?)—which very much infested the land—was suffered to attain a rank growth in the spring of 1831, and about the 20th of June it was ploughed in. Another crop sprung up, and covered the ground, and in August that was ploughed in also. A third crop soon appeared, which, in the latter part of September, was served like the others. At this time the rye was sown in the usual manner, namely, a narrow strip of land was ploughed, the seed sown immediately upon the furrows, and harrowed in, and so on, until the whole was completed. Sowing the seed immediately after the plough, was considered very advantageous to the crop. The soil then being moist, caused the seed to spring immediately, and give a forwardness and vigour to the plants, which they ever after maintained. The next year, 1832, the rye was harvested at the usual season. The land contained one acre and thirteen rods, and yielded forty-six bushels and three pecks. A field of four acres, similarly managed in 1828, gave 33½ bushels of rye to the acre.

Mr. Kelly remarked that experience and close observation upon the management of green crops had convinced him that three things, among others that might be more obvious, were essential to a successful result.

First, the absolute necessity that the plough used be of good construction; second, that some method be devised to prostrate the crop before the plough, or it would not be covered:—He used a wooden roller, about four inches in diameter, and sixteen inches long, fixed on the end of the plough beam, in a frame temporarily put on for the purpose.—Third, it had been found necessary to plough the land soon after a rain (this was very light, sandy, land,) while it is moist, or the plough would crowd the furrow, instead of turning it handsomely. He

also considered it advantageous to roll the land, after each ploughing.

The principles by which lands are improved by turning in green crops are clearly set forth by Professor Johnston, in his usual happy way. I cannot resist an inclination to quote briefly from his lectures:—

“The ploughing in of green vegetables on the spot where they have grown may be followed as a method of manuring and enriching *all* land, where other manures are less abundant. Growing plants bring up from beneath, as far as their roots extend, those substances which are useful to vegetation, and retain them in their leaves and stems. By ploughing in the whole plant, we restore to the surface what had previously sunk to a greater or less depth, and thus make it more fertile than it was before the green crop was sown.

“This manuring is performed with the least loss by the use of vegetables in the green state. By allowing them to decay in the open air, there is a loss both of organic and inorganic matter; if they be converted into fermented (farm-yard) manure, there is a large loss; and the same is the case if they are employed in feeding stock,* with a view to their conversion into manure. *In no other form can the same crop convey to the soil an equal amount of enriching matter as in that of green leaves and stems.* Where the *first* object, therefore, in the farmer's practice is, so to use his crops as to enrich his land, he will soonest effect it by ploughing them in, in the green state.

“But it is deserving of separate consideration, that green manuring is especially adapted for improving and enriching soils which are poor in vegetable matter. The principles on which living plants draw a part—sometimes a large part—of their sustenance from the air, have been discussed, and I may presume that you sufficiently understand the principles, and admit the fact. Living plants, then, contain in their substance not only all they have drawn up from the soil, but also a great part of what they have drawn from the air. Plough in these living plants, and you necessarily add to the soil more than was taken from it; in other words, you make it richer in *organic* matter. Repeat the process with a second crop, and it becomes richer still—and it would be difficult to define the limit beyond which the process could no further be carried.”

I would never depend upon green manure alone, on land that I intended to tax with grain crops.

* The manure voided by an animal contains very much less solid matter than the food it has consumed. For every 100 lbs. of dry fodder, the horse or the cow will give, on an average, 46 lbs. of dry manure. *Loc. cit.* sec. 13.

In such a case, some additional saline substances would need to be added, which this system of manuring could not supply, in order to support those crops and maintain the fertility of the soil. The possession of light and poor sandy or gravelly lands is usually attended with limited means for making or *purchasing* manure; and these soils are always materially deficient in vegetable matter. It has therefore been my impression, for years, that were I to become the owner of such a farm, I should use green crops extensively, in connection with other manuring, to invigorate my poor soil, and supply it speedily with this essential material, vegetable matter.

In the case of worn and exhausted pastures,—such as the one I have described,—which are level

enough to plough, and where a good portion of the droppings of the cattle remain on the land, a resort to green manuring will doubtless increase and perpetuate their fertility. In my immediate vicinity, pasturage is worth from 45 to 50 cents, a week for each cow. If my pasture ranges were five or ten times larger than they are, I could readily obtain these prices. With me, then, a considerable outlay for increasing the productiveness of these lands is judicious. In other sections where the various conditions I have named are all right, I would confidently recommend the practice of turning in green crops, as a cheap, effectual, and speedy method for increasing the productiveness and profit of worn-out pastures.—F. HOLBROOK. *Brattleboro', Vt., May, 1849.*

FORTY-DAYS' MAIZE.

DEAR SIR,—Among many of the projects, both nationally and individually, for making improvements in trade, manufactures, and agriculture—or, in other words, “for the purpose of making money”—is one lately brought forward in glowing terms, both by pamphlet and advertisement, as a novel species of foreign grain “of quick and easy growth, suited to the climate of England,” and introduced under the attractive title of “Forty-days' Maize.” The gentleman who has thus ushered it into notice as a novelty, describes it as a “hybrid” species, in consequence of its being grown as a cross between other qualities of the same species from different countries, though all emanating from one original stock; but, without quarrelling with the inappropriateness of the term, permit me to say, “there is nothing new in the discovery.” It was, many years ago cultivated on a small scale, as a matter of experiment, by the late Mr. Cobbett, at his farm in Surrey, and there tried, for some years consecutively, with a certain degree of success; yet not sufficient to engage the attention of our English husbandmen, by whom it was sneeringly called “Cobbett's Corn.”

Having had some knowledge of Mr. Cobbett, and being myself somewhat of an amateur farmer, I also made a trial of the seed grown by him, and grew a garden crop with such success as to convince me that, if sown and re-sown, it might be eventually naturalized in our Southern counties. So well, indeed, was I persuaded of its value, that I drew up a short account of the corn, with the intention of publishing it; but not having carried it into effect, I herewith forward to you the manuscript.

I have likewise, this year, grown the seed of the

Forty-Days' Maize—some of it in a sunny corner of my garden, and the remainder in an open unsheltered spot; in both cases without any additional manure or further care than might be applied to any properly cultivated farm crop, and upon a very heavy soil, not well adapted to its growth. The result has been that the sheltered corn produced large, ripe cobs (some of which I have sent to Mr. Pusey); but that grown in the open ground has only partially ripened, and the cobs are of inferior size.

There is also this very serious remark—that stems produced from this seed yielded only each *one* cob, whereas that grown from Cobbett's corn gave several. The price of the seed must also form a strong objection to its general adoption; as the gentleman, who it seems has brought it from the Pyrenees, deems himself entitled to charge for a packet containing about three pints, and only sufficient for the sowing one-tenth of an acre, the sum of no less than half-a-guinea! while a bushel of any Indian corn, of apparently the same sort, can be purchased in our seed shops for four shillings: thus reminding us of the former Cæsarean cabbage and the Talaveral wheat, by the sale of the seed for whose growth the discoverers so largely profited.

The corn is a very nutritive food for cattle of all sorts, pigs, and poultry, and might form a good preparation, as a green crop, for wheat; but, notwithstanding the flattering recommendation—“that every farmer will find it advantageous to have maize-bread in his house and at his table,” I am persuaded that it will never be brought into general use in this country, as even rye-bread, though far superior, has been long abandoned by our peasantry. Regarding the assertion, “that bread from pure maize-flour, without any admixture of wheaten-flour, is the sta-

ple food of a large population in the Basque provinces, and preferred by the labourers to wheaten bread," I can truly say, that I have eaten of it in both Spain and Portugal (where the flour of chestnuts is also made into bread) and that it is both heavy and indigestible; but, if mixed up with not less than one-fourth of wheaten flour, it may be rendered palatable. Here, I believe, the chief use made of Indian corn meal is by the cheap bakers, as a profitable adulteration of wheaten flour.

Yours, my dear sir, truly,

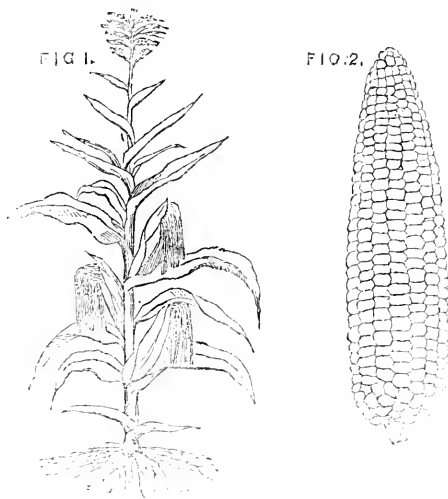
Woolwich, Nov. 14 FRENCH BURKE.

"Indian corn, which has lately attracted so much attention in this country, is not indigenous in any part of Europe, but has acquired the name of *Blé de Turquie*, by which it is generally known throughout the continent—from its being presumed to have been introduced from the Levant by the Mahometans after their conquest of Constantinople. Some strong reasons have indeed been adduced from the Scriptures by the late Mr. Cobbett, in support of his supposition that it came originally from Syria; though it is not improbable that he may have confounded it with millet, which plant it in many particulars resembles. Whether they be well-grounded or not, it is however certain that it was found in its native state in the West Indies by Columbus; for it is particularly mentioned by Pedro Martyr—who was a cotemporary of his, and who published an account of the first voyage immediately after its completion—as being commonly grown in the island of Hayti, and there called *Maïs*; or, as now termed, *Maize*.

"The plant springs upwards with a tall and strongly-jointed stem, the summit of which is crowned with 'a tassel' of numerous variegated flowers containing the pollen, and performing the functions of a male; while the blossoms on the lower part of the stalk throw out long pendulous filaments, called 'silks,' which are impregnated by the pollen falling from the tassel. These female flowers produce from two to five ears—or, as they are usually termed, 'cobs'—varying from six to ten inches in length, and by $\frac{3}{4}$ of an inch to double that size in diameter; around which the corn is closely piled in rows, bearing frequently more than 500 grains: differing, however, in size, from that of a small tick-bean to that of a flattened pea; and in colour, from a bright orange to a very pale yellow, stained in some instances with dark red, but producing a farina of the same sort, much resembling that of wheat.

"The interior of these cobs is a pithy substance enveloped within delicate but strong folds of a silky

covering, termed the husk, which serves as a complete protection to the grain; and the leaves, though not numerous, are very broad. In tropical countries it grows to a great size, and the varieties are perhaps as numerous as those of wheat; though, in America, they are solely distinguished as the 'yellow, or golden,' and the 'white, or flint-corn'—meaning the early and the late species. Either kind, however, requires the full heat of our warmest summers, and botanists describe the plant as being incapable of being regularly brought to perfection in any country of Europe farther north than the 46th degree of latitude. The seeds of the sort which has been introduced into England under the name of 'Cobbett's Corn,' were however obtained from the province of Artois, in France, which lies nearly parallel to our southern counties; but the plant is a dwarf species, the height of which does not exceed four feet on good land; neither does it usually produce more than three cobs, nor the ear attain the length, or produce an equal number of grains, though the corn is of the full size of the maize grown in a warm climate. The fibres of the root spread equally around to the extent of full six inches in diameter, and take a firm hold of the ground.



"Fig. 1, in the annexed cut, which, together with the above description, we have taken from a work entitled 'British Husbandry,' published by the Society for the Diffusion of Useful Knowledge, and forming a series intended for the Farmer's Library, is a drawing of the plant in a state of maturity; and fig. 2 represents a cob, or ear of corn, when stripped of its husk.

"The soil best suited to Indian Corn is a friable loam, and it is found in foreign countries to succeed better on light lands than in those which are clayey.

Last year, however, we have known a large crop of it grown upon heavy clay; but the land was dug, and it is almost unnecessary to add that it was by that operation rendered more pervious than it could have been by common ploughing. Cobbett, indeed, who has made some large experiments upon its growth, says, 'that a tolerably good crop would certainly succeed, in numerous cases, on land much too poor to yield a crop of wheat, or even a good crop of barley, oats, or rye;' yet in that assertion we think he is mistaken, for other accounts, from countries where it is grown extensively, and under climates more favourable than this, say, that it requires an abundance of manure, and on poor land does not pay the expense of cultivation.

Cobbett describes *two modes of sowing*: one by dibbling in hills four feet every way apart—'which may be formed by ploughing longways and crossways;' the other by drilling the corn in rows at the same distance.

"In the first method, if the land be not previously dunged, the manure may be laid in the hills, which are marked out by the plough, and at every crossing a hole is made with the hoe, about six inches in diameter, around which five or six seeds are placed at the depth of less than two inches, and the earth is drawn upon them by the hoe; taking care that it be free of clods, and merely pressed down by the back of the hoe, or lightly trodden. This mode is therefore nearly similar to that of dibbling. The planting in hills he, however, only recommends with reference to the larger species of corn, which is, in this climate, of hazardous growth; though, in warm countries, it is grown in conjunction with root crops planted between the rows; in which manner we have seen maize and pumpkins extensively cultivated together in Portugal and many parts of Spain." *History of British Husbandry.*

In the second mode, which is that best adapted to the dwarf species, he advises the seeds to be drilled in rows five feet apart, and sown at distances not exceeding six inches from each other; which, however, is contrary to the practice of the Peninsula, where the distance between the rows rarely exceeds three feet, unless intermediate crops be grown: and the plants are never allowed to stand at less than a foot apart. This is, indeed, the least space to which they should be allotted; for it is evident that a plant growing to the size which it attains, and bearing the chief portion of its produce on the lower part of the stem, should have air and room to expand.

The time of sowing is during the latter end of April and the month of May; but, as the weather is then precarious, and a slight frost might prove very injurious, perhaps a more judicious mode would be, to sow the seeds in well-prepared beds at differ-

ent times during the spring, and to set out the plants in the first week or by the middle of June. The act of transplantation should, however, be carefully performed by a man who is well acquainted with the use of the dibble, or with the manner of planting out cabbages. The sprouts should be cautiously heaved out of the bed with a spade, and the earth which adheres to them should not be shaken off. They should be immediately carried, in a shallow covered basket, to the planter, who ought to reject those which appear weak, and set them in holes of not more than two to three inches deep, taking care to fix the roots well in the ground, and to fill up the vacant spaces which surround them with loose mould. They should also be afterwards wetted; and this should be repeated every second or third day until they strike, and show an appearance of vigour.

It is almost unnecessary to insist on the absolute necessity of the land being previously well manured and brought into a state of nearly garden tilth; after which the mode of management is nearly as follows:—When the plants have got to the height of about three inches, the first hoeing should be given, to clear the ground of weeds; and, when they have reached a few inches higher, it should be stirred to a good depth, either with the spade or plough, to within two or three inches of the stems of the plants; which should then be earthed up, in order to support and furnish them with fresh food. About the middle of July the plant will probably be from eighteen inches to two feet high; and then a second string should be given to the ground, approaching to within six inches of the soil, again earthing up the stalks to the height of six or seven inches above the level of the land. Before that is done, however, the plants should be "snuckered;" as thus—they each send forth from the very bottom of the stem two, three, or more shoots or suckers; and these must be pinched clean out of their sockets: for, if not, they will start again, and weaken the crop: they amount to but little in bulk; but as they are excellent food for cows, they will pay for the labour.

Towards the beginning of September the plants are "topped," which is rendered necessary when the tassel has performed its functions by shedding its pollen upon the female flowers beneath; and is performed when the tassel is withered by cutting off the top at about two-thirds of its height, or some short distance above the lateral cobs which spring from the stem. The workman then strips off the blades, thus leaving the cobs to ripen divested of leaves; and the herbage thus obtained is greatly relished by all sorts of cattle when given to them in a green state, or even when made into hay.

The harvesting of the ears does not take place until sometime in November, when the grain is quite hard; and may be further deferred until dry weather, as the cob, being enveloped by its husk, is secure from the effects of rain, or the shedding of the corn by its being over-ripe. The operation is performed by stripping the cobs by hand, downwards, off the stems, instead of twisting them off; after which they are carried to the barn to be husked, the stalks being then pulled out of the ground and used as fuel.

The "husking" is done by women and children, who are seated round a large heap with a basket before them, into which they throw the ears, which are afterwards carried to the corn-crib—which is a little granary formed of open rails fixed upon saddles, with a well-covered top; and the husks are secured in sacks, to be used for the stuffing of mattresses. In America, however, it is made a scene of merriment by the neighbouring families, who assemble together to enjoy a "husking frolic," of which Mr. Cobbett gives this humorous description:—"They collect together to husk farmer Jonathan's corn to-night, and farmer Ebenezer's to-morrow-night, and so on; for it is as plain as the nose on your face, that twenty families would do the same work in twenty nights, each sticking to their own corn. Long-headed farmers know that they would not stick to it, and therefore they resort to this system of frolic; for young women and their sweethearts do not think about toping, and yet there must be something to amuse, something to prevent the mind from entertaining the gloomy idea that this is work. The red ears come very opportunely to answer this purpose; for the man who has the good fortune to fall upon a red ear is entitled to a kiss of any of the girls which he pleases; and if a girl finds a red ear, she must submit to be kissed by some one of the males of the party. So that there is a constant looking out for these red ears, and a-laughing and joking upon the circumstances attending the success of the parties who happened to get them. In the case of my corn, however, where the proportion of red ears is greater ten to one than it is in the American corn, this amiable regulation must not be adopted; for it would be a frolic indeed! There would be nothing but kissing, which is by no means what the farmer aims at, when he assembles his congregation of huskers. Nevertheless, and so it would be found upon experience, the frolic system is a good one; the privilege of kissing might be modified. 'Modified!' exclaims the bouncing dairy-maid: 'what do you mean by modified! you were young yourself once.' Yes, yes; but lips cannot last for ever."

The separation of the corn from the pith of the cob, or "shelling it," is usually effected by fixing the blade of a strong, though blunt, knife across a tub, and scraping the cob lengthwise across it with both hands, until the grain falls into it; but it may be done nearly as well by putting the ears into a sack, and thrashing them with a short flail or a stick.

Cobbett estimates the produce of the crop as high as 100 bushels; and there have been several instances of experimental crops lately reared in this country having reached 70 and even 90 bushels per acre. This, however, can only be expected upon rich soils, well-manured and cultivated; for it exceeds the average grown upon good land, under the favoured climate of the south of Europe, and we should rather bound our expectations within about 60 bushels. This, however, is a very large product: and if we consider that the weight of the grain is very nearly equal to that of wheat, and that its quality is more nutritive than that of either barley or oats, besides yielding a large quantity of straw of a more valuable sort than that of any other kind of corn, we must admit that, if it can be brought into the common rotations of our farm-crops, of which we think there can be no doubt in our Midland and Southern Counties, it must be considered as a great acquisition to the husbandry of the country.

The uses to which the corn is applicable are various; the flour is very white, and makes good bread when mixed with a considerable quantity of that of wheat: otherwise, though palatable and nutritious, it is heavy. It is also consumed throughout North America, in different preparations of cakes and porridge, under the names of "Mush," "Hominy," and "Samp;" and the green ears are commonly brought to table either roasted or boiled, in which state the grain much resembles that of young peas. To pigs and poultry it is not only very fattening, but is found to impart a superior degree of flavour to their flesh. The blades of straw, as we have already stated, besides being given to cattle, are very generally used in Spain and Portugal as the stuffing for mattresses; not quilted like the hard palliasses under our beds, but placed loose in the covering, the centre of which is slit open to allow the chambermaid to insert her hand and spread it evenly; in which way it is both very elastic and cleanly. Both the pith of the cobs, the roots, and the stems make a good fire: and in all these modes we think that, even if not generally introduced into our farms, it may in many sheltered situations be employed with advantage as a green crop.

GLEANINGS IN AGRICULTURE.

(Continued.)

28. *Poa fertilis* (Fertile meadow-grass).—This species is a native of Germany; it thrives best when sown with other grasses. The latter-math contains more nutritive matter than it does at the time of flowering; this is owing to its sending forth a succession of flowing culms, till it is stopped by frost. Schroder says it is not unfrequently met with in rich meadows in Germany; and Sir Humphrey Davy has shown that its nutritive matter consists of mucilage 65, saccharine matter 6, and extractive matter 7=78. Hares and rabbits are particularly fond of this grass. It flowers about the beginning of July. Sinclair says, at the time of flowering, the produce from a sandy loam was 15,654 lbs. per acre. The produce of the latter-math was 4,764 lbs. per acre. This grass deserves a place in all mixtures for rich pastures; and for irrigating meadows it stands amongst the first.

29. *Poa nemoralis* (Wood meadow-grass).—This species differs considerably from the preceding, the former being found in rich meadows, and our present subject in woods; and in fact the only species of our native Poæ that is found in such situations. It is rather a delicate-looking plant; it springs early, but the produce is inconsiderable compared to that of many others, yet it deserves a place in the mixture for permanent pasturage, particularly under the shade and drip of trees. Sinclair says, and we have observed the same thing ourselves, that just before it begins to flower (that is, the cultivated plant) it is frequently attacked by the disease termed *rust*; yet, in cloudy, moist seasons, the disease is less severe, being more confined to its leaves. According to Sinclair's experiments, at the time of flowering the produce from a brown loam was 9,188 lbs. per acre; it flowers about the middle of June, a perennial.

30. *Poa cæsia* (Blue alpine meadow-grass).—This species is a true alpine grass, found only in the high mountains of Scotland. We are not aware of its having been found in Wales. It produces seed in abundance, and is easily cultivated on soils of an intermediate quality as to moisture and dryness; but as far as experiment in an agricultural point have been carried with respect to this truly beautiful grass, it is supposed to be possessed of no excellence to recommend it in the mixtures of pasture-grasses; yet when cultivated in rich soils, in gardens, it becomes very luxuriant and succulent. And we have no doubt that it would prove a useful grass in mixture for mountainous pasturage for sheep, where, we believe, it has, as yet, never been tried; therefore we recommend it to the consideration of the Highland farmers. It may be as well to remark that this *Poa cæsia* is the *Poa glauca* of some botanists. It is found in flower about the middle of June, and a perennial.

31. *Glyceria aquatica*, Sm.; *Poa aquatica*, E. B.; *Hydrochloa Aquatica*, Har. (Water-meadow grass).—Such are the names by which this very common grass is known botanically; but why one name is not as good as three we cannot imagine; but such is the case with many more, as most botanical authorities must have a name of their own fabrication. This grass is generally met with in ditches and pools, and the banks of rivers, occasionally attaining the height of five or six feet, and associating with *Arundo junceus*. Curtis, in "Flora Londinensis," says it forms a chief part of the riches of Cambridgeshire and Lincolnshire, and other counties. In the Isle of Ely we are informed it is cut when about three or four feet, dried and bound up in bundles, and stacked in a greenish state, so as to cause it to heat slightly, by which it is said to be much improved; and in many places it is used for thatching out-houses, and even cottages: yet, when cut young, as in the Isle of Ely and other places, it is an excellent food for cows; horses will eat it also. Sinclair says: "I offered a bundle of the grass to a horse that was grazing on a field of white clover; the animal ate it with seeming relish, taking a bite of the clover, and then another of the *Poa aquatica* alternately, till the whole of it was consumed." That this grass can, and ought to be cultivated on higher ground, we are perfectly satisfied (that is, in irrigated meadows); in which places it will prove a valuable grass, as it can, from its rapid growth, be cut at least three times in the year without injury to it; for cattle in summer as well as in winter, by cutting it into chaff. It is a perennial, flowering in July, and, according to Sinclair's experiments, at the time of flowering the produce from a tenacious clay was 126,596 lbs. per acre; and the best season for sowing the seeds is in the autumn, as soon as they are ripe: it may also be propagated by its creeping roots, but this is a very slow process.

32. *Poa compressa* (Flat-stalked meadow grass).—Sinclair says, "If the produce of this grass was of greater magnitude, it would rank as one of the most valuable grasses, as it produces foliage early in the spring, of stronger nutritious power than most other grasses." Some writers have recommended it on poor soils, but the produce is very deficient, yet better herbage is everywhere obtained. It is only in corn fields, when cattle are turned in to glean all fragments that remain after the removal of the crop, that it disappears with the rest, which system of husbandry cannot be too much condemned, for the land ought to be in such order that such plants ought not to exist there; but it is a system adopted in almost every county in England that we have been in. According to the experiments of Sinclair, "at the time of flowering the produce from a gravelly soil, with manure, was 3,403 lbs. per acre." The roots of this grass

penetrates to a considerable depth. A native of Britain; and a perennial.

33. *Elymus arenarius*.—This grass is called the sugar-cane of Britain. Sir H. Davy says it contains one-third of its weight of sugar: yet, in its natural or growing state, it is not touched by cattle, no doubt owing to its coarseness; yet, when cut up like chaff and given to them, it is readily eaten, either alone or mixed with other food: he also recommends it to be cut up and steamed with other food. This grass is only found by rivers, pools, and the sea shore; its creeping matted roots binding the sands and penetrating the encroachment of the sea, for which purpose it is in many places employed in Britain, and extensively on the shores of Holland. According to the experiments of Sinclair, on a clayey loam the produce at the time the seed was ripe was 43,560lbs. per acre. He also says that the culms are produced in small numbers when cultivated on a clayey loam, or on a sandy soil. The greater proportion of the saccharine matter is afforded by the culms of this grass, which must render the hay made of this grass very nutritious. It is a native, and a perennial.

34. *Elymus Sibericus* (Siberian lyme-grass).—This grass is not a native of Britain, but of Siberia, and a very coarse one; and, though it produces an abundant crop, it is comparatively of little value, which is produced rather late in the spring. Although termed a perennial, it is not so permanent in its duration as some others—in fact it is called an annual by some authors. It has more the habit of the rye-grass, and, like them, it is better fitted for alternate husbandry than for permanent pasturage; and the soil best adapted for its cultivation is such as are of a free texture: on wet or tenacious soils it will not answer. According to the “*Hortus Kewensis*” it was cultivated in 1758 by Mr. Philip Miller; and, according to the experiments of Sinclair the produce at the time of flowering, from a rich sandy soil, was 16,335 lbs. per acre. It flowers in June.

35. *Elymus geniculatus* (Pendent lyme-grass).—In an agricultural point, this grass is hardly worthy of notice. Even as an agent for curbing the driving sands it is inferior to *E. arenarius* (No. 33), its foliage and straw being much weaker; nor do the roots trail so far, or obtain so firm a hold in the soil. In the young state the spike is erect; advancing in age, it becomes bent about the middle, parallel with the horizon; and finally the terminating joints become pendent. A mortification seems to take place at the geniculations, which turn yellow, perish, and fall off in succession. It appears that Mr. Curtis was the first to distinguish this grass (*E. geniculatus*) from *E. arenarius* (No. 33). It is a perennial, and a native; flowering in July. According to the experiments of Sinclair, the produce from a sandy loam at the time of flowering was 20,418lbs. per acre.

36. *Briza media* (Common quaking-grass).—This elegant little plant, which delights in our climate, is well known; in fact there is scarcely an indigenous plant more generally known. The child loves it from its simplicity, its prettiness; and in a more adult age there are found those who admire it from its elegance, its spicule “trembling at the zephyr’s whispering breath,” and as-

sociate it with fairer flowers to ornament the bouquet. Dr. Withering observes “that if the seed be carefully dissected with a fine lancet the young plant will be found with its leaves and roots perfectly formed.” In an agricultural point, this grass is deserving of our attention as being a grass which thrives best in very poor and inferior soils (although it is found in damp and rich soils at times), yielding more nutritious matter than any other grass found on such inferior soils. According to Sinclair, the produce at the time of flowering, from a brown loam, was 9,528lbs. per acre. The latter-math produced 8,167lbs. per acre. It is eaten by horses, cows, and sheep. These merits demand attention; and though it is unfit, comparatively, for rich permanent pasture, yet for poor sandy, and also for poor tenacious soils where improvement in other respects cannot be sufficiently effected to fit them for the production of the superior grasses, our present subject will be found of value. It flowers in June, and a perennial.

37. *Aira cespitosa* (Tufted hair-grass).—Amidst all our marsh grasses *Aira cespitosa* claims a primal station, and necessity alone compels the hard-fed animal to crop it as food, and then chiefly the younger and less pungent shoots. This plant is generally to be considered as a water-loving plant, being mostly to be found in those hollows where water is retained after the winter rains, but yet it is met with upon the driest hills. In Scotland no plant is so universal to all situations as this grass. Nature seems to have armed this tufty hair-grass for reasons quite unknown. Were its virtues such as might serve for the pasturage of an animal it would claim some esteem, as the foliage is abundant, and the plant commonly the only vegetable that has escaped from destruction by the long stagnation of water. It therefore becomes the business of the agriculturist to extirpate this grass as soon as possible, not only on account of their unsightly appearance in meadows and pastures, but because they occupy a very considerable portion of the best soil, which should be producing more valuable grasses. The best manner of doing this in our opinion (for on this subject every farmer and labourer has his own) is to root them fairly out with a large hoc or mattock, such for instance that is used for grubbing up furze, stirring the ground with a fork, and sowing some seeds of the stronger and quicker growing grasses, such, for instance, as Nos. 2, 3, 4, &c. If this *Aira* exists in parks the best remedy is unquestionably to pare and burn the whole of the surface, then drain it with deep and shallow drains, pulverizing the surface, and then re-sow it with a proper mixture. Although this grass is deprived of a place in the list of agricultural plants used as the food of man or beast, yet it may be advantageously sown in covers for game, particularly near lakes, ponds, and marshy places, which are frequented by some of our rarer fowl game, as Scolopacidae, Anatidae, &c. To finish our remarks on this grass, we may add that it is known in many country places as hassock-grass, bull’s-face, &c. According to Sinclair’s experiments, the produce at the time the seed was ripe from a strong tenacious clay was 10,209lbs. per acre. It flowers in July.

(To be continued.)

PLACING PIPE TILES IN DRAINS.

SIR,—In your very useful publication of the 10th October, you have given extracts from the evidence of Robert Neilson, Esq., before the Court of the House of Lords, on the subject of “land draining.”

I observe that Mr Neilson very properly objects to draining with small pipes, for the reason that unless they are laid in collars, or very carefully placed in the clay, a small pipe is very apt to get out of place, and thereby effectually stop the drain.

I have myself experienced this difficulty; and having also had to contend with dishonest workmen, who wilfully displaced the pipes at the moment of packing, I was led to contrive a method of rendering this displacement *impossible*. I have ever since continued to use, in the south of England, the following simple but effectual plan:—

Take a straight, round rod, of dry ash, seven feet in length, reduce it in diameter until the pipes you are using will thread on to it, except the last nine inches, which must be left stouter. It will be found necessary to reduce the rod to a less diameter than the bore of the pipe, as many pipes are not quite straight.

Next take a bent scythe handle, and to the lower end of it fasten on a circular sheet-iron socket, nine inches in length, and terminating in an eye, to take a hook; the socket to be of the diameter of the short end of the rod: set it at right-angles to the scythe-handle, and pointing from its convex bend. Through this iron socket or tube, and inwards, in the direction of the bent handle, pass the ash rod, the stout end of which will join it firmly, and prevent its passing quite through; the scythe handle will then be in the position of bending over the rod.

On the rod so fixed thread six pipes, when three inches of the rod will remain uncovered; lower the whole into the drain by means of the bent handle, passing the three inches of uncovered rod into the last pipe laid in the drain. Leave the six pipes and the machine as they are in the bottom of the drain, and pack them down firmly with the material excavated from the drain, even to ramming or treading it in, for it is impossible to displace the pipes by so doing.

Having packed them tightly, withdraw the machine by means of a long cord previously hooked

to the eye in the socket, standing at some distance up the drain; thread on six more tiles, and proceed as before.

If there should be such a bend in the drain as to prevent the use of the rod, an old tarred rope of the requisite diameter will answer the purpose, if the drain is wide enough for a man to get into, but it is necessarily more tedious.

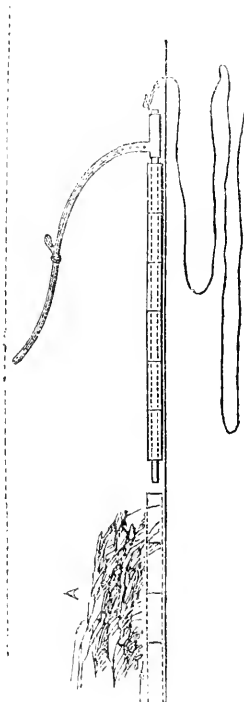
I take this opportunity of adding my humble testimony to the necessity of deep draining, either in farming or engineering operations, if intended to be either permanent or economical.

I am, sir, &c.

Bath, Nov. 5.

WILLIAM M'ADAM.

SKETCH OF THE IMPLEMENT REFERRED TO BY MR. M'ADAM.



4 FEET.

—North British Agriculturist.

LABOUR AND THE POOR.

THE RURAL DISTRICTS.

BUCKS, BERKS, OXFORD, AND WILTS.

The low physical condition which I have depicted as the unfortunate lot of nine-tenths of the labouring poor in Wiltshire, of five-sixths of them in Berks, and of the great bulk of them in Bucks and Oxford, is utterly incompatible with the existence amongst them of a high standard of intellectual and moral attainment. Startling as may have been the disclosures made in reference to the household accommodation, the wages and diet of the agricultural labourers, they will not be found to be more so than the revelations of their intellectual and moral condition which it is now my painful duty to make. I have no desire but one in reference to the matter, and that is to tell a plain unvarnished tale. My object is to conduct, as impartially as possible, the branch of this extensive inquiry which has been committed to my hands, leaning neither towards nor against the poor, but dealing fairly by all classes concerned, and relating only what I have myself witnessed, or that of the existence of which I have had the most ample proof. The reader may be both shocked and astonished at what I shall relate, but not more so than I myself have been on finding that I had no alternative but to relate it.

In what I have heretofore said in regard to the physical circumstances of the agricultural labourers, I have carefully guarded against its being supposed that there were no exceptions in the four counties in question to the picture drawn of their miserable condition. These exceptions do exist, scattered over these counties in greater or less proportion, being most numerous, perhaps, in Buckingham, and least so in Wilts. But they are but mere exceptions, after all, the description which I have given of their physical lot being applicable to the great bulk of the labourers in all the four counties. To the sketch which I am about to draw of their condition, intellectually and morally, the exceptions, I regret to say, are still rarer in them all. I shall first consider them in reference to their intellectual state, treating this branch of the subject in connection with the condition of the present and the prospects of the rising generation.

Of the intellectual training of the present generation of labourers little need be said—indeed, little can be said of that which has scarcely an existence. We hear much of the want now of a proper educational system for the poor; but there is this difference between the present time and that which is just passed, that whilst now something is being done, however imperfect that may be, there was then little or nothing effected for the education of the lower orders. There are, at this moment, in the counties under consideration about 120,000 adults, both male and female, who are either themselves engaged in out-door agricultural work, or are dependent upon those so employed. Of these how many can read

or write? The question is more aptly put by framing it, how few can read or write? A clergyman in Berkshire, who had been for eleven years in his parish, informed me that in seven cases out of ten the parties whom he married could not sign their own names. It may not be so bad as this everywhere, for the education of the people, like their physical comforts, has been more left to the benevolence and caprice of individuals than it has been largely and comprehensively cared for by the state. Here and there you meet with endowed schools and other appliances of education, the existence of which, for many years past, is traceable either to private munificence or to local bounty, and the result of which has been to illumine, with a few feeble rays, in their different localities, the intellectual gloom which surrounded them. But for these, the prevailing ignorance amongst this class of our countrymen would be universal and supreme. This may be denounced as a strong assertion, but its strength is that of truth. He who doubts has but to examine for himself, and I care not into which of the four counties he goes for this purpose, for either of them will furnish him with abundant proof of the correctness of my statement. The mental degradation, so characteristic of the labouring class in the counties, does not arise from their want of intellectual parts, but from the absence of tuition and instruction. These same parties, when they remove into a large town, or a manufacturing district, display an acuteness and aptitude, which, if not equal to those of others more favourably situated from their youth, is in striking contrast with their previous intellectual torpidity. Nor are those who live in the larger rural towns so stolid, or so intellectually inert, as those who inhabit the villages, or live detached in the more thoroughly ruralized districts. It is amongst them that ignorance has so completely established her dominion, and has so long swayed her sceptre undisturbed, that in many cases it is difficult to trace even the vestiges of intelligence in the countenances of the people. Their intellectual range is as limited as is the horizon of the mariner when in the deep trough between two heavy seas. Their perceptive powers are feeble, for their opportunities of observation are few. Their stock of acquired or communicated knowledge is in all cases small—in some it has scarcely an existence. Unfortunate though it be, it is, nevertheless, true, that the greatest mental activity that they display is in general in the exercise of cunning and the pursuit of vice.

So far even as the routine of their daily labour is concerned, their knowledge is not always sufficient. There are some who work intelligently, others who work mechanically, and the number of the mechanical is far greater than that of the intelligent workmen. The little knowledge which they possess as a class is almost entirely confined to the round of their occupations. They can weed well, and hoe well, and do the ordinary work of

harvest well, but there are but few of them who can plough well. There are operations in the practical conduct of husbandry which, to the superficial observer, appear to be merely mechanical, for which multitudes of them are incompetent. But, however limited their knowledge may be in many cases, even of the different branches of their own occupation, the range of their intellectual acquirement is, in seven cases out of ten, bounded by that occupation. They may or may not, as the case may be, display acuteness and intelligence when you question them in connection with their daily avocations, but when you transcend the line of their own pursuits, and endeavour to make them follow you beyond it, they become confused and bewildered; and the degree of intelligence which may have previously irradiated their countenances, is superseded by a vacancy of aspect which it is distressing to contemplate. I speak now not of all, but of the great bulk of the men and women employed in the fields in the four counties. They have grown up at their daily tasks without anything like proper intellectual culture, and are, both in their mental darkness and moral obliquities, a standing disgrace to the nation, and living monuments to its educational shortcomings. We vent our indignation upon the Carolinian planter, who takes positive steps to prevent the light of education from dawning upon the darkened soul of his slave. But, if we have not exactly followed his example with regard to the rural labourers, we have, at all events, refrained, as a people, from extending to them those means of enlightenment which, as a people alone, we could afford them. It is not this, that, or the other class that is to blame, but the nation at large, which has too long consigned to the chance efforts of individuals and localities the all-important subject of popular education. The consequence is, that, to this day, a large proportion of the lower orders are utterly ignorant of the veriest elements of instruction—an intellectual destitution of which hundreds and thousands of examples may be found within the counties in question. I have spoken to hundreds of them, and tested their knowledge of subjects bearing upon their social, moral, and religious duties, and found them generally with notions of morality lax and undefined—with their knowledge of the obligations of society towards them as limited as that of their duties towards society; and with ideas upon religion, in many cases too crude and too fantastic to be very efficacious in the practical regulation of their lives. But for them there is no better prospect held out, so far at least as regards their intellectual improvement. They must toil away listlessly and mechanically as they have ever toiled, and die as ignorant as they have lived. But there is hope for the generation that is to succeed them at their avocations. For them more is being done than was done for their fathers, and I propose now to inquire into the means actually in operation for the instruction of the young in the agricultural districts, and to ascertain how far we are in this respect atoning by our present exertions for our past neglect.

Nothing is more difficult than to obtain an adequate idea of the educational machinery of an English county. This may sound odd, but there is a very obvious reason

for it. Were education with us a matured and general system, extending on a uniform plan to every corner of the land, its appliances in one municipal sub-division would be but the *fac simile* of those in another, and indeed of those in all. Thus in the state of New York, one has only to acquaint himself with the educational apparatus of any one school district to become master of the whole plan of education throughout the state. Each district is, in this respect, but the repetition of its neighbour. But in England our whole system of public instruction is ragged and incomplete. In no particular district has the system pursued any necessary relation to that followed in adjoining districts. Schools which are common to one locality may or may not be found in another, but the machinery at work in each is not, as in the United States and in Prussia, part and parcel of one grand, comprehensive, and national scheme. The efforts made in this, that, or the other district in behalf of popular instruction are more or less isolated and independent, having no direct or necessary identity with any great educational operation homogeneous to this country. So essentially local, incomplete, and disjointed, is our whole system, that not only can one not predicate upon his knowledge of what is going on in one county an assertion to the proceedings in another adjoining it, but the same may also be said as regards contiguous parishes. Next to the inspectors of schools, whose duty it is to acquaint themselves thoroughly with the educational appliances of their respective districts, one would expect that the parties most likely to be well informed on such a subject would be the resident rural clergy. But, even from them, the information to be derived is scanty and imperfect. They know what is being done in their own parishes; but they are not necessarily informed of what is being effected in the same direction elsewhere. I am, therefore, compelled to present to the reader not a detailed, but a very general picture of what is being done for the promotion of popular instruction in the counties now under consideration.

Baffled in my endeavours to obtain very explicit information from those resident on the spot, I betook myself to official records, in the hope that they would furnish me with the intelligence which from other sources I have been unable to obtain. But here again I was disappointed, for on referring to the reports presented to the Education Committee of the Privy Council for the year 1847-8, by the different inspectors of schools throughout the kingdom, I found that, whilst they communicated some information, they, too, left much, very much, to speculation and conjecture. And this may be as fitting an occasion as may present itself for alluding to the manner in which the public are actually misled by some of the "Blue Books" published by authority of Parliament. In conducting this investigation your correspondents have necessarily very frequently to refer to numerous and bulky tomes of parliamentary literature. But it so happens that some of them, although ostensibly published for general information, are so prepared as to be convertible with accuracy only to official purposes. In this category are the important returns in connection with the poor. Looking into these returns, the public

would be led to infer that from 1,800,000 to 2,000,000 of people were paupers in the regular receipt of relief, in other words, that every seven Englishmen, in addition to supporting themselves, had to find the means amongst them of supporting an eighth. Thousands have recoiled with horror from this appalling statement, and have been led to despair of the fortunes of the country, when, believing that already one-eighth of the population were regular paupers, they saw that pauperism was still rapidly on the increase amongst us. But the truth is, that these returns were prepared more for the Poor-law Board than for the public. And in preparing them the practice is, if a man, from the sickness of his wife or any of his children, is induced to apply for aid and receives it from the workhouse, to put him and his whole family down as paupers receiving relief. If the family consisted of nine, this transaction would add nine to the list of those returned as paupers. Nay more, if, some time afterwards, a second application were made, under similar circumstances, and complied with, the nine would count up again, thus making eighteen to be added to the number to be returned as poor. And this, when the reality may be that neither the man nor any of his family can justly be reckoned amongst the class called paupers. So far as they go, the returns of the school inspectors are curious, interesting, and valuable; but they do not go far enough, affording but an incomplete picture of an imperfect system. One, for instance, states that the schools *under inspection* in his district are 282 in number. This may, or it may not, imply that that is the whole number *liable to inspection*. Again, he states what proportion of them receive grants from the Committee, and what from the Lords of the Treasury. So far as these grants are concerned the return is sufficiently perfect, provided the number of schools given comprises all liable to inspection. But a portion of the number given consists of schools which, not having received any grants, have nevertheless "invited inspection." But we are not informed whether or not there are other schools which, not having received grants, have *not* invited inspection, or, if any, how many. There is no record whatever of the private schools in the district, and yet it is essential that we should know what is being done by private efforts to enable us to appreciate all that is being done in any locality for education. There is no reason why the number of these private schools, and of the number attending them, at least should not be given. They form an item in the returns presented to other Governments, and are necessary to enable us to compare our educational system with that of other countries. In the returns, for instance, made to the Government of Connecticut, the private schools are as carefully enumerated as are those of a public description. Again, when in this same report information is given as to the number of children in attendance, and their ages, it is confined to 75 schools of the 282. The only way in which one can come at the whole number of children attending these schools, is by laboriously adding together whole pages of tabulated statistics, each page containing at least two dozen columns of figures! Again, the inspector within whose district Oxford falls, tells that in that county

there are 33 schools liable to inspection, but not a word is there about private schools in the whole report. The inspectors in this are not to blame, as in all probability they were instructed to confine themselves to schools of a particular class. It is the whole system which is to blame, which seems to be as imperfect in its separate parts as it is as a whole. And with regard to the 33 schools in Oxford, we have no general results given us. For these we must wade through a fresh succession of statistical tables similar to those alluded to—a task from which a mind ordinarily constituted recoils with horror. Nor is there any uniformity in the plan on which the several reports are drawn up. In fact, we are so much in the infancy of our educational career as a nation, that the department superintending it seems yet at a loss to know how to deal properly with the subject. I repeat it, therefore, that these reports convey no adequate idea of the machinery actually employed in the work of popular instruction in England. The reports on the parochial union schools are more complete and satisfactory; but, with this exception, we are left to grope comparatively in the dark in reference to a subject so all-important as that of public instruction.

Imperfect as they are in many respects, they nevertheless serve to show how utterly defective our whole system of education is. Many are led away by what has recently been done for the education of the masses, both of a public and private nature, into the belief that the business of popular instruction has now attained at least a respectable footing in this country. But this is a mistake which a very little observation will suffice to dissipate. What has been done to give rise to such a belief? The public grants have, in the course of a few years, swelled from £30,000 to somewhat upwards of £100,000 per annum. This is consolatory, but it is still trifling as compared with what is being done elsewhere in the same sacred cause. The private efforts which have been made, particularly amongst some of the dissenting bodies, have been on a most munificent scale; but they have been, more or less, confined to particular districts of the country, the rural districts, as a whole, having participated but very little in their advantage. In numerous parishes in the country districts the dissenters have scarcely a footing; in others they are too feeble and too poor to take any effective measures for the instruction of the people. That which has been done, both of a public and of a private nature, in this country, falls far short of the mere public provision made for education in some of the states of the Continent, and in almost all the states of the American Union.

The number of schools for which public provision has, to some extent, been made in Wiltshire, is only 68, being one school for every 3,800 of the population. In Oxford the number is only 33, being but one school for every 4,900 of the population. In Berks it is still lower, being only 25, which gives but one school for every 6,200 of the population. The precise number in Bucks is not given; but giving that county as its proportion the average number of the other three counties, that proportion would be about 36 schools, or one for every 4,500 of the population. This will give us for

the four counties but 162 schools, or one for every 4,420 of their aggregate population. Let us compare this with what is being done elsewhere. The latest returns which we have in reference to education in Holland are those of 1846. In that year there were in Holland 3,214 schools for a population of about 3,857,000 souls, being one school for about every 950 of the population. But of this number 639 are returned as "private schools," and 165 as schools on "special foundation," leaving 2,410 as the number of the "public parish schools." Now, taking these alone as the schools for which public provision is made, we have one school for every 1,600 of the population. In Prussia, during the same year, the number of elementary and other public schools amounted to upwards of 25,000, which for a population of 16,000,000 gave one school for about every 650 people. The contrast to our own, presented by the educational system established on the other side of the Atlantic, is still more striking. In New York, the population of which is about 3,000,000, the number of common public schools is about 10,000, being one for every 300 of the population. In Connecticut, again, there is one school for about every 250 of the population. Of Canada I cannot speak with the same degree of exactness, having no returns from the province before me; but this much I can say from personal knowledge, that in Canada West an ample and a munificent provision has been made for popular instruction as in most of the states of the Union. As compared, therefore, with the public provision made for education in the four counties in question, we find that that made in Holland is at least three times, that in Prussia nearly seven times, that in New York fourteen times, and that in Connecticut seventeen times as ample as it is in these counties.

The educational machinery of the state of Connecticut furnishes the most striking example of what may be done, when a people is in earnest, for the promotion of public instruction. Although its population is but about one forty-fifth part that of England alone, its revenue arising from the school-fund, and available for the purposes of education for the year, is nearly one-fourth as great as the sum last voted for education by the British Parliament. There are in the state about 1,660 common schools, attended by about 90,000 children, being one school for about every sixty children. In New York, again, the lowest municipal sub-division is the school district, of which there are somewhat upwards of 10,000 in the state. Each district has its common school, the area of the district being in the great majority of cases not more than four square miles, generally forming a square the length of whose side is two miles. The school is planted as near the centre as possible, so that few of the children in the state are two miles removed from a place of public instruction. There is at present one school for about every 70 children. Instead of a school, for which public provision appears to have been made, in the four counties in question, for every four square miles, we have but one for every 22½ square miles; and instead of there being one school for every 60 or 70 children, we have in these counties but one for 1,090, between the ages of 5 and 15. In making these com-

parisons, I have in all cases excluded from my calculations such schools as are more strictly of a private nature.

Were the schools thus established in the four counties as perfect and efficient as they might be, a great deal of good might be effected by 162 schools, in addition to private institutions, amongst a population of about three-quarters of a million, and extending over an area of from three to four thousand square miles. But, in a great many instances, they are woefully deficient as regards those appliances with which they should be liberally supplied. Taking a bird's-eye view of a county in its educational aspect, we find that the combined machinery at work consists of the national schools, British schools, diocesan schools, sometimes connected with the National Society, and at other times not; endowed schools, private schools, and the schools of parochial unions. Of these the British and private schools are, generally speaking, the most active and efficient. The national and diocesan schools are, in many cases, perfect in their organization, adequate in their machinery, and efficient in their operation. But both the national and the British schools, which are the chief recipients of the public money, and particularly the former, are in too many instances deplorably wanting in what is essential to constitute a good elementary school. Some of the national schools are but caricatures of a proper educational establishment. To say nothing of inadequate accommodation, or of their deficient supply of books, apparatus, &c., they are in the character and attainments of their teachers lamentably behind what they should be. Many of them are able men, not only well educated, but also thoroughly instructed in the art of communicating their knowledge to others. But there is a large proportion of them who are rigid disciplinarians and honest in their efforts to do their duty, but who are each, nevertheless, a species of intellectual fossil, far behind as regards the knowledge of the day, and utterly unprepared, either by education or antecedent habits, for the important and by no means easy task of imparting instruction to the young. For these and for other reasons, to which I shall hereafter advert, the education acquired in these schools is, for the most part, of the most imperfect kind. The Bishop of Oxford, who has certainly done much to put the educational institutions of his diocese on a better footing than they formerly occupied, has issued a circular to the teachers of his diocese, stating what, in his judgment, should be the subjects on which the pupils in the national and diocesan schools should be instructed. It is a large and liberal catalogue, but one which will not be properly embraced in the round of instruction in one school out of ten, until the whole system is remodelled and rendered more efficient. One of the inspectors, again, gives the following list of subjects on which he thinks the children should be taught more or less:—Biography (of good men), natural history, the preservation of health, domestic economy, horticulture, mechanism, agriculture, geography, history, grammar, natural and experimental philosophy, money matters, political economy, and popular astronomy. A stranger would think, from scanning this list, that we were, throughout, the most

erudite and philosophical people in the world. But we must not be misled by sounds or names. A lad who is taught the nature of wages and the names of the heavenly bodies may be described as receiving instruction in political economy and popular astronomy. It is true that most of the subjects mentioned are taught in the elementary schools of America; but how many of them are taught with us the following fact may attest. In the county of Oxford, under the four heads of geography, grammar, etymology, and history of England, there is not one child returned as receiving instruction. Whether this is a defect in the return, or arises from the fact that no children in the county are receiving instruction at the inspected schools on these subjects, I cannot exactly say. The simple fact is, that none are returned as receiving such instruction. The columns are there to receive the numbers, if there were any; but they are all blank, whilst the columns beside them are more or less filled up. But however this may be, geography is not as thoroughly and universally taught as it should be. This is a great mistake; for there is no greater drawback to the extensive emigration of the lower orders than that arising from their almost total ignorance of the capabilities, position, and even names of the places to which they should go. I have questioned them, old and young, on this subject, and have found their ignorance as universal as profound. Yet it is a subject on which they are most eager to acquire information. Many of them—men far advanced in life—were as much taken aback on my asking them what a colony was, as they could have been had I questioned them to unfold to me the mysteries of the Principia. They could give me no distinct notion of Canada, as to what or where it was. Their only idea seemed to be that it was somewhere across the sea, and very far off; whilst some of them entertained the most exaggerated notions of its climate. One man told me that he believed it was a country where it was winter all through the summer; whilst very few of them could give me any reason why it was more competent for them to go and settle in Canada than in France. On my telling them that there were portions of Canada where melons, peaches, apricots, and grapes grew luxuriantly in the open air, and that the same toil, which here brought them but a bare subsistence, might, in a very few years, make them landed proprietors there, they pricked up their ears, and looked at me in mute astonishment. Some of them had heard of New Zealand, others not; but none of them had any practical knowledge of it. With the name of Australia they almost exclusively associated the idea of transportation. It is this ignorance that keeps them at home wedded to their misery here, instead of transferring themselves and their only capital, their labour, to spheres in which the willing hand need never want work, and labour is sure of its reward. But wretched though they be here, they will not leave to encounter the undefined evils with which ignorance associates emigration in their minds. Not only should geography be sedulously taught to the young, but something might be done to atone for the ignorance in which the existing generation of labourers was allowed to grow up, by teaching even them that which might in

its results be of such service, both to themselves and others. It is not in connection with this department alone that our system is deficient. A large proportion of those who attend these schools never learn to read or write well, and have but a slight knowledge of arithmetic beyond its most elementary rules. Grammar is a branch of which few acquire more than the merest smattering—many not even that.

I have alluded to the parochial union schools, as constituting a feature of our educational system; but as no room is left me in this paper to enter into a detailed account of them, and as I shall have occasion hereafter to refer more particularly to their working, and that of the other schools in simultaneous operation with them, I shall content myself for the present with a general remark upon them, that, I regret to say, has reference to their utter inefficiency in the vast majority of cases for the accomplishment of their professed object. They are invariably connected with the workhouses of the different unions, their object being the instruction of pauper children, and are in most cases found within the walls of the workhouse. That at Aylesbury is the best arranged and the most efficient of any that I have seen; but even its efficiency cannot date much further back than a year. But in general the whole scheme is as ill devised as it is badly executed. It presents such a wreck, such an aspect of dilapidation throughout, that it looks more like the ruins of an educational system which had gone irretrievably into decay than like one which purports to be in active operation.

The list of schools which I have mentioned as constituting the main features in our scheme are all to be found, but in varying proportions, in the different counties of the kingdom. But it would be a mistake to suppose that they are to be found in different parishes constituting the counties. If each parish had its National and British schools, or either of them, it would be well off, provided they were efficient, without the others. But it is seldom that you find two parishes similarly provided with the means of education. They differ from each other both as regards the amount and the nature of the machinery at command. In one parish may be a National school, in that adjoining it a British school, or one may have both and its neighbour none. Again, there are some in which there are private schools, whilst there are none in others, and the same may of course be said with regard to endowed schools. But so irregularly and arbitrarily are the means of instruction distributed amongst them, that some parishes may be utterly destitute, whilst others have, more or less converged, all the means of education at command. The educational destitution of some of them may be illustrated by the condition in this respect of one in Berkshire.

The parish alluded to is that of Sutton Courtney, near the town of Abingdon. It has an area of 4,040 acres, and, with the exception of one or two farmers who own the land which they farm, cannot boast of a single resident proprietor. There is, consequently, no rent spent within it, and although tithes to the amount of about £3,000 is collected, that too is abstracted and spent elsewhere. The tithes belong to the Dean and Chapter

of Winsor, who, however, do not draw the title, having leased it to different parties on lives, the leases being renewable, and the dean and chapter receiving a fine on every renewal. The lessees are one or two parties in the neighbourhood, and another in Exeter. The case of Sutton Courtney is, in this respect, the parallel of that of Wokingham, which was presented by petition to the House of Commons in 1848. There the title to the amount of about £2,000, had been alienated; and the consequence was that a large and important parish, which requires for its proper spiritual superintendence the undivided energies of two clergymen, did not enjoy the undivided attention of even one. And so in Sutton Courtney. Although nearly £3,000 are raised there in the shape of tithes, the stipend allowed to the vicar of the parish is but £150, although he has two churches to serve. The parish has a population of upwards of 1,500, who chiefly inhabit the village of Sutton Courtney, which has a thousand inhabitants, and the hamlets of Appleford and Sutton Wyck, with 200 and 300 respectively. Although situated in the midst of a healthy district, it would be difficult to conceive a more filthy and unwholesome locality than Sutton Courtney was, until within the last three or four months. Even yet, after much has been done to purify it, the nose of the wayfarer is assailed, on his descending the wide street, of which the village chiefly consists, by the most loathsome and sickening odours, proceeding from foul pools of reeking filth close to the doors of some of the cottages, and the short but slimy and pestilential tributaries, which proceed from most of the houses, discharge their contents into a putrid but covered drain at the side of the road. Bad as it is even yet, what must it have been when this drain, the sluggish receptacle of the accumulated filth of an uncleanly population, was uncovered, and glistened and simmered in the hot sun? And yet this was so late as a few months back. The suns of May and June last quickened into fatal activity this hothead of disease and death, and fevers and other kindred diseases were the necessary consequence. The improvement which has taken place is owing to the vigilance and energy of the present vicar, who took steps which resulted in the covering of the drain. It was well that they did so, for by and bye the shadow of the cholera, in its fearful flight over the land, fell upon Sutton Courtney, as upon other places around it. First came several severe cases of diarrhoea, which spread alarm throughout the community. The clergyman endeavoured to calm their apprehensions from the pulpit, told them how to treat the disease in its premonitory stages, and above all insisted upon the necessity of sobriety and cleanliness both of person and domicile. At length a case of decided cholera was announced, and all was consternation. The vicar was absent on duty, but he returned at night. In the meantime, some of the inhabitants waited on a farmer in the neighbourhood to know what could be done. He was *nonplussed*, and advised them to "chance it." Not so the vicar. On returning and hearing what occurred, he immediately procured lime, and by torchlight, with the aid of his own stall boys, scattered it in the filthiest localities in the neighbourhood of the house which had been

stricken by the plague. Next morning he procured more lime, and had the same operation performed over nearly the whole village. He had also about twenty necessaries emptied of their contents, which had been in a state of pestilential overflow for years, and the filthy contents of which were in some cases constantly oozing through thick stone walls into the highway. He had dung-heaps innumerable removed from the backs and from the fronts of houses—and in one heap, which was behind a cottage, in a small garden, not much larger than an ordinary room, and between a pig-stye and a necessary, he found, a few inches below the surface, the carcasses of a sow and nine young pigs, which had all died, and which had been thrown there, scarcely covered, to decompose into manure. He had also an extensive reform effected in the internal economy of many of the houses, some of which were of the lowest class, comprising but two rooms, in one of which, in more cases than one, ten of a family slept together. In company with the vicar, I ascended to several of the dormitories. It was quite common to find three beds in one room. One of them, not more than twelve feet square, was thus furnished. The rafters were covered, and the room appeared to have been recently whitewashed. So far well—but the air seemed nevertheless sour and stifling. The light struggled through a small window, which was shut. The vicar opened it, exclaiming as he did so, "they never will ventilate their rooms." On descending, he asked the mother if nine of them did not sleep in the room up-stairs. "There's ten of us sleeps there, since she's come home," she replied, pointing to a girl, between thirteen and fourteen, who was then combing her hair at a broken piece of looking-glass, which was hanging against the window. She, her husband, and the two youngest children, one an infant at the breast, slept in one, the largest bed of the three, the rest being huddled together night after night in the other beds. Fortunately, the cholera did not spread, another instance of the baffling caprice of this singular disease—for if any place seemed to promise it a harvest it was Sutton Courtney. But I have here made a digression, which I am sure the reader will pardon for what it contains. Besides, as I shall illustrate another branch of my subject by the condition of Sutton Courtney, I thought it as well at once to pave the way for what I shall then relate of its morals by apprising the reader of the physical habits of its people. But to return to the subject of education.

Incredible as it may seem, it is nevertheless true, that, four years and a half ago, when the present vicar came to the living, with the exception of two "dame schools" in Sutton Courtney and an endowed school at Appleford, the parish was entirely destitute of the means of instruction. Now, those who know anything of a "dame's school" are aware that it is just no school at all; and as to the endowed school, I shall show that it also was a nullity. Having got the people into the habit of attending church, which he deemed to be his first duty, his next object was to provide them with the means of instruction. He soon established a school, which he divided into four departments—the first an infant school for boys and girls; the second a day-school for boys and

girls above the degree of infants; the third a night school for men and boys above the degree of children, and the fourth a night school for women and girls above the degree of children. He thus assailed ignorance in every stronghold which it possessed. For attendance at the night school a penny a week is paid by each individual, which, of course, entails a loss, as the fees will not cover the expense of coals and candles, pens, ink, and paper, &c. For attendance at the day-school twopence a week is paid by each. The school has not, as yet, been sufficiently long in operation to have produced any striking results. Its influence, however, will soon manifest itself, and an intellectual glimmering at least will be cast over this long-benighted portion of the land. The vicar has also established a small school at Appleford, where the endowed-school already alluded to is situated. The principle of the foundation of this school is, that twenty children belonging to the parish should be educated at it. But that principle has long since been departed from. To sustain the school, a few hundreds a year, with a free house and garden, were left to the master. The present incumbent is a lieutenant in the navy. What his qualifications were for the office of teacher, the trustees can best explain. The average attendance at the school at present is a dozen instead of twenty. Instead of grounding them in the ordinary branches of instruction, he has given an almost exclusively industrial turn to their education, the boys being more employed in digging and cultivating his garden than they are occupied in the school-room. Their proficiency may be appreciated from the fact that one of them, after having been for three years at the school, had actually to be put to the very first lessons in writing on entering the school at Sutton Courtney. It was not, therefore, too much to say that, previously to the establishment of the latter school, this parish, which is within eight miles of Oxford, was utterly destitute of the means of instruction. The public little know to what extent this malappropriation of educational funds is carried on in England. The vicar had no little difficulty in establishing his school, the majority of the ratepayers being insensible to the necessity which existed for it. He at length, however, got it established, and now pays £40 a year towards its support, the ratepayers amongst them paying only £3! It must be admitted, however, that they contributed to the purchase of the school-house and piece of ground attached to it, which cost about £300. But, having built the mill, they take no interest in keeping the machinery at work. Fortunately for the vicar, the Rev. Mr. Gregson, who has had a terrible struggle of it, he is a man of independent means. The working machinery of his parish, including his school, costs him more than his stipend. But suppose he had entirely to depend upon his stipend, where would the parish, as regards education, be at this moment? Just where it was when he entered it—at zero in destitution. And this it is which so closely connects the question of the tithes with that of education. Were the £3,000 raised spent in the parish, there would be more than sufficient to provide amply for its spiritual wants. The proper destination of the surplus would then be

obvious. As it is, the parish is insufficiently provided with spiritual, whilst it has been left utterly destitute as regards secular, instruction. This, it may be said, is an extreme case. It is to be hoped that it is so. It may be an extreme, but it is not a singular, case. There are many not far from it which approximate it, in point of destitution, if there are not many which equal it. It would be scarcely possible to surpass it in this respect. But, even admitting it to be an extreme case, it is by such cases that our educational system can be best illustrated, as regards its deficiency. But one person may die of starvation out of a community of 100,000; but the death of one, under such circumstances, would indicate very great privation amongst a large proportion of the survivors. The educational system which admits of such a case, even as an extreme one, must be radically defective. I have dwelt more particularly on this parish as affording evidence of its defects, not because it was the only illustration at hand, but because I was desirous of citing a striking one, limited as I am, in these communications, as regards space.

Of how many of the 16,000 parishes in England is Sutton Courtney the type! I do not adduce it here as an exception, but as an illustration. There are, as already said, too many similar cases around it—similar even as to the extent of their destitution. But between that destitution, and the state of those parishes which are even the best supplied, how many grades of educational insufficiency intervene? It requires but little investigation into the subject to perceive that the great work of national education has yet to be begun in England.

There are many other topics connected with this subject which I shall have ample opportunity hereafter of adverting to.

THE METROPOLITAN DISTRICTS.

I purpose considering the whole of the metropolitan poor under three distinct phases—according as they *will* work, as they *can't* work, and as they *won't* work. The causes of poverty among such as are willing to work appeared to me to be two: 1. The workman might receive for his labour less than sufficient to satisfy his wants. 2. He might receive a sufficiency, and yet be in want, either from having to pay an exorbitant price for the commodities he requires in exchange for his wages, or else from a deficiency of economy and prudence in the regulation of his desires by his means and chances of subsistence. Or, to say the same thing in a more concise manner, the privations of the industrious classes admit of being referred either to (1) low wages, (2) high prices, or (3) improvident habits.

In opening the subject which has been entrusted to me, and setting forth the plan I purpose pursuing, so as to methodize and consequently simplify the investigation of it, I stated it to be my intention to devote myself primarily to the consideration of that class of poor whose privations seemed to be due to the insufficiency of their wages. In accordance with this object, I directed my steps first towards Bethnal-green, with the view of inquiring into the rate of wages received by the Spitalfields

weavers. My motive for making this selection was, principally, because the manufacture of silk is one of the few arts that continue localized—that is, restricted to a particular quarter—in London. The tanners of Bermondsey—the watchmakers of Clerkenwell—the coach-makers of Long-acre—the marine-store dealers of Saffron-hill—the old clothesmen of Holywell-street and Rosemary-lane—the potters of Lambeth—the hatters of the Borough, are among the few handicrafts and trades that, as in the bazaars of the East, are confined to particular parts of the town. Moreover, the weavers of Spitalfields have always been notorious for their privations; and being all grouped together within a comparatively small space, they could be more easily visited, and a greater mass of information obtained in a less space of time, than in the case of any other ill-paid metropolitan handicraft with which I am acquainted. In my inquiry I have sought to obtain information from the artizans of Spitalfields upon two points in particular. I was desirous to ascertain from the workmen themselves, not only the average rate of wages received by them, but also to hear their opinions as to the cause of the depreciation in the value of their labour. The result of my inquiries on these two points I purpose setting forth in my present communication; but, before entering upon the subject, I wish the reader distinctly to understand that the sentiments here recorded are those wholly and solely of the weavers themselves. My vocation is to collect facts, and to register opinions. I have undertaken the subject with a rigid determination neither to be biased nor prejudiced by my own individual notions, whatever they may be, upon the matter. I know that as in science the love of theorising warps the mind, and causes it to see only those natural phenomena that it wishes to see—so in politics, party-feeling is the coloured spectacles through which too many invariably look at the social events of this and other countries. The truth will be given in its stark nakedness. Indeed, hardly a line will be written but what a note of the matter recorded has been taken upon the spot; so that, no matter how startling or incredible the circumstances may seem, the reader may rest assured that it is his experience rather than the reporter's veracity that is at fault.

With this preamble let me now seek to set before the reader the peculiar characteristics, first, of the district to which the Spitalfields weaver is indigenous, and, secondly, of the art he follows. "Owing to the vastness of London," says Mr. Martin, in one of his Sanitary Reports, "owing to the moral gulf which there separates the various classes of its inhabitants, its several quarters may be designated as assemblages of towns rather than as one city; and so it is, in a social sense and on a smaller scale, in other towns: the rich know nothing of the poor—the mass of misery that festers beneath the affluence of London and of the great towns is not known to their wealthy occupants."

The term Spitalfields, at an early period of the history of London, designated the suburban fields, situate between the ancient highway of Bishopsgate-street and the Whitechapel High-street. In the year 1197 one Walter Brune, a citizen of London, founded in these fields a

large hospital for poor brethren of the order of St. Austin; hence the surrounding meadows were called Hospital-fields, and ultimately Spitalfields. Of the district of Spitalfields, the weaving population for a long period was chiefly confined to Christchurch, but it has emigrated principally to the parish of Bethnal-green. This was formerly one of the hamlets of the ancient manor of Stebon Heath, now called Stepney. In 1740, according to the act of Parliament for making it a distinct parish, and erecting a parish church, the hamlet contained 1,800 houses, and 15,000 people, being upon an average rather more than eight persons to each house. Its extent at that period is not stated. Now, however, it occupies an area of nearly one square mile and a half, and constitutes a little more than a tenth part of the metropolis. The population in 1841 was 74,088, and the number of inhabited houses 11,782, being in the proportion of rather more than six individuals to each house, and nearly seventeen houses to each acre. The average number of individuals per house throughout London is 7.4, and the average number of houses per acre is 5.5, so that we see, though each particular house contains one individual less, still each acre of ground has twelve houses more built upon it than is usual throughout London. From this we should naturally infer that the generality of tenements in this district would be of a small and low-rented character: and accordingly we find, from the returns of Mr. Bestow and the other parish officers, in 1839, that the number of houses rated under £20 was about 11,200 out of 11,700 and odd. Hence we see the truth of the remark, that there is no parish in or about London where there is such a mass of low-rented houses. "The houses of the weavers," says Dr. Gavin, in his valuable "Sanitary Ramblings," "generally consist of two rooms on the ground floor and a work-room above. This work-room always has a large window for the admission of light during their long hours of sedentary labour. Whole streets of such houses abound in Bethnal Green, and a great part of the population is made up of weavers. There are some, but not a great number of dwellings consisting of one room only. Such houses are always of the worst description. With very few exceptions, the dwellings of the poor are destitute of most of those structural conveniences common to the better classes of houses. There are never any places set aside for receiving coals; dust bins to hold the refuse of the houses are exceedingly rare, and cupboards or closets are nearly altogether unknown. There are never any sinks, and the fire-places are constructed without the slightest regard to the convenience or comfort of the inmates." The history of weaving in Spitalfields is interesting, and tends to elucidate several of the habits existing to this day among the class. Upon the revocation of the edict of Nantes in 1685, numerous French artizans left their native country, and took refuge in the neighbouring states. King James II. encouraged these settlers, and William III. published a proclamation, dated April 25, 1689, for the encouraging the French Protestants to transport themselves into this kingdom, promising them his royal protection, and to render their living here comfortable and easy to them.

For a considerable time the population of Spitalfields might be considered as exclusively French; that language was universally spoken, and even within the memory of persons now living their religious rites were performed in French, in chapels erected for that purpose. The weavers were formerly almost the only botanists in the metropolis, and their love of flowers to this day is a strongly marked characteristic of the class. Some years back, we are told, they passed their leisure hours, and generally the whole family dined on Sundays, at the little gardens in the environs of London, now mostly built upon. Not very long ago there was an Entomological Society, and they were among the most diligent entomologists in the kingdom. This taste, though far less general than formerly, still continues to be a type of the class. There was at one time a Floricultural Society, an Historical Society, and a Mathematical Society, all maintained by the operative silk-weavers; and the celebrated Dollond, the inventor of the achromatic telescope, was a weaver; so too were Simpson and Edwards, the mathematicians, before they were taken from the loom into the employ of Government, to teach mathematics to the cadets at Woolwich and Chatham. Such were the Spitalfields weavers at the beginning of the present century; possessing tastes and following pursuits the refinement and intelligence of which would be an honour and a grace to the artisan even of the present day, but which shone out with a double lustre at a time when the amusements of society were almost all of a gross and brutalizing kind. The weaver of our own time, however, though still far above the ordinary artisan, both in refinement and intellect, falls far short of the weaver of former years.

Of the importance of the silk trade, as a branch of manufacture, to the country, we may obtain some idea from the estimate of the total value of the produce, drawn up by Mr. McCulloch, with great care, as he tells us, from the statements of intelligent, practical men in all parts of the country, conversant with the trade, and well able to form an opinion upon it. The total amount of wages paid in the year 1836 (since when, he says, the circumstances have changed but little) was upwards of £370,000; the total number of hands employed, 200,000; the interest on capital, wear, tear, profit, &c., £2,600,000; and the estimated total value of the silk manufacture of Great Britain, £10,480,000. Now, according to the census of the weavers of the Spitalfields district, taken at the time of the Government inquiry in 1838, and which appears to be considered by the weavers themselves of a generally accurate character, the number of looms at work was 9,302, and those unemployed 894. But every two of the looms employed would occupy five hands; so that the total number of hands engaged in the silk manufacture in Spitalfields, in 1838, must have been more than double that number—say, 20,000. This would show about one-tenth of the silk goods that were produced in Great Britain in that year to have been manufactured in Spitalfields, and hence the total value of the produce of that district must have been upwards of one million of money, and the amount paid in wages about £370,000. Now, from in-

quiries made among the operatives, I find that there has been a depreciation in the value of their labour of from 15 to 20 per cent. since the year 1839; so that, according to the above calculation, the total amount of wages now paid to the weavers is £60,000 less than what it was ten years back. By the preceding estimate it will be seen that the average amount of wages in the trade would have been in 1839 about 7s. a week per hand, and that now the wages would be about 5s. 6d. for each of the parties employed. This appears to agree with a printed statement put forward by the men themselves, wherein it is affirmed that “the average weekly earnings of the operative silk weaver in 1824, under the act then repealed, taking the whole body of operatives employed, partially employed, and unemployed, was 14s. 6d. Deprived of legislative protection,” they say, “there is now no means of readily ascertaining the average weekly earnings of the whole body of the employed and unemployed operative silk weavers; but, according to the best approximation to an average which can be made in Spitalfields, the average of the weekly earnings of the operative silk weaver is now, taking the unemployed and the partially employed, with the employed of those remaining attached to the occupation of weaver, only 4s. 9d. But this weekly average would be much less if it included those who have gone to other trades, or who have become perpetual paupers.” Hence it would appear that the estimate before given of 5s. 6d. for the weekly average wages of the employed is not very far from the truth. It may therefore be safely asserted that the operative silk weavers, as a body, obtain £50,000 worth less of food, clothing, and comfort per annum now than in the year 1839.

Now let us see what was the state of the weaver in that year, as detailed by the Government report, so that we may be the better able to comprehend what his state must be at present: “Mr. Thomas Heath, of No. 8, Pedley-street,” says the Blue Book of 1839, “has been represented by many persons as one of the most skilful workmen in Spitalfields. He handed in about forty samples of figured silk done by him, and they appear exceedingly beautiful. This weaver also gave a minute and detailed account of all his earnings for 430 weeks, being upwards of eight years, with the names of the manufacture and the fabrics at which he worked. The sum of the gross earnings for 430 weeks is £322 3s. 4d., being about 14s. 11½d., say 15s. a week. He estimates his expenses (for quill-winding, picking, &c.) at 4s., which would leave 11s. net wages; but take the expenses at 3s. 6d., it is still only 11s. 6d. He states his wife’s earnings at about 3s. a week. He gives the following remarkable evidence:—Have you any children? No; I had two, but they are both dead, thanks be to God! Do you express satisfaction at the death of your children? I do! I thank God for it. I am relieved from the burden of maintaining them, and they, poor dear creatures, are relieved from the troubles of this mortal life.” If this, then, was the condition and feeling of one of the most skilful workmen ten years ago, earning 11s. 6d. a week, and when it was proved in evidence by Mr. Cole that 8s. 6d. per week was the average net earn-

ings of twenty plain weavers, what must be the condition and feeling of the weaver now that wages have fallen from 15 to 20 per cent. since that period!

I will now proceed to give the result of my inquiries into the subject; though, before doing so, it will be as well to make the reader acquainted with the precautions adopted to arrive at a fair and unbiassed estimate as to the feelings and condition of the workmen in the trade. In the first place, having put myself in communication with the surgeon of the district, and one of the principal and most intelligent of the operatives, it was agreed among us that we should go into a particular street, and visit the first six weavers' houses that we came to. Accordingly we made the best of our way to the nearest street. The houses were far above the average abodes of the weavers, the street being wide and airy, and the houses open at the back, with gardens filled with many-coloured dahlias. The "long lights" at top, as the attic window stretching the whole length of the house is technically called, showed that almost the whole line of houses were occupied by weavers. As we entered the street, a coal cart, with a chime of bells above the horse's collar, went jingling past us. Another circumstance peculiar to the place was the absence of children. In such a street, had the labour of the young been less valuable, the gutters and door-steps would have swarmed with juveniles. We knocked at the door of the first house, and, requesting permission to speak with the workman on the subject of his trade, were all three ushered up a steep staircase, and through a trap in the floor into the "shop." This was a long, narrow apartment, with a window back and front, extending the entire length of the house—running from one end of the room to the other. The man was the ideal of his class—a short spare figure, with a thin face and sunken cheeks. In the room were three looms and some spinning wheels, at one of which sat a boy winding "quills." Working at a loom was a plump, pleasant-looking girl, busy making "plain goods." Along the windows, on each side, were ranged small pots of fuchsias, with their long scarlet drops swinging gently backwards and forwards, as the room shook with the clatter of the looms. The man was a velvet weaver. He was making a drab velvet for coat collars. We sat down on a wooden chair beside him, and talked as he worked. He told us he was to have 3s. 6d. per yard for the fabric he was engaged upon, and that he could make about half a yard a day. They were six in family, he said, and he had three looms at work. He got from 20s. to 25s. for the labour of five of them, and that only when they all are employed. But one loom is generally out of work waiting for fresh "cane." Up to 1821, the price for the same work as he is now doing was 6s. The reduction, he was convinced, arose from the competition in the trade, and one master cutting under the other. "The workmen are obliged to take the low prices, because they have not the means to hold out, and they know that if they don't take the work others will. There are always plenty of weavers unemployed, and the cause of that is owing to the lowness of prices, and the people being compelled to do double the quantity of work that they used to do, in order to live.

I have made a stand against the lowness of prices, and have lost my work through refusing to take the price. Circumstances compel us to take it at last. The cupboard gets low, and the landlord comes for his weekly rent. The masters are all trying to undersell one another. They never will advance wages. 'Go get my neighbour to do it,' each says, 'and then I'll advance.' It's been a continuation of reduction for the last six-and twenty years, and a continuation of suffering for just as long. Never a month passes but what you hear of something being lowered. Manufacturers may be divided into two classes—those who care for their men's comforts and welfare, and those who care for none but themselves. In the work of reduction certain houses take the lead, taking advantage of the least depression to offer the workmen less wages. It's useless talking about French goods. Why, we've driven the French out of the market in umbrellas and parasols—but the people are a-starving while they're a driving of 'em out. A little time back he'd had only one loom at work for eight persons, and lived by making away with his clothes. Labour is so low he can't afford to send his children to school. He only sends them of a Sunday—can't afford it of a work-a-day."

At the next house the man took rather a more gloomy view of his calling. He was at work at brown silk for umbrellas. His wife worked when she was able, but she was nursing a sick child. He had made the same work he was then engaged upon at 1s. a yard not six months ago. He was to have 10d. for it, and he didn't know that there might not be another penny taken off next time. Weavers were all a-getting poorer, and masters all a-getting country-houses. His master had been a-losing terrible, he said, and yet he'd just taken a country mansion. They only give you work just to oblige you, as an act of charity, and not to do themselves any good—oh, no! Works fifteen hours, and often more. When he knocks off at ten at night, leaves lights up all round him—many go on till eleven. All he knows is, he can't. They are possessed of greater strength than he is, he imagines. In the dead of night he can always see one light somewhere—some man "on the finish." Wakes at five, and then he can hear the looms going. Low prices arise entirely from competition among the masters. The umbrella silk he was making would most likely be charged a guinea; what would sixpence extra on that be to the purchaser, and yet that extra sixpence would be three or four shillings per week to him, and go a long way towards the rent? Isn't able to tell exactly what is the cause of the depression—"I only know I suffers from it—aye, that I do! I do! and have severely for some time," said the man, striking the silk before him with his clenched fist. "The man that used to make this here is dead and buried; he died of the cholera. I went to see him buried. He had 11d. for what I get 10d. What it will be next God only knows, and I'm sure I don't care—it can't be much worse." "Mary," said he to his wife, as she sat blowing the fire, with the dying infant on her lap, "how much leg of beef do we use?—4lb., ain't it, in the week, and 3lb. of flank on Sunday—lucky to get that too, eh?—and that's

among half a dozen of us. Now, I should like a piece of roast beef, with the potatoes done under it; but I shall never taste that again. And yet," said he, with a savage chuckle, "that there sixpence on this umbrella would just do it. But what's that to people? What's it to them if we starve?—and there is many at that game just now, I can tell you. If we could depend upon a constancy of work, and get a good price, why we should be happy men; but I'm sure I don't know whether I shall get any more work when my 'cane's' out. My children I'm quite disheartened about. They must turn out in the world somewhere, but where Heaven only knows. I often bother myself over that—more than my father bothered himself over me. What's to become of us all? What's to become of us all—nine thousand of us here, besides wives and children? I can't say."

These two specimens will give the reader a conception of the feelings and state of the rest of the weavers in the same street. In all there was the same want of hope—the same doggedness and half-indifference as to their fate. All agreed in referring their misery to the spirit of competition on the part of the masters, the same desire to "cut under." They all spoke most bitterly of one manufacturer in particular, and attributed to him the ruin of the trade. One weaver said he was anxious to get to America, and not stop "in this infernal country," for he could see the object of the Government was the starvation of the labouring classes. "If you was to come round here of a Sunday," said he, addressing himself to us, "you'd hear the looms going all about; they're obligated to do it, or starve. There's no rest for us now. Formerly I lived in a house worth £10 a-year, and now I'm obliged to put up with this damnable dog-hole. Every year bad is getting worse in our trade, and in others as well. What's life to me? Labour—labour—labour; and for what? Why, for less and less food every month. Ah! but the people can't bear it much longer; flesh, and blood, and bones must rise against it before long."

Having, then, seen and heard the opinions of six of the operatives taken promiscuously, I was desirous of being placed in a position to see different classes of the same tribe. I wished to be placed in communication with some of the workmen who were known to entertain violent political opinions. I was anxious also to be allowed to see weavers who were characterized by the possession of such tastes as formerly distinguished the class. Unfortunately, however, though I was kindly taken to the houses of two or three individuals of known scientific tastes and acquirements, the parties were all absent from their homes. I was conducted, however, in the evening to a tavern, where several of the weavers who advocate the principles of the People's Charter were in the habit of assembling. I found the room half full, and immediately proceeded to explain to them the object of my visit, telling them that I intended to make notes of whatever they might communicate to me, with a view to publication in the *Morning Chronicle*. After a short consultation among themselves, they told me that, in their opinion, the primary cause of the depression of the

prices among the weavers was the want of the suffrage. "We consider that labour is unrepresented in the House of Commons, and being unrepresented, that the capitalist and the landlord have it all their own way. Prices have gone down among the weavers since 1824 more than one-half. The hours of labour have decidedly increased among us, so that we may live. The weavers now generally work one-third longer than formerly, and for much less." "I know two instances," said one person, "where the weavers have to work from ten in the morning to twelve at night, and then they only get meat once a week. The average time for labour before 1824 was ten hours a day, now it is fourteen. In 1824 there were about 14,000 hands employed, getting at an average 14s. 6d. a week, and now there are 9,000 hands employed, getting at an average only 4s. 9d. a week, at increased hours of labour. This depreciation we attribute, not to any decreased demand for silk goods, but to foreign and home competition. We believe that the foreign competition brings us into competition with the foreign workman; and it is impossible for us to compete with him at the present rate of English taxation. As regards home competition, we are of opinion that, from the continued desire on the part of each trade to undersell the other, the workman has ultimately to suffer. We think there is a desire on the part of every manufacturer to undersell the other, and so get an extra amount of trade into his own hands, and make a large and rapid fortune thereby. The public, we are satisfied, do not derive any benefit from this extreme competition. It is only a few individuals, who are termed by the trade slaughterhouse-men—they alone derive benefit from the system, and the public gain no advantage whatever by the depreciation in our rate of wages. It is our firm conviction that if affairs continue as at present, the fate of the working man must be pauperism, crime, or death."

It was now growing late, and as I was anxious to see some case of destitution in the trade, which might be taken as a fair average of the state of the second or third-rate workman, I requested my guide, before I quitted the district, to conduct me to some such individual, if it were not too late. He took me towards Shoreditch, and on reaching a narrow back street he stood opposite a three-storied house to see whether there was still a light shining through the long window in the attic. By the flickering shadows the lamp seemed to be dying out. He thought, however, that we might venture to knock. We did so, and in the silent street the noise echoed from house to house. But no one came. We knocked again still louder. A third time, and louder still, we clattered at the door. A voice from the cellar demanded to know whom we wanted. He told us to lift the latch of the street-door. We did so—and it opened. The passage looked almost solid in the darkness. My guide groped his way by the wall to the staircase, bidding me follow him. I did so, and reached the stairs. "Keep away from the banisters," said my companion, "as they are rather rotten, and might give way." I clung close to the wall, and we groped our way to the second floor, where a light shone through the closed door in a long

luminous line. At last we gained the top room, and knocking, were told to enter. "Oh, Billy, is that you," said an old man sitting up, and looking out from between the curtains of a turn-up bedstead. "Here, Tilly," he continued to a girl who was still dressed, "get another lamp, and hang it up again the loom, and give the gentleman a chair." A backless seat was placed at the foot of the old weaver's bedstead; and when the fresh lamp was lighted, I never beheld so strange a scene. In the room were three large looms. From the head of the old weaver's bed a clothes-line ran to a loom opposite, and on it were a few old ragged shirts and petticoats hanging to dry. Under the "porry" of another loom was stretched a second clothes-line, and more linen drying. Behind me, on the floor, was spread a bed, on which lay four boys, two with their heads in one direction and two in another, for the more convenient stowage of the number. They were covered with old sacks and coats. Beside the bed of the old man was a mattress on the ground without any covering, and the tick positively chocolate-coloured with dirt. "Oh, Billy, I am so glad to see you," said the old weaver to my companion; "I've been dreadful bad, nearly dead with the cholera. I was took dreadful about one o'clock in the morning; just the time the good 'ooman down below were taken. What agony I suffered to be sure! I hope to God you may never have it. I've known four hundred die about here in fourteen days. I couldn't work! Oh, no! It took all the use of my strength from me, as if I'd been on a sick bed for months. And how I lived I can't tell. To tell you the real truth, I wanted such as I never ought to want—why, I wanted for common necessities. I got round as well as I could; but how I did it I don't know—God knows; I don't, that's true enough. I hadn't got any money to buy anything. Why, there's seven on us here—yes, seven on us; all dependent on the weaving here—nothing else. What was four shilling a yard is paid one-and-nine now; so I leaves you to judge, sir—an't it Billy? My work stopped for seven days, and I was larning my boy, so his stopped too, and we had nothing to live upon. God knows how we lived. I pawned my things—and shall never get 'em again—to buy some bread, tea, and sugar for my young ones there. Oh! it is like a famine in these parts just now among the people, now they're getting well. It's no use talking about the parish; you might as well talk to a wall. There was hardly anybody well just round about here, from the back of Shoreditch Church, you may say to Swan-street. The prices of weaving is so low, that we're ashamed to say what it is, because it's the means of pulling down other poor men's wages and other trades. Why, to tell you the truth, you must need suppose that 1s. 9d. a yard aint much, and some of the masters is so cruel that they gives no more than 1s. 3d.—that's it. But its the competitive system; that's what the Government ought to put a stop to. I knows persons who makes the same work as mine—scores on 'em—at 1s. 3d. a yard. Wretched is their condition! The people is a being brought to that state of destitution that many say it's a blessing from the Almighty that takes 'em from the world. They lose all love of country—yes, and all

hopes; and they prays to be tortured no longer. Why want is common to a hundred of families close here to-morrow morning; and this it is to have cheap silks. I should like to ask a question here, as I sees you a-writing sir. When is the people of England to see that there big loaf they was promised—that's it—the people wants to know when they're to have it. I am sure if the ladies who wears what we makes, or the Queen of England was to see our state, she'd never let her subjects suffer such privations in a land of plenty. Yes, I was comfortable in '24. I kept a good little house, and I thought as my young ones growed up—why I thought as I should be comfortable in my old age; and 'stead of that, I've got no wages. I could live by my labour then; but now, why it's wretched in the extreme. Then I'd a nice little garden, and some nice tulips for my hobby, when my work was done. There they lay, up in my old hat now. As for animal food, why it's a stranger to us. Once a week, may be, we gets a taste of it, but that's a hard struggle, and many a family don't have it once a month—a jint we never sees. Oh, it's too bad! There's seven on us here in this room—but its a very large room to some weavers—their's a'n't above half the size of this here. The weavers is in general five or six all living and working in the same room. There's four on us here in this bed: one head to foot, one at our back along the bolster, and me and my wife side by side. And there's four on 'em over there. My brother Tom makes up the other one. There's a nice state in a Christian land! How many do you think lives in this house? Why 23 living souls. Oh! aint it too bad? But the people is frightened to say how bad they're off, for fear of their masters and losing their work, so they keeps it to themselves, poor creatures. But oh, there's many wuss than me. Many's gone to the docks, and some turned costermongers. But none goes a stealing nor a sojering, that I hears on. They goes out to get a loaf of bread—oh, it's a shocking scene! I can't say what I thinks about the younguns. Why you loses your nat'ral affection for 'em. The people in general is ashamed to say how they thinks on their children. It's wretched in the extreme to see one's children, and not be able to do to 'em as a parent ought; and I'll say this here, after all you've heerd me state, that the Government of my native land ought to interpose their powerful arm to put a stop to such things. Unless they do, civil society with us is all at an end. Everybody is becoming brutal—unnatural. Billy, just turn up that shell now, and let the gentlemen see what beautiful fabrics we're in the habit of producing; and then he shall say whether we ought to be in the filthy state we are. Just show the light, Tilly. That's for ladies to wear, and adorn them, and make them handsome." [It was an exquisite piece of maroon coloured velvet, that, amidst all the squalor of the place, seemed marvellously beautiful, and it was a wonder to see it unsoiled amid all the filth that surrounded it]. "I say, just turn it up, Billy, and show the gentleman the back. That's cotton partly, you see, sir; just for the manufacturers to cheat the public, and get a cheap article, and have all the gold out of the poor working creatures they

can, and don't care nothing about them. But death, Billy—death gets all the gold out of them. They're playing a deep game, but death wins after all. Oh, when this here's made known, won't the manufacturers be in a way to find the public aware on their tricks!

They've lowered the wages so low, that one would hardly believe the people would take the work. But what's onc to do?—the children can't *quite* starve. Oh no!—oh no!"—*Morning Chronicle*.

TESTIMONIAL TO MR. RUSBRIDGER.

The following is an account of the presentation of an elegant testimonial to Mr. Rusbridger, subscribed for by a long list of friends, of all ranks, who have evidenced his worth and experienced his friendship and kindness—some of them for a period of fifty years. The money value of such articles is only to be regarded as the measure of the respect and esteem which integrity and uprightness of conduct will ever command, and which have so eminently distinguished Mr. Rusbridger in a long and useful career. The only drawback upon the occasion was caused by Mr. Rusbridger's state of health, which, however, we trust will yet improve, and that he may be spared to enjoy the unalloyed satisfaction, which ever awaits the recipient of well-earned honours.

On Tuesday, Nov. 27, the presentation of this testimonial took place. It consists of two magnificent centre silver candelabra, and two splendid silver salvers. The design of one of the candelabra is an oak-tree springing from a rustic base, on which, beneath the branches, are grouped, in beautiful taste, three agricultural labourers with their implements of labour. From the stem of the tree spread five branches bearing acorns, which form sockets for the candles. The workmanship is exquisitely chaste and elegant. The design of the other candelabrum is a six-branch acanthus, with most elaborately chased foliage, springing from a richly-decorated triangular scroll of the purest classical art. Both the centres have brilliant glass bowls for flowers. The value of the whole is about five hundred guineas. The designs were supplied by, and executed under the superintendence of, Mr. Wilmshurst, silversmith, Chichester; and we need scarcely say that they have won for his artistic display on this, as on similar occasions, the greatest praise and admiration.

The inscription runs thus: "Presented to Mr. Rusbridger by a number of his friends, in testimony of their regard and esteem for his friends, in testimony of their fied by an experience of many years.—November, 1849."

The following is Mr. Rusbridger's letter to the deputation:

"To the Right Honourable Lord George Lennox, of Southsea; Mr. Thomas Halsted, of Woodcote; Mr. Robert Raper, of Chichester.

"MY LORD AND GENTLEMEN,—As you were deputed by a large number of my friends to present to me two magnificent candelabra and salvers, 'in testimony of their regard and esteem for my character and conduct,' I cannot suffer the day to close without sincerely thanking you for undertaking this very friendly office.

"I would moreover avail myself of this welcome moment to express to each and to all of the subscribers how deeply sensible I am of their indulgent kindness, and how truly I value and prize so splendid a token of their 'regard and esteem.' It is no mere affectation when I say that no event in my life has been so soothing and refreshing; for, in taking a survey of the long list of subscribers, I find that all my friends of all ranks have united to do me honour, from those in the highest to those in the lowest sphere. I recognize also the names of many with whom for fifty years I have lived in the closest friendship: their 'testimony to my character and conduct' is indeed most dear. What more can I desire? It has exceeded in a manifold degree all that I dared to hope.

"It is painful when I reflect on my inability to express what I now intensely feel. I have been too long an invalid to have the strength for so severe yet gratifying a trial. And here I am reminded of the considerate attention to my health which has been so thoughtfully shown; for to have received in any public manner this thrilling mark of approbation would have been more than I could have endured. It would have evinced also such a recklessness to the advice of my medical attendant (Dr. Duke) that I am sure my presence would have been regretted with anxiety and alarm.

"I will add but a few words. To the committee, to the tenantry on the Goodwood estate, to those labouring poor men who have so willingly borne their part, and to all my private and personal friends, I offer the thankfulness of a grateful heart. Their beautiful gift is invested with a sacredness which speaks to me of joy and peace.

"The duties of a responsible stewardship I have endeavoured to fulfil with courtesy and integrity to my superiors and equals, whilst to those who eat their daily bread in daily toil and poverty I have endeavoured to manifest the feelings and conduct, not of an overbearing master, but of a benevolent, sympathizing friend. These endeavours have been blessed.

"I remain, my lord and gentlemen,

"Ever yours most gratefully,

"JOHN RUSBRIDGER.

' Goodwood, Nov. 27, 1849.'

LECTURE ON THE SCIENCES AS APPLICABLE TO DOMESTIC LIFE.

At a recent meeting of the members and friends of the Retford Literary and Scientific Institution, George Chapman, Esq., Welham Cottage, delivered a lecture on the above subject, which was both well and respectably attended. A lecture delivered by a person so well informed on all scientific subjects as Mr. Chapman is well known to be, we feel quite certain, must have been both interesting, and to the members, who appeared to take great interest during its delivery, instructive.

The chair was taken on the occasion by John Mee, Esq., who took an opportunity, after the delivery of the lecture, to speak in the highest terms of the desire which had at all times been shown on the part of the lecturer to render instruction pleasing and attractive.

Mr. CHAPMAN commenced by observing—In these days of education and of the march of intellect, we commonly teach our children every art, every science, and every accomplishment that the mind of man can suggest; but we too often forget to teach them that which would turn all these to good effect, viz., to think, to reason, and to observe. “A mind which has once imbibed a taste for scientific inquiry,” says Sir John Herschel, and has learnt the habit of applying its principles readily to the cases which occur, has within itself an inexhaustible source of pure and exciting contemplations.” One would think that Shakspeare had such a mind in view when he describes a contemplative man as finding

“Tongues in trees, books in the running streams,
Sermons in stones, and good in every thing.”

Accustomed to trace the operations of general causes, and the exemplification of general laws, in circumstances when the uninformed and unenlightened eye perceives neither novelty nor beauty, he walks in the midst of wonders; every object which falls in his way elucidates some principle, affords some instruction, and impresses him with a sense of harmony and order. Nor is it a mere passive pleasure which is thus communicated. A thousand subjects of inquiry are continually arising in his mind, which keep his faculties in constant exercise and his thoughts perpetually on the wing; so that lassitude is excluded from his life, and that craving after artificial excitement and dissipation of mind, which leads so many into frivolous, unworthy, and destructive pursuits, is altogether eradicated from his bosom. Desiring at the same time to instruct the youthful and refresh the memory of

the better informed portion of my hearers, I will not apologize for sometimes descending to what might otherwise be deemed examples too familiar to require explanation. Imagining myself, then, your companion from first awakening in the morning till the evening calls you again to repose, I will endeavour to explain the cause of the various phenomena that will fall under your notice. We will therefore commence with the first object that presents itself to our view—our awakening on a fine frosty morning. The window of our bed-room is probably covered with hoar frost, whilst that of the adjoining or dressing room, though the aspect is quite as cold, remains perfectly clean. Now what is the cause of this phenomena? In the bed-room the vapour, arising from the breath of its inhabitants, has created a damp atmosphere, which, when it arrives at the window, becomes condensed upon the cold glass, in the same manner as we have observed on cold water jugs or other glasses when brought into a warm room. This condensed vapour, from the severity of the external atmosphere, is formed into ice in the most minute particles, and has caused those brilliant coruscations, in every variety of form and shape, which the process of crystallization has produced. The adjoining room having been destitute of an inhabitant, has had nothing to produce a damp atmosphere; and, therefore, though the temperature was the same, there is no appearance of frost on the windows. In frosty weather it is a common remark made to domestics to be careful in cleaning the windows; as the glass is brittle, and this certainly is the case, and for an obvious reason. The outside of the window is exposed to a cold frosty air, whilst the inside is warmed by the heated air of the room; hence, the two sides are expanded in different ratios, and a slight accident is sufficient to break the pane, just as hot water put suddenly into a cold glass may crack the vessel, especially if it be so thick that the heat is not readily transmitted through it. Another curious circumstance may arrest attention on rising from bed, and that is the difference found on putting the feet upon a carpet or on a marble hearth; the cold of the first being scarcely perceptible, whilst the latter has a more chilling effect; and yet, if both were examined by the thermometer, they would be found of the same temperature. To explain this, it will be necessary to remember the fact, that bodies of different temperature when brought into contact, assimilate the same heat—the one becoming colder as the other becomes warmer. Some substances are much

quicker in imbibing and imparting warmth than others, and are therefore termed good or bad conductors of heat. In the instance just mentioned, the carpet is a bad conductor; consequently, when the warm foot is placed upon it, it does not suffer much loss of heat. On the contrary, marble is a very good conductor; the moment, therefore, the foot is placed upon it, the marble absorbs a portion of the warmth, and having an easy mode of disposing of it, immediately calls upon the foot for a fresh supply. In the same way we account for the cold felt on immersing the hand in a basin of water, though the water is probably warmer than the air; but the superior conducting power of water renders us far more susceptible to the cold when conveyed by water than by air. That colour also exercises considerable influence in the absorption of caloric, may be shown by the following experiment:—When the ground is covered with snow, take four pieces of woollen cloth—black, blue, brown, and white—and lay them on the snow exposed to the sun; in a few hours the black cloth will have sunk considerably below the surface, the blue nearly as much, the brown considerably less, whilst the white will remain in precisely its former position on the surface of the snow. It thus appears that the sun's rays are absorbed by the dark coloured, and excite such a degree of heat as to melt the snow beneath, but that they have little power to penetrate the white cloth. It is from this cause we observe that a white surface, such as the tombstones in a churchyard, will remain covered with hoar frost long after it has melted from the darker-coloured foot-paths. I will next draw attention to the pernicious practice of sleeping with the curtains drawn close around our beds, which would scarcely be persisted in, did we but reflect on the effect produced by thus depriving ourselves of pure air during the hours of sleep. Air that has been once breathed is rendered unfit for animal life, until it has again been purified; it is composed of two gases, termed oxygen and hydrogen: the first of these is the great agent in respiration and combustion; the latter is of a contrary nature, and is fatal to animal life. Yet on the proper mixture of these two gases the purity of our atmosphere depends. In the process of respiration the air is deprived of a large portion of its oxygen, and obtains in its stead a portion of carbonic acid gas, which also, like hydrogen, is not capable of supporting life. It therefore now follows that air, after it has served the purposes of respiration, is no longer fit for man till it has been purified in nature's best laboratory, where that portion which was unfit for animal life is absorbed by the vegetable world, and the other substances by which it is brought into contact, and from them it again absorbs its proper proportion of hydrogen

gas. The air as it passes through the lungs is brought into very close contact with the blood as it returns from its circuit round the system: it is then in a dark coloured state, and unfit to be again circulated. From this close connection with the atmospheric air, it speedily obtains a large supply of oxygen, which turns it to a beautiful bright red, and it is again fit to be expelled by the action of the heart to the extremities: the blood by this means has become pure, but the breath at the same time has become vitiated, being deprived of its vital quality, and having imbibed carbonic acid in its stead. It therefore follows that the more we are exposed to the free air of heaven, the better will be the state of our blood. Of the pure air a man requires about a gallon per minute; so that if the curtains of a bed are closely drawn, we may easily imagine how prejudicial such an atmosphere must be. There is positively less risk of infection in attending the fever wards of an hospital, where the beds are without testers or drapery of any kind, than in the more luxurious bed-rooms of the middle and higher classes of society, where frequently the excess of anxiety and fear lest a too cold air should visit the patient induces the tender nurse to draw close the curtains, and thus exclude the first of medicines—a pure atmosphere. [Mr. Chapin here quoted a passage from "Waterton's Essays on Natural History," showing the folly of excluding night-air from our dwellings, and proceeded:] In performing our morning ablutions, we shall be led to remark the difference between hard and soft water, and their different action upon soap. Hard or spring water has, by filtering through the earth for a considerable time, imbibed many impurities from the various earthy and mineral substances with which it has come in contact. "There is a very curious fact," says Professor Griffiths, "presented during the formation of lime-water, namely, that the colder the water the more lime will it actually dissolve: thus, water at 33 degrees, or near the freezing point, will dissolve exactly twice as much lime as water will do at 212 degrees, or its ordinary boiling point." These impurities have the effect of decomposing the soap, and preventing its solution by the water, on which the washing properties of the soap depend. Rain water, before coming in contact with these soluble substances, is pure—being, in fact, condensed vapour or steam. White soap dissolved in strong spirits of wine, so as to form a clear transparent liquid, is a simple and accurate test of the relative purity of water. Soap is perfectly soluble in pure or distilled water,—hence no curdling ensues when added to it; on the other hand, if the water contains sulphate of lime (upon which its hardness generally depends), the soap is immediately decomposed: it is a compound of soda and fatty or oily

matter, and the lime combines with such matter, forming an insoluble soap, or curd. Whilst speaking of the properties of hard and soft water in dissolving soap, we are forcibly reminded of our early days, and the hours we have spent in blowing soap bubbles, watching the beautiful colours they assume, till just as they appear to have attained the height of perfection, they suddenly vanish, and disappoint all our hopes; like many an airy day dream which since that time has filled our imagination, and has as suddenly disappeared. A bubble is nothing more than a very thin film distended with air. When blown from a tobacco-pipe we see it ascend, the warm breath with which it is filtered being lighter than the external cold air, the difference being more than the weight of the light film forming the bubble; in a very few seconds, however, if they do not previously burst, these miniature balloons fall, the air contained in them condensing as they cool, when the weight of the film brings them to the ground. This, however, is but a small portion of the wonders of the soap bubble, which will be heightened in our estimation when we find that in his observations upon it, the great Newton was assisted in some of the most astonishing discoveries in optics that have ever been made. The changing colours of the soap bubble caught his attention, but how to account for it was the difficulty which he has solved in his theory of light. It is, however, far too deep a subject for present consideration. I will, therefore, merely explain that white light, as we may term it, consists of three primary colours, red, blue, and yellow, but which, when blended together, make white. That the mixture of red, blue and yellow produce white, may easily be shown by dividing a circular card into three equal parts, coming to a point in the centre, and painting the one part blue, the next red, and the next yellow: if a pin be put through the centre and the card rapidly turned round on it, it will appear white. Now, light, on passing through a medium, such as glass or water, under certain circumstances, becomes refracted or bent; and according to the different degrees to which the ray is bent, it assumes different colours, on emerging by refraction from the medium through which it has passed. The various colours of the soap bubble, therefore, depend on the slackness of the film through which the ray passes, because different thicknesses will give a different angle of refraction, or bending, and a bubble is constantly growing thinner till it bursts. Thus the various hues it presents are accounted for.

Having entered the breakfast-room, let us examine the phenomena which present themselves most worthy of observation. The first striking object will be the kettle boiling, and steam rising from the spout. Here we have a familiar illustration of

the process of evaporation, which, when carried on by nature in her vast laboratory, is the cause of rain and fair weather, the sunshine and the storm. In the instance before us, the fire is acting the part of the sun; and on the principle already mentioned, when two bodies of different temperatures come in contact (the one imparts and the other imbibes) the fire imparts a portion of its heat to the water, which rises in temperature till it arrives at the boiling point, when it changes its character, and from an almost incompressible fluid, becomes that highly elastic vapour, steam, whose giant arm is so wonderfully employed in chasing the face of the universe, and connecting the remotest corners of the globe by its expansive power. But perhaps it will be requisite, before proceeding further, to say a few words on heat—or caloric, as it is more scientifically termed. Caloric then may be familiarly defined as an extremely subtle quality residing in every substance; and although it cannot be termed material, it has the property of insinuating itself between the pores of substances, and causing them to repel one another and fly asunder, increase of temperature being almost invariably attended with increase of bulk.

In the instance of the kettle the water has absorbed caloric from the fire, which mingling with its particles has caused them to repel one another, till they have overcome the density of the fluid, and it flies off in the shape of steam. This vapour diffuses itself over the room till it meets with some cold surface, which condenses it into its original state of water. In a room where there is a large party, and consequently a considerable quantity of water, so that, from the warmth of the room it may be invisible, we shall observe on cold glasses being introduced that they are immediately covered with steam. It is from a circumstance exactly resembling this that southerly winds are often accompanied with rain. The regions over which a southerly wind has passed in coming to us are generally warmer than the part we inhabit; the wind therefore is warmer. Now we know that warm air will retain a larger portion of vapour than cold air will, because when the cold tumbler was brought into the room, the water contained in solution in the air was immediately deposited on the glass: in like manner the warm south wind, when it arrives in our colder climate, is obliged to abandon a portion of the vapour it held in solution, which consequently falls in the shape of rain. It at first appears extraordinary that steam, which is, as we have first seen, only water in a different form, should be so light as to rise in air; yet such is the case, the repulsive power of heat having separated its particles to such an extent that it has become even lighter than air—that is to say, a pound of

water converted into steam occupies more space than a pound of air would do ; it is therefore specifically lighter, and floats in the air, till the coldness of the atmosphere into which it ascends, by robbing it of its caloric, reduces it to a dense fluid, when it descends in air almost imperceptible, as dew or rain. The current of air and smoke which ascends the chimney is again an object to attract our attention, caused by the same expansive power of heat. The air, as it passes through and over the fire, becomes greatly increased in bulk, and consequently lighter, causing it to ascend through the denser part, leaving its space to be filled by cold air from the door or window. By this means the fire is supplied with the proportion necessary for combustion, whilst a considerable quantity of rarified air ascends the chimney, carrying up with it the smoke or dense vapour which arises from burning bodies. It may be inquired how it is when a fire is lighted in a room the air does not descend the chimney to supply it, because that appears the easiest access to the outside air ; and this, if the chimney were very large, and quite open above, so as to admit space enough for an ascending and descending current, might be the case. To obviate this we contract the opening at top by putting on a chimney pot, by which means the current of ascending air is rendered so strong through the small aperture as to prevent the external air from entering. Sudden gusts of wind are apt to cause chimneys to smoke by removing the equality of the atmospheric pressure on the outside. During the gust the perpendicular pressure is partly removed by the velocity with which it passes over ; the consequence is that during the time of the gust, whilst the pressure is removed, there is a rapid draught up the chimney, caused by the want of resistance above ; but the moment the wind lulls again, this pressure returns, the upward draught is suddenly checked, which causes a momentary obstacle to the ascending current, and a puff of smoke in the room is the probable result. Some particular direction of wind will generally influence a chimney in this way more than another, either from some peculiarity in the situation above, or from the apartment being more or less immediately influenced by the same cause ; for it is clear, if the variation of pressure above and in the room is simultaneous no confusion will take place ; but if one happens a few seconds after the other a contrary effect will be produced. In warm weather we often find a disagreeable smell of soot in our rooms ; the reason of which is that in the day time, whilst the outward air is very warm, the chimney, not having been in use and being removed from the sun, is considerably colder ; it consequently cools the air and condenses it, causing it to descend into the room. In the night, when the air in the

room is warmer than the external air, it expands and rises in the chimney. It is this same principle which influences the land and sea breezes of tropical climates ; the surface of the shore becoming very much heated by the perpendicular rays of the sun, the air above it is warmed, causing it to ascend, and the space left is filled by fresh air from the sea ; for the sun's rays having penetrated deeper into the water, the surface has not become so hot, and the air above is comparatively cool. In the night, when the surface of the earth becomes cool, the air above it condenses and descends, whilst the air above the water has become the warmest, because the water is giving out the heat which it had imbibed during the day ; the wind will therefore blow from the land to the sea. By taking a glance over the breakfast table, we shall be reminded that a bright silver tea pot will make better tea than an earthenware one, and for this simple reason—that bright surfaces radiate or throw off heat much slower than black or dull ones, consequently the tea is kept better. From this we may learn, that whenever heat is to be retained, a bright vessel should be employed ; but, on the contrary, if we want a vessel to absorb heat rapidly, a black surface is the best. The quickest boiling saucepan, therefore, will be the one which is black on that part exposed to the fire, but bright on the portion which comes only in contact with the air ; the black part acting as a good conductor, to allow the heat to approach the water—the bright as a bad radiator to prevent its escape. Woollen, as before stated, in the instance of the carpet, is a bad conductor, therefore a very proper substance to wrap round anything which is to be kept hot : and by the same reasoning, although it may sound rather contradictory, it will equally keep any substance cold ; for instance, a piece of ice wrapped in woollen will be much slower melting than another piece not so enveloped. Heat and cold we must remember are only relative terms, as there is no precise point where heat ends and cold begins. Before leaving the breakfast room, we will just observe the effect of a lump of sugar put into a cup of tea ; we shall find it will be some time melting if left at the bottom of the cup, but if we hold it in a spoon at the surface it will dissolve very speedily. This arises from the sugar as it melts rendering the tea heavier ; the sweetened portion therefore descends, leaving the sugar constantly in contact with a fresh portion of unsweetened tea, keeping up a continual circulation till it is all dissolved ; whereas when the sugar is at the bottom of the cup it remains in the sweet portion of the liquid, which, becoming saturated, causes it to dissolve the sugar, and it requires stirring to bring it in contact with the unsweetened portion of the tea. This may be prettily shown if

we colour a lump of sugar with a little ink, and put it at the bottom of a deep glass, gently filling it with water, then colour another lump, and hold it at the surface of another similar glass; the one will be dissolved away quickly, while the other will remain at the bottom of the glass. A walk in the fields, whether they be clad in the russet livery of winter, or in the glowing tints of summer, is ever replete with subjects of meditation. Perhaps the first enquiry may be directed to the cloud of steam, which, as soon as we leave the warm atmosphere of the house, has become visible, issuing from our mouth and nostrils. Here we have an instance similar to that mentioned in the bed-room, where the moisture occasioned by our breath was invisible till condensed on the cold window; whilst in the house our breath was not perceptible, the warmth being sufficient to keep it in a state of invisible vapour; but the cold air outside at once condenses it, and it becomes a cloud of steam. The hoar frost we see covering the trees arises from the same cause;—during the night a thick fog or vapour enveloped the earth, and towards morning a sharp frost setting in cooled every branch and spray, causing the vapour to condense and freeze upon them. The earth, warmed by the heat of the sun, is constantly sending forth vast volumes of invisible steam or vapour (which may easily be proved by inverting a glass on the ground on a fine day, when, if the glass be kept cold, the inside will soon be covered with steam); indeed the quantity is so great that 25 hogsheads of water will be evaporated from the surface of a square acre in 12 hours. It is this vapour, when condensed by any sudden change in the temperature, that produces fog. It may also be observed on a very warm day producing a dazzling effect to the height of a few feet from the ground, resembling the vapour arising from a brick kiln. It does not, however, appear to us in its moist form until condensed into dew by the chill of the evening. Dew is, however, a very important natural phenomenon; and as it is the first and most gentle cause of the separation of water from the atmosphere, it is worthy of a good deal of attention. The subject of dew and of the “dew point,” or degree of temperature at which the atmosphere begins to part with moisture in the form of dew, collected upon surfaces with which it is in contact, are very important ones in the science of the weather. If the temperature is reduced to about 6° below the mean temperature of the place, the season, or the day, as the case may be, the air immediately in contact with the surface of the ground is no longer able to take up the vapour that radiates from it, or even to retain the whole of that with which it is already charged. It was long a question whether dew descended from the atmosphere, or ascended from the earth; though, in strict language, dew can neither be said to ascend nor to descend, yet the water of which it is formed may be afforded by the earth—by the rain—or by both; the last of which is, I believe, pretty generally the case; still, however, there is a little vagueness in the theory, inasmuch as the electric state of the atmosphere may, and must have, some effect upon the formation of dew, and this is an effect which cannot easily be estimated. Looking at the facts, however, which are

our best guides in such cases, we find that there is the greatest disposition to the formation of dew when the difference of temperature between the day and the night is the greatest. There is a greater proportion of solar heat reflected from the earth when the sun is near the horizon; the withdrawal of the reflection acts almost immediately after the sun sets; and so this cause, acting alone, or being the predominant one, occasions an evening dew, which forms in greatest quantity early in the night. There is, however, another means of cooling the lower stratum of the air; the result of which is a dew, which forms later in the night: this is produced by what may be called a night cooling of the air, arising not from the withdrawal of the sunbeam, but from the escape into the upper regions of the air of that heat which radiates from the earth during the absence, as well as during the presence of the sun. If the air is clear—that is, free from clouds—this heat finds its way to an indefinite elevation, because the diminished density of the atmosphere offers less and less resistance to it as it ascends higher and higher. If, however, the atmosphere is clouded, the clouds arrest the upward progress of the radiated heat, and the retention of its action below the clouds prevents the lower atmosphere from tending to the requisite degree below the mean temperature for forming dew. Hence it is only in very particular states of the atmosphere that a thickly-clouded sky is attended with any formation of dew; and one may often observe that when the night sets in cloudy, and afterwards clears up, the ground will remain perfectly dry so long as the clouds are undissolved; but that a heavy morning dew will form after the sky becomes clear. Whatever increases the tendency of the air to receive the vapour of water, must counteract the formation of dew; and hence there is seldom much dew in windy nights, even though the sky is without a cloud. Dew, as we have now noticed, may be considered as the most perfect species of surface-clouds, that is of clouds produced by the states of the earth and atmosphere at their immediate point of contact. But the formation sometimes extends to a moderate height in the air, and appears there in the state of visible vapour, or in what may be called a ground fog. These ground-fogs are chiefly formed along the valleys of rivers which are surmounted by more elevated and exposed grounds. The cold wind from the latter descends after the diurnal influence of the sun upon it has ceased; and diminishing the capacity of the whole for moisture, produces a stratum, a sort of fog, which fills the hollows like water, and remains in the morning until it resolves into vapour by the heat of the sun. Such ground-fogs are more common in the autumnal months, but they appear even in summer in those situations where the formation of dew is frequent and copious. Sometimes the warmth and resistance of the earth are so great that there is less formation of dew accompanying the ground-fog than when no fog is apparent; and the electric state of the atmosphere is often so peculiar, that these fogs scarcely moisten a substance exposed to them, and thus they are what are called “dry-fogs.” That evaporation produces cold may be immediately proved by moistening the palm of the hand and exposing it to

the wind, when cold will be very sensibly felt; and the more so if we use a volatile fluid, such as sal volatile or spirits of wine; the greater rapidity with which they evaporate producing a greater degree of cold. It is from this reason that remaining in wet clothes is so dangerous; the evaporation that takes place during the time they are drying, carries away so large a portion of heat from the body as almost certainly to induce cold, and all the thousand diseases will follow in its train. When a person is obliged to remain in wet clothes, the best method to adopt is to prevent evaporation by covering them with a mackintosh, or any other garment which will best keep in the moisture; and if this is effectually done, the person will feel little inconvenience from his damp clothes; the warmth of the body will soon communicate itself to the damp garments under the mackintosh, and as the steam cannot escape through it, there is nothing to produce a greater degree of cold than if the garments had been dry. We may often observe on a fine clear day that the sky becomes suddenly overcast, and we wonder from whence the clouds have come; now this is most probably the effect of a sudden change of temperature which has condensed and rendered visible in the form of clouds that vapour which before was floating unperceived in the atmosphere. Southerly winds commonly bring rain, because, being warm, and replete with aqueous vapours, they are cooled by coming into a colder climate, and part with some of their vapour, which is precipitated in the form of rain; whereas, northerly winds being cold, and acquiring additional heat by coming into a warmer climate, are ready to absorb more vapour than they before contained, and therefore they are dry and parching, and commonly attended with fair weather. Snow is nothing more than rain congealed in the higher regions of the atmosphere, before it has become dense enough to be formed into drops; and hail is rain, which during its descent, and after having been formed into drops, passes through a stratum of very cold air which transforms the drops into ice. This cold stratum is often the result of an electric state of the atmosphere, and is frequently accompanied by storms of thunder. The formation of ice, as it shoots its long, needle-like crystals from the margin of a shallow pool, is a very beautiful phenomenon, which, however, may be more agreeably examined at the fire-side by mixing a handful of salt in a dish of snow—the mixture producing extreme cold. If a saucer partly full of water be placed in the dish containing the salt and snow, it will rapidly congeal, even in a warm room, the only difference being that the crystals will shoot more from beneath than they would have done in a pond, from the freezing mixture being placed below the saucer. Water is subject to a remarkable anomaly. There is a point in its temperature, about 40 degrees in our common thermometer, at which it is most dense or compact, and from which it expands in heating till it become steam, and expands in cooling till it becomes ice, which takes place at 32 degrees. This is a beautiful provision of nature. By being less dense than water, ice floats on the top, and by forming a hard crust prevents the mass of cold liquid beneath from being greatly affected by

the intensely cold atmosphere. Thus the lower stratum in lakes and rivers continues to maintain a temperature from 6 degs. to 8 degs. above the freezing point, and in this comparatively warm stratum fishes dwell as usual. The boiling point of water is not fixed and definite like the freezing point. It is 212 degs. at the level of the sea; but, in consequence of the diminished pressure of the atmosphere becomes lower as we ascend, till on a summit 15,780 feet high, it is 180 degs.; at the bottom of a mine 1650 feet below the level of the sea, water will boil at 216 degrees. It is through this liquid that all the active functions of vegetable and animal life are carried on. It is water alone that can act as the solvent for the various articles of food which are taken into the stomach, the gastric juice itself being nothing else than water with a small quantity of animal matter and a little acid, which form with the albumen, &c., of the food, new compounds that are capable of being dissolved in that liquid. It is water that forms all the fluid portions of the blood, that vital fluid which penetrates the minutest textures of the body, and convey to each the appropriate materials for its growth and activity. It is water which when mingled in various proportions with the solid matter of the various textures gives to them the consistency which they severally require. And it is water which takes up the products of their decay, and conveys them by a most complicated and wonderful system of sewerage, altogether out of the system. No other liquid naturally exists in the animal body, save the oily matter of fat. It might be inferred then that water, in addition to properly selected articles of solid food, would constitute all that the wants of the system can ordinarily require; and there is abundant evidence that the most vigorous health may be maintained, even under every trying circumstance, without any other beverage. "He that gives his mind to observe," says Bacon, "will meet with many things even in vulgar matters worthy of observation." Many of the operations of the kitchen are conducted on solid philosophical principles; but there is one of which the benefit is less apparent, although from the universality of the practice one is inclined to fancy there must be some advantage derived from it. I allude to the custom of placing an inverted cup in a fruit pie, as the cook will inform us, to contain the juice while the pie is baking, and prevent its boiling over; and she is the more convinced in her theory, because while the pie is removed from the oven, the cup will be found full of syrup. When the cup is put in the dish it is full of cold air, which will expand by the heat in baking, driving out all the syrup and a portion of the air it contains, in which state it will remain till removed from the oven, when the air in the cup will condense and occupy a very small space, leaving the remainder to be filled with syrup; but this does not take place till the danger of "boiling over" is past. If a small tumbler is inverted in the pie, its contents may be examined into whilst it is in the oven, and what has been advanced will be found correct. In the manufacture of bread the most curious part of the process is the action of the yeast. Flour contains a small portion of saccharine matter, the addition of yeast to which produces fermentation in

the same manner that it does in brewing; during the fermentation carbonic acid gas is evolved; now the glutinous nature of the dough will not allow this air to escape, but we find it pervading the whole mass in minute cells or bladders, forming it into a light spongy substance. The warmth of the fire has a double action, 1st, by increasing the inclination to fermentation, and 2ndly, by expanding the air in these small bladders, rendering the paste still more porous. The use of yeast then is to render the bread light by separating its particles. Knowing this, it is not difficult to substitute some other material to produce the same effect when yeast cannot be procured, and none is more efficient and simple than the mixture of muriatic acid and carbonate of soda, in such proportions as to neutralise one another when they form that useful article salt. The addition of this acid to a solution of carbonate of soda, gives out carbonic acid gas; and as this mixture takes place in the dough the gas pervades the whole mass in the same manner as if formed by the yeast. Ropy bread is generally admitted to depend on the presence of fungi; an eminent modern chemist ascribes its cause mainly to the yeast, aided by a particular state of atmosphere. From a microscopic examination of yeast it is found to consist of minute disconnected vesicles, that appear to constitute one of the simplest forms of vegetation. These, like seeds, may remain for any length of time in an active state without losing their vitality; but when placed in a fluid where any kind of sugary matter is contained, they commence vegetating actively, provided the temperature be sufficiently high; and they assist in producing that change in the composition of the fluid, which is known under the name of "fermentation." If a small portion of the fermenting fluid be examined at intervals with a powerful microscope it will be observed that each of the little vesicles, at first contained in it, puts forth one or more prolongations, which in time become new vesicles like their parents. These organs perform the same office, so that in a few hours the single vesicles have developed themselves into rows of five or six. Sometimes also the vesicles burst and emit a number of minute globules which are the germs of new plants, and which soon develop themselves into additional cells. By the time that five or six vesicles are found in each group, the fermentation is sufficiently far advanced for the purposes to which it is to be applied, and measures are then taken to check it, by which the vegetation of the yeast-plant is checked. Suppose then any circumstance to arise by which the vegetation of the yeast was checked, and the yeast amalgamated with the flour, for the vegetation again to become active, you will have a sufficient cause for the origin of fungi in bread. The art of brewing again is based upon chemical data, and will bear the test of philosophical inquiry. Fermentation here is also the most important phenomenon, as the agent which transmutes the sugary principle of the malt from a mere syrup, as it may be considered when in the first state of sweet wort, into a spirituous liquor. A weak solution of sugar will of itself ferment, if kept in a warm place, as will also the sugar contained in grapes and the saccharine matter of malt. In a general view of

fermentation, therefore, we will leave out the small quantity of yeast employed, because it is not absolutely necessary, but seems merely to render the effect more rapid, and thus to prevent the change of the liquid into acidity. In complete fermentation the sugar disappears altogether, and two new substances are found in its place—carbonic acid and alcohol. The former escapes whilst the beer is left open, which may be easily tested by holding a lighted candle near the surface of a tub of beer whilst at work, when it will be quickly extinguished, proving also the deadly nature of the air. The alcoholic parts remain in the liquor. If too much of the carbonic acid is driven off before the cask is bunged down, the beer will become flat, and will be a long time before it acquires briskness. The use of hops in beer, besides the flavour they communicate, is to render it clear, and also a preventive to its becoming acid.

Atmospheric pressure is the weight of the air resting on the surface of the earth. Air extends to a height of many miles above the earth; and although but a light fluid, yet so great an altitude of it must be of considerable weight. Were we to take a square tube, one inch in diameter, and so many miles high as to reach to the top of the atmosphere, the air in that tube would weigh about 15 lbs.; therefore, every superficial inch of the earth's surface is pressed upon by a weight of 15 lbs. Now air being a fluid, presses in all directions alike; consequently, every surface which is exposed to its action, whether it be horizontal or perpendicular, is subject to this pressure. If we place our hand over the open receiver of an air-pump, and exhaust the air from beneath, we should very quickly be made painfully sensible of this pressure. But a more simple experiment, to show the weight of the atmosphere, may be made in the following manner: fill a wine-glass with water, and cut a piece of writing paper nearly to fit the top of the glass; lay the paper on the glass which should be quite full, then placing the palm of the hand over the paper, gently invert the glass, and hold it bottom upwards. The hand may then be removed, and the paper will be pressed against the mouth of the glass by the atmosphere, so as to prevent the water from escaping. The common pump is a most useful application of this pressure to domestic purposes. As before stated, every inch of surface supports a weight of 15 lbs. Now if we can remove this 15 lbs. from one inch of the surface of the water in a well, whilst we allow the pressure to remain over the other part, it follows that the water will be forced up in the part from which the pressure is removed; and if the water so forced up be enclosed in a tube an inch square, we shall find that it will rise in this tube till the quantity contained in it will weigh 15 lbs., which would require an altitude of 33 feet, the weight of water in the tube being equal to the weight of air on a similar surface of water in the well. The pump is an instrument for removing this pressure of the atmosphere from the pipe; every time the piston is raised it lifts the weight of the atmosphere resting upon it, removing its weight from the water in the pipe; the water from the well, therefore, follows up the pipe to fill the parts from whence the pressure is removed, and there is a valve

or small door at the bottom of the pipe which prevents the water returning into the well as the piston descends; every fresh stroke of the pump is followed by a fresh supply of water. The foregoing example of atmospheric pressure seems naturally to lead us to the barometer, an instrument contrived for the purpose of ascertaining the variations of this pressure; for though we have stated it at 15 lbs. per inch as its mere weight, it is subject to constant variation with every change of the atmosphere. The barometer is a glass tube about 33 inches long, filled with quicksilver, and inserted in a cup containing the same, the air being allowed to press on its surface, as it did on the water in the well, the weight of air being removed from the quicksilver in the tube by the upper end being closed. The mercury will now be supported in the tube to a height equivalent to the weight of the atmosphere; this, as before stated, requires 33 feet of water; but as mercury is $33\frac{1}{2}$ times heavier than water, it will rise about 30 inches only. When the atmosphere is heavy it presses with more force upon the surface of the mercury in the cup, forcing it higher up the tube; whereas, when the atmosphere is light, the pressure is relieved and the mercury falls. There can be no doubt that the primary agent in the production of these atmospheric fluctuations is heat. This influence, from various causes, is very unequally distributed. It affects the weight of the atmosphere by expanding its volume. When this spreading takes place in the air over any particular part of the earth's surface, the diminished pressure on the exposed portion of the mercury in a barometer will of course be shown by the diminished elevation of that in the tube. But it will occasion other effects also in the air itself. The more condensed air from distant places will soon begin to rush with more or less violence towards the situation of diminished pressure: in other words, wind will occur. But the increase of heat has also been occasioning a more rapid and plentiful evaporation of moisture from the earth, which, rising into the air in the form of invisible vapour, has of course produced more than the usual accumulation there; and is therefore ready to fall again to the earth as soon as the reduction of temperature has taken place. Hence, in such circumstance, the occurrence sometimes of mist or dew; at other times of rain, or snow, or hail. The process, in short, is this—the heat operating in the air, dilates it, diminishes its weight, and consequently lowers the mercury in the barometer; operating upon the terrestrial moisture, raises it by evaporation into the air, which soon becomes charged with more than its usual humidity. Then come the wind, the fall of temperature, and the rain, &c. A fall in the barometer, accordingly, is found by experience to be in general an indication of all these coming changes. By inverting an empty wine glass into a tumbler of water, and forcing it down, the air in the wine-glass will prevent the water from entering it more than a little way up the mouth, thus showing the power of resistance the atmosphere is capable of exercising, a fact we are apt to lose sight of from the ease with which we move about in it. It is upon the principle of air excluding the entrance of water that the diving-bell is constructed. The effects of the pressure of water

was very curiously exemplified a few years ago by some gentlemen who were trying experiments in water brought from different depths of the ocean. For this purpose they corked up and lowered an empty bottle into the sea, imagining that when the pressure was sufficient it would force the cork into the bottle, and that the bottle would fill so as to bring them a specimen of water from that depth; but what was their surprise on finding it still corked although full of water! They conjectured that the water had forced its way through the cork; and to prevent this, they sealed the cork of the next bottle; on pulling this up, however, the mystery was solved—the bottle was found to be full, and corked as before, but the cork was reversed, and forced into the neck of the bottle, with the sealed end inside. This curious fact was thus accounted for:—As the bottle descended, the pressure drove the cork in, and filled the bottle; the weight of the sealing-wax on the top of the cork caused it to reverse its position, and float with the sealed end downwards; when the bottle was drawn up, the pressure being diminished, the water, or perhaps more properly speaking, the small portion of air contained in the water expanded, and forced the cork again upward into the neck of the bottle. All this appears simple enough when explained, but it required a good deal of consideration on the part of those who first witnessed the experiment. Early in my paper I drew your attention to certain objects of interest occurring in the course of a morning walk. It was my intention to have closed it by noticing a few of the phenomena observable during a stroll on a summer's evening, such as the refraction of the rays of light, in connection with the setting sun, our lengthening shadows, which source would have suggested a cursory remark or two on the cause of lunar eclipses. Then the cause of, and various circumstances attendant upon, thunder storms, might have been not inaptly introduced, which again would have naturally led to the subject of "sound." But having already reached the prescribed limits as to time, I must bring my notes to a hasty conclusion. The acquirement of knowledge consists in the registry of *facts* in the mind ready to be applied as they may be required; and it is this faculty of applying facts thus gained in the brain which constitutes wisdom. Bacon has justly observed that, "the man who writes, speaks, or meditates, without being well stocked with facts as landmarks to his understanding, is like a mariner who sails along a treacherous coast without a pilot, or one who adventures on the wide ocean without a rudder or a compass." The mere possession of knowledge may be only the work of a good memory, and serve but little purpose without wisdom to apply it to good account; it may be compared to a huge folio volume without an index, full of valuable information, but useless to its possessor at the moment it is required, from the want of arrangement and the means of arriving at its contents. To those who pass through the world, as many do, without a wish even to increase their knowledge, or to examine into the wondrous works of nature, satisfying themselves with the opinions of others, seeing with other men's eyes and reasoning with other men's faculties; to such persons I would say, in the language of Locke,

“that he who examines, and upon a fair examination embraces an error for a truth, has done his duty more than he who embraces the profession of the truth without having examined whether it be true or no.” Nor need we fear that the man of an inquiring mind will ever be puffed up with vanity and self-conceit: for the more he sees and observes, the greater will his admiration of the goodness of his

Creator become, and the more humble his opinion of himself, because he is always reminded that his faculties are finite, whilst the God whose works he studies is infinite.

The lecturer having concluded, a vote of thanks was unanimously given to Mr. Chapman for the very able and comprehensive manner in which he had treated his subject.—Derbyshire Courier.

THE LONDON FARMERS' CLUB.—MONTHLY DISCUSSION.

The Monthly Discussion took place on Wednesday evening, Dec. 12, at the Club-rooms, Blackfriars—subject, “Farm leases, particularly in reference to the cropping and cultivation of land.” The chair was taken by Mr. R. Smith, the chairman for the current year. There was a very large attendance.

The CHAIRMAN, in opening, said: In proceeding to open the business of the evening, I am quite sure, gentlemen, that you will allow me to congratulate you upon the numbers present on this occasion (Hear, hear). Gentlemen, when I look round this room I see faces from various counties of England; and such being the case, I am justified in coming to the conclusion that the subject is regarded by you as one of the utmost importance. The subject is important in many respects. The question of leases has long been discussed and thought over in almost every county in England. Gentlemen who are at all familiar with leases, and who have seen different forms of lease, will agree with me that there is often a considerable bulk of paper containing too little substance (Hear, hear, and laughter). I hope our friend Mr. Beadel is prepared this evening—his great abilities have, I am confident, qualified him—to offer to your notice a condensed form of lease, and will make some remarks on the subject of covenants which will be worthy not only of our consideration, but of the attention of the whole country. I am fully aware that this subject is, from its nature, an intricate one. It is, too, a subject which is, to some extent, confined to particular districts. But I am sure the meeting will treat it as generally as possible, and not be led unnecessarily into allusions to special cases. Gentlemen, having said thus much, I shall now, on your behalf, call upon Mr. Beadel to introduce the subject appointed for discussion, which is, “Farm leases, particularly in reference to the cropping and cultivation of land” (cheers).

MR. BEADEL, of Bromfield Lodge, Chelmsford, then spoke as follows:—The subject selected for this evening's discussion is one of peculiar interest to the owners and occupiers of land throughout the United Kingdom; and those who have turned their attention to its consideration will agree with me in thinking it a difficult one. I felt the importance of the subject when I submitted it for the consideration of the committee; and it was with great reluctance I consented to introduce it, feeling how unequal I should be to the task. I rely, however, with confidence upon the candour and kindness of this numerous meeting, and I prefer doing so rather than occupying any time in apologising for my appearance before it. The text, sir, which is to be the basis of our discussion to-night is, “Farm leases, particularly in reference to the cropping and cultivation of land.” It cannot be necessary for me to enter into speculations as to the origin of leases, or when the first document of the kind was executed, by whom granted, or to whom demised. Suffice it to remark that, in the earliest stages of agricultural history, the occupier of the land was little if any better than the menial servant of the lord of the

soil; rent was paid in labour or in kind; the farmer's wants were few, his expenses limited; capital and skill were scarcely appreciated; he laboured on, from day to day, a child of toil, and with little or no hope beyond that of being able, by the sweat of his brow, to provide for his few and meagre daily wants. As time, however, rolled on, a change came o'er the scene, and the occupier of the soil became by degrees less dependent upon the owner; personal services were dispensed with; payments in kind were converted into a money equivalent; the energies of the farmer were exerted; he occupied the position of a man of business, and looked to the occupation which he followed as the means not only of keeping him from day to day, but as enabling him to provide for the wants of old age, and the requirements of a family. It would be curious and highly interesting to trace, through all its gradual changes, the condition of the farmer, from the time when he was in a state of villanage to the present moment: the causes which led, from time to time, to those great and mighty changes which have affected not only the cultivator of the soil, but the artisan, the mechanic, the tradesman, and the merchant. But this, sir, would be opening far too wide a field for this evening's discussion; and I therefore propose, without further comment, to proceed at once to the consideration of the subject before us, having reference to the present race of tenant-farmers, many of whom, if not all, may with truth be designated improvers of the soil. It is one of the rules of this Club that politics shall be excluded from our discussions. I acknowledge the propriety of this exception, and bow with all submission to so wholesome and necessary a rule; but I may be allowed to consider the farming interest as I find it, independent of all extraneous help, and depending entirely on the energies and resources of those who follow it. In this position of affairs, a grave question to be decided between those who own and those who occupy the land, is how to afford the tenant the greatest latitude in farming, consistent with the proper security of the landlord. I need not enlarge upon this; a slight consideration will satisfy any one of its simplicity and justice; and I have no apprehension as to its progress. There is, doubtless, a difference of opinion as to the necessity for leases, and some are even bold enough to contend that a farmer holding on from year to year is as well off as those who have the security of a lease. It cannot be necessary for me to attempt to refute this fallacy—the broad and indisputable fact that the operation of farming requires and necessitates forecast, and the expenditure of capital in operations the benefit from which is looked for in years to come, will be alone sufficient to justify the assertion, that common and ordinary prudence demands that he who expends his money in carrying out such operations should have either the security which a lease gives, or a defined and recognized claim for compensation. Far be it from me to question the kindly feeling, the strict sense of justice, and the high honour, which characterise the conduct of most of our great landowners; nor

would I make the few exceptions the reason for insisting upon leases being granted. I prefer the higher ground, and must contend that, so long as the farmer must progress, must improve the soil, he is entitled to security of tenure, so as to be able to meet not only the rent, but other and important charges, which he cannot do unless by his capital and skill he makes the land more productive than it would be in a state of nature. If (taking an example from another class) parties hiring houses and buildings out of repair require a long lease when they are to find the money for putting them in order, why should not a farmer ask and insist upon a similar security in a case in which he very generally invests not only the whole of his own property, but frequently some which the kindness of friends has supplied him with? But, sir, it will be quite consistent for me on the present occasion to assume that leases are necessary; and I will proceed at once to state a few points which, in my humble opinion, should be the characteristics of a good farm-lease—

- 1st. The names and description of the contracting parties.
- 2nd. A statement of the number of acres, and the quantity of arable, pasture, wood, &c.
- 3rd. The term of years for which granted.
- 4th. The rent, whether in money, corn, or how else.
- 5th. The rates, taxes, and tithes, by whom to be paid.
- 6th. What reserved by the landlord.
- 7th. What the tenant is prevented from doing, and the punishment for breaches of covenant.
- 8th. The course of cropping and cultivation.
- 9th. The mode of entering and of quitting.

It is unnecessary for me to state each particular which it may be requisite to notice in every lease. The custom of different parts of the country will render additions and deviations necessary, which the local knowledge of the parties interested will enable them to suggest. The points I have enumerated are general in their character, and, I may almost say, universal in their application. The first five, which relate to the names of the parties, the description of the land demised, the term of years granted, the rent agreed upon, and which of the two parties is to pay rates, tithes, and taxes, require, I think, no observation, and I will therefore pass on to the consideration of those matters which are usually reserved by landlords, viz., timber, game, mines, minerals, woods, and coppices. As to timber, the clause reserving this is generally as comprehensive as legal phraseology can make it, extending to hedges, pollards, and everything else in the shape or likeness of a twig or tree. The tenant is commonly allowed to cut pollards and hedges of a specified growth, making the ditches and plashing the hedges. Although few people would wish to see the country denuded of every tree, and laid bare and open, it cannot be denied that in many parts of the country the enclosures are much too small, and timber too much preserved and cultivated. Hedges may be removed to a considerable extent, with great benefit to the occupier, without injury to the owner, and neither interfering with the beauty of the country nor destroying the supply for necessary repairs. As a covenant, reserving the timber will doubtless form part of a lease so long as leases are granted; the only suggestion I can offer is, that the tenant, on hiring, should make a large deduction for the injury actually done and the damage occasioned by a redundancy of timber. The preservation of game is so irritating a subject, that I approach its consideration with great trembling. I cannot, however, question the right which an owner undoubtedly has to reserve any privilege over the property he lets to another: it is the duty and ought to be the care of the tenant, in the calculations he acts upon, to make provision for the damage which must inevitably result from a too strict preservation of game. This no doubt is difficult, and few good farmers will

hire farms on which they must remain passive spectators of the injury inflicted upon them. I think, sir, we may congratulate ourselves that a gradual improvement is taking place in this respect. Many landlords now give their tenants the right of sporting, and so enable them to prevent the increase of game to an injurious extent. I believe, as a body, there is no class more desirous of encouraging the sports of the field than the farmers, as affording a manly and healthy exercise to those whose means place them above the necessity for labour; but their antipathies are directed against the novel and effeminate practice of battue-shooting, with the team of keepers and rangers, and the swarms of every description of game, which a predilection for such a pursuit necessitates. There are many other great and crying evils resulting from the too strict preservation of game, the detail of which would not be germane to the subject before us; but I would that I could induce the landlords, by an annual inspection of the destruction caused by game, a calm consideration of the social evils resulting from the unlimited increase of it, and the enormous expenses entailed upon the country to maintain and vindicate the laws relating to it, somewhat to relax a practice which has been proved to be so injurious to society at large. The reservation of mines and minerals, and of woods and coppices, are points which appear to me to require no remark, and I will proceed to another division of the subject:

What the tenant is usually prevented from doing, and punishment for breaches of covenant.
The breaking up of pasture land, cutting down timber, selling off green produce, hay or straw, or growing pernicious seeds.

The two first are most grave and substantive offences, and without going into the questions as to the policy of converting grass land into arable, or of removing hedge-row timber, no one ought to complain that he is restricted in these particulars. The selling off the land of hay and straw is usually allowed, on the tenant bringing back a specified quantity of rotten dung. That some return ought to be made to the land for the loss of manure by the removal of the straw, all will admit; but the introduction of artificial manures will justify the addition of the words, "or other manure," without confining it to rotten dung. The proper return for hay sold off appears to me to be the purchase or use of a certain quantity of cake, or other food, either not the produce of the farm, or not usually consumed by stock; at all events, the remark will apply to the sale of green produce. The permission may be guarded by restricting, in each year, the quantity to be sold off to one-half the quantity grown, and requiring the manure brought on, or the artificial food purchased, to be subsequently to the selling off. The punishment for breaches of these covenants is now frequently inflicted by increased reserved rents, payable not only in the year in which the offence has been committed, but recurring and continuing on to the end of the term. I think this mode of punishment is liable to great objection; and in calling attention to it, I wish to show how disproportioned the punishment is to the offence committed, and I cannot better illustrate the point than by relating a fact which occurred in my own practice about three years ago. The tenant had occupied a farm for many years under a lease which contained a clause binding him to pay an additional yearly rent of £20 for every acre he farmed contrary to the covenants, such extra rent to continue payable thenceforth during the continuance of the demise, and to be recoverable by distress. There was also a covenant preventing his taking two white straw crops in succession. The lease expired, and the tenant admitted he had, five years prior to its expiration, grown two white straw crops in succession, on 20 acres of the land. The land

lord preferred a claim for the increased rents, which, by a simple calculation, amounted to £2,000: the tenant was thunderstruck, as well he might be, at this demand; but there was the bond, the landlord asserting he was entitled to, and could recover, the whole. The matter was ultimately compromised by the tenant paying £500 for the breach of a covenant, the injury, if any, resulting from which fell on himself, and caused not one farthing damage to the landlord, who received the money. I hope it will not be imagined that I think lightly of breaches of covenant. I quite admit the offender should be punished, and that severely; but punishment, to be effective, ought to be proportioned to the offence committed; and one would as soon expect that a pickpocket should be hanged, drawn, and quartered, as that a tenant should be subjected to a payment wholly and utterly ruinous for any breach of the covenants in his lease. I would urge upon those whose duty it is to prepare leases, the abandonment of increased reserved rents, and the substitution of a specific sum, as ascertained and liquidated damages. Let the sum be far beyond any possible advantage the tenant can derive from the breach, or (*at the option of the landlord*) an immediate forfeiture of the lease. It happens, sometimes, that tenants are bound to pay *specified penalties* for breaches of covenant. I do not think these a proper security to the landlord, nor a sufficient punishment to the tenant, inasmuch as, however large the amount of penalty may be, it will only be recoverable to the extent of the damage proved to have been committed, and this would amount to mere restitution. The next point is, the course of cropping and cultivation. In considering this part of the subject, it will be impossible for me to lay down a specified course which shall suit all soils, or be in unison with every description of practice, which long experience and careful observation may have shown to be best suited to different localities; but there are some points of universal application which cannot be neglected without injury to both landlord and tenant. I do not approve of the plan of specifying in a lease the exact crop which shall be grown in the year on each acre of the land. It is no real advantage to the landlord, and seriously fetters the tenant. This, although often stipulated for, is afterwards almost as often disregarded. In some instances a tenant is allowed to farm as he likes till the last four years of his term—a course hardly safe or proper, and for this simple reason, that no man can, with any degree of certainty, foresee or foretell which may be the last four years of his holding. From the best consideration I have been able to give the subject, and, admitting the propriety allowing a tenant the utmost liberty, consistent with the fair protection of the landlord, I am inclined to the opinion that it is reasonable to make it compulsory upon the tenant to have in each and every year of his term a specified portion of the land in fallow, with the right to take green produce—another similar portion in clover grass, or other non-exhausting crops, and leaving the remaining portions of the farm to the management, discretion, and judgment of the tenant. I have purposely avoided stating the respective portions; these must be left to local practice, and to those who have a knowledge of the land. In my own practice, which has been more in Essex than in any other district, I am content to have not less than one-sixth in fallow and one-sixth in clover, &c., so as not to prevent the farmer from following the four or the five-course shift, whichever he thinks best suited to the soil he cultivates; thus giving him as much liberty as a good tenant can reasonably require. The mode of entering and of quitting need not detain me long; custom usually regulates this matter, and the generally received maxim that a tenant should go out as he goes in, is commonly acted

upon. I cannot, however, pass over this part of my subject without noticing what I find a great difficulty in letting farms in districts in which the valuation of dressings and half-dressings, fallows and half-fallows, has obtained. The sum on entering is often a fearful amount, and a large portion of the farmer's capital lies as it were dormant, which might be far more usefully and profitably employed in another way. Any alteration on this head must of course be effected by the landlords, and it is a subject well worthy their best consideration. As a fact illustrative of what I have been stating, I have at the present moment a farm to let, under 150 acres; the rent required is only £100 a-year, and the valuation amounts to nearly eight times that sum, or £800. There is another point I will venture to remark upon; that is, the length to which farm leases frequently extend. I can be no judge as to what may be necessary to make a binding document between the contracting parties—that I shall leave to gentlemen learned in the law; but as I sometimes meet with a lease of one sheet, and at other times a lease occupying nine sheets, each thought to be equally binding and conclusive, I am quite sure all my auditory will agree with me in preferring the short to the long lease. Farm leases have been for some time the opprobrium of the law; antiquated and useless covenants are continued from lease to lease and from party to party, and one common and ordinary cause of the great length of farm leases arises from the barbarous tautology by which legal men seek to ensure the proper cultivation of the land and the observance of covenants, the nature and effect of which they do not understand. It would be a great boon to farmers if some short and simple form of lease could be devised, avoiding all unnecessary repetition, and to be fully binding and conclusive on all parties. With a view to further this object, I have drawn out a form, which I am advised would stand the test of legal scrutiny. I have adopted the schedule form, as the shortest and most readily altered or added to, as may be necessary to meet the peculiar customs of the locality or the requirements of particular cases. I do not wish this to be considered as anything like a model or pattern lease; but if it should be the means of drawing attention to a subject so peculiarly interesting to the tenant-farmers of the United Kingdom, and lead to any improvement in shortening and simplifying farm leases, I shall be deeply gratified. I will, sir, with your permission, read the form I have prepared; and if it should be considered too short, or should there be points omitted which ought to be inserted, it may be nearly doubled without exceeding the number of words which the Stamp Act permits to be written on a single sheet:—

THIS DEED made on the day of 18 between (name description and residence of landlord) of the one part and (name description and residence of tenant) of the other part witnesseth that the said (landlord) doth hereby demise unto the said (tenant) his executors administrators and assigns all that farm called containing acres or thereabouts of which acres are arable acres pasture and acres wood with its actual and reputed appurtenances situate in the parish of in the county of . To hold the said hereditaments and premises unto the said (tenant) his executors administrators and assigns henceforth for the terms of years from at the yearly rent of by equal half yearly payments on Lady day and Michaelmas day in each year But upon such terms and subject to such reservations conditions provisions and clauses on the part of the said (landlord) and (tenant) respectively as are in the schedule hereunder written expressed and contained respecting the tenancy hereby created. And each of the said parties hereto for himself his heirs executors administrators and assigns covenants with the other of them his heirs executors administrators and assigns respectively that the said covenanting party his heirs executors administrators and assigns respectively will observe pay and perform such of

the clauses moneys and things in the said schedule contained as ought to be observed paid and performed on his and their parts respectively and particularly as to the said (tenants) part that he the said (tenant) will pay the said rent to the said (landlord) his heirs executors administrators or assigns and will also pay to the said (landlord) his heirs executors administrators or assigns the several sums of money in the said schedule mentioned to be paid for any breach of the matters therein contained. And lastly it is hereby agreed between the said parties hereto that in case the said (tenant) shall become bankrupt or insolvent within the meaning of any statute in that behalf or execute any deed of composition with his creditors and the said (landlord) shall within three months after the appointment of assignee or assignees of the estate of such (tenant) under any such bankruptcy insolvency or deed of composition pay to him or them for all permanent improvements in or upon the said farm made by the said (tenant) such sum as the same shall be valued at by two valuers one to be chosen by each party or their empire in the usual way and in case either party shall refuse or request either verbally or in writing to appoint a valuer the valuation of the party appointed by the other shall be conclusive Then this indenture and everything contained herein shall thenceforth be wholly void.

The reason why I have inserted the provision contained in the latter part of this form of lease is this: If the tenant become bankrupt, the commissioners of bankruptcy can, without any sort of restriction, order a sale of his interest in the lease. Now, I do think that the landlord, if he be inclined to do what is right and just as between the parties, should have the power of getting back the farm into his own hands; and therefore I say that if from unforeseen causes the tenant is overtaken by bankruptcy, the lease should be rendered null and void on the landlord's paying for the permanent improvements.

Mr. MECHE: What is the custom now?

Mr. BEADEL: The assignees may sell the lease to any one who will pay it.

THE SCHEDULE ABOVE REFERRED TO.

The said (tenant) his executors administrators or assignees to pay the rent charge and all rates taxes and assessments except land tax.

Not to assign or underlet any part of the said premises without the consent in writing of the said (landlord).

Not to take down or injure any of the timber or other trees pollards or underwood which are or shall be upon the said premises without paying to the said (landlord) fifty pounds as and for ascertained and liquidated damages (and not by way of penalty) for each tree or pollard which shall be cut down or injured over and above the value of the same.

Mr. MECHE: Don't say pollard.

Mr. BEADEL: I quite admit that the sooner pollards are got rid of the better; but I cannot forget that if the landlord chooses to have pollards he has a right to retain them. (Hear, hear.) Every tenant must make the best arrangement that he can with the landlord.

Not to break up or convert into tillage any meadow pasture or grass land hereby demised without paying to the said (landlord) fifty pounds as and for ascertained and liquidated damages (and not by way of penalty) for every acre which shall be broken up or converted into tillage and in proportion for any greater or less quantity than an acre.

To ordinarily reside in and inhabit the principal messuage hereby demised.

To maintain keep and leave the buildings and premises on the said farm and all the gates posts fences and drains in good tenantable repair (damage by fire only excepted) being allowed rough timber bricks and tiles within six miles of the said farm.

That may be varied in any way that shall be necessary. If you hire a farm you are bound to keep it in repair.

Mr. MECHE: There is an immense difference between tenantable repair and substantial repair.

Mr. BEADEL: I have only put in these covenants as

skeleton covenants. The great point for consideration is, whether a system of schedule leasing would answer the purpose.

To yearly new make so much of the hedges ditches and fences belonging to the said premises as shall reasonably require the same in a good and husbandlike manner being allowed the underwood bushes and the lops and tops of the pollards.

To yearly spend and consume on the land hereby demised all the hay stover and straw which shall grow or arise thereon or for every ton of such hay stover and straw sold off but not exceeding one half the quantity grown to bring back and use on the said land within six months after two three-horse loads of good dung or its equivalent in suitable artificial manure.

To feed upon some part of the said land or premises all the turnips or other green crops which may be grown thereon and for every acre of such crops sold and carried off shall consume on the said premises one ton of oil-cake or artificial food or corn of equal value thereto.

One ton is probably too great a quantity. I have put one ton, but it might be half a ton or a quarter of a ton. That does not affect the principle. I am not at all bound by the quantities which I have stated.

To manage and cultivate the said demised premises in a good and husbandlike manner and to have in each and every year of the term not less than one-sixth part of the arable land in fallow with or without green crops and one other sixth part in clover beans or other non-exhausting crops and at the expiration or other sooner determination of the said term to leave for the use of the lessor or his incoming tenant all the meadow and clover hay which shall be made in the last year and not have been consumed on the premises being paid for the same at a feeding out price and also shall leave all the straw chaff and colder arising from the last year's crop of corn and grain being paid for the thrashing dressing and carrying out the said corn to any distance not exceeding ten miles.

I am perfectly aware that the latter part of this covenant is by no means generally acted upon; that in some counties the tenant pays a foddering price for the straw, while in others he has a right to fodder out the straw for himself. I have adopted here what has, I know, been acted upon for years with much satisfaction both to landlord and tenant. The next covenant is one which I am almost afraid to read:

To preserve the game [laughter] and fish upon the said premises and suffer notices to be given and proceedings taken against trespassers in his the said (tenant's) name and permit (landlord) or his friends to sport over the lands.

I said, in the early part of my observations, that I thought we might congratulate ourselves on the fact that considerable improvement had taken place of late in reference to this matter. In several instances in which I have been concerned, the landlord not residing on the spot, and having no present object to serve, has said to the tenant: "If you like to have the game, and will pay me 6d. or 1s. per acre for it, no stranger shall interfere." It is infinitely the best that the tenant should have the control of the game in cases in which the landlord has no personal wish to gratify. All I can say is that, if gentlemen who reside on their estates like the pleasure of shooting, a large deduction should be made on that account. A similar observation will apply to timber.

The said (landlord) his heirs executors administrators and assigns on the reasonable request in writing of the said (tenant) to provide sufficient and necessary rough timber bricks and tiles for the repairs of the said premises and at the expiration of the term to pay the said (tenant) his executors administrators and assigns for any valuable and permanent improvement which he or they shall have made upon the said lands and not have derived a fair benefit therefrom.

I am quite aware, gentlemen, that in this last covenant I am trenching on a subject which can hardly be said to belong to the subject this evening; but in considering a

form of lease, I was obliged to consider the relative position of landlord and tenant; but as the words "sooner determination" are always introduced into a lease, there is a clear anticipation of the case of a tenant being obliged to quit his occupation through some misfortune which has overtaken him; and I do think that in such a case the landlord ought not to object to pay for permanent improvements which have increased the value of the land, the increased value being entirely owing to the skill and capital of the tenant.

To allow the said (tenant) to retain possession of the barns and stack-yards till the 1st day of May next after the expiration of the said term.

Well now, gentlemen, the next clause in this schedule is one which is certainly novel, so far as my own experience extends: I never knew a similar one in any lease or agreement. It is, however, in my opinion called for, by the peculiar state of the law with regard to tenant farmers. It has been held that if a tradesman hiring premises shall erect a building for the convenience of carrying on his business, he is, by the common law, entitled to remove it; but Sir J. Thesiger decided that buildings erected on a farm, being estate buildings, must be left. Experience must have taught all of us that in times like these it is exceedingly important that farm-stalls generally should be improved—frequently they are not fit for the carrying on of the farmers' business. But it happens that in many cases the parties who receive the rent are not in a position to expend money for such improvements; in many instances the present landlord is only a life-tenant, and as such it is naturally his object to obtain all that he can out of the estate. Such persons have no permanent interest in the farm. I think, therefore, that any well-regulated lease must contain such a provision as I will now read to you.

To permit the said tenant at the end or other sooner determination of the term to remove any buildings or erections he may have put up at his own expense on the said land or pay him for the same such a sum as may be determined upon by two valuers or their umpire in the usual way.

I think the landlord should have the right of taking to the buildings on a valuation; and if he decline to exercise that right, it appears to me that common justice requires that the tenant who has erected such buildings should have the right of removing them. Permit me, sir, to say in conclusion, I have no predilection for the form of lease I have suggested; my only object is to invite attention to a subject so deeply interesting to the farming interest. Strongly impressed, however, with the necessity and the justice of some alteration, I shall feel the greatest satisfaction if the humble effort I have made, as a member of this club, shall be the means of introducing, however gradually, an improved and more liberal contract between the owner and the occupier of the soil. I believe I have exceeded the time usually allotted to the introduction of a subject for discussion; and although I have endeavoured to compress my observations, I feel I have left much unsaid which might have been fairly and properly urged. But, sir, one great advantage attending our meetings is, that a discussion follows the introduction of a subject, in which novel views are exploded or confirmed by the practical knowledge of the members—errors are corrected, and fallacies exposed. Thanking you, sir, and all present for the patient attention I have received, I will conclude with the hope that our efforts to improve farm leases will be ultimately successful.

Mr. W. BENNETT said he had listened with great pleasure to the observations of Mr. Beadel in opening this discussion, and was convinced that all present felt indebted to him for the able manner in which he had brought forward the subject. He rose chiefly for

the purpose of eliciting information from him with regard to the infliction of penalties. A penalty had been named for breach of covenant; and considering the eminence of Mr. Beadel in this part of the country, and more particularly in Essex, as a land-agent, it was pretty certain that any form of lease which he proposed for the benefit of his brother farmers, and especially if adopted by that numerous meeting, he considered as more or less a standard to which all landlords might refer. For this reason it was very important that any such matter as a penalty should be strictly, fairly, and honestly scrutinized. The penalty proposed to be inflicted on a tenant for breach of covenant was £50. He would be glad to know from Mr. Beadel what penalty he would propose as against the landlord for not furnishing the necessary materials after receiving proper notice from the tenant. Many questions of that sort had arisen within his (Mr. Bennett's) own observation. He was then engaged in an arbitration, in which awful dilapidations had occurred. Proof was given that numerous applications had been made to the landlord at different times for materials, and that they were not furnished; and then, at the end of the chapter, a claim was put in by the landlord for breach of covenant. If there were to be an honest contract between landlord and tenant, there must be penalties on both sides (Hear, hear). He therefore wished to know whether Mr. Beadel means to propose that, in cases in which materials were not furnished on being applied for by the tenant, in consequence of the landlord being at a distance, or from any other cause—the tenant being pushed off from time to time, in forgetfulness of the saying, "A stitch in time saves nine"—whether in such a case he would propose a penalty as against the landlord (Hear, hear).

Mr. BAKER said: I also wish to put a question to Mr. Beadel, and it is a very important one. Within a very short distance of my residence there has been two fires in farm buildings. In one case the tenant had consented to keep the buildings in repair, and, no exception being made as to any damage which might arise from tempest or fire, he has been called upon by his landlord to restore the buildings. Not having insured them, he is compelled to do so out of his own pocket. In the other case—in which the fire was, I have no doubt, the work of an incendiary—there was a covenant in the lease by which the landlord exempted his tenant from liability on account of damage arising from fire. But there was no covenant for the landlord to rebuild, and consequently the tenant is now in the position of having to occupy the farm without the buildings. As regards bankruptcy, or the power of the landlord to re-enter in case of bankruptcy or insolvency on the part of the tenant, I think Mr. Beadel's plan is liable to objection. As the law stands at present, the landlord has the power of re-entering as though the deed were re-executed. In some cases injustice has, doubtless, been committed. In a former discussion I introduced a clause into a lease with the view of getting rid of the difficulty. If what is proposed were attempted to be brought into operation, the landlord might say, "No, I will not sign your lease; because if I did, the tenant would have nothing to do but to commit a fraudulent act of bankruptcy, which would render it null and void; and he would then, perhaps, pocket the valuation at my expense." As regards hay and straw, I have made a clause to the effect that the tenant shall have the privilege of selling off the hay and straw and the green crops, bringing on the farm the money-value in the shape of some other description of manure, such as oilcake. Such a clause as that would, I think, relieve us from a great deal of difficulty. In that case there would be no necessity for laying any restriction on the tenant. If he

brings upon the farm the money-value of what he sells off, that must be sufficient to meet the case. As regards the closing of a lease at the expiration of the term, I have introduced a clause lately to provide that the tenant shall be paid for all the permanent improvements made within the last five years of his term, of which he has not received the full benefit; also that the valuers shall take into consideration any acts of mismanagement which he may have committed, to the injury of the farm, and have power to deduct for acts of dilapidation from the amount of the ordinary valuation, the decision of the valuers or umpires to be binding on both parties. In such a state of things no law-suit can arise between landlord and tenant. On the one hand the tenant will be paid an equivalent for unexhausted improvements: on the other hand, if he has done any injury, a deduction will be made on that account from the amount which he would otherwise receive. I trust that Mr. Beadel will accept these observations in a kindly spirit (Hear, hear). I wish to see the question investigated in such a manner that we shall be able to show landlords what is the best form of lease for them to adopt. In particular, I repeat, that if there be a clause binding tenants to such a course as will prevent injury to the farm, very great difficulties will be obviated.

Mr. MECHI: Allow me to make one remark. Drainage being now considered the basis of all improvements on farms, I would suggest that a covenant should be introduced to compel tenants to keep the mouths of drains perfectly open, and to have the open ditches cleaned out at least once a year (Hear, hear). I have seen very great injury arising from the stoppage of drains; and I am quite sure that if this point be not attended to, in less than two years the advantage of laying down drains must be entirely lost.

Mr. LAWRENCE: I can mention a fact in confirmation of Mr. Mechi's last observation. A short time ago I went over a field which evidently required draining, being in a very bad state. I was making preparations for draining it, when an old man who heard that I was doing so said—"O, sir, that field was drained about six years ago, and I can point out where the main drain was." The drain was opened, and found to be in perfect order. It turned out, however, that after the field had been drained the outfall had never been opened, and the ditch into which the water should have run was just a foot higher than the bottom of the drain.

Mr. SHAW said: In a meeting so numerous as the present one, in which I see so many gentlemen who are intimately acquainted with all the details which Mr. Beadel has introduced to our notice, and so many who are practically acquainted with the working of those details, I feel considerable diffidence in rising to make any remarks on this subject, because I know that I may lay myself open to animadversion on purely practical points with which I may not be familiar. Nevertheless, I am of opinion that our meetings are of value, not only with respect to details, but also as affording an opportunity for propounding to the world, and more particularly to the landlords of this country, the principles which we think should in these days be observed (Hear, hear). With the view, therefore, of offering a few remarks in that direction, I am induced to trespass on your attention for a short time. In the first place, I would observe, in reference to Mr. Baker's remarks on the subject of buildings, that it does so happen that my attention has been a little drawn to that subject. In the bill introduced into the House of Commons, in the last session, by Mr. Pusey, some provisions with respect to the affording of compensation to tenants came under my special notice, and I must confess that I think the proposition of Mr. Baker would be utterly inefficient. I do not know whether I misunderstood him or not, but

if I did I hope he will set me right. I think I understood his observation to apply to the case of all permanent improvements made more than five years before the termination of the occupation.

Mr. BAKER: I did not mean buildings, but all improvements.

Mr. SHAW: The major of course includes the minor. All buildings are improvements (Hear, hear).

Mr. BAKER: Mr. Beadel having mentioned buildings, I conceded the point. I did not offer any objection.

Mr. SHAW: Very well; I will leave that point. I apprehend that draining is a permanent improvement, and I apprehend that it will not be laid down as a general principle—though I admit that it may be the case under some circumstances—that five years' occupation is sufficient to compensate the tenant for draining. There may, I repeat, be some circumstances under which it would be so; but there are many others under which it clearly would not, and I hold that when we are deliberating upon general principles, we ought not to allow it to go forth to the world that this club considers that five years' enjoyment of the advantages of an outlay for draining is sufficient to remunerate the tenant for that outlay (Hear, hear). Another point which Mr. Baker propounded related to green crops. Now I feel sensibly that the permission to sell green crops may, under certain circumstances, be of great importance to the tenant. I think the landlord is entitled to a full protection of his property, and in my opinion the perfection of any agreement or lease that can be made consists in providing for an ample extension of liberty to the tenant, at the same time that the property of the landlord is adequately protected (Hear, hear). I must confess, however, that I cannot see now any advantage is to be derived by the tenant from the sale of his green crops, if he is to be compelled to bring back their value to the farm in the shape of manure (Hear, hear). I apprehend that by every article which he sells the tenant expects to make a profit (Hear, hear). He is now permitted to sell certain crops from which he is assumed—I am afraid it is not really the case—to realize a profit; and if, in addition to those which he can sell already, he is allowed to sell his green crops, it must be for the purpose of making additional profit. If, however, he is required to replace the full value of, what he sells in the form of manure, it does appear to me that the permission to sell is no boon at all. Gentlemen, Mr. Beadel has very properly called our attention this evening to the subject of legal covenants, and when I speak of legal covenants I mean covenants drawn principally by legal men. Now, although I have some intimate friends to whom my observation will apply, I cannot help saying that I believe no men on the face of the earth are less capable of drawing covenants for farm leases than legal men (Hear, hear). I make that remark in reference to them simply in their capacity of land-agents; it is in that capacity that I am now viewing them. I believe that from the employment of such persons, and of others in the same capacity—men selected for all reasons that can be conceived except the right one: such, for example, as their having been college acquaintances, or brother officers in the army or navy, of the landlord—I believe that more mischief, arises from the circumstance of such men being employed as land agents, when they are utterly unfitted for the office, than from any other sources of evil affecting the interests of the tenant (Hear, hear). I perfectly agree with Mr. Beadel that the musty parchments which are frequently taken down as precedents from shelves where they had lain for 20 years are, with reference to the present day, most absurd, preposterous, and prejudicial to agricultural improvement. With respect to the general regulations of a lease, however, it cannot be forgotten that the property belongs to the landlord, and however

absurd and capricious may be the terms which he seeks to impose on the in-coming tenant, it must be admitted that he has a *prima facie* right to propose any terms he pleases. I believe that many of the mischiefs which prevail have arisen in a great degree from the conduct of tenants themselves (Hear, hear.) It is of no use to blink this question. Whilst, as soon as a farm is to be let, we find tenants from one end of the country to the other running over each other to get it on almost any terms, it cannot be surprising that so many evils redound. If tenants are not careful, and if the spirit of competition prevents them from considering their own interest, the result may be easily anticipated (Hear, hear.) It is to this cause, I think, that the stringency of many existing covenants is to be traced—covenants which are so inimical to agricultural improvement. With respect to game, I quite agree with Mr. Beadel that a great improvement is taking place; and I have no doubt that if the present state of things shall continue (I must confess I do not think they will) not only game, but pollards, and many other and similar impediments to the progress of the tenant will be removed (Hear, hear). But that is a mode of obtaining redress which I should be sorry to have to rely upon. I hope that the good sense of the landlords, and the information which is diffused by means of this club, and through other channels of intelligence, will convince them that it is their interest—aye, their duty—to take care that such impediments are removed. This question is not simply one between landlord and tenant—it is not simply the question how much advantage the tenant might derive, but there is another question, which is becoming more and more important, namely, that of the employment of the labouring population (Hear, hear). There is one other point on which I desire to make one or two remarks, namely, the large amount which we are told is demanded in the shape of valuations. Now, I must confess, that although I have paid some attention to that subject, having had occasion to search for information upon it some time since, yet I never met with anything at all approaching the statement made by our friend, Mr. Beadel, this evening (Hear, hear). £800 upon 140 acres surpasses everything that I could possibly have conceived. I really should have imagined that if a piece of garden ground were about to be transferred from one tenant to another, the valuation would have hardly exceeded that sum. I know, indeed, that in some parts of the country the valuation is very heavy; for example in the neighbourhood of Wakefield, in Yorkshire, where a species of tenant-right exists, though not that which I should like to see established throughout the country generally. I know that the payment by the in-coming tenant amounted to nearly £4 per acre; and I should certainly have thought that £4 per acre, though only about half the amount of which our friend has spoken, was quite enough to cover any value which the tenant could possibly have received. Surely in the case mentioned there must be something very extraordinary. There must have been some permanent improvements of an extraordinary character, of which the in-coming tenant derived the advantage; an ordinary valuation sum could not amount to that sum. I hope our friend by-and-bye will give some explanation. With respect to valuations generally, I believe it is the interest of the landlord, as well as that of the tenant, that there should be a certain amount of valuation; but if this valuation goes to such an extent as it does in some parts of the country, if the tenant pays for what he does not receive, if he pays for a certain amount of scratchings, called harrowings, and ploughings, and for a quantity of old straw designated manure, in such cases the valuation must be onerous and injurious to him. On the other hand, I certainly cannot see what injury the

in-coming tenant can sustain if, as is the case in Lincolnshire, he has to pay only the value of what he receives. In that case the tenant is, in my opinion, in a much better position than he would be if he came into possession of a beggared occupation (Hear, hear). I have to apologize to you for making these lengthened observations. As I said before, I wished to make some remarks on the general principles involved in this question, leaving the details to those who are better acquainted with them than myself (cheers).

Mr. LAWRENCE said: I do not see that the difficulties which have been raised with regard to insurance are at all insuperable. The practice in my part of the country is for the landlord to covenant to repair the roofs and the outer walls, while the tenant agrees to do what may be termed tenantable repairs. I do not think it necessary to provide a lease which shall meet the case of a party neglecting to do that which he has covenanted to do. The only protection which can be afforded is that of insurance. With regard to the whole question of leasing, I concur in the remark that a discussion of this kind is likely to produce a considerable impression throughout the country, and that on that account it is highly important that our decision this evening should be well considered. I should be very sorry indeed to see any lease going forth in print, with the stamp of our authority, which had not been maturely weighed by at least three or four experienced heads, who, after taking into account all the observations which will have been made this evening, shall agree upon such a form of lease as it would be satisfactory to send forth from this club. Mr. Beadel's form is, in my opinion, an exceedingly good one on the whole; but I conceive that it might advantageously be reduced. The discussion this evening might facilitate the mature consideration of the question in the manner that I have suggested; and thus a form of lease might be confidently recommended for adoption, and would, in all probability, be generally adopted.

Mr. WALTON said: Farming, as I do, in the Hampshire, I wish to observe that in that country we have great difficulty in finding sufficient green crops for the feeding of sheep. Within ten or fifteen miles round London it may be most advantageous to the tenant to sell his green crops, because he has an opportunity of getting them into the London market cheap. Permit me to make a remark with respect to what I conceive to be the interest of both landlord and tenant as regards the leasing of farms. I consider that it is ten times more beneficial to both that the tenant should be paid fairly for the improvements which he has made than that he should have a lease ("No, no"). When a man has a long lease, he always prepares for its termination; and the effect must be, to put the land in a certain degree out of cultivation. In my opinion the effect of that state of things is to create more dilapidations than would take place were the tenant paid a fair remuneration for unexhausted improvements. On leaving a farm in Essex I am convinced that I lost one-third of the amount which I had paid for improvements. It is clearly the interest not only of the landlords and the tenantry, but of the whole country, that farms should be kept in as good a condition as possible (Hear, hear). There is a great outcry everywhere, that farmers have all got more land than capital. The adoption of what I advocate would tend to remove that state of things. A good tenant-right in the shape of a good reservation on behalf of the tenant at the end of the term would, I repeat, be, in my opinion, preferable even to a lease.

Mr. PAYNE, of Felmersham: With reference to an observation of Mr. Shaw, I hold that, as regards the fee simple of the manure, the tenant does not by the suggestion made get value for what he has invested. He

certainly loses the interest of his money during the period that he occupies the land (No, no). I understand that in many cases it is the practice for the manure itself to go from tenant to tenant, instead of being the property of the landlord; and if the manure be paid for by the incoming tenant, I hold that until he leaves he loses the interest of the capital thus invested. I should like to see all leases so drawn that the manure would be the landlord's property, and not the tenant's (No, no). Such is the principle adopted in my district, and it is, I think, the proper one. I am speaking merely of the produce of the farm for the year; I do not refer to oilcake manure. It has always been a point with us that if a tenant has to pay for an outlay of that sort he loses the use of the money which he lays down for the fee simple during the whole period of his tenancy; whereas, if it be the property of the landlord, he may use that money in effecting improvements on his farm. That is, in my opinion, the proper principle for adoption in farm leases. Mr. Shaw says that the circumstance of a farm being overrun with pollards and game is frequently more the fault of the tenant than of the landlord. I confess that I do not quite agree with him on that point. It frequently happens that a tenant looks rather shy when he finds a farm in such a condition; but the landlord says to him, "The rent of the farm is so and so, and these are my conditions. I have been accustomed to keep what quantity of game I please. I hope it will do you no damage; but it is my pleasure that things should remain as they are." The tenant is in the end induced to accept the farm, knowing that there is something doubtful, because the terms are the best that he can get. And in such circumstances I do not think it can fairly be said that the fault always lies with the tenant. He has what is called, "Hobson's choice" in the matter (laughter). I could not refrain from making these few remarks in defence of tenants.

Mr. SHAW: Allow me to offer one word in explanation. The distinction which I wished to draw is this. I say, on broad, general principles, that if a man makes a bad bargain with his eyes open the fault is his own; but I also say that if, by means of a plausible tongue, the landlord induces the tenant to take a farm with a certain quantity of game upon it, and if from any cause whatever he increases the mischief by increasing the game, in such a case the tenant has a real ground of complaint. If a tenant does what he is doubtful about, to use my friend Mr. Payne's expression, I do not see how it can be denied that the fault is his own.

Mr. BAKER: With regard to the money value of turnips, permit me to say that those of us who have practical experience generally consider the turnip crop as the means of raising manure for the farm. Turnips are now grown almost exclusively for that purpose. We look upon bullocks and sheep as mere machines for making manure. If the tenant were permitted to sell his green crops—which nearly all leases prohibit him from doing—it might be more advantageous to sell them and turn them into manure to be brought on the farm than to feed them off on the land. At any rate, I thought the point was a fair one for discussion, and it was with that feeling that I introduced it. It must be recollected that, whatever might arise from converting turnips into manure, the tenant would have the enjoyment of it. If the matter be regarded practically, I believe you will all come to the same conclusion as I have done. As regards improvements existing at the end of the lease, I have stated that I think the tenant should be entitled to receive value for all improvements which are permanent; and, in order to prevent him from improving less through his occupation not being renewed he should lose the value, I think it right that there should be a covenant that he be paid for certain improve-

ments made within the last five years of his term—such an improvement, for example, as drainage. I cannot admit that every tenant should have a right to erect just whatever buildings he may please, and be able to compel the landlord to compensate him. At the same time, if the landlord does not choose to take the buildings, the tenant ought certainly to have the power of removing them.

Mr. SHAW: I am quite conscious that my friend Mr. Baker has a great practical advantage over me. Nevertheless, upon this turnip question I wish to make one or two more observations. Mr. Mechi says, in effect, that he is still of opinion that the tenant should be called upon to bring back the money value of what he exports in the shape of green crop. Now, I have heard of statement that turnips are not worth more than 3s. per ton; and, on the other hand, I have been told that in some parts of Essex turnips are now worth 16s. a ton. I will suppose them to be worth 10s. a ton. Assuming that price, and assuming also that the produce is sixteen tons per acre—that being said to be the average in the Eastern Counties—you have £8 per acre. Does my friend Mr. Baker hold that the farmer should be called upon to bring back £8 worth of manure? (Hear, hear.) I must confess that I cannot understand how that could be justly required. I am in the hands of practical men, and am willing to bow to their decision; but it really appears to me that that view cannot be supported.

Mr. BAKER: It must be recollected that there are not many turnip buyers: it is only on a very limited scale that a market can be found for them. They cannot generally be disposed of at a much higher rate than they will realize for feeding purposes.

Mr. BEART said: I wish to make one or two remarks with regard to the bearing of this question on draining. If, after agreeing to give a certain rent for land, it is not properly drained, I drain that land perfectly; and if at the expiration of ten or fifteen years, for example, the draining apparatus is just as good as when it was constructed, I do not see what the lapse of time has to do with the question of compensation. If I go into the market and give the price at the time, my landlord is, I conceive, bound to pay me for my drainage improvements, whatever they may amount to—supposing, that is, that the drains remain as efficient as they were at first. Now, what is the exact position in which we are placed this evening? We are called upon as tenant farmers to sanction certain clauses, or a certain form of lease. I concur in the remark that such a matter requires great caution. It has been suggested that a committee should be appointed; at any rate, I think we should be very cautious as to committing ourselves to any definite principles in connection with the occupation of land. I want to see something of a more commercial character than anything which has been brought forward to-night (Hear, hear). I recollect a clause in the lease which was read, to the effect that, if a tenant farmer shall have erected buildings, he shall at the end of the term either receive value from his landlord on certain conditions, or be allowed to remove them. Suppose the landlord should be a tenant for life: what, in such a case, would be the position of the tenant? The next landlord on coming into possession would, I apprehend, be entitled to have the buildings without paying anything for them.

Mr. MECHE: Not if there were an agreement.

Mr. BEART: The question is at all events worthy of consideration. I repeat that tenant farmers ought to be very cautious ere they commit themselves to principles, unless those principles have a commercial character, and unless their adoption is likely to be beneficial both to the landlord and the tenant.

Mr. MECHE: I hope our friend Mr. Beadell will be

kind enough to explain to us by-and-bye the difference between substantial repair and tenable repair. In the one case, as I understand, what is intended is, such repairs as are necessary to render property wind and weather tight; in the other case the repairs are of a more durable character.

Mr. W. BENNETT: As regards the bringing back the value of a green crop, when sold off the farm, I am, I confess, rather induced to agree with Mr. Shaw than with Mr. Baker. Let us deal with this question as men of business. I do not see Mr. Knight or Mr. Smith here this evening; but those gentlemen having farms in the neighbourhood of Edmonton, are in the habit of bringing turnips and mangel wurzel to London; and the latter is, I believe, worth 16s. a ton. Now, supposing a man to grow thirty tons of mangold wurzel per acre, he must, in such a case, bring back between £20 and £30 worth of manure. Will any one deny that that would be monstrous?

Mr. BAKER: I did not speak of garden land (laughter).

Mr. BENNETT: It is a lamentable fact in reference to all those extraordinary profits which have been held up of late, when people have wanted us to imitate farming models, that it has always turned out that the parties who had made such profits were selling either potatoes or something which derived its great value from the close vicinity of a market town (laughter). The facts were published in all the newspapers as showing the favourable condition of the farming interest, and it is taken for granted that all farmers might if they pleased have equally large profits (laughter). I contend that there is no fairness in the proposition that the whole value of the green crop which is sold off a farm should be brought back in the shape of manure. I admit that the landlord is entitled to an equivalent, but it should not be of the same nature or extent as that proposed. In many instances these crops are produced at very great cost to the tenant. If a clause like that suggested were inserted in a lease, I for one would never sign the lease, and I hope no sensible man would be induced to take such a step. I fear that I did not make myself sufficiently understood by Mr. Beadel as regards the first clause of his form of lease. I want to know what penalty he proposes to impose on a bad landlord. Penalties should not be all on one side (Hear, hear). I quite agree with Mr. Lawrence that we ought to pause before venturing to publish a form of lease, and thus giving our sanction to a document which may go through the length and breadth of the land as one which is approved by the London Farmers' Club (Hear, hear). It must be recollected that if we were to act thus, landlords might afterwards say to tenants, "Why, I require of you nothing more than what has been approved of by a body of tenant farmers assembled in London from different parts of the country, who, after a full discussion of the subject, consented that such and such clauses should be inserted in leases." I quite agree with Mr. Lawrence that there ought to be extreme caution. I think that Mr. Beadel has introduced on the whole a good substantial form of lease, but we should not commit ourselves to it without previously going through it clause by clause (Hear, hear). This system of saying "You may sell this," and "You shall not sell that," is opposed to all good farming as well as to fair play. If we are to become more commercial, we must have the power of turning the farm to the best possible account.

Mr. CHEETHAM said: My opinion with respect to green and root crops is this, that in cases in which they are carried off, the equivalent ought not to be more than what the money value of the crops would amount to, otherwise the farmers would be a loser by the amount of labour which had been performed. I can adduce an in-

stance in which such a view of the case has been taken. I know a farmer who grew a few potatoes, and it turned out, though he was at this time unconscious of the fact that his doing it was contrary to the terms of his lease, his landlord came down upon him for dilapidations. Each of them chose a person to settle the matter, the two parties chosen selecting a third. There was a most excellent crop of potatoes, and the valuers fixed upon £2 per acre for dilapidations, an amount which could not be anything like an equivalent for the value of the potatoes. With respect to what has fallen from Mr. Payne, I am astonished at the surprise expressed by the meeting as to the circumstance of the manure belonging to the landlord; I confess my own ignorance in relation to the views taken by many persons present. I never knew a case in which the manure did not go with the land. I have been a farmer in the neighbourhood of Ripon for some years, previous to which I was in Nottinghamshire, and I never knew a case in which the incoming tenant did not pay for the manure. I am certainly not an advocate for making the incoming tenant pay more than is necessary.

Mr. TRETHERY: It was not my intention to offer any remarks this evening, but I cannot refrain from adding my testimony to that of Mr. Payne, to the effect that it is the exception for the manure to belong to the tenant. Within my experience it has always been customary for the manure to belong to the landlord, except with regard to the use of oilcake, or other artificial manure. I desire to make one or two remarks on the general subject of our discussion this evening. We are involved in the consideration of a very comprehensive question, and I scarcely know where to begin in dealing with it. I feel that in considering this question, we are considering the important subject of tenant-right (Hear, hear). Some remarks have been made about pollards and game. The question of game is, I trust, much more simple than it was. I trust that landlords are becoming increasingly disposed to restrict their game preserves. As regards pollards, I have found as strong objections entertained by tenants to their removal, as on the part of landlords. Tenants have said, "We have no objection to your cutting down other trees, but we want pollards for stakes." Now, I am an advocate for felling pollards whenever they stand in the way of the land (Hear, hear). With respect to hedges and fences, it is difficult to lay down any positive rule. It is clear, however, in relation to tillage, that the less land they occupy the better; the lower they are kept too, the better; and, in fact, the less you have of them the better (laughter). As regards the privilege of shooting, I think that in cases in which the landlord does not himself shoot, it would be much better to give the tenant the liberty of shooting, than to make a paltry charge of 6d. per acre (Hear, hear, and laughter). As to draining, it is scarcely possible to lay down any general rule. I certainly do not concur in the opinion expressed by a gentleman at the other end of the room, that the landlord should be bound to take to the drainage in the manner that he suggested. At the same time I would sooner, on taking a farm, pay for drainage in an efficient state, than execute the same kind of drainage myself.

Mr. BEART observed that his remark on the subject had been misunderstood.

Mr. TRETHERY continued: I think the most satisfactory plan would be to let the drainage extend, as it were, over a certain number of years; and if the tenant have not had the enjoyment of it for a certain period, I think he should then be entitled to compensation. A rule might be laid down which would in some degree meet this case. It is impossible, however, to fix upon any form of agreement which would be adapted to all cases. We have all witnessed this evening the manifes-

tation of differences of opinion. If we cannot concur in the terms of an agreement, how is it possible for any lease or covenant to be drawn up which will apply throughout the whole kingdom? For my own part, I am of opinion that the fewer restrictive clauses a lease contains the better.

Mr. CLUTTON said: The amount mentioned by Mr. Beadel as having been the result of a valuation is not unparalleled. There is within my own knowledge a case in which the valuation for 340 acres amounted to £2100. I will tell you what were the items of that valuation (A voice: "In what county was it?") Surrey. In Surrey, Essex, and Kent, the manure almost universally belongs to the tenant. The items to which I especially allude were hay and straw, at the market price, dung, dressings and half-dressings, foldings and half-foldings, layings, seeds, and underwood.

Mr. BEADEL then proceeded to reply. He said: I felt the importance of not attempting to bind the meeting to any particular form of lease. At the same time it was necessary that I should draw up some form to invite discussion (Hear, hear); and as I confess that I have learned something from the discussion which has taken place, I do not regret having introduced the form which I read (cheers). I never contemplated the form which I had drawn up being sent forth stamped with the authority of the club, and in the observations which I made I carefully guarded myself against being supposed to have such an object. I submitted my form to the club under the feeling that it would be a grand step in advance, if we could reduce the length of leases, while we endeavoured to make them more secure for the landlord and more liberal to the tenant. It so happens that on this occasion one member who has spoken has in many cases been very efficiently answered by another, and where that has been the case it will be unnecessary for me to say anything in reply. I will now reply to some of the questions and objections which have been urged in the course of the discussion. Mr. Bennett asked, in effect, why I had not provided a penalty against landlords in cases in which they had neglected to find timber for their tenants. Now, it is impossible to provide for everything of that kind (Hear, hear). I apprehend that in cases in which there is a lease, and in which the landlords are bound to find materials for repairs, if after receiving reasonable notice in writing, he neglects to do what he has undertaken, the tenant's remedy resembles that which all persons have against those who neglect to do what they have covenanted to do. The remedy is, I admit, a very bad one, and I should have a very poor opinion of the landlord whose conduct compelled his tenant to resort to it; but the remedy clearly is to apply for a mandamus to compel the fulfilment of the covenant (Hear, hear). The observations made by Mr. Baker have been pretty well answered by Mr. Shaw, and the discussion which took place was an exceedingly interesting one. Mr. Baker mentioned two fires; and with regard to one of them, he told us that the tenant having entered into a covenant to repair, the landlord called upon him to rebuild after the fire. I believe it is pretty well known that if a tenant is bound to keep buildings in repair, he cannot, in such cases, call upon his landlord to repair (Hear, hear). It is the tenant's duty to insure; and if he be so imprudent as to neglect insuring, he is very properly called upon to rebuild out of his own pocket. We cannot provide a remedy for such neglect (Hear, hear). In the other case it appears that damage by fire was excepted, but there was no covenant to rebuild. Now, here is a point which I am very much obliged to Mr. Baker for suggesting to me. I think that should be contemplated in all agreements between landlord and tenant. If the landlord is bound to insure, there should also be a covenant that in cases

of fire he should be compelled to rebuild. On that point I have certainly been enlightened, and I am glad that the reference was made. As to the observation that the tenant may be disposed to commit an act of bankruptcy, I don't see how we can deal with such a case (Hear, hear). If a tenant consider bankruptcy a luxury, why he must have his luxury, and the landlord must pocket the affront (laughter). One word with regard to Mr. Baker's suggestion, that the money value of crops sold off the farm should be brought back in manure. Now, I must confess, that in the covenants which I drew up, one great object which I had was to put money into the farmer's pocket (Hear, hear). I consider that in many cases the turnip crop is worth far more than the manure. I shall have an observation to make presently in reference to the price of turnips, which may somewhat astonish you. My friend Mr. Mechi has introduced a very important point in saying that there should be a covenant to compel tenants to keep the drains open. I must confess, however, that I am afraid that the man who does not know or feel the importance of keeping open the pipes which were designed to take the water off his land, must be so stupid that no covenant would at all improve him ("Hear, hear," and laughter). The case reminds me of two gentlemen who confessed with regard to a lease in which they were mutually interested, that they had never read it (laughter). Where there is such gross neglect no covenant between landlord and tenant can be very material. In the case referred to, if you were to insert a specific clause to the effect that the drains should be opened once a week, it would produce no alteration.

Mr. MECHE: That remark will apply to all covenants in similar cases.

Mr. BEADEL: As regards the landlord, I think it is palpably his interest to get rid of such negligent tenants as soon as possible. My friend Mr. Shaw made some observations with regard to the valuation of £800, and appeared almost to doubt the correctness of my statement. Notwithstanding his amazement, I can assure him that that was actually the amount, and my client has got to pay it. The statement of Mr. Clutton appeared to me to set the question at rest. His case was in Surrey, where the valuation extends not only to fallows, but to half-fallows. We are frequently called upon to value not only what we see, but what we do not see. We have to value half fallows, half dressings, half manures, half foldings, and half—God knows what. Unless we have a very fine pair of spectacles it is almost impossible for us to execute our task (laughter). There must be some limit imposed; otherwise a man might as well be told to put £1,000 in the Bank, of which he was not to have the use until he quitted his farm (Hear, hear). With regard to the green crop, Mr. Walton says that farmers in his neighbourhood have none to sell, as they have not sufficient for their own use.

Mr. WALTON: What I said was that we had a difficulty in growing enough turnips.

Mr. BEADEL continued: Well, I hope you will grow more in future, and get over the difficulty. There are hundreds of farmers to whom it would be a great boon to be allowed to dispose of their green crops. I have seen many cases in which a profit might be realized by selling, while the feeding would cause a loss. It would, at all events, be a great advantage to the tenant to have two strings to his bow. I am rather surprised to hear the statement that a tenant who was paid for improvements would be better off than one who had a lease. I must confess that if I were going to invest my money in land, I would take a lease in preference to merely having payment for improvements. If I rightly understand Mr. Walton, he thinks a tenant would be better

off under an agreement by which he would be paid for improvements than a lease.

Mr. WALTON: A lease without improvements.

Mr. BEADEL: I did not understand you to say that. With regard to the amount of valuations Mr. Walton says that the payment of a large amount is satisfactory proof that it is better. It certainly cannot prove that the tenant will have capital enough left to cultivate his farm. There is a general tendency amongst tenants to get quite as much land as they can manage, and on that account I think it must be a great advantage to get rid of those heavy valuations. Mr. Payne is of opinion that the manure should be the property of the landlord. I must confess that that observation struck me with surprise. It appears that there are extensive districts in which the manure is the property of the landlord. I know that in some parts of Essex, in particular on the property of Lord Petre, the practice mentioned exists; but the contrary is the rule: and I must confess my preference for the arrangement by which the manure is the property of the tenant. Mr. Baker said that green crops were now considered as machines for manufacturing manure. To a certain extent that is really the case; but my object was to give the tenant the option of selling, and if he is to bring back the whole value of the manure, he is deprived of the advantage which would be thus secured to him. The time is come when there should be some relaxation of the relations between landlords and tenants, and when the tenants should have conceded to them more liberal covenants than they have hitherto obtained; though in seeking that relaxation the interest of the landlord must not be overlooked. There was an observation of Mr. Shaw with regard to turnips which I desire to refer to. He said that some one had told him that turnips were in one place worth only 3s. a ton, and that in Chelmsford he believed the price was 16s. per ton; though in accordance with his usual modesty, he assumed it to be 10s. Now, this very morning, I wanted to buy some turnips, for the feeding of bullocks; I offered 4½d. a bushel to a person who had 800 bushels. His reply was that he would not take 6d. As to the objection that when a tenant for life dies, the reversioner would take improvements without paying for them, all I can say is that as on the one hand a gentleman who is about to buy an estate would take care that the title is good; so, on the other hand, a person who is about to leave a farm ought to satisfy himself that the party who is offering him a lease has the power to grant it—that he has an interest commensurate with the term for which this lease is drawn. We all know that the owner cannot grant a lease binding a mortgagee except with the mortgagee's consent. I know many tenants-for-life who have the power of granting a 21 years' lease; but there are a good many others who have no such power. (Hear, hear). My friend, Mr. Mechi, has asked for explanation with regard to the difference between substantial repair and tenantable repair. I suppose his reason for asking this question is that I have had something to do with the matter. (Laughter). He knows that it comes within my craft, and therefore asks me for information. I have no doubt that I shall have the fee to-morrow. I understand the difference between substantial repair and tenantable repair to be this:—Under the system of tenantable repair the tenant is to be allowed fair and reasonable wear and tear; under the system of substantial repair there is an obligation to keep everything wind and weather tight, so as to prevent waste. I will conclude by thanking you very sincerely for the kind attention which you have paid to my observations. I have been glad to observe the business-like manner in which the discussion has proceeded. I hope that the meeting will not be without advantage to agriculture generally, and

that if landlords learn something as to what is due to tenants, tenants will have a stronger sense of the duty of properly recognizing the rights of landlords; and thus the general result will be that tenants will be placed in a better position than they can be under leases which are too stringent and restrictive.

The CHAIRMAN said:—Gentlemen, before you proceed to pass a resolution, in accordance with the usual practice, allow me, as your Chairman, to make one or two observations. Within the last two years I have been placed in a capacity somewhat different from that which I occupied in former years. I appear before you this evening in the new capacity of a land-agent. Under these circumstances, I feel bound to say something in reference to the subject of this evening's discussion, more especially as regards the form of lease, and what I have found to work well on the property with which I am connected. Gentlemen, that property is not similar to that with which the farmers of midland counties and other cultivated districts are familiar. I am engaged in bringing into cultivation a barren waste; and you may naturally suppose that I must offer very liberal terms indeed to induce men to leave rich and fertile lands to come to a barren waste. Now as regards leasing, I take the principle to be this: Two men meet on Monday morning to make a bargain, and if either of them enter into a bad bargain, he must suffer the consequence. The lease which I offer on the land to which I have referred, is a lease of 20 years, with liberty to the tenant to put an end to it at the expiration of 4, 8, 12, or 16 years, the tenant having also the option of continuing his occupation at the expiration of 20 years. As regards the question of rent, I think you will agree with me that I have hit upon a plan which, though somewhat novel, is adapted to meet particular cases. Supposing the period of 20 years to be divided into 5 equal parts, in the first four years the rent is 3s. per acre; I add 1s. per acre for each of the succeeding periods of four years; so that, if a tenant likes to give up the experiment at the end of eight years, through not liking the cultivation of barren hills, he may do so, and will only have paid the two lowest rents. With regard to the question of game, gentlemen, I think only one positive rule can be laid down, and that is that no more game should be allowed to accumulate upon a farm than there is upon it at the time when the tenant enters into possession. What I should generally prefer is that the game should be reserved to the landlord, with liberty to the tenant to shoot over his own farm (Hear, hear). A great deal has been said with regard to the stringency of many covenants in leases. Gentlemen, let me remind you that landlords must guard themselves against bad tenants (Hear, hear). Leases may be so drawn that the landlord will have the power of conceding particular advantages on certain conditions, but there must always be some precaution taken against the conduct of bad tenants. I will not trouble you, gentlemen, with any further observations, but conclude by thanking you for the attention which you have paid to the entire subject.

Mr. SHAW said: May I be allowed to explain, that when I spoke of the large amount of the valuation mentioned by Mr. Beadel I did not mean to question the correctness of that gentleman's statement. My only object was to lay stress upon so striking a fact. Such an amount appears to me most preposterous. I have always thought it desirable that the tenant should pay something for valuation; but it does not at all follow that because the tenant ought to pay a reasonable amount of valuation, regulated by the principle of paying for value received, he should pay anything like so exorbitant a sum as that mentioned. With respect to the question of leases, and the adoption of any resolution by the club in refer-

once to it, I feel that the matter is a very delicate one. I think that the drawing of general conclusions from isolated cases is doing a vast deal of mischief in the present day in relation to agriculture. One gentleman, for example, finds that thin sowing answers his purpose, and immediately he proclaims to all the world, that under all circumstances, whatever may be the nature of the soil or the other peculiarities of the case, everybody should thin-sow (Hear, and laughter). Another gentleman, on finding that deep draining has answered in his own case, tells all the world that they should deep drain (laughter). A third, having obtained a pretty good crop of potatoes, notwithstanding all the disadvantages to which the potato crop has lately been subject, advises everyone to grow potatoes. Now, the putting forth of such general statements or advice does agriculture, in my opinion, a vast deal of mischief. (Hear, hear.) I feel that it would be highly improper to adopt one particular form of lease, declaring that it is desirable that it should always be used; for no lease can be framed so as to meet the exigencies of every case. (Hear, hear.) Leases must vary—I do not say in proportion to the number of farms in the country, but certainly in proportion to the number and difference of districts in the country. I cannot understand how any man can frame a lease which would be applicable, under all possible circumstances. There must be an elasticity in any form of lease which is prepared, if it is to be rendered available in a number of cases. I do not think you can fix upon covenants which shall be so framed that landlords and tenants in all districts will be able to adopt them as perfectly satisfactory. For these reasons I have endeavoured to draw up a resolution by which you

will avoid committing yourselves distinctly to any particular form of lease; while, at the same time, I should be glad to see the meeting come to some expression of opinion on the subject.

Mr. Shaw then proposed, and Mr. Mechi seconded, a resolution, which, after undergoing some discussion and amendment, was at length adopted in the following form:

RESOLVED,—“That the covenants in leases now in general use are unsuited to the present improved mode of agriculture, and are frequently prejudicial, not only to the well-being of the tenant, but to the interests of the landlord.

“That the form of lease now submitted by Mr. Beadel be published in the report of the meeting, in order that the various clauses may be subject to a more extended discussion.”

Mr. TRETHERY proposed a vote of thanks to Mr. Beadel, for his able introductory address. (Cheers).

The motion having been carried,

Mr. BEADEL briefly returned thanks; expressing the gratification with which he had observed the course which the discussion had taken, and his satisfaction with the result. He would have regretted the adoption of any proposition of his own without the most ample deliberation. (Hear, hear).

On the motion of Mr. Mechi, seconded by Mr. Beadel, a vote of thanks was given to the chairman.

The CHAIRMAN, in returning thanks, said he should quit his office of chairman with the conviction that his successor, Mr. Payne, would discharge its duties much more efficiently than he himself had done.

[ERRATA.—In Mr. Cheetham's address, page 62, instead of the “money value of the crop,” read “the money value of the manure which would arise from the consumption of the crops;” and in reference to his reply to Mr. Payne, for “the neighbourhood of Ripon,” read “neighbourhood of Rutland.”]

THE ANNUAL DINNER OF THE LONDON FARMERS' CLUB.

The annual dinner of this Club took place on Thursday evening, Dec. 13, at Radley's Hotel, Bridge-street, Blackfriars. The chair was taken by Mr. Payne, of Felmersham, who was immediately surrounded by the following members:—The Hon. Mr. Wilson, Capt. Aitcheson, Mr. W. F. Hobbs, Mr. Shaw (of the Strand), Mr. Baker, Mr. Emery, Mr. R. Smith, Mr. Cuthbert Johnson, &c.

The cloth having been drawn,

The CHAIRMAN proposed the health of Her Majesty the Queen, observing that, as that was the day on which the funeral of the Queen Dowager had taken place, the committee of management thought it desirable to dispense with the customary honours (Hear, hear).

The toast was most loyally, though silently, responded to by the company assembled.

The health of “Prince Albert, Albert Prince of Wales, and the rest of the Royal Family,” met with a similar response.

The CHAIRMAN, in proposing “The Army and Navy,” remarked that, although no member of the former service was present, he had the pleasure of seeing a gentleman who had been honourably connected with the Navy (Capt. Aitcheson); and he would, therefore, couple the toast with that gentleman's name (Hear, hear).

The toast having been duly acknowledged,

Capt. AITCHESON said he rose with peculiar pleasure to return thanks, having been connected with the Navy for a great many years, and retaining a warm interest in that most important branch of the public service. He would take that opportunity of bearing his testimony to the good which had been done by the club; and, as an old member, and as one who had attended a great many of its meetings, he hoped he might be allowed to address

a few words to the many agricultural gentlemen who were then assembled (Hear, hear). It appeared to him that there was a fairer opening for them at that moment than there had been for some time past; and the saying was that, when the wedge had entered, it should be driven home (Hear, hear). He had ceased to be a sailor, and was now a farmer; and he would say to farmers, let us strive to right ourselves if we possibly can (cheers). Let us join together with a proud determination to ask what is right, and no more; being entitled to that, let us claim it at the hands of our country, and, above all, do not let us lose the little which is left. We have been robbed for several years; let us not lose the rest, but, as agriculturists and as men, let us show that we are deserving of what we ask (cheers).

The CHAIRMAN said the next toast which he had to propose was, “Success to the London Farmers' Club.” In doing so he would make only one or two remarks. Having been connected with the club almost from the period of its formation, he could say, without fear of contradiction, that it had not only conferred great benefits upon its members individually, but also upon the agricultural interest at large. Probably there was no gentleman present who did not feel that, from the nature of its discussions, and from what had been said within and without on the subjects introduced, some good had emanated; while many things had been borrowed from the discussions which tended, in the result, highly beneficial both to landlord and tenant (Hear, hear). He would not trouble the company with any lengthened remarks: he was neither fond nor capable of making long speeches. He believed, however, that this club and others of a similar nature ought to be encouraged to the fullest

extent by farmers. There was one important feature of the toast which he must not omit. He had to couple it with the name of the father of the club—Mr. Shaw (cheers and laughter). As they all knew how to appreciate that gentleman's exertions, he would at once propose "Success to the London Farmers' Club," in connection with the health of Mr. Shaw (cheers).

Mr. SHAW said he had that day got a new designation (laughter). He had suddenly become the father of a large family, and he was very proud and happy to see a family of such promise around him (laughter). He trusted that they had all responded to the declaration of the Chairman that the Club had, since its formation, been instrumental in doing some good (Hear, hear). Considering the difficulty which met them at all points, as farmers, when they had been subjected to great changes, he thought that, although the club might not have attained to the full extent of the expectations of some persons, there were but few who had watched its progress who were not prepared to admit that it had done, and was still doing, a considerable amount of good (cheers). Since the period of its establishment, irrespective of the original purpose for which it was founded—namely, that of affording to farmers whose business called them to London an opportunity of intercommunicating in the ordinary way, and of enjoying each other's society—there had been superadded to the original intention the plan of discussing questions of importance to agriculture generally. On looking back to the discussions which had taken place during the last six years, they would find that very few topics of great interest to agriculturists had been omitted, and it was quite impossible that such subjects could be discussed by the members of the club, and the discussions be diffused throughout the country, without great good resulting; and although the position in which they were then placed was not precisely what they had the good fortune to occupy six years ago, still there had been no want of energy, so far as the spirit of that club was concerned, inasmuch as during the last year fifty new members had been added to the previous number (cheers). He was quite as much disposed to consider that increase a mark of the character of the English farmer as such, as he was to ascribe it to a desire to support the club as a club (Hear, hear). He believed the circumstance of that increase in the present year to be illustrative of the farmer's feelings at that moment (Hear, hear), evincing, first, his determination to meet the difficulties which he had to encounter, and in the next place evidencing that elastic spirit and that invincible energy by which Englishmen generally are distinguished (cheers). He was aware that it had been, as it ought to be, their practice at the meetings of this club to avoid questions the discussion of which might occasion great diversities of opinion, or be the means of introducing what might lead to a dissonance of feeling. But without wishing to go further than was necessary, on that occasion, into the question, which must be uppermost with them all, he could not forbear to offer a few remarks; and although he might possibly clash with the opinions of some individuals who might differ with himself and with many persons present, still he must express his belief that even they were at that moment so deeply impressed with a sense of the peculiarity of their position, that they would be disposed so far to sympathise with them as to allow some little expression or ebullition of feeling without being materially hurt by such expression (Hear, hear). Great changes had been made; and he, for one, was willing (as he believed all present were willing), in a liberal and Christian spirit, to believe that those who had been instrumental in effecting those changes might have considered that they were pursuing a course which was calcu-

lated to promote the general interest (Hear, hear). This was putting that favourable construction on the motives and views of others, which they desired to have placed on their own (Hear). But it so happened that even the most enlightened, the most experienced, the most talented—those who possessed the greatest ability to direct the helm of state—owing to the ingenuity of human nature, failed in that *summum bonum*, the perfection of wisdom, so that those who were supposed to possess a high superiority over their fellow men sometimes erred even as others who moved in a more humble sphere. Now he believed it would not be denied that at that moment the agricultural interest was suffering to a degree that it had never before suffered within their own recollection (Hear, hear). He was free to confess that there were diversities of opinion as to the cause to which that suffering was to be ascribed. He was willing to take a middle course, and to suppose that the whole of the suffering which existed at that moment was not ascribable to the one cause to which so many of them attributed it. Still, of this he felt perfectly convinced, that there was a sufficiency of suffering arising from that one cause to call upon them all, in the defence of their position, in the defence of their property, in the defence of their families, to adopt immediate and decided means of giving expression to their feelings on the subject, in that legal way which the constitution pointed out (cheers). He had no fear that Englishmen would, under any circumstances, imitate the course which had been adopted in some other countries; he had no apprehension that they would have recourse to violence instead of relying on the moral force of opinion (Hear, hear). But he believed that when the time did arrive—and he held that it had now actually arrived—for the moral expression of opinion, Englishmen would not be backward in giving utterance to it (cheers). He believed, also, that a very great change had taken place in the minds of many who had formerly thought differently from themselves on that question. He was enabled to state—within his own knowledge, and also within that of some other gentlemen in the room—a circumstance which had occurred that day, which would lead to no other conclusion than that conviction was beginning to come over persons in the highest quarters; that they were now beginning to be sensible that they had been urged on from former good and sound opinions into a hasty and most unfortunate course (cheers). Some of them had that day been in communication with a nobleman who had hitherto been a strenuous supporter of the present Government, and whose lady was in the household, on the subject of this particular point—whether they believed that the farmers of this kingdom and the inhabitants of agricultural towns were prepared to agree upon a definite proposition which would effect a change as regarded the present position of the agriculturists, and their future prospects. (Hear, hear). He could not imagine a communication coming from such a quarter, unless it were made for the purpose of intimating that the individuals who took a part in depriving them of the advantages which they previously possessed, were now prepared to support them in taking what might be called by some people a retrograde step, but what he (Mr. Shaw) would call, replacing them in their proper position. (Hear, hear). He took that opportunity of mentioning the subject, because he would urge now that which he urged many years ago in another way. In the year 1841—when the great question which so deeply affected their interests was mooted, he endeavoured to rouse the farmers of this country to a united movement for the expression of their opinions in respect to their own interests. He then observed that there were in England 14,000 parishes, and that it was very hard indeed if there could not be found in each of those

parishes one farmer who was willing to move on his own behalf and on behalf of those around him; and he added that if such machinery were put in operation, there would be such an overwhelming array of force—not, indeed, of physical force, but of that moral force which must ever control affairs in this country—as would compel any government, be its members who they might, to place them in that position in which they ought to be placed. Now, he embraced this opportunity of endeavouring to impress on the minds of farmers the necessity of paying immediate attention to their position. He felt assured that nothing was wanting at that moment but an energetic expression of their feelings to secure their rights; and although he might in some measure concur with those who were of opinion that if the year was suffered to ripen a little more, the fruit would be more productive, and that six or eight months hence the evil would, from its magnitude, be the more likely to work its own cure, yet he could not throw overboard the distressing feelings which all must entertain, at the misery and ruin which must befall whole families, and in particular the vast amount of suffering which must fall on the labourers, in the intervening period (Hear, hear). He therefore trusted that from that moment, from the day when that communication was made, which emanated, he believed, from authority, steps would be taken in every county in England, and in every market town, to induce farmers to intercommunicate not only with each other, but with the tradesmen of the agricultural towns, with the view of ascertaining whether they were satisfied with their position—whether they were disposed to remain as they were—or whether they were prepared to unite for the one good and common object of restoring the agricultural community, and those who were dependent upon it, to the position from which they had been displaced (cheers). This was not a mere party question (Hear, hear). In the artificial state in which they existed, and with the taxation which was levied on this country, he held it to be wholly impossible for them to compete with the foreigner. The English farmer was not afraid, as far as science went—as far as skill went—as far as energy went (Hear); he was not afraid to compete with any class of men in the world; but farmers did require to be so far put on a footing with foreigners that they should not be burdened with an excess of taxation which rendered it impossible for them to enter fairly into that competition (cheers). Now he was quite aware that there were those who thought that all their energies should be immediately directed to the securing a reduction of agricultural burdens, as calculated to enable them to go on under a change which must otherwise be intolerable. He must confess, however, he was not of that opinion. He was exceedingly desirous, indeed, that the financial state of the country and the public expenditure should be immediately and minutely enquired into (Hear, hear). He thought that in every department, whether of taxation generally or of local taxation, there existed a system of abuse which required appropriate remedy; but at the same time he felt that it was impossible to bring about immediately such a change in that respect as would effectually relieve agriculturists. They must have a more summary remedy—the reduction of taxation would follow—if they were to be replaced ere it was too late in the position which they occupied before the last great change was effected (Hear, hear). It had been his misfortune to be always complaining of the want of unanimity amongst farmers; and he much feared that notwithstanding the suffering which existed there was still a considerable degree of apathy. Communications had been made to him within the last week in which the writers expressed astonishment that their brother farmers said so little respecting the position in which they were

placed. He could only account for this by supposing that the parties referred to were suffering under that feeling of desperation which takes possession of those who feel that there is a powerful influence above them to which they had been sacrificed (Hear, hear). He could readily understand how men who had looked up to those whom they had been taught to regard as the high and mighty and worthy of the land, and who felt that they had been betrayed by such persons—he could readily understand how they might feel under such circumstances (Hear, hear, and cheers). That feeling must no longer be entertained by farmers: they must remember that they had a great—a common cause at stake (cheers). It was the cause of each and every one; it was the cause of their families, the cause of the labourers who depended upon them, the cause of their common country. (Cheers.) He trusted that they would excuse his having gone thus far into a question which, although he was not a farmer, had pressed heavily and continuously upon his mind, having witnessed day by day the misery which had been produced. He had not been able to refrain from thus warily expressing himself on that occasion (cheers). On behalf of the members of the club generally, he thanked the chairman for the manner in which he had expressed himself as regarded its efficiency. He trusted that it would continue to progress; that it would cement a bond of union amongst tenant-farmers; and that it would not be confined to tenant-farmers, but that they would see more landed proprietors intermixed with them—(cheers)—for he felt convinced that if landed proprietors looked more immediately at the position of tenant-farmers, they would, in most instances, be disposed to adopt a course in many respects different from that which they then pursued. He rejoiced in the existence and operations of this Club, because he believed it had produced a great and beneficial influence upon the interests of tenant farmers. It was exceedingly desirable that the tenant farmer should have a channel through which he could express his opinions with respect to his own position; and in speaking of the tenant farmer, he did not wish to see him advocating any selfish opinions with regard to himself at the risk of injury to others, but he desired to see him seeking to promote his own interest conjointly with that of the landlord above him and the labourer below him (cheers). Again, and in conclusion, he begged to return thanks on behalf of the Club.

The Hon. Mr. WILSON said he rose to propose a toast which would, he was confident, meet with a cordial response—it was the health of their worthy Chairman (cheers). The manner in which that gentleman had performed his duties in the chair, not only justified their choice, but called for their approbation (cheers). It was with much pleasure that he (Mr. Wilson) had accepted the invitation of the society to attend on that occasion. He was, and ever had been, identified with them in interest. He had ever been anxious to mix with the tenantry of this kingdom, in order to obtain from them their opinions on passing events, and if possible to add his humble mite either to the conviviality or the usefulness of their meetings. He could not help expressing the gratification with which he had listened to the remarks which had escaped from the gentleman who had just addressed them. (Cheers.) He had ever been anxious to ascertain the feelings of the farmers of England; and wherever he had gone of late, he had found them most unanimous. On that occasion, too, he felt desirous of ascertaining whether or not, as a body, they were satisfied with their present position or their future prospects. He came into that room with a determination that he would in no way infringe the rules of the society; but

he could not help declaring that he was glad to observe the spirit which had been displayed by that assembly. He rejoiced to find that the farmers of England, as represented in that club, and in other clubs of a similar nature throughout the kingdom, were not to be gagged and prevented from honestly declaring their opinions (loud cheers). It had been said that the year was not yet ripe. They were told that the distress which was felt throughout the length and breadth of the land was temporary, and that the farmers were in a state of transition. Now, he was not of the number of those who would incur the responsibility of sending hundreds to their graves, or to a distant land, during what might be called a state of transition (Hear, hear). He knew the state of the tenantry of England, and no man could lament it more than he did; he knew that it had been brought about by causes into which he would not then enter; but he knew also that the remedy was in their own hands (cheers). He knew that if the tenantry of England were not backward in honesty, and fearlessly expressed their opinions in every market town, and in every village of the counties of England, so great was their power, that they would be heard; for no ministry would be bold or powerful enough to resist claims which were so evidently founded on justice (cheers). It was nothing but justice which they claimed. He stood there in the character both of landlord and tenant. He was as large an occupier as many in that room, and his object in coming there was to show that he was identified with them in interest, and to declare that he would use his best exertions in the promotion of the good cause of agriculture. He could wish that landlords and tenants generally met together far more frequently than they did, for he was quite sure that the result of their doing so would be to promote the welfare, not only of agriculturists, but of the kingdom at large. Nothing could be more beneficial to the community than the cementing of the bond between the landlord, the tenant, and the labourer. He would not trespass on their time any longer, being fully sensible that when he began to speak on such subjects he was in danger of exceeding the proper limits (voices of "Go on.") He would now propose, and it was with the greatest cordiality that he did so, the health of their worthy chairman (loud cheers).

The CHAIRMAN thanked the company most sincerely for the kind manner in which they had responded to the toast. He could have wished that the honourable post which he then occupied had been filled by one who was more competent to perform its duties; but though he felt his inferiority with regard to the duties of the chair, he would yield to no one in that room as respected the interest which he had ever felt in the promotion of every practical object connected with the club (cheers). As he had said before, he considered it a most important body, and he believed that great good had arisen from its proceedings. After the appeals which had been made to them in the addresses of Mr. Shaw and Mr. Wilson, it would ill become him to take up more of their time; he would therefore conclude by again cordially thanking them for the honour which they had done him.

Mr. EMERY said he rose to propose prosperity to a society of which that club was a seion, if not a component part—namely, the Royal Agricultural Society. (Cheers). There would be no difference of opinion as to the usefulness of that institution, which had, in his opinion, produced more beneficial results as regarded agriculture than any other society in the country. If any person were ignorant of its usefulness, a visit to Baker-street, where, he presumed, they had all been that week, would remove his ignorance. There he would see proofs not only of the improvement of the animal creation, but also of the ingenuity of man. The implements to be seen there would, at least, bear a comparison with any similar exhibition in the world; indeed, he would venture to say that in no other part of the world could so many useful implements be seen collected together. During the last fifty years improvements had been introduced and brought into operation, which could not previously be imagined, and in their combination they presented an extraordinary and most gratifying spectacle. (Hear, hear). He could not mention the Royal Agricultural Society,

on such an occasion, without coupling with it another, although in doing so he might digress in some degree from the toast—a society which claimed the support of all of them as a copartner in usefulness: he need scarcely say that he referred to the Labourers' Friend Society, whose cause many present had heard him advocate, and which he trusted he would continue to plead as long as life continued. It was impossible that they could ever forsake or forget the labourer. In drinking prosperity to the Royal Agricultural Society they must drink prosperity to the labourers whom it employed, and to whom agriculture owed so vast a debt of gratitude. With these feelings he begged to propose "The Royal Agricultural Society," coupling with that toast the other society which he had mentioned. With the name of the former he would couple that of a gentleman to whom it was in a great degree indebted for its usefulness—namely, Mr. Robert Smith. (Cheers).

Mr. R. SMITH said that, on behalf of the Royal Agricultural Society, he cordially thanked the company for the warm reception which had been accorded to the toast. He could well understand the feelings with which Mr. Emery had dilated on the usefulness of that society, for all its members must have been convinced long since of its great utility both to agriculture and to the country generally. Reference had been made that morning to matters upon which it would not be right for him to dilate; but, as one of the earliest members of the club, he hoped he might be allowed to express the great gratification which he had felt at the manner in which their friend Mr. Shaw had mooted a most important question. He rejoiced, too, that there was one common, central point, where the farmers of England might congregate to discuss and talk over matters of mutual interest, to exchange ideas, and to become abler and better men (Hear, hear). Things were growing up as they ought to do. He well remembered the time when the Smithfield exhibition was held in Goswell-street; and if it were said then, surely it might be declared now, that the exhibition presented to the public was a grand and noble one. To the removal of that exhibition must be added the establishment of the Royal Agricultural Society; and last, though not least in the order of progress, was the formation of that club. When it was considered that the Royal Agricultural Society included seven or eight thousand members, and that its Journal was distributed twice a year amongst the leading agriculturists of England, who, instead of allowing it to lie idle, took care to lend or distribute it in their respective localities, so as to give it the widest field of usefulness; and when it was considered that that publication emanated from men who understood not merely the theory, but the practice also of agriculture, it could not be doubted that that society was adapted to work most beneficial results. In conclusion, he was happy to be able to assure the company that the Royal Agricultural Society was as sound that day as it had ever been, and that, in his opinion, it would continue to prosper in its career of usefulness (cheers).

Mr. CHETHAM (of Rutlandshire) said the next toast had been put into his hand, not perhaps very wisely, but he would endeavour to do justice to it; it was, "Prosperity to the Smithfield Club" (cheers). In the whole of his experience he had never seen so good a show in the yard as during that week; evincing that notwithstanding all the difficulties which farmers had had to encounter, they had in one respect progressed. To himself it was not the least interesting feature of the exhibition that the first prize animal in Prize I, the first in Prize 2, the first in Prize 9, and the second in either Prizes 10 or 11 (he could not remember which) had been exhibited in the provincial show in his own district; showing that the farmers of that district had succeeded in keeping their position in the scale of improvement (Hear, hear). That the Smithfield Club had been exceedingly useful need not be asserted in that room. He was quite sure that all who had watched its progress from the commencement—when the exhibition was held in Sadler's-yard down to that period—must have arrived at the conclusion that the offspring of what had been so frequently termed "the monster nuisance" had progressed a great deal more in utility and in every beneficial respect than its aged parent, Smithfield market ("Hear, hear," and laughter). It had on many occasions been stated that the farmers of England were a slow race. At all events the corporation of the greatest city in the world could not justly throw that charge in their teeth; for when he considered the great efforts which had been made to remove Smithfield market, and that those efforts had

not yet prospered, although its days might be considered as numbered, and no long period probably would elapse before Smithfield market would be amongst the things that had been, yet he for one would not hereafter be disposed to give the corporation any great credit for having removed the market, inasmuch as the removal would not have been conceded in such a way as was creditable to themselves and considerate with respect to others (Hear, hear). It had been frequently urged that the farmers of this country had not progressed in a manner commensurate with the requirements of the age. He would not deny that manufactures had advanced faster than agriculture; in other words, that the quantity of manufactured goods had increased more rapidly than the products of agriculture. But then it must be remembered, that farmers were now cultivating about the same number of acres that they cultivated about forty or fifty years ago; while manufactures, which had sprung up all around them, had thriven, not only by the aid of machinery, but under circumstances which necessarily created a great difference between their progress and the progress of agriculture. If they examined manufactories which had existed thirty years ago, without any addition to their number or their size, he greatly doubted whether it would be found that the increase of manufactured goods in such establishments had exceeded the increase in the products of the earth on a given number of farms. (Hear, hear.) That would be clearly illustrated by taking the thirty years from 1815 to 1845. In those years the foreign importation amounted to nothing scarcely in comparison with the increase in the population, and yet during the whole period prices were coming down from a remunerating to an unremunerating point. From this, he concluded that farmers must at least have prospered in proportion to the increase in the population. Mr. Emery had very judiciously introduced the subject of the Labourers' Friend Society. That was a subject which had engaged a good deal of his (Mr. Cheetham's) attention. He considered the Labourers' Friend Society an institution of great importance, and he greatly desired to see it supported in a manner commensurate with its deserts. The improvement of the condition of the labouring classes was an object which they were all bound to promote as far as lay in their power. He knew of no one thing more likely to improve the condition of the labourers, in conjunction, of course, with other circumstances, than the leading them to respect themselves. (Hear, hear.) Self-respect was one of those things which would work its own good. It had been said, that to give a man a good house was the way to improve his condition; that to fill his belly was the way to improve it. But such means would not impart self-respect, or improve his condition morally, socially, and physically. (Hear, hear.) He had, on many occasions, witnessed with great satisfaction, in local agricultural societies, the distribution of awards and premiums to members of the labouring class. A week before he had, at Oakham, seen good and venerable working-men receive a reward for their past services; and on no other occasion had he seen men who had had such lengthened periods of service on the same farm. He would take that opportunity of stating that he had found the small allotment system work exceedingly well, as regarded the improvement of labouring men. In no county of England, he believed, had the system been carried out so practically as on the estate of the Earl of Gainsborough, in Rutlandshire. He would conclude by proposing "Prosperity to the Smithfield Club," coupling with it the name of that friend of agriculture, Mr. Jonas Webb, one of the Stewards of the Club. (Cheers.)

The toast was well received.

Mr. JONAS WEBB, in acknowledging it, said he had intended to make one or two remarks; but his friend, Mr. Cheetham, had quite cut the ground from under him. He would here observe that when the new society sprung up at Birmingham, he was greatly afraid that it would interfere with the Smithfield Club, and he wrote to the secretary on the subject, with the view of preventing any clashing between the two exhibitions. He thought it would be easy to make arrangements which would preclude the possibility of such a result.

Mr. SPEARING said he had a very pleasing duty to perform, that of proposing the health of a body of gentlemen to whom they were all deeply indebted—the Committee of Management (cheers). He need not inform the meeting that those gentlemen had catered for them as well as it was possible to do under the depressing circumstances of the past year (laughter). They must all agree with him that the proper regulation of the

discussions of the club was a very onerous task. The accession of 50 new members during the past year was a fact which redounded greatly to their credit. To borrow a sentiment from their father, as a gentleman present had been termed, he must say that he would like to see at their monthly discussions a few more of the landed gentry of this country (Hear, hear). Those landlords who might be induced to join, would find, he thought, that those who assembled were not, what Dr. Buckland had described them, as stupid as their own oxen, but that they had some common sense, and that they obtained information, the diffusion of which throughout the country would lead to relieve the farmers throughout the country from the charge of supineness, and exempt them from those harsh terms which had been applied to them. Now, he was no orator, but he must say that when a good father had set an example, they ought, as children, to follow that example. It had been objected by some, in reference to the monthly discussions of this club, that if they attended them, and attempted to express their sentiments freely, they were immediately met by the cry of "Politics, politics, politics," and told that they need not proceed in that strain. He hoped that the public had bestowed a little of the milk of human kindness on the newly-elected committee (laughter), and that those who might take part in the discussions in future would have no cause to complain. He admitted that politics should not be introduced so as to create discord, but the tenant farmers were now placed in a situation so unparalleled in the history of the country that they might well be forgiven if they slightly overstepped the traces, and introduced political questions, so far as they were connected with their welfare as agriculturists. In conclusion, he would couple with the health of the Committee of Management the name of Mr. Baker.

The toast having been cordially responded to,

Mr. BAKER, in rising to reply, said that in presenting himself to their notice as having had his health drunk in connection with the last toast, he had to express his regret that he did not better deserve such a compliment at their hands, having during the past year been prevented by ill-health and other causes from devoting his time as he was wont to do to the management of their affairs in committee. Still he had been as anxious as ever for the prosperity of the Club, and he was determined to do all in his power in future for the furtherance of its objects (cheers). He congratulated them on meeting that evening under circumstances which were not only peculiar in themselves, but of far deeper import in connection with agriculture than those under which they had met on any former occasion. There seemed to him to be that evening more unanimity of opinion, more cordiality in responding to the sentiments which were uttered, as well as more spirit and determination in uttering them, than he had ever before observed in the meetings of that Club (cheers). They seemed at last to have come to the conclusion that to fight a battle with their hands tied behind them was not the most likely way to obtain the victory (Hear, hear). They seemed to be at length convinced that although politics might, under certain circumstances, tend to damage society, yet so far as they bear upon the interests of the British farmer they were within the province of, and were eligible for, discussion (Hear, hear). The formation of that Club had, by leading to the formation of similar associations throughout the country, placed them in a position which enabled them not only to ask a boon of Her Majesty's Ministers, but to demand of them their rights. There was an old adage which had been used in reference to some political questions—"The straw begins to move." If he ever saw an indication that something was coming from the moving of the straw, he had seen one that day, and he saw one in what he had heard that evening (cheers). He rejoiced that they were then in a position not only to ask but to enforce on the Legislature that which, as citizens of the state, they might justly claim. Were they, he asked, members of a free community, and as such liable to all the taxes and impositions which were said to be imposed for the good of the community, and were they to be treated like a horse in a race, which was heavily weighted, and then put in competition with another horse who carried only feather weight? The taxes which entered into the agricultural products of this country were of such enormous extent that it was impossible for the farmer to compete with the foreign or British soil. Could it be fair to the agricultural producers of this country that foreign products should be introduced into their markets, and placed in direct competition with their own,

they paying enormous taxes and the foreigner bringing his products into the country entirely free? (cheers.) Did not common justice require that the foreigner should be taxed in an equal proportion with themselves? and that, if he could not be met by any other description of tax, he should, at any rate, be met by a customs duty which would be equal to the amount of taxation which entered into their own productions? (Hear, hear.) It was not their own interest merely that they looked to. They demanded the means of affording employment to the British labourer and placing him in his proper position. He had maintained, and would still maintain, that whatever article was introduced into this country from abroad, in the shape either of agricultural produce or of a manufacture, must displace just so much labour here as would be required to produce it, and that, consequently, the importation of that article must operate injuriously to the labourers of this country. As producers they were entitled to demand, at the hands of the government, protection against foreign competition; and he believed that their cause being just, they had only to unite and their demand would be conceded. They were often taunted with not having developed the resources of the soil, and with not having employed sufficient capital for that purpose. Why, was capital to be talked of as if it were a portion of the soil itself, as if it could be dug up like chalk or marl, and spread over the land? (Hear, hear.) Was not capital a thing of slow growth? Had not the capital which was now employed in the cultivation of agriculture arisen gradually out of its improvement? Instead of capital being in the tenant's pocket, available to him at any moment, it was generally incorporated with his occupation, and if he left that occupation he frequently resigned his capital to his successor, being himself almost a ruined man. The outgoing tenant left his capital in the soil, and the incoming tenant, who was so anxious in times of competition to obtain a farm, anticipated the opportunity of absorbing that which his predecessor had left in the land (Hear, hear.) That was one of the main causes of the competition which was taking place for farms. He had known cases in which tenants, on being told that they were giving too high a rent for a farm, had replied "O! I have only taken it from year to year; and when I have sucked out of it all that I can get, I shall leave it for somebody else to fill up the void" (Hear, hear, and laughter.) Although that might not have been said in express terms, there were hundreds of cases in which the object was what he had described. Let landlords look to it (Hear, hear); let them consider well whether it might not be better to mitigate the burdens of those who were upon the land, than to take new tenants who would extract from it all its valuable qualities, and then throw it on the hands of others who should succeed them (Hear, hear.) He congratulated the members of the club on their position that evening. Formerly the tenant farmers were the footballs of the two great political parties in the state, whereby they endeavoured to obtain a victory over each other; and so long as that was their position, it was impossible that any great step could be taken by farmers for their own benefit. That time was, however, past. They were not now subjected to any political interference; and he held that so far as politics affected their interest, not only did they afford legitimate subjects for discussion, but it was for the interest of the country that they should be discussed (cheers). He trusted that they would never outstrip the bounds of reason—that, as reasonable men, they would know how to treat reasonably subjects connected with their own interest. He had for a long time past taken a very great interest in the subject of protection, and had advocated protection conscientiously, ardently, and sincerely; and although he might heretofore have been tempted on by illusions which resembled what poets described, in reference to mirage in the case of a person who, in travelling over a desert, fancied that he saw something in the horizon which vanished at his approach; although he and others might have felt in past times that they had been deceived, and thrown overboard by their own party, so that what they had been seeking seemed at length further than ever from their grasp; yet he thought the illusions were now being dispelled,

the mists being cleared away, and he began to see in the horizon a steady gleam of light, affording an intimation that sunshine would yet break on that interest of which he was an humble member, and leading him to indulge the hope that he would live to congratulate farmers that they had not exerted themselves in vain (cheers).

Mr. CUTHBERT JOINSON, in proposing "Success to the Local Farmers' Clubs of England," said he was quite sure that little need be said to obtain for that toast a cordial reception. However well deserved might be the praises which had been bestowed that evening on the Royal Agricultural Society, on the London Farmers' Club, and on the Smithfield Club, he felt quite certain that equal merit belonged to those local associations which were scattered through the agricultural districts of England. Farmers were sometimes taunted with not paying more attention to the application of science to agriculture, and with not making greater efforts to increase the productions of the soil. It would be a complete answer to those who uttered—frequently in complete ignorance of what they were talking about—such a taunt, to point to the transactions, sayings, and doings, of the local agricultural associations of England. The debates which were carried on in those associations were frequently far above the comprehension of those to whom he referred. They might not be able entirely to comprehend scientific discussions on the advantages of certain manures—of the introduction, for example, of such manures as superphosphate of lime and guano—discussions on the feeding of stock, and on the use of food in different states. These were subjects which would probably amaze many of those who talked of the ignorance of agriculturists. It should be recollected that, while their opponents had long had their clubs, their chambers of commerce, and other places where they constantly, unitedly, and energetically discussed topics which concerned their interests, it was only of late that the farmers of England generally had imitated the example they set them. The fruits of that imitation were already becoming visible (Hear, hear.) When anything new or especially interesting arose, it was discussed by the London Farmers' Club; the local associations ever followed in the discussion; and thus a united action existed, which would, he was confident, tend to the honour and the prosperity of agriculture in this country. He felt great pleasure, therefore, in proposing "The Local Agricultural Associations."

The CHAIRMAN added to the toast the name of Mr. Tyler, in which connexion it was most cordially received.

Mr. TYLER briefly returned thanks.

The CHAIRMAN observed that in order to carry on the operations of such an association as that, it was indispensable that they should have an efficient servant to represent them efficiently. He trusted that Mr. Corbet would excuse the use of the term servant. In point of fact, he was so efficient in the discharge of his duties, that he might, perhaps, with more propriety be designated their master (laughter). Those who had witnessed his exertions in committee were most competent to appreciate them. The fact mentioned by Mr. Shaw that evening, of the addition of 50 new members within the past year, was attributable, no doubt, in a great degree, to the exertions of their secretary; and he was happy to be in a position to add that, owing no doubt a considerable extent to the same cause, the finances of the club were in a most satisfactory position. He could therefore with great sincerity call upon them to drink the health of their secretary, Mr. Corbet.

The toast was cordially responded to.

Mr. CORBET said that, not as their master—(laughter)—but as their very humble servant, he begged to return his best thanks for the honour which they had done him. His great wish had always been to do justice to the Club, and if he had failed, the failure had arisen, not from want of inclination to discharge his duty, but solely from inability (cheers).

The CHAIRMAN, in taking leave of the company, expressed the pleasure which he had felt in presiding, and a hope that in future agriculturists would be united, in order that they might be strong.

The company then dispersed.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A Monthly Council was held at the Society's House, in Hanover Square, on Tuesday, the 4th of December; present, Mr. Raymond Barker, Vice-President, in the Chair; Lord Camoys; Hon. Captain Dudley Pelham, R.N., M.P.; Sir Thomas Dyke Acland, Bart., M.P.; Mr. C. Barnett; Mr. H. Blanshard; Mr. Brandreth; Mr. Burke; Colonel Challoner; Mr. Garrett; Mr. Brandreth Gibbs; Mr. Grantham; Mr. Fisher Hobbs; Mr. Jonas; Mr. Kinder; Mr. Milward; Professor Sewell; Mr. Shaw (London); Mr. Shaw (Northampton); Mr. Villiers Shelley; Professor Simonds; Mr. W. Simpson; Mr. Hampden Turner; and Professor Way.

The following new Members were elected:—

Aston, Rt. Hon. Sir Arthur, G.C.B., Aston Hall, Cheshire
Balls, George, Brixton Hill, Surrey
Bence, Henry Alexander, Edinburgh
Boucher, Charles, Greenway House, Wivelescombe, Somerset
Bond, Thomas James, Perry Elm, Wellington, Somerset
Boys, John, Totham, Maldon, Essex
Braithwaite, Septimus, Powell Villa, Weymouth, Dorset
Buckmaster, J. C., Parkhurst, Isle of Wight
Caellius, William, 62, Moorgate Street, London
Clayton, Nathaniel, Melville Street, Lincoln
Dawson, Richard, Epworth (Lincolnshire), near Bawtry
German, George, Measham Lodge, Ashby-de-la-Zouch
Greenwood, Richard, Towse House, Ludford
Griffith, George David, Berry Hill, Haverfordwest, Pembroke-shire

Heathcote, Eustace, Penn, Blanchard, Lyndhurst, Haunts
Lan-ke, C., Syston, Grantham, Lincolnshire
Molesworth, Walter Hele, Plympton, Devon
Newman, Sir Robert, Bart., Manhead, Exeter
Ramsay, Rev. Edward, Raithby, Spilsby, Lincolnshire
Rendle, William Edgecombe, Plymouth, Devon
Robson, John, Whitwell Grange, Durham
Shuttleworth, Joseph, Pelham Street, Lincoln
Stainsby, Mark, jun., Lady Pitt Lane, Lee's
Tomkinson, William, Newcastle, Staffordshire
Way, Sir Bouchier, Bart., The Chase, Ashburton, Devon
Wren, Adderley Barton, Lenwood, Bideford, Devon.

The names of 17 Candidates for election at the next Meeting were then read.

Finance.—Colonel Challoner, Chairman of the Finance Committee, presented the monthly report on the accounts of the Society, from which it appeared that the current cash-balance in hand on the last day of the month just ended was £400. The Council ordered, agreeably with the suggestion of the committee, that a separate list of those members in arrear of their subscriptions, who had been addressed by the Society's circular for payment, but could not be found, should be made out and suspended on the walls of the Council Room of the Society. Colonel Challoner took that opportunity of reporting to the Council the progress made by the Committee in considering and enforcing those just claims of the Society in reference to members in arrear who disputed that claim and demurred in making the payments required of them, on various grounds of excuse. He informed the Council that within a few days past a Governor of the Society, in arrear of subscription, on receiving the circular issued by the Chairman of Finance, and containing the legal opinion of Sir Frederick Thesiger and Mr. Warren, had expressed his doubt of the validity of the Society's claim against him, and firmly (but with every gentlemanly courtesy) conveyed his determination to resist it, referring the Committee to his solicitors for the legal settlement of the question. He

had, however, the pleasure of stating, that the Committee having authorized Messrs. Tooke, Son, and Hallows, of Bedford Row, to act as solicitors on the part of the Society, and confer with the solicitor named by the Governor in this case, the result had been most satisfactory, the claim on the part of the Society being pronounced by the defendant's legal advisers to be so clear that they did not hesitate at once to recommend him to pay the arrears demanded. Col. Challoner added that the arrears had accordingly been immediately paid to the Society's credit.

Member of Council.—On the motion of Mr. Shaw, of London, seconded by Sir Thomas Acland, Mr. Sillifant, of Coome (Vice-Chairman of the General Exeter Committee, and late High Sheriff for the County of Devon), was unanimously elected a Member of the Council to fill the vacancy occasioned by the decease of Mr. Hill-yard.

Day of Meeting.—On the motion of Mr. Shelley, seconded by Colonel Challoner, the Council decided to revert, after the Christmas recess, to Wednesday, their original day of meeting, instead of continuing their meetings on the Tuesday, under the change made on the 3rd of May, 1848.

Specimens of Wheat.—Mr. Brandreth reported to the Council the completion of the arrangements he had undertaken respecting the collection of Wheats presented to the Council by Miss Molesworth, Col. Le Couteur, and Prof. Henslow. These specimens had been carefully arranged in guard books, and placed in a cabinet prepared for them in the Council Room for the ready access and convenient inspection of Members of the Society. He thought it only just to allude to the attention paid to his directions by Mr. Henry Wright, who had executed the manipulatory part of the task assigned. Mr. Brandreth added that space had been purposely left in the guard-books for the purpose of receiving further specimens, and in the catalogue for their due registration. On the motion of Mr. Fisher Hobbs, seconded by Mr. Jonas, the best thanks of the Council were given to Mr. Brandreth for the great pains he had taken in carrying out the wishes of the Council and House Committee on this interesting subject.

Lectures.—Mr. Raymond Barker reported the arrangements made in the rooms of the Society for the delivery of Lectures in the ensuing week, before the Members of the Society. It was decided that at the Lectures the chair should be taken at half-past eight o'clock precisely.

Farm Accounts.—Colonel Challoner, Chairman of the Farm Account Committee, reported to the Council the various comments and suggestions made by Members of Council on the specimens sent round to them of the forms of accounts recommended by the Committee. These communications, and those made additionally by Members then present, were taken into mature consideration. The forms were adopted, with certain alterations, and leave given for their publication (by Mr. Sanford, the Stationer of the Society, 315, Oxford-street), at a reduced rate to Members of the Society, on condition that the following announcement should be printed and inserted on the inside cover of each book respectively of the series:

"The Council of the Royal Agricultural Society of England, feeling the importance of Accounts being kept by Farmers upon as simple a plan as possible, and having

appointed a Committee to examine the various Forms in use, now submit this book, No. 1, together with Nos. 2, 3, 4, and 5, to the Members of the Society as the result of their investigation: which they recommend for present adoption, in the hope that, by the use of them, suggestions may be offered that may render them more complete."

On the motion of the Hon. Captain Pelham, the best thanks of the Council were expressed to the Farm Account Committee for the great attention they had paid to this question, referred to them by the Council.

Exeter Meeting.—Mr. Raymond Barker presented the Report of the General Exeter Committee, which was adopted. The following points were decided:

1. That the Exeter Meeting of the Society should be held in the week commencing Monday, the 15th of July, the principal day of the show being Thursday, as formerly.
2. That there should be no Council Dinner, but a Pavilion Dinner, to accommodate 900 guests.
3. That Mr. H. Stafford Northcote's name should be added to the list of the General Exeter Committee.

Steward of Implements.—The Hon. Captain Pelham's motion for a Steward-elect of Implements to be appointed at the May Monthly Council, who should have access to the operations carried on in the Stewards' Departments at the ensuing Country Meeting, but who should not come into actual office as a Steward in rotation until the Country Meeting of the following year, was seconded by Mr. Garrett, and carried unanimously. Mr. Shaw (London) expressed the great satisfaction it gave him to witness the carrying of a measure so essential, in his opinion, to that great object of the Society, the progressive improvement in the trial of agricultural implements at its country meetings. The measure was one, too, in accordance with principles of action he had long advocated; he considered it the most important step taken by the Council for some time, and he gave it his cordial support from experience which led him to estimate its value. The increase in number and importance of agricultural implements rendered the proposed preliminary training indispensable for all parties who had the immediate superintendence and control over the trials for determining their comparative value and efficiency.

Badges.—On the motion of the Hon. Captain Pelham, it was also decided that the Consulting Engineer of the Society, and the Judges of Implements and Stock, should have the privilege of wearing badges of office at the Country Meetings of the Society.

Exhibition of Stock.—Mr. Milward's motion that the judges of Stock should be requested to commence at 6 o'clock in the morning, in order that admission might be given on the same day to the Show-Yard by one p.m. (or as soon after as the Judges had completed their awards) was carried unanimously.

Committees.—The Standing Committees for the ensuing year were then re-appointed, the name of Mr. Brandreth being added to the Finance Committee, and those of Mr. Milward and Mr. Shaw (London) to the Journal Committee.

The General Meeting of this Society was held at the Society's House, Hanover-square, on Saturday, Dec. 15, at eleven o'clock; His Grace the Duke of Richmond in the Chair. Amongst those present we observed the Hon. Captain Pelham, M.P., Colonel Challoner, Mr. Raymond Barker, Mr. Mark Phillips (late M.P. for Manchester), Mr. Shelley, Mr. Shaw, Mr. Fisher Hobbs, and Mr. D. Milne of Edinburgh.

By direction of the noble Chairman—

Mr. Henson, the Secretary, read the following Report from the Council:—

REPORT.

The Council have to make the following Report to the Members of the Society on the occasion of their present General Meeting.

During the past half-year, 2 Governors and 189 Members have been elected, 3 Governors and 71 Members have died, and the names of 4 Governors and 236 Members have been removed from the list. The Society now consists of the following numbers:—

90 Life Governors
173 Annual Governors
607 Life Members
4499 Annual Members
19 Honorary Members;

making a total of 5,388 Members. This total amount, being 124 less than at the former General Meeting, does not indicate so much a reduction in the actual Members of the Society, as a removal of those names from the list, which were put down for temporary and local purposes only, at the early country meetings of the Society: the new Members now joining the Society consisting of those steady friends to agricultural improvement, who, on higher grounds, take a permanent interest in the advancement of its objects, and in its continued prosperity.

The Council have directed a new list of the Governors and Members of the Society to be printed and published as an appendix to the ensuing part of the Journal.

Among the deaths recorded, the Council regret to specify that of their venerable Member, Mr. Hillyard, one of the founders of the Society, and a constant attendant to within a very short period of his decease at their various meetings. The Council have filled up the vacancy in their body occasioned by his lamented loss, by the election of Mr. Sillifant. They have also elected Mr. Simpson a Member of Council, in the place of the Earl of Lovelace (whose present engagements prevent his due attendance), and Lord Camoys a Member of their body, in the place of the late Mr. Umbers.

The Council reported at the General Meeting in May, last year, that they had altered the Bye-law regulating the week-day of their ordinary meetings from Wednesday to Tuesday; they have, however, after experience of that change, decided to revert, after the end of the current year, to the original day for their meetings, namely, to the Wednesday, as more generally convenient to all parties.

Finances.—The Council have had under their most serious consideration the question they have been so often under the painful necessity of bringing under the notice of the members—namely, that of the arrears of subscription remaining unpaid to the Society. The Council have taken every ordinary means in their power to awaken the members, from whom these arrears are due, to a sense of their engagements to the Society, by repeated circular letters, by an attempted system of local collection, by personal communications kindly made to the parties by zealous members of the Council, by suspension of their names in the public Council-room, and in some cases by application made to them by the Solicitors of the Society. These means having proved successful only to a certain extent, the Council have requested a scrutiny to be made into the circumstances of the individuals who thus neglect to comply with the just claims of the Society; and they find that no plea, in the great majority of the cases, can be set up on the ground of inability to discharge their obligations—a plea to which the Council have always most considerately attended in the case of those members who, from adverse circumstances, have unfortunately been unable to meet even the small demands of the Society. The Council have never for an instant doubted, under all this forbearance, the just and legal claim the Charter of the So-

ciety gave them to recover these arrears in a Court of Law; but thinking that many of the defaulters might regard the payments due from them as simply optional, like those of an unchartered club or association, held together by motives merely of personal convenience, and with advantages enjoyed only while the voluntary subscription is yearly paid, they conceived that the opinion of eminent Counsel on this point, if obtained and transmitted to them, would at once remove such doubts, and lead to the instant payment of the arrears due. Accordingly, such legal opinion was obtained from Sir Frederick Thesiger and Mr. Warren, in the following terms, and a copy of it addressed in a letter by the Chairman of the Finance Committee to each member in arrear, namely:

"We can see no difficulty whatever in this case. No member of the Society can legally cease to be such, simply by discontinuing the payment of his subscription. By so doing, he may disentitle himself to the privileges of the Society, but unquestionably remains liable to pay all arrears of subscription which may be due, till he shall have legally withdrawn from the Society in the manner provided for in the bye-laws. The subscriptions are by no means voluntary donations, but legal dues, and, as such, legally recoverable by the Secretary for the use of the Society. Every member is clearly apprised of his legal liabilities by the circular sent to him, announcing his election. We are, therefore, of opinion that none of the grounds suggested in the case are available for resisting payment of the subscriptions in arrear.

"(Signed) { FREDERICK THESIGER.
SAMUEL WARREN.

"Inner Temple, May 7, 1849."

Of the parties thus addressed, only about one half favoured the Chairman with an answer, either by paying the arrears or entering into explanations by way of extenuation of claim; while the other half, to the present time, have refused him the ordinary courtesy of a reply. Under these circumstances, the Council feel that their duty to the Society places them under the painful necessity of resorting to the extreme measure of enforcing these payments by process issued from the County Courts in their district throughout the kingdom, against all Members who are more than two years in arrear; and they have accordingly directed their Secretary to address a letter to all such Members, informing them that unless the sums due are paid to him by post-office order or otherwise, on or before the 1st of February next, immediate steps will be taken, without further notice, to recover such sums in the County Court of the district wherein they respectively reside. The Council have instructed the Finance Committee to proceed in each case in such order as they may determine, and to report at each Monthly Council the proceedings taken in furtherance of this order. When it is considered that the admission of Members into the Society is made by voluntary request on their part, and that provision has constantly to be made in advance by the outlay of a considerable amount of money to meet and supply their privileges, the Council feel assured that the Members of the Society will think they have only done their duty to the body at large by enforcing the regulations against those non-contributing Members, and by bringing to a final issue this long-pending and agitated question of arrears; thus reducing the Society to an efficient body of contributing Members, and rendering the income of the Society a definite and legitimate amount, instead of its being as at present, from the obstacle of the arrears, a loose estimate, founded on vague probabilities and unsettled claims.

Country Meetings.—The Norwich Meeting of this year has proved eminently successful, in the amount and character of the live stock and implements, as well as in all the arrangements connected with their conveyance

and exhibition. The Society are indebted to Mr. Thompson for a report on the exhibition and trial of the implements at Norwich, which will appear in the ensuing number of the Society's Journal. His period of office, as one of the Stewards of the Implement-yard at the Society's Country Meetings, expired at the close of the Norwich meeting, when he went out by rotation as Senior Steward, the vacancy being filled up by the appointment of Sir Matthew Whistler Ridley as Junior Steward of that department, who has accepted that office. On the motion of the Hon. Capt. Dudley Pelham, the Council have resolved in future to appoint a Steward-Elect of Implements, who being nominated a year in advance of that in which he comes into actual office, will have the opportunity of qualifying himself by attendance at the Steward's Departments, and careful examination into the numerous details and duties of his office, for the actual duties he will have himself to perform, and the operations he will have to superintend and direct, when he comes into office by rotation in the following year. The Council are assured that this important preliminary qualification will render the duties performed by the Stewards more valuable to the Society, whilst they will be more easy and satisfactory to themselves. The means for testing the power given off by agricultural machinery having this year been perfected in so striking and satisfactory a manner by the Consulting-Engineer, Mr. Amos (of the firm of Easton and Amos), as to render what had been previously a laborious and uncertain task nothing more than a simple registration of facts, or mechanical results, alike convincing to the Judges and to the Implement makers themselves, the Council, on the recommendation of the Stewards, decided to present to Mr. Amos the gold medal of the Society for having effected this important object. The Council before leaving Norwich conveyed to the Mayor and Corporation of that city, to the Local Committee, and to the owners and occupiers of sites of ground, and to the various other parties, who had so zealously co-operated with them on the occasion, their cordial thanks for the kind attention they had paid to the wishes of the Society, and the admirable manner in which they had made every arrangement required of them for promoting the success of the Meeting. The Society were also especially indebted to the various Railway Companies for the great privileges and facilities they afforded to the Society's exhibitors, and particularly to the Eastern Counties' Company, for the great attention paid by them to the local requirements of the occasion. The Council have fixed the period for the Exeter Meeting as the week commencing Monday, the 15th July—Thursday being, as usual, the principal day of the show. They have also determined the prizes to be offered for that meeting, and the various terms and conditions connected with the competition, all of which will be found detailed in the Prize Sheets printed for the occasion, and to be obtained on application to the Secretary. They have decided not to have a Council Dinner at Exeter, but to have a Pavilion Dinner to accommodate 900 guests. They have resolved that the Judges of Stock shall be requested to commence their duties at 6 o'clock on the Wednesday morning, instead of 9 o'clock, in order that admission may be given to inspect the Stock on that day by one o'clock in the afternoon, or as soon after as the Judges may have delivered in their awards.

Lectures and Chemical Investigations.—The Society at the Norwich Meeting were favoured by Prof. Simonds and the Rev. Edwin Sidney with valuable Lectures, which will appear, with interesting illustrations, in the ensuing number of the Society's Journal. To Prof. Simonds and Prof. Way they have also been indebted at the present Meeting in London, for the delivery of valuable lectures on topics of scientific and practical interest to the farmer. Agreeably with the arrangement made with

Prof. Way, as the Consulting Chemist to the Society, important chemical investigations are in active progress in his Laboratory: of these some of the results will be given in the next part of the Journal. He has also kindly offered to deliver before the Council, after each of their weekly Meetings, during the ensuing spring, a course of twelve familiar chemical lectures, on topics of practical interest, and elucidated by experiments.

Veterinary Inspection.—The Council have received and adopted the following Report from their Veterinary Committee:—

REPORT OF THE VETERINARY COMMITTEE.

With a view to the collecting and perpetuating a body of authentic information in regard to the diseases of Cattle, Sheep, and Pigs, and arresting their progress, the Society appoints a professional inspector for these purposes. Any Member of the Society who may desire a competent professional opinion and advice in cases of extensive or destructive disease among his stock, and will address himself by letter to the Secretary, will, by return of post, receive a printed list of queries, which he is requested to fill up and return immediately. On the receipt of such returned list the Secretary will convene the Veterinary Committee forthwith (two Members of which, with the assistance of the Secretary, shall be competent to act); and such Committee will decide on the necessity of dispatching the Society's inspector to the spot where disease prevails. The remuneration of such inspector shall be a professional fee of £2 2s. per diem, and £1 1s. per diem for personal expenses; and he shall also charge the cost of travelling to and from the localities where his services may have been required. The fees will be paid by the Society, but the travelling-expences will be a charge against the applicant for professional aid. This charge may, however, be commuted or remitted altogether at the discretion of the Council, on such step being recommended by the Veterinary Committee.

The inspector, on his return from visiting the diseased stock, shall report to the Committee, in writing, the results of his observations and proceedings, which report will be laid before the Council.

When contingencies arise that may prevent a personal discharge of the duties confided to the inspector, he may, subject to the approval of the Committee, name some competent professional person to act in his stead, who shall receive the same rates of remuneration.

(Signed) THOMAS RAYMOND BARKER,
Chairman.

The Council have received with much satisfaction the cordial acquiescence of the Governors of the Royal Veterinary College in the request made to them by the Council that Professor Simonds should be allowed to act as the Veterinary Inspector of the Society.

Farm Accounts.—The Society having offered in 1816 a prize of £10 for the best Essay on Keeping Farm Accounts, the Council reported to the May General Meeting in that year in the following terms:—"The Judges on the 16 Essays on the Keeping of Farm Accounts, having reported that none of the Essays are worthy of the prize offered by the Society in that class, the Council appointed a Committee to report on the best mode, in their opinion, in which a practical farmer may be enabled in the simplest manner to keep the requisite accounts connected with his farming establishment." The Committee having taken that important practical question into their mature consideration, and having examined the various forms transmitted at different times to the Library of the Society, have laid before the Council the forms of Accounts proposed by them for adoption. These forms having been sent round to each Member of the Council, inviting their comments and suggestions, the Council took such communications into their consideration, and finally agreed to adopt the forms proposed, subject to certain alterations of headings and rulings, and conditionally that a statement should be inserted in the prin-

cipal book (to be sold with the others at a reduced price to the Members of the Society) that they were submitted to their notice only for present adoption, in the hope that such suggestions would be offered to the Council by practical men who might use them as might tend to their further improvement. The Council are fully aware that forms of accounts of any kind must be adapted to the different capacities or habits of business of those who are to use them, and bear a reference to the farmer's extent of occupation. They accordingly put forth these forms of accounts more as further means for improvement to be derived from experience of their practical use, than as offering them to the agricultural world as an exact or universal model by which all farm accounts are to be kept. They conceive the experience thus gained, and the simple fact of impressing upon farmers the necessity of keeping accurate records of outlay and income, and of profit and loss, in the several departments of their farming, will in itself be a great step towards that desired end. The habit of exact registration thus acquired in their money transactions, will also extend to other objects, especially to that journalising of daily occurrences and operations on their farms, which will become to them a valuable historical record for detecting the cause of failure or success in any particular mode of cultivation they may adopt, and thus furnish them with useful direction for future guidance.

Cottages and Farm Buildings.—The Society have been much favoured by his Grace the Duke of Bedford with a valuable contribution to their Journal, on the subject of Labourers' Cottages; and they are also indebted to Mr. Spooner, Mr. Sturgess, Mr. Ewart, and Mr. Tebbutt, the authors of the Essays on Farm Buildings commended by the Judges, for the kind manner in which they have placed their respective Essays at the disposal of the Journal Committee for publication.

Collection of Wheats.—Mr. Brandreth has reported to the Council the completion of the arrangements he had undertaken, at the request of the House Committee, respecting the Collection of Wheats presented to the Society by Miss Molesworth, Colonel Le Couteur, and the Rev. Professor Henslow. These specimens have been carefully arranged in guard-books, and placed in a cabinet prepared for their reception in the Council Room, for the ready access and convenient inspection of Members of the Society; space having been purposely left in the guard-books for the insertion of further specimens, and in the Catalogue for their due registration.

The Council congratulate the Society on the improvements successively made each year in the various departments of its operations, and on the general recognition of the value of its influence in animating and sustaining the cause of practical farming; and they cannot entertain a doubt that, by the united exertions of all parties connected with agriculture, such a progressive improvement will be made in the cultivation of the soil, and the economy of British husbandry, as will promote the greatest production at the least cost, and thus be found contributing to the mutual interest of the parties more immediately concerned, and to the increased resources of the country.

By order of the Council,

JAMES HUDSON, Secretary.

London, Dec. 14, 1819.

Mr. WINGATE begged leave to propose that the Report be adopted, and he hoped in doing so he should be excused for making an observation with respect to what was stated in the report in reference to the finances. He was a farmer from the county of Lincoln, and he could not help thinking that the farmers of that county, and those throughout the country, would think it sharp practice if they took them into the County Courts in the manner proposed in the Report.

Mr. GEORGE DYER did not agree with the gentleman who last spoke in the observation which he had made. He believed there were but few members who were unwilling to pay their subscription, and that many of the defaulters were so put down because the applications to them were sent to wrong addresses.

Mr. R. BARKER said that with reference to all the letters which had gone out from that office applying for payment of arrears, not one in one hundred had come back with the notification that the parties could not be found; and that was a proof that the letters had been correctly addressed, and had been received; and it did not show common courtesy that they had not been acknowledged when undoubtedly they had been received.

Mr. BLANCHARD hoped his Grace, the Chairman, would allow him to say that it appeared that the Society had an annual revenue of £7,000 a-year to enable it to carry out its objects; and if it was necessary to have that revenue to enable it to carry on scientific experiments and the publication of the Society's Journal, and at the same time defray the expenses of the general meetings which were annually held in different parts of the country, it was essential that the Committee of Finance should adopt measures to secure the payment of this sum so necessary; and when they found that scores and hundreds of the subscribers had not paid their subscriptions, he thought the Committee should urge upon the defaulters the necessity of immediate payment, in order to enable the Society to carry out the objects which were promised by its founders in the outset.

Mr. SHELLEY said that he must state, with reference to what had been said about County Courts, that Colonel Austen had written to several gentlemen in the county of Kent, requesting them to pay up their arrears, but he never received an answer from any of them.

Colonel CHALLONER thought the gentleman who characterized the proceedings proposed as sharp practice could not be aware of the real state of things connected with the arrears: he hoped he would therefore be allowed to say a few words in explanation. The member who had been five years in arrears had received no less than 9 applications soliciting him to pay up his arrears; and if to those applications no answer had been received, he thought it must be admitted that it was treating the Society with something like contempt: but further, he had to say, that after the opinion of Sir Frederick Thesiger and Mr. Warren had been obtained, a copy of that opinion had been sent by him, as Chairman of the Finance Committee, in a letter intimating the fact that they were bound by law to pay up their subscriptions, and calling upon them to do so by a certain day, in the most civil terms that could be used. And, if any gentleman had written in answer to that letter, and said, "I cannot pay my subscriptions just at this moment, but I will do so in three or six or eight months," the name of that man would not appear on the list of persons in arrears, which had been placed around the room, nor would be called upon to appear before a County Court (cheers). The Finance Committee had done all in their power, and when they could do no more they went to the Council and asked them the question, "Will it be expedient to expunge all those names from the subscription lists that are in arrears; or will you, as a Council, enforce those claims?" and the Council came to the resolution—not the Finance Committee be it remembered—that unless the money was paid by a certain day, the parties should be sued in the County Courts, and that that should be done in the least objectionable way (cheers). Now if any other way could be pointed out by which greater delicacy could be observed, the Finance Committee would willingly observe it. One gentleman, a member of the Council, had himself

paid the subscriptions of two or three of his acquaintances; and when he applied to them, on the next market day, after twisting the paper about for a time, the answer was: "No; I don't think I shall belong to the Royal Agricultural Society any longer." He thought that, after that explanation, no gentleman would say that the proposed proceeding would be called sharp practice (cheers).

Mr. WINGATE said he had not thrown out the hint for the purpose of raising a discussion; but he was glad he had done so, as the observations which had been made would go forth to the public, and would, he hoped, have a beneficial effect. He thought so many applications should not have been made to the parties in arrears, as he thought two or three would have been quite sufficient; and no opportunity should have been given to have treated the society with so much contempt. He remembered that the Earl of Yarborough applied by letter to several subscribers in the county of Lincoln, and he was sure the letters were not treated with contempt by any one.

THE SECRETARY: Many of them were never answered.

Mr. PAYNE was of opinion that they were greatly indebted to the Council for the course they had recommended.

Mr. MILNE, of Edinburgh, also thought thanks were due to the Council for what they had done and recommended. He might mention that in the Highland Society of Scotland, of which he was a Director, they had been similarly situated; and, after much discussion, they had adopted the same course, and took legal proceedings in the Courts. But he thought it right to state, for the warning of the Meeting and the Council, that the Highland Society had been cast in many of the cases because there was no proof that the parties sued had given any authority to the parties proposing them as Members to do so. That they had been proposed and seconded there was no doubt, but it could not be proved that they had given authority to that effect. He threw out that hint for the consideration of the Council; and although he did not doubt that the opinion of the professional men was a correct one, still he thought it was desirable to ascertain, before commencing proceedings, whether the parties themselves authorised those who nominated them. He did not know whether according to the rules of the Society the proposer and seconder were responsible.

The Duke of RICHMOND said he was not present at the Council when the resolution was passed, but he had no doubt that when proceedings were taken they would be taken only against those gentlemen who had paid their subscriptions before, and who, by that act, made themselves responsible. They were all much indebted for the hint which had been thrown out by the last speaker, and of which they would avail themselves. He was sorry they should be obliged to go to law, and he agreed, to some extent, with the gentleman who called it sharp practice; but it was only common courtesy that answers should at any rate have been returned to the letters of application. It was very hard that members who paid should have to bear any part of the expense occasioned by persons who became members for a day only. He had looked at the list of those in arrears in his own county, and he knew that some of them had been dead for two or three years, and the letters did not always go to the executors; and when they did, it was more than probable that the executors threw them in the fire. They might save themselves a great deal of trouble if the gentlemen present would take the first opportunity of speaking to their friends and acquaintances in their respective counties, and urge upon them the necessity of payment; for he did not himself much like County Courts.

MR. MARK PHILLIPS (of Manchester) entirely concurred with what had fallen from the Noble Duke, and that they should use their efforts in their respective neighbourhoods to bring parties to them rather than drive them away. At the same time he thought those members, who might be called the fine-weather members (and he had no doubt they would have plenty of them at Exeter), should be made to pay. He would suggest that before a person was admitted a member he should be obliged to sign some document to the effect that when he became a member he would abide by and observe all the rules and regulations of the society (cheers).

The report was then agreed to.

Colonel CHALLONER said he had to submit to the meeting the report of the Finance Committee upon the receipts and expenditure of the Society from January to June last; and which had been audited by Messrs. Knight, Beaman, and Crompton:—

RECEIPTS.

Balance in the hands of the bankers on the 31st of Dec., 1848.....	£538	7	1
Do. in the hands of the secretary.....	10	3	5
Dividend on Stock.....	140	4	7
Governors' composition.....	40	0	0
Members' do.....	280	0	0
Governors' subscription.....	595	5	0
Members' do.....	2,922	12	0
Journal receipts.....	153	12	6
Subscriptions paid in error to bankers hands ...	10	0	0
Country Meeting.....	1,010	13	6
	£5,750	18	1

EXPENDITURE.

Permanent charges.....	£170	12	6
Taxes and Rates.....	14	16	2
Establishment.....	742	19	7
Postage and carriage.....	17	16	0
Advertisements.....	10	5	6
Journal expenses.....	1,594	15	6
Prizes.....	340	0	0
Country Meeting.....	907	19	11
Analysis of ashes of plants.....	100	0	0
Returned subscriptions.....	19	1	0
Miscellaneous items.....	3	11	2
Balance at banker's, June, 1849..	1,825	15	11
Do secretary.....	3	4	10
	£5,750	18	1

It was not, he said, customary at that meeting to enter into all the items connected with the country meeting; but from the statement which he held in his hand, made up to the last moment, as far as they could, it appeared that the charges exceeded the receipts only by the sum of TENPENCE (cheers). The Norwich meeting was the first meeting that gave anything like such a result. But gentlemen must not suppose from that favourable result that the Society had not been put to expenses with respect to that meeting, for they had given a sum of £1,600 for prizes; but in comparison with many of their shows, as that at Shrewsbury and Derby which had each cost them £1,700, the result of the Norwich Meeting was highly satisfactory (cheers). He had to state that the finance committee had erased all arrears due from 1841 and 1842, and the arrears (original and accumulative) since that time stood as follows:—

1843.....	£285
1844.....	489
1845.....	636
1846.....	765
1847.....	1,010
1848.....	1,292
1849.....	2,061

Being in all... 6,538

Now, if any portion of that sum could be collected—could be *bona fide* obtained for the Society—he thought

the Finance Committee could come before the Society and say that they had done that which was originally contemplated—raised the capital of the Society invested the funds to £10,000. If, as he hoped, he should live to see the day when they could do so, the Finance Committee would have done its duty, and would leave to the Council the application and disposal of the money. They would then have a certain income for the year; and if the income should fall short, they had a rest of £10,000 to look to for relief. He thought, upon the whole, their affairs were in a most flourishing state, and would, he hoped, give satisfaction to the Meeting (cheers).

The report of the Finance Committee was then agreed to.

Mr. SHELLEY begged to propose the thanks of the meeting to the auditors, to whom they were so much indebted for their services.

Mr. KINDER seconded the motion, which was unanimously agreed to.

On the motion of Mr. Mark Phillips, seconded by Mr. Payne, Mr. Knight, Mr. Beaman, and Mr. Bell Crompton, were re-elected auditors.

The Hon. Captain PELHAM begged to propose the thanks of the meeting to Professors Way and Simonds, for the very useful lectures delivered by them during the past week. The least the Society could do in acknowledgment of the valuable services of those gentlemen, was to return them their best thanks (cheers).

Mr. RAYMOND BARKER did not wish to trespass on the meeting, but having taken the Chair on each of those occasions, he could not allow the vote of thanks to pass without expressing his cordial concurrence in what had fallen from Captain Pelham in reference to the able and lucid lectures which Professors Way and Simonds had given; and he only regretted they had not more time to lengthen their lectures, as they had a patient auditory, willing to listen for at least an hour longer.

The motion was then agreed to.

Professor SIMONDS said that in the absence of Professor Way he had great gratification in acknowledging the compliment that had been paid to them, and he had great pleasure in bearing his testimony to the usefulness and importance of the lectures delivered by Professor Way, which bore directly upon and illustrated the importance of the application of chemical science to practical farming; the agriculturist might be assured that the science of chemistry and the science with which he (Professor Simonds) was more immediately connected had a great practical influence upon farming operations, and the more farmers became aware of that fact the better for themselves.

Mr. SHELLEY said, as the business of the day had been got through, he was sure it would give them all satisfaction to return thanks to the Noble Duke in the chair, who had done so much for the Society.

Colonel CHALLONER, as one of those on whom the working of the Society devolved, felt bound to express how deeply he felt the advantages of the Noble Duke's presence, and the important services he had rendered to the Society, and how deeply they felt and lamented his absence last year, when from indisposition he was prevented from attending.

The motion was carried unanimously.

The CHAIRMAN said, believing as he did that the Society was in every way calculated to be of very great advantage to all classes in the country, he felt called upon to give it all the aid and support in his power. He must again say that he did not take so gloomy a view as some had done of the amount of arrears: he thought a great proportion would eventually be paid; and if his friends in Gloucestershire and Lincolnshire, Mr. Beaman

and Mr. Wingate, exerted themselves, as he himself would do in Sussex, they would enter into an honourable competition to show which county should have the least number of names in arrears next year.

MR. WINGATE: I take you at your word, my Lord. Mr. BEAMAN also signified his willingness to enter the lists in so useful a competition.

The Meeting then separated.

ANNUAL MEETING OF THE SOCIETY FOR THE PROTECTION OF AGRICULTURE AND BRITISH INDUSTRY.

The Annual Meeting of this Society was held on Wednesday, Dec. 12, at the rooms, No. 17, Bond-street. The attendance was numerous, the gentlemen present representing the branch societies of almost every agricultural county in England. Amongst the company we observed the Duke of Richmond, K.G. (chair); Hon. H. W. Wilson; Sir John T. Tyrell, Bart., M.P.; C. N. Newdegate, Esq., M.P.; Richard Spooner, Esq., M.P.; Revs. John Cox (Essex), James Linton (Huntingdonshire), and — Cator (Yorkshire); Messrs. T. Hartsborne and — Locker (Staffordshire), John Ellman (Sussex), Paul Foskett (Surrey), Robert Baker (Essex), S. Jonas (Cambridgeshire), W. Fisher Hobbs (Essex), E. Ball (Cambridgeshire), T. Weall (Herts), W. Bennett (late of Beds), — Stone (Aylesbury), Robert Smith (Devon), S. Chatham (Rutland), Caldecott and Pearman (Worwickshire), R. Healy (Lincolnshire), George Brown (Wilts), Peter Mathews (Gloucestershire), J. Warsop (Huntingdonshire), K. Viall (Essex), Joseph Pain (Bedfordshire), Worthington, Blanchard, Holding, Stone, H. Byron (the secretary), &c.

The noble Chairman explained the objects of the meeting, after which,

Mr. NEWDEGATE read the report, which is as follows:—

REPORT OF THE GENERAL COMMITTEE OF THE SOCIETY FOR THE PROTECTION OF AGRICULTURE AND BRITISH INDUSTRY, 1849.

Your committee, in presenting their sixth annual report, whilst they lament the condition of those interests the repeated attacks upon which called the protection societies into existence, have the fullest confidence and belief that the members of this society, as well as of those with which it is in connexion, are still agreed in the conviction that adequate protection is indispensable to our national industry, and are resolved to use every constitutional effort to obtain from the legislature that which they consider the performance of its duty to the constituent interests of the State.

Parliament having determined to expose the shipping interest of this country to an almost unprecedented competition with foreigners, it becomes more than ever the duty of those who adhere to the system under which this country has grown up to greatness, and which is still the ruling commercial policy of the world, to watch the effects of this experimental policy, not only upon our exports and imports, but upon our home trade—upon the prosperity and attachment of our colonies—upon the employment and condition of the poor. We observe that our colonial empire is fast approaching dissolution—an event openly desired by some leading free-traders. We know that in our respective localities the agricultural labourer is thrown out of work, and that poor-rates are increasing as prices diminish. Many of the best labourers and farmers who have accumulated some little property are quitting the shores of this country, in the hope of saving, and finding elsewhere profitable employment for, the remnant of their diminished capital. This is an emigration of the wrong sort—an emigration of those who constitute the strength and sinews of this country.

Some persons adduce the retention of farms by their present occupants, and the competition for the occupation of land, as unanswerable arguments, proving that the prospects of the agriculturists are not gloomy. The retention of farms by many of the present occupiers is attributable rather to the fear of having to wind up their affairs, and to submit the sale of their

stock at the present low prices, and to the transference of their interest in improvements, than to any hope of profitably carrying on their business under the present policy. It is true that this competition for the occupation of land has, in some instances, prevented the reduction of rent, but it arises from the abandonment of other trades, under the discouragement of native industry which is universally felt; and it will, in too many instances, be found that the present competitors for farms have neither the experience nor the capital requisite for the profitable and continuous occupation of the land. Many, also, are induced to make offers for farms under the conviction that the present fatal policy cannot be persevered in, and that, if they take advantage of the present lamentable depression of prices in purchasing farming stock, they will participate in the general improvement which must necessarily follow from the adoption of an altered policy.

Your committee cannot wonder that the practical are hopeless of a safe return for the investment of their capital and industry in English agriculture, and emigrate; or that the sanguine speculate upon an alteration of the present policy, when so many circumstances combine to refute the assurances which were lavished in support of the system of free imports. A more complete refutation of the predictions of those who declared that a moderate reduction of price would modify the influx of foreign agricultural produce cannot be given than is afforded by a review of the importations of grain, meal, and flour, during the present year, as compared with those of 1847.

The importation of corn, flour, and meal during the first ten months of 1849, this year of abundance, falls short by only 15 per cent. of the enormous quantities imported in the first ten months of 1847, that year of scarcity (of which it was said that, as the requirements were unprecedented, so the imports would prove unparalleled), and this in the face of a fall of price in 1849 equivalent to 33 per cent. as compared with the average price for the year 1847. The corn duty, which raised in 1847-8, without derangement of commerce or perceptible pressure, more than a million of revenue, has been abandoned, in total disregard of our heavy internal taxation and increasing national debt.

We must be blind, indeed, were we not daily more and more convinced that the formidable experiment now in course of trial can never be brought to a successful issue. We have been charged with gloomy predictions, and with attempts to destroy confidence among farmers. Now, as to our gloomy predictions, we only predict a continuance of those low prices which free importers have prophesied and proclaimed as the one great desideratum of the whole community; and as for confidence among farmers, no prediction of ours could have destroyed confidence so utterly as the tone of contempt in which the farmers are spoken of by the supporters of the hostile legislation which is directed against them. In the steady depreciation of the value of our products and industry, even our opponents now begin to find cause of alarm, and their organs have recently taken upon themselves to assure us that there is no 'fear' of still lower prices. 'Fear of lower prices' is a significant term on the lips of those who once proclaimed that cheapness is in itself prosperity; but it is evident these men cannot much longer go on holding two languages—assuring the farmers, on the one hand, that they ought to invest capital, for prices will not be unremunerative, and declaring to the public generally that they have made excessive cheapness permanent and universal.

It has been said that protection can never be restored—that no legislature will ever again consider the interest of producers as well as that of consumers—forming, as in fact they do, one great community. That whether it be the struggling farmer, the pauperised labourer, the starving needlewoman, or

even the despised colonialist, all must be left to the fierceness of competition, and that whether they live or die, cheap products will compensate society for their suffering lives and premature deaths. Such results may have little weight with certain not over-scrupulous persons, and may be rendered tolerable in their eyes by the prospect of pecuniary advantage, gratified ambition, and personal indemnity; but we believe the opinion is rapidly gaining ground that it is the duty of a government to protect its subjects, as well as to tax and to punish them.

"There is one part of our empire whose position is so miserable, and whose future is so black, as to demand from us a separate consideration. We know that the south and west of Ireland depended, like some of our own manufacturing districts, on the existence of a single plant. In Ireland one plant enabled masses of men to be congregated together, permitted the owners of property to stimulate competition to its highest, to sell the occupation of their land at the dearest and to buy their labour in the cheapest market. We know that many proprietors did so sell and so buy, with a singleness of purpose and a rigour of consistency which may well entitle them to be considered as bright examples to the school of Manchester. Now, through some hidden, unseen influence, this mainstay of Connaught and of Munster, the potato, has failed. It was as necessary to the subsistence of their population as the cotton plant is to that of Manchester. In Ireland the prices of other food are ruinously low to the producer, and yet too high for the pauperised consumer; and while whole districts are laid waste, scarcity increases as prices diminish. Meanwhile England has thought fit to supplant Irish produce by the unrestricted admission of foreign competition in her own, the best agricultural markets of the world; Ireland, thus pauperised and prostrate, lies a scandal at our doors, a beacon to those who believe that competition and cheapness are all that are needed to make a people happy or a nation great.

"The whole question of local and general taxation must, of necessity, be brought again under the consideration of Parliament. The owners and occupiers of real property have long submitted to heavy burdens in the discharge of the local duties imposed upon them. These local responsibilities have ever been held to have largely contributed to England's greatness. Self-government and the control of taxation are the fundamental elements of our national independence and social order. If these principles should fall amid the wreck of public honour and of public confidence which the passing and enforcing of the system of free imports have made, let those bear the blame who have created the necessity for their abandonment. As the system of free imports proceeds, no advance has been made towards really reciprocal freedom of exchange. America and Sweden have, indeed, published each of them a reciprocity proclamation with regard to our shipping; but the circumstances

of those countries can render such proclamations of little practical value. There seems no prospect of a reduction of the import duties of the United States, while Sweden has, by her new tariff, raised her import duties upon all manufactured articles of cotton, linen, and silk. Russia has officially announced to the merchants of the empire that no modification of her tariff will take place. While Spain has imposed a duty of 50 per cent. ad valorem on the importation of cotton goods, and Hamburg has joined the Zollverein, thus adopting its protective system, it would require some assurance on the part of any free-trader to boast of the reciprocity his favourite system has met with abroad.

"Your committee having thus glanced at the leading circumstances of our present position, think that you will concur with them in the opinion that there is every necessity for exertion and combination in the defence of those whose interests have been thus wantonly exposed and sacrificed.

"Your committee cannot conclude without expressing their earnest hope that, in the present distressed state of the tenant-farmers and labourers, the landlords will give their undivided support to raise them from their present lamentable and ruinous position.

"Your committee have no wish to suggest, far less to dictate the means by which the change that has taken place in public opinion towards a protective policy can be best advanced and elicited; but they believe that the calm good sense of England will use the experience which has already been so dearly bought, though but comparatively little of its price has yet been paid, in the suffering and decay which perseverance in the recent course of commercial policy will entail. The meshes of sophistry and falsehood by which this policy has been recommended and upheld, are yielding like gossamer before the wintry blast of keen experience. Many, once deceived, are now awakened to the certain consequences of the downward course this country is pursuing. Let us welcome every honest labourer in our common cause, even though he join us at the eleventh hour."

We regret that want of space prevents our giving the speeches of the several gentlemen who addressed the meeting.

Mr. BAKER proposed that the report be received and adopted; which being seconded by Mr. WILSON, after an interesting discussion, in which Messrs. Ball, William Bennett, Stone, and Paul Foskett took part, the motion for its adoption was put and carried unanimously.

Thanks were then voted to the noble Chairman, Mr. Newdegate, and the Committee who prepared the report, after which the meeting separated.

SMITHFIELD CATTLE CLUB.

The annual show of this useful society, at the Bazaar, in Baker-street, concluded on Friday, Dec. 15. In the evening the anniversary was celebrated as usual by a dinner at the Freemasons' Tavern, which was served in a manner so *recherché*, and accompanied and followed with wines so delicate in flavour, and so excellent in quality, as to augur well for the success of the new proprietorship of this long-celebrated establishment.

The chair was taken by his Grace the Duke of Richmond; and among those present we noticed Colonel Sibthorp, M.P.; the Hon. H. W. Wilson; the Hon. Captain Dudley Pelham; Colonel Challoner; John Villiers Shelley, Esq.; T. R. Barker, Esq.; Colonel Sibthorpe; — Green, Esq.; H. Brandreth, Esq.; W. Wingate, Esq.; W. Shaw, Esq.; W. F. Hobbs, Esq.; Mr. Mechi; Mr. Emery; Mr. Fletcher; Mr. Peters; Mr. E. Bowley; Mr. Robert Beman; Mr. Hudson (secretary of the Royal Agricultural Society); Mr. Brandreth Gibbs, &c.

Great complaints were naturally made that, of the farmers and gentlemen who had won the prizes, so few attended the

anniversary dinner at which those prizes were dispensed. Out of the long list of successful competitors, the following gentlemen only appeared, to receive from the hands of the noble president the rewards they had so honourably achieved:—

- Mr. R. Jones, of Woodstone Lodge, near Peterborough.
- Mr. James Bult, Dodhill House, near Taunton.
- Mr. Thomas Bond, of Bishop's Lydiard.
- Mr. William Fletcher, of Radmantwaite, Notts.
- Mr. J. W. Peters, of South Petherton, Somerset.
- Mr. Edward Bowley, of Cirencester.
- Mr. Robert Beeman, of Moreton, Gloucestershire.
- Mr. George Wamesley, of Rudlingstowe, near Bridlington.
- Mr. Thomas Mitchell, of Wellington, Beds.
- Mr. W. Fisher Hobbs, of Colchester.
- Mr. John Hitchman, of Wheatley, Oxon.
- Mr. William Rigden, of Hove, near Brighton.
- Mr. John Wentworth, of Beckhampton, near Marlborough.
- Mr. William Humphrey, of Wantage.
- Mr. William Sainsbury, of Devizes.

The noble CHAIRMAN, immediately after the cloth was withdrawn, eulogised the public and private virtues of her

Majesty, and proposed "The health of the Queen, and may Providence bless her with a long, happy, and contented life. (Loud cheers.)"

The toast was drunk with three hearty cheers.

The noble CHAIRMAN next gave, "His Royal Highness Prince Albert, and the other members of the Royal Family of England." (Cheers.) He was quite sure there was not a gentleman there present who did not feel deeply obliged to his Royal Highness for the support he had invariably given to the Smithfield Cattle Club (cheers). His Royal Highness was always an exhibitor, and had gained one of the premiums on the present occasion, and he would have had great pleasure in visiting the show-yard, accompanied, as his grace had reason to believe, by her Majesty, but for a loss which both the Queen and Prince Albert must deeply have deplored—the loss of an illustrious lady, who performed every act of Christian virtue, and who had no greater pleasure while in life than to endeavour to ameliorate the condition of her poorer neighbours—a loss which every man who had an English heart in his bosom must long deplore—and, under these circumstances, they could not expect that his Royal Highness with her Majesty would honour the show with their presence (Hear). He had, however, ventured to assure those royal and much-beloved personages that the Smithfield Cattle Club would at all times feel highly honoured by their presence, and that the club would do its utmost to make it worthy of such distinguished patronage (cheers). Prince Albert, he hoped, would become, as indeed he trusted they all would, a better farmer every day, and that on another occasion he would be more successful—(cheers)—but whether successful or not, his royal highness would continue to show stock (cheers). They were unfeignedly grateful for the favour which he showed towards this society; and as they well knew the desire the Royal Family of England had ever shown to promote the agriculture of the country, he trusted they would drink the toast with three times three farmers, cheers (loud cheers).

The toast having been duly honoured,

The noble CHAIRMAN again rose and said, he had great pleasure in proposing the next toast, "Success to the Smithfield Cattle Club" (Loud cheers). From circumstances to which he could not at that moment rightly allude, he regretted to say the show in that room was not so numerous as it had been on other occasions; but still he felt the greatest possible satisfaction that it was in his power to congratulate the Smithfield Cattle Club on the show of cattle which had taken place during the past week (cheers). He believed that in most classes there never had been a better. In the cow class and in short-wooled sheep, he was certain that better animals had never been shown at Smithfield (cheers). It might be said that he (the Duke of Richmond), having gained two premiums, would be sure to say that the show of sheep was good, and truly he did believe his sheep were very good ones ("Hear," and a laugh). But he was delighted to think that, if he could not win the gold medal himself, it had been taken from him by a Sussex tenant farmer whom he saw there (loud cheers). He pleaded guilty to a great deal of provincial feeling, and he thought that Sussex always ought to carry off the prize for Southdowns—(cheers and laughter)—and he rejoiced that the fortunate competitor this year was that good, honest, intelligent, straightforward fellow, Farmer Rigden (loud cheers). The club had not been so much attacked of late on the ground of its uselessness; but he (the Duke of Richmond) would nevertheless state why he thought it of great use. By the establishment of this club the intelligent farmers of the country had been induced to turn their attention to the raising of a superior breed of cattle (cheers); for if good cattle would not pay, they were quite sure that bad ones would not (loud cheers). If they went into the country they would find—and he did not wish to deprive the local associations of their share of the honour—the breed of cattle everywhere much improved. It was certain that the breed of cattle in this country was far better now than it was twenty years ago (loud cheers). It was a matter of great importance, not only to the farmers, but to the consumers, that the club should be enabled to show such cattle as had been that week exhibited. He did not mean to say that the farmer could or ought to bring his cattle into the market as fat, but that, by letting him see what breeds fattened best, it would enable him to decide what was the right stock to keep on his farm (cheers). He contended that it was a matter of no little importance, when they considered the number of

persons that visited the show-yard—the sons of farmers, whom their parents had intended to follow the not now, he regretted to say, very profitable business—it was of infinite advantage to see the comparatively bad animal in the pen beside the comparatively good animal (cheers). There was another advantage resulting from the Smithfield Cattle Club. He had always felt that every opportunity of bringing into closer contact the occupiers of the land and the landowner must be of the greatest possible advantage to both (loud cheers). He regretted the annual dinner of the club was not better supported by the landowners, who had the deepest interest in the improvement of breed (cheers). He was not going to trumpet his own praises, but, ever since he came home from the wars, he had taken every opportunity of meeting the tenantry of England (loud cheers). He only asked the landowners to attend one such meeting, and the reception they would meet with would make them go to many another (cheers). He believed the Smithfield Cattle Club was one of great national importance; he wished it prosperity from the bottom of his heart, and asked them to drink to its success with three times three hearty cheers.

The toast having been drunk with enthusiasm,

The noble DUKE proceeded to read the awards, and to deliver the prizes to those of the winners who were present to receive them, accompanying each with some graceful and appropriate compliment, which must greatly enhance their value in the eyes of the possessors.

PRIZES.

OXEN OR STEERS.

Class 1.—First prize, 30 sovs., Mr. Richard Jones, of Woodstone-lodge, near Peterborough; a silver medal to the breeder, Mr. James Cartwright, of Wistanstow, Salop; second prize, 15 sovs., Mr. Stephen Gooch, of Honingham, near Norwich; third prize, 5 sovs., Mr. Thomas Batson, of Kynaston-house, near Ross.

Class 2.—First prize, 30 sovs., the Marquis of Exeter, of Burghley-park, near Stamford; and the silver medal as the breeder; second prize, 15 sovs., Mr. James S. Bult, of Doolbill-house, Kingston, near Taunton; third prize, 5 sovs., his Royal Highness Prince Albert.

Class 3.—First prize, 25 sovs., Mr. R. Stratton, of Salthorp, near Swindon; and the silver medal as the breeder; second prize, 15 sovs., Mr. Harvey Coube, of Downside farm, Cobham; third prize, 5 sovs., Mr. T. Bond, of Bishops Lydeard, near Taunton.

Class 4.—First prize, 20 sovs., the Earl of Leicester; and the silver medal as the breeder; second prize, 10 sovs., Mr. J. Tucker, of Abbey Print Works, Stratford, Essex.

Class 5.—First prize, 15 sovs., the Earl of Leicester; and the silver medal as the breeder; second prize, 5 sovs., the Right Hon. the Earl of Aylesford, of Packington near Coventry.

Class 6.—Prize of 10 sovs., Mr. J. Rob, jun., of Thorpfield, near Thirsk, Yorkshire.

COWS AND HEIFERS.

Class 7.—First prize, 20 sovs., Mr. William Fletcher, of Rodmanthwaite, near Mansfield; and the silver medal as the breeder; second prize, 10 sovs., Mr. J. W. Peters, of South Petherton, Somerset; third prize, 5 sovs., Mr. Edward Bowly, of Siddington-house, near Cirencester.

Class 8.—First prize, 20 sovs., Mr. Samuel Wiley, of Bransby, near York; and the silver medal as the breeder; second prize, 10 sovs., Mr. Edward Newbatt, of Old-place, Sleaford, Lincoln.

Class 9.—First prize, 20 sovs., Mr. Richard Hickson, of Hougham, near Grantham; and the silver medal as the breeder; second prize, 10 sovs., Mr. Robert Beman, of Moreton-in-the-Marsh, Gloucester.

LONG-WOOLED SHEEP.

Class 10.—First prize, 20 sovs., Mr. G. Walmsley, of Rudston, near Bridlington; and the silver medal as the breeder; second prize, 10 sovs., the Marquis of Exeter, of Burghley-park, near Stamford; third prize, 5 sovs., Mr. T. Twitchell, of Willington, near Bedford.

Class 11.—First prize, 20 sovs., Mr. G. S. Foljambé, of Osberton-hall, near Worksop; and the silver medal as the breeder; second prize, 10 sovs., Mr. J. Stokes, of Ruddington Notts; third prize, 5 sovs., to Mr. W. Fisher Hobbs, of Boxtead-lodge, near Colchester.

LONG-WOOLLED SHEEP (NOT LEICESTERS).

Class 12.—Prize of 10 sovs., Mr. R. Beman, of Moreton-in-the-March, Gloucester; and the silver medal as the breeder.

CROSS-BRED SHEEP.

Class 13.—First prize, 10 sovs., Mr. John Hitchman, of Little Milton, near Wheatley, Oxon; and the silver medal as the breeder; second prize, 5 sovs., Mr. Charles Howard, of Biddenham, near Bedford.

Class 14.—Prize, 10 sovs., the Earl of Leicester; and the silver medal as the breeder.

SHORT-WOOLLED SHEEP.

Class 15.—First prize, 20 sovs., Mr. William Rigden, Hove, near Brighton; and the silver medal as the breeder; second prize, 10 sovs., Mr. G. S. Poljambe, of Osberton-hall, near Worksop.

Class 16.—Prize of 10 sovs., the Duke of Richmond; and the silver medal as the breeder.

Class 17.—First prize, 20 sovs., the Duke of Richmond; and the silver medal as the breeder; second prize, 10 sovs., Mr. John Wentworth, Beckhampton, near Marlborough.

SHORT-WOOLLED (NOT BEING SOUTH DOWNS).

Class 18.—Prize of 10 sovs., Mr. William Humfrey, of Oak Ash, Chaddleshworth, near Wantage; and the silver medal as the breeder.

PIGS.

Class 19.—First prize, 10 sovs., Mr. William Fisher Hobbs, of Boxstead Lodge, near Colchester; and the silver medal as the breeder; second prize, 5 sovs., His Royal Highness Prince Albert.

Class 20.—First prize, 10 sovs., Mr. Samuel Druce, jun., of Eynsham, near Oxford; and the silver medal as the breeder; second prize, 5 sovs., His Royal Highness Prince Albert.

Class 21.—Prize of 5 sovs., the Earl of Radnor; and the silver medal as the breeder.

The gold medal for the best ox or steer, in Classes 1, 2, 3, 4, 5, and 6, Mr. R. Jones, of Woodstone Lodge, near Peterborough.

The gold medal for the best cow or heifer, in Classes 7, 8, and 9, Mr. S. Waley, of Brandsby, near York.

The gold medal for the best pen of one-year old long-woolled sheep, in Classes 10, 11, and 12, Mr. G. Walmsley, of Rudston, near Bridlington.

The gold medal for the best pen of one-year old short-woolled sheep, in Classes 13, 16, or 18, Mr. W. Rigden, of Hove, near Brighton.

The gold medal for the best pen of pigs, in Classes 19, 20, and 21, the Earl of Radnor, of Coleshill.

EXTRA STOCK.

The silver medal for the best beast in extra stock, Mr. S. Gooch, of Honingham, near Norwich.

The silver medal for the best long-woolled sheep in extra stock, Mr. G. Walmsley, of Rudston, near Bridlington.

The silver medal for the best short-woolled sheep in extra stock, Mr. W. Sainsbury, of West Lavington, Devizes.

The silver medal for the best cross-bred sheep in extra stock, the Earl of Leicester, of Holkham-hall, Norfolk.

The silver medal for the best pig in extra stock, Messrs. Bearblock, Hornchurch, Essex.

The noble CHAIRMAN then proposed the health of the successful candidates in Class I, coupling with the toast the name of Mr. Jones, who had gained the gold medal; and paying him a high compliment, as well for his attendance at the dinner as for the excellence of his stock (cheers).

Mr. JONES returned thanks.

The noble CHAIRMAN next gave "The health of Mr. George Walmsley, and the successful competitors with long-woolled sheep" (cheers).

Mr. WALMSLEY acknowledged the compliment.

The noble CHAIRMAN next proposed "The health of Mr. Rigden, and the successful competitors in short-woolled sheep." His grace again expressed his delight that a tenant farmer of Sussex had won the principal prize in this class. Mr. Rigden had said that he (the Duke of Richmond) did not care about the prize, but he begged to tell them that he did care about losing it (cheers). He did not mind being fairly beaten (cheers). He had pleasure in proposing the health of Mr. Rigden, and hoped he would continue his exertions, as it was

only by the tenant farmers putting their shoulders to the wheel that any great agricultural improvement could be hoped for (cheers).

Mr. RIGDEN was highly gratified that the gold medal had come to his farm, but he thought he must not boast too much, as Sussex this year had not had their usual formidable competitor Mr. Webb (cheers). He thought, however, that his presence could not have caused a different result, but that he (Mr. Rigden) could beat even him (cheers and laughter). He, however, had had a serious competitor in his grace (cheers), and the gentleman at the right (Mr. Shelley) would be taking the shine out of some of them one of these days (cheers and laughter). He returned thanks for the compliment paid him and the other fortunate exhibitors.

The noble CHAIRMAN next gave the "Successful competitors in the class for pigs," and, the winner of the gold medal being absent, coupled with the toast the names of "Mr. Druce, sen., and Mr. Fisher Hobbs."

Mr. DRUCE, sen., who appeared for his son, in acknowledging the compliment, laid great stress upon the importance of breed to the farmer, who, without the best blood, could not, under present circumstances, feed to advantage. In these times expense was the great thing they had to fight against, and they, therefore, must look about them for those descriptions of animals which fattened on the least quantity of food (cheers).

Mr. FISHER HOBBS had great satisfaction in finding that, after three years' absence from the competitorship, in consequence of his having been steward of the yard, his improved breed of Essex pigs continued to maintain their pre-eminence. He took a similar view to that of Mr. Druce, on the importance of having a breed of animals which came early to maturity and were small consumers of food (cheers).

The noble CHAIRMAN then read the following list of commendations, which has not before been printed: Class 1, Mr. Tucker's ox; class 2, the steers of Mr. Franklin and Lord Spencer; class 4, Mr. Greenaway's steer; class 6, Mr. Robb's ox; class 7, generally commended, and particularly Mr. Philip's heifer; class 8, Mr. Townley's cow; class 9, Earl of Leinster's cow; class 10, generally commended; class 11, Mr. J. R. Overman's pen; class 15, W. and J. Horcold's pen and Mr. Sainsbury's; class 16, the pens of Messrs. Horcold, Mr. Shelley, Mr. Goodlake, and the Earl of Chichester—the latter highly; in pigs, the pens of Earl Radnor, Mr. Woods, and Mr. Pusey; in extra stock, Sir John Conroy's ox, Mr. Thomas Bulwer's Leicester ewe, the Southdown wethers of Mr. Poljambe and Mr. Overman, the pigs of Dr. Daniel and G. Turpin.

The Hon. Captain DUDLEY PELHAM, in a complimentary speech, proposed "The health of the Duke of Richmond; and long might they have the satisfaction of seeing him preside over the Club" (loud cheers).

The toast was drunk with great enthusiasm.

The noble DUKE, in returning thanks, expressed the satisfaction with which he found himself associated with a body of practical farmers, not so much for the purpose of promoting their own worldly concerns as of being of service to the community at large. He had always felt this club to be of importance to the country. He had always shown and had often been beaten. He did not like Mr. Rigden's plan of saying "I have won, but Mr. Webb was not there." (Hear, hear.) On the contrary, he should like Mr. Webb to show again, that they might see whether his hand was yet in. (Cheers.) He recollected the time when Mr. Webb was quite fatigued with his many journeys to the chair to fetch his prizes, they were so numerous—a laugh—but he doubted whether that would be the case now. (Cheers.) Defeats only stimulated him to try again; and he trusted others would be similarly influenced. (Cheers.) Whether he was successful or not, he should always compete, as he felt the club had a national importance. Whatever position others might be in, the British farmers could never charge him with ingratitude, or say that he dare not face them in any part of England. (Cheers.) They could not say that he was one who would only go to packed meetings—(Cheers)—and having thus had a full experience of the feelings and character of farmers, he was anxious to impress upon the landowners the necessity of more frequent intercommunication. It was of enormous importance to them—it was of great importance to the farmer, and equally important to the labouring classes—

that the agriculture of the country should be improved. On the condition of agriculture depended the whole empire, and he would remind them that, if good farming would not pay, bad farming could not (cheers). He thanked them for having re-elected him president, and regretted there were not more young landowners in the room. He could not at his time of life expect long to be able to preside over them, and he hoped they would have had the young stock paraded before them, from which they might in future select their presidents (cheers). As long as he had health he would never abandon the Smithfield Cattle Club. He might be permitted to say, amongst the numerous institutions in existence for the improvement of agriculture, he knew of none in which the funds were in a more satisfactory condition, and that proved that the great body of agriculturists and the public believed that the Smithfield Cattle Club ought to be patronised (cheers). His grace concluded by proposing "The healths of the Hon. H. W. Wilson, Mr. George Villiers Shelley, and the unsuccessful candidates" (cheers).

The Hon. H. W. WILSON, after some remarks in reference to the show, recalled to the memory of those who attended the agricultural meeting at Norwich in July that in St. Andrew's Hall they had seen a portrait of England's darling hero, Lord Nelson, and the flags which floated triumphantly at the battles of the Nile and of Trafalgar; and now he trusted they would never forget the dying words of that immortal warrior, "England expects every man to do his duty" (loud cheers). The eyes of the whole kingdom were at this moment upon the farmers of England; they had the power, and, drawing tight the bonds of union between the landlord, the tenant, and the labourer, they would o'ermaster all their difficulties, and England once more become prosperous and happy (loud cheers).

Mr. SHELLEY also acknowledged the toast, and advised Mr.

Rigden to be vigilant, for he might depend upon it he (Mr. Shelley) would be at his heels next year.

The noble CHAIRMAN said he had no doubt his Sussex friend would be happy always to have Mr. Shelley in that position (great laughter). His Grace then proposed in succession the healths of "The Judges," "The Stewards of the Showyards," "Mr. Brandreth Gibbs, the Honorary Secretary."

Mr. Brandreth Gibbs, in returning thanks, drew attention to the prosperous state of the Club; and particularly adverted to the advantage which would be derived from the meetings of local societies being so arranged as not to clash with the meeting of the Smithfield Club.

"Prosperity to the Labouring Classes" having been proposed from the Chair, and received with enthusiasm, the meeting broke up, his Grace being loudly cheered at his departure.

OFFICERS FOR THE YEAR.

President.—His Grace the Duke of Richmond.

Vice-Presidents.—The Right Hon. the Earl of Aboyne; Mr. Philip Pusey, M.P.; the Right Hon. the Earl of Hardwicke; the Right Hon. Earl Spencer; the Right Hon. the Earl of Yarborough.

Trustees.—His Grace the Duke of Richmond, Mr. B. T. Brandreth Gibbs, the Right Hon. Lord Portman.

Stewards.—Beasts and Long Wool Sheep.—Mr. Chamberlain, Mr. W. Torr, Mr. George Turner. Short Wool Sheep and Pigs.—Mr. Elman, Mr. Grantham, Mr. Jous Webb.

Judges.—Beasts and Long Wools.—Mr. Thomas Townsend, Mr. John Booth, Mr. Thomas Reynolds. Short Wool Sheep, and Pigs.—Mr. John Ford, junior, Mr. John Clayden, Mr. William Saxby.

Hon. Secretary.—Mr. B. T. Brandreth Gibbs.

THE BIRMINGHAM AND MIDLAND COUNTIES CATTLE SHOW.

The award of the prizes for cattle, sheep, pigs, and poultry exhibited at this show—the first ever held in the Midland Counties—took place on Monday, Dec. 10. The high expectations previously entertained were more than realized. The facilities of railway communication to nearly every part of the country, and the fact that in the Midland Counties there are many of the most eminent breeders and feeders of stock, appeared to warrant the conclusion that such an exhibition would prove a successful experiment, and lead to practical results.

Amongst the chief promoters of the exhibition in Birmingham, and who, throughout the present year, have displayed the greatest zeal in its formation, have been Mr. T. B. Wright, Mr. Tower, and Mr. Shackel. Those gentlemen having determined to make the attempt, their first object was to secure the patronage of the chief agriculturists resident or holding property in the adjoining counties. In this they were eminently successful; for, amongst others, they speedily obtained the support of his Grace the Duke of Richmond, his Grace the Duke of Rutland, the Earl of Warwick, the Earl of Aylesford, Lord Leigh, the Earl of Dartmouth, Earl Talbot, Lord Hatherton, and also of his Royal Highness Prince Albert. To these names may be added a long list of commoners, among whom are enrolled Sir Francis Lawley, Mr. Spooner, M.P., Mr. Adderley, M.P., Mr. Newdegate, M.P., and distinguished landholders and practical farmers, and breeders of stock from various parts of the midland counties.

It was proposed to raise the necessary funds by subscription, and a sufficient amount having been obtained a prize list was prepared suitable to the midland counties, and including all the most useful varieties of animals. In reference to fat cattle, a more complete classification was adopted than usual in lists of this nature, as without this classification it was deemed impossible for judges to

decide on the merits of the different breeds with satisfaction to themselves or the exhibitors, or in any way which should promote a general good object—the main object of the meeting being to encourage profitable and not expensive feeding. Certificates of age were, of course, to be required, and the cattle and sheep to be in the possession of the exhibitors previous to the show.

The project, in its infancy, promised well; and in the course of a few months it was ascertained that the entries would be numerous beyond all expectation. It was resolved to erect an extensive wooden building in the neighbourhood of Bromsgrove-street, the land being granted for that purpose by Sir Thomas Gcoch. This work was undertaken by Mr. Briggs, and executed by him to the entire satisfaction of the promoters of the show. Originally it was 330 by 100 feet wide; but ultimately the applications of exhibitors were so numerous that it was found necessary to add another erection, 75 by 45 feet.

The stock, consisting of not fewer than 800 head of fat cattle, sheep, and pigs, arrived on Saturday; and the arrangements for the exhibition were fully completed that day. When the immense structure was lighted by gas at night the scene was extremely pleasing; and judges of farming stock declared that in point of quality the show of cattle and pigs, not to forget poultry, was far above the average of similar exhibitions held in other parts of the kingdom. The show of pigs was deemed to be unequalled on any former occasion.

It will be seen that Prince Albert, the Duke of Rutland, the Earl of Aylesford, the Earl of Warwick, Lord Hatherton, Sir Francis Lawley, &c., were among the successful competitors.

Judges of Cattle and Sheep.—Mr. John Outhwaite, Buinesse, Catterick, Yorkshire; Mr. Robert Lucas,

Grafton Manor, Worcestershire; and Mr. Benjamin Swaffield, Chatsworth, Derbyshire.

The following is a list of the prizes just awarded:—

OXEN OR STEERS.

Class 1.—Herefords: First prize, £10, the Earl of Warwick, Warwick Castle; and a silver medal to the breeder, Mr. John Wheeler, Trippleton, near Lintwardine, Ludlow; second prize, £5, Mr. H. Chamberlain, Desford, near Leicester.

Class 2.—Devons: First prize, £10, His Royal Highness Prince Albert; and a silver medal to the breeder, Mr. James Quartly, Molland, Devonshire; second prize, £5, Mr. Thomas Newbold, Baggington, near Coventry.

Class 3.—Short-horns: First prize, £10 (and the gold medal for the best fat ox or steer in the yard), the Duke of Rutland, Belvoir Castle, Lincolnshire, and also a silver medal as breeder; second prize, £5, Mr. Thomas Pulver, Broughton, near Daventry, Northamptonshire.

Class 4.—Scottish and Welsh Breeds: First prize, £10, and second prize, £5, Mr. Joseph Rob, Thorpfield, near Thirsk, Yorkshire.

COWS AND HEIFERS.

Class 5.—Herefords (Cows): First prize, £10, Mr. Joseph Lester Hassall, Packington, near Ashby-de-la-Zouch; second prize, £5, Mr. Edward Gough, Gravel Hill, Shropshire.

Class 5 A.—Herefords (Heifers): Prize, £3, Lord Hatherton, Teddesley, near Penkridge. A heifer exhibited by Sir Francis Lawley, Bart., Middleton Hall, near Tamworth, was highly commended by the judges.

Class 6.—Devons (Cows): First prize, £10, the Earl of Aylesford, Packington, Warwickshire; and the silver medal as breeder. Second prize, £5, Mr. Thomas Newbold, Babbington, near Coventry.

Class 6 A.—Devons (Heifers): Prize, £3, the Earl of Aylesford, Packington, Warwickshire.

Class 7.—Short-horns (Cows): First prize, £10 (and the gold medal for the best fat cow or heifer in the yard), Mr. Robert Beaman, Moreton-in-the-Marsh; and silver medal to the breeder, Mr. Stephen Clemans, Churchill, Oxfordshire; second prize, £5, Mr. Joseph Lester Hassall, Packington, near Ashby-de-la-Zouch. A cow in this class by William Woodward, Esq., Bredon's Norton, near Tewkesbury, and one exhibited by Mr. George Graham, Yardley, Worcestershire, were both highly commended by the judges.

Class 7 A.—Short-horns (Heifers): Prize, £3, Mr. Thomas Harris, Stoney-lane, Tardebigg, near Redditch. A heifer exhibited in this class by Sir Charles Knightley, Bart., M.P., was commended by the judges.

Class 8.—Oxen or Steers, not qualified to exhibit in the preceding classes: First prize, £10, Mr. Charles Wilson, the Hill Farm, Claines, near Worcester; and a silver medal to the breeder, John E. Vernon, Esq., Himbleton, Worcestershire; second prize, £5, Mr. Richard Harvey, Sheldon, Warwickshire.

Class 8 A.—Cows: First prize, £10, Mr. Edward Lythall, Snitterfield, near Stratford-upon-Avon; and a silver medal as breeder; second prize, £5, Mr. Richard Warner, of Weston Hill, near Nuneaton.

Class 8 B.—Heifers: Prize, £3, Lord Hatherton, Teddesley, near Penkridge.

SHEEP.

Class 9.—Leicesters: First prize, £5, Mr. Francis Robbins, Stoneleigh, Warwickshire; and a silver medal as breeder; second prize, £3, Mr. Robert William Payne, Dordon, Warwickshire.

Class 10.—Long-wooled Sheep, not being Leicesters: First prize, £5, Mr. Robert Benam, Moreton-in-the-Marsh, Gloucestershire; and a silver medal as breeder.

Class 11.—Southdowns: First prize, £5, the Earl Howe, Gopsall Hall, Leicestershire; and a silver medal as breeder.

Class 12.—Short-wooled, not being Southdowns: First prize, £5, the Earl of Aylesford, Packington, Warwickshire; and a silver medal as breeder; second prize, £3, Mr. John Baker, Grendon, near Atherstone.

Class 13.—Cross-bred: First prize, £5, Mr. Richard Adcock, Stone House Farm, Inkberrow, Worcestershire; and a silver medal as breeder; second prize, £3, Mr. William Shipway, Hanley Castle, Worcestershire.

Class 3 A.—Best pen of Three Long-wooled Wethers,

not exceeding thirty-four months: First prize, £5, Mr. John Henry Lees, Bacon's End, near Colchill; and a silver medal as breeder; second prize, £3, Mr. John Henry Lees, Bacon's End, near Colchill.

Class 13 B.—Best pen of Three Short-wooled Wethers, not exceeding thirty-four months: First prize, £5, the Earl of Aylesford, Packington, Warwickshire; and a silver medal as breeder; second prize, £3, Mr. Edmund Herbert, Powick, Worcestershire.

Judges of Pigs:—Mr. Carmichael, Sowerby Park, near Thirsk, Yorkshire; Mr. Harris, Fletchamstead, near Coventry; Mr. Ball, Bretforton, near Evesham, Worcestershire.

FAT PIGS.

Class 14.—Not exceeding nine months old: First prize, £5, Mr. David Mace, Chatteries, Isle of Ely; second prize, £3, Mr. Joseph Hardwick, Camp Hill, Birmingham. Pigs exhibited in this class by Mr. William Adams, Spring-street, Birmingham; James Taylor, Esq., Moseley Hall, near Birmingham; Mr. John Lowe, Camp Hill, Birmingham; Mr. George Vincent, Sherlock-street, Birmingham; and Messrs. Henry and James Cooper, Small Heath, near Birmingham, were commended by the judges.

Class 15.—Fat Pigs, exceeding nine and not exceeding fourteen months old: First prize, £5, Mr. Thomas Dobbs, Edgbaston; second prize, £3, Mr. Thomas Dobbs, Edgbaston.

Class 16.—Fat Pigs, exceeding fourteen and not exceeding eighteen months old: First prize, £5, Mr. Arthur Perks, Kingsbury, Warwickshire; second prize, £3, Mr. Thomas Padmore, Dean-street, Birmingham.

Class 17.—Fat Pigs, exceeding eighteen months old: First prize, £5, Mr. James Baldwin, King's Norton, near Birmingham; second prize, £3, Mr. Henry Lowe, Comberford Mill, near Tamworth.

STORE PIGS.

Class 18.—For Breeding Sows of a large breed: First prize, £5, Mr. Joseph Tuley, Exley Head, near Keighley, Yorkshire; second prize, £3, Mr. Edwin Eddison, Headingley, Leeds.

Class 19.—For Breeding Sows of a small breed: First prize, £5, Mr. Richard Ashwin, Addington, Worcestershire; second prize, £3, Mr. Charles Randell, Chadbury, Worcestershire.

Class 20.—For Pigs of Five Store Pigs of one litter, not exceeding seven months old: First prize, £5, Mr. Moses Cartwright, Stanton-Hill, near Burton-upon-Trent; second prize, £3, Mr. Matthew Pemperton, Gibraltar, Leeds.

Class 21.—For a Sow of a large breed, with Litters of Pigs not exceeding eight weeks old: First prize, £5, Mr. Moses Cartwright, Stanton-hill, near Burton-upon-Trent; second prize, £3, Mr. Charles Eley, Beaver's Farm, Hounslow, Middlesex.

Class 22.—For Sows of a small breed, with Litters of Pigs not exceeding eight weeks old: First prize, £5, Mr. Edward Taylor, Outland, near Leeds; second prize, £3, Mr. George Edward Taylor, Outlands, near Leeds.

Class 23.—Brawns of a large breed: First prize, £5, Mr. Edwin Eddison, Headington-hill, Leeds; second prize, £3, Mr. J. Cartwright, Longton, Staffordshire Potteries.

Class 24.—Brawns of a small breed: First prize, £5, Mr. Thomas Alkin, Grendon, Atherstone; second prize, £3, Mr. Edwin Eddison, Headingly Hill, Leeds.

RICHMOND TESTIMONIAL.—We are glad to be able to announce that the funds subscribed for a testimonial to his Grace the Duke of Richmond are, with His Grace's consent, to be applied to a good and benevolent purpose, namely, the foundation of annuities for widows of decayed farmers, under the management of trustees and a committee, free of expense. This principle once established, we trust that landed proprietors and farmers will contribute to the funds, so that the sphere of its benevolence may be extended, and that the agricultural body may no longer form an almost solitary instance of the want of such a provision for members of their own class who have suffered from the frowns of fortune.

REVIEW.

"THE FOX-HUNTER'S GUIDE."

BY CECIL.

A glance at the contents of this work will best explain its object and utility. It gives, then, the places of meet of upwards of seventy different packs of fox-hounds in England and Wales, their locality, distance from the nearest towns, railway stations available for each hunt, and a list of inns where proper accommodation for hunters may be had. All these necessary facts for the sportsman have been very carefully compiled by one of their own order—a gentleman who has had full experience of that he advises on; and which, coupled with "the authorities," masters of hounds, and so on, he is assisted by, at once assures the enquiring stranger that full reliance may be placed upon his information.

The list of inns alone where "good entertainment may be really had for man and horse" is well worth the price of the work to any of our friends in the habit of sending valuable animals about the country; while to those who go with them for a little sport, an occasional reference to "the Guide" will be a saving of trouble and money in many ways.

The book, which is very handily arranged for use and carriage, is promised as an annual.

PROFITS OF FARMING.

EDS. CULTIVATOR,—I notice an article in the September number of *The Cultivator*, signed "A Farmer, Hillsdale, Columbia County," containing statements of the comparative productiveness of capital and labour, as applied to farming and other pursuits, suggested by the table in the July number of your paper, giving the estimate of the principal products of Seneca county, for the year 1848. He says—"That notwithstanding the superior advantages and management of the farmers of Seneca county, still the income on their capital and labour is vastly inferior to that of any other of the great industrial interests of our country." Now, on examining that table, I find the following results, viz. :—That the average nett profit over cost of production on the land devoted to wheat, was 11 d. 25 c. per acre; on the land in barley, 6 d. 13 c. per acre; on that in oats, 5 d. per acre; and on the corn lands, 7 d. 25 c. per acre; and that the average of the whole 64,363 acres, devoted to these four principal products, was 9 d. per acre.

Assuming the average value of these lands to be 50 d. per acre, which I imagine is a liberal estimate, I find that the income or nett profit of capital would be, on the wheat lands, 22½ per cent.; on that in barley, 12¼ per cent.; on that in oats, 10 per cent.; and on that in corn, 14½ per cent.; and the average rate upon the whole 64,363 acres, 18 per cent. nett profit! Now, I would ask, what "other of the great industrial interests of our country" does or can produce an "income on their

capital and labour" like this? Certainly not the manufacturers of New England, which I believe to be at this time as profitable as those of any other country in the world, and which, I think I may say without fear of contradiction, have not netted their owners for the ten years past, a profit exceeding 7 per cent. per annum upon their capital.

In the same September number of *The Cultivator*, is a statement of the products of the Lakeland farm of Mr. Foster, in that same Seneca county, in which 55 acres of wheat land (the only crop of which particulars are given), are stated to have produced 28 per cent. on the value of the land! Certainly I would not offer this premium farm as an exponent of farming in general, but I take it in some measure as an exponent of what farming *might be*, if the same skill, economy and capital was devoted to it as there is to many other of the great industrial pursuits. Again, "A Farmer" says that "the income of all the other great industrial interests of our country is shown by the census to be from 100 to 200 per cent. upon their capitals;" and to prove this, quotes in a note the census of Massachusetts for 1845, where the manufacturing capital of that State is put down at over forty-six millions of dollars, and the value of their products at nearly eighty-eight millions "or," he adds, "nearly 200 per cent. on capital employed, and near 700 d. annual income from the labour of each individual." Here, it seems to me, is an important error, occasioned by leaving out of view the value of the raw material, which the manufacturers work upon, and which, though constituting a great part of the value of their productions when finished, is yet in no sense *their* production; for example—the cotton manufacturer, out of a pound of cotton, costing 12 cents., producing three yards of cloth, which nets him 6 cents per yard, amounting to 18 cents. Now the production of *his* labour and capital is not 18 cents—it is only *six cents*, the increased value of the cotton over its cost, and this is about the average proportion of the products of our manufacturers generally. So that instead of taking the *income of capital and labour* employed in manufacturing in Massachusetts at the "value of their products" when sold, it should be stated at only *one-third* of the amount: thus, the income from the capital and labour of the manufacturers of Massachusetts should be put down at twenty-nine millions, instead of eighty-seven millions and over—which would leave for each hand employed 230 dollars annually, instead of near 700 d." as stated by your correspondent; and showing too, the earnings of individuals engaged in agriculture, by his own statement, to be nearly seventy dollars per year more than those engaged in manufacturing, &c.

It seems to me that the profits of capital and labour devoted to agriculture have never been ascertained and understood in this country, and that a more thorough examination and calculation would show that agriculture might be made to be what God intended it should be, the *most profitable* as well as the *most natural* and *happy* pursuit of man.

Stockbridge Mass., Oct. 5, 1849. ENQUIRER,
—American Cultivator.

METEOROLOGICAL DIARY—1849.

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.	
Nov. 21	30.10	30.03	42	45	40	Easterly, var.	calm	cloudy	cloudy	cloudy	dry
22	30.02	29.78	36	45	37	S. East	calm	cloudy	cloudy	cloudy	dry
23	29.69	29.38	37	48	48	S. West	variab.	cloudy	cloudy	cloudy	rain
24	29.37	29.33	43	46	36	N.E. N.W. cr.	calm	fine	fine	haze	dry
25	29.33	29.56	33	38	36	N. West	calm	fog	haze	fine	dry
26	29.70	30.05	31	39	30	N. by East	calm	haze	sun	fine	dry
27	30.06	30.11	28	33	29	W. by North	calm	fog	fine	haze	dry
28	30.01	29.94	25	33	30	W. by N. by S.	gentle	haze	fine	cloudy	dry
29	29.90	29.97	26	38	35	Southerly	brisk	cloudy	sun	cloudy	dry
30	29.85	29.80	34	46	42	S.W. var.	variab.	cloudy	cloudy	cloudy	very wet
Dec. 1	30.09	30.10	35	44	40	W. by N. by S.	gentle	fine	sun	cloudy	dry
2	29.83	29.45	38	45	43	S. West	brisk	cloudy	cloudy	cloudy	rain
3	29.40	29.50	39	45	38	N. East	brisk	cloudy	cloudy	cloudy	rain
4	29.50	29.52	32	38	30	N. by West	gentle	cloudy	sun	fine	dry
5	29.39	29.40	27	45	45	S. by East	brisk	cloudy	cloudy	cloudy	rain
6	29.70	29.78	39	48	42	S. West	gentle	fine	sun	fine	dry
7	29.63	29.36	40	44	42	S. by East	strong	cloudy	cloudy	cloudy	rain
8	29.40	29.63	40	47	39	S. West	gentle	cloudy	sun	fine	dry
9	29.80	30.00	32	48	39	Every way	calm	fine	sun	fog	dry
10	30.10	30.15	34	38	36	N. Westerly	calm	fog	fog	cloudy	dry
11	30.15	30.10	35	38	34	N. East	gentle	cloudy	cloudy	cloudy	rain
12	30.00	29.90	33	35	32	N. East	brisk	cloudy	cloudy	cloudy	dry
13	29.80	29.81	30	35	34	Easterly	brisk	cloudy	cloudy	cloudy	dry
14	29.82	29.82	34	52	52	S. West	lively	cloudy	cloudy	cloudy	small rain
15	29.93	30.00	50	55	47	S. West	airy	cloudy	cloudy	fine	idem
16	29.94	29.80	47	51	49	S. West	airy	cloudy	cloudy	cloudy	dry
17	29.50	29.88	45	52	44	W. by North	airy	fine	sun	fine	dry
18	29.78	29.49	43	50	46	S. West	strong	cloudy	cloudy	cloudy	rain
19	29.89	30.23	46	36	36	N. West	airy	cloudy	cloudy	fine	dry
20	30.23	30.30	33	40	36	N. West	gentle	fine	sun	cloudy	rain
21	30.39	30.47	30	37	31	Various	gentle	cloudy	cloudy	cloudy	snow

ESTIMATED AVERAGES OF DECEMBER.

Barometer.		Thermometer.		
High.	Low.	High.	Low.	Mean.
30.32	29.20	55	17	39.8

REAL AVERAGE TEMPERATURE OF THE PERIOD.

Highest.	Lowest.	Mean.
43.4	36.7	40.0

WEATHER AND PHENOMENA.

November 21, 22.—Overcast, or broken clouds. 23.—Rainy afternoon. 24.—Cross currents, N.W. above. 25.—Clearing after wetting dense fog. 26.—Keen frost, fog clears off. 27.—Chilling fog, profuse snow in Thanet. 28.—Superb noon after fog. 29.—Total change, double lunar halo. 30.—Murky atmosphere, with much rain.

LUNATIONS.—First quarter, 23rd day, 2h. 24m., morn; full, 30th, 3 h. 25 m., morn.

December 1.—Very fine till evening. 2, 3.—Haze and close rain. 4.—Fine cheerful day. 5.—

Soaking rain. 6.—Fine, not drying. 7.—Changeable for rain. 8.—Change for fine. 9.—Fine and sunny. 10.—Dark and yellow fog: thence to the 16th, a series of cold, cloudy, or rainy days and nights. 17.—Very fine and lively. 18.—Much wind and some rain. 19.—Lively drying day. 20.—Fine keen day after wet, early. 21.—Snow, thawing.

LUNATIONS.—Last quarter, 6th day, 6 h. 53 m., aft.; new moon, 14th day, 3 h. 38 m., aft.

REMARKS REFERRING TO AGRICULTURE.—The weather of December has been wet enough to satisfy the farmer, that of November, to its 30th day, remained very fine. Winter now (21st) promises to approach in earnest, but the crops are so far promising; and if we are to have severe frost, a little snow might be protective. At present all is promising.

Croydon, Dec. 21st.

J. TOWERS.

CALENDAR OF HORTICULTURE.—JANUARY.

RETROSPECT.

November maintained its character for unwonted beauty of weather, from the termination of the last report, to the day of the full moon, at 3:35 p.m., of the 30th, when rain fell, accompanied, in the afternoon, with a hazy atmosphere. On the 25th a nipping frost set in, with a dense fog early and late, that threatened the sudden approach of a rigorous winter. The cold increased, and on the 28th, at sun-rise, my instruments indicated 7 degrees of actual frost (25 Fahr.); and here it should appear that we were much favoured, as at Hertford they noted 12 degrees, and in other places 10 to 14 degrees! However, on the 29th the wind veered from the north-west to south, then, on the 30th, to south-west, and it raised the temperature to 45 degrees Fahrenheit. After so much fine weather, it cannot be surprising that a reverse should be experienced. December came in fine; but the 2nd, 3rd, and 5th were miserably wet and windy. The easterly winds then again reduced the temperature, and several of the mornings were slightly frosty. Perpetual gloom, with some fog, commenced on the 10th, and continued till the 15th. Very much drizzling rain fell at that time, and as the air was constantly damp, the ground was rendered very poshy, a condition in which it is very dangerous to touch it with any tool, that is, if the texture be in any degree clodding. The 17th proved a cheerful and sunny day, which at once carried off much of the surface moisture.

Every vegetable remains in abundance, and very fine. Potatoes, independently of the large and excellent foreign supply, are plentiful, and comparatively cheap (here 2s. 6d. per single bushel). It, therefore, becomes very probable that the disease is on the eve of disappearance, and that our cultivators will have acquired experience and wisdom.

OPERATIONS IN THE KITCHEN GARDEN.

The weather and state of the land must determine. If decidedly frosty, the wheeling of dung, composts, and leaves, for hot-beds, &c., must be the main occupation connected with those employments, which admit of shelter. Since the general introduction of chambered pits, the old-fashioned hot-bed has gone into disuse; but still, it is well to recollect that in the construction of one, dung alone should not be used. It ought, when fresh from the stable, long and short (and the more saturated with urine the better), to be thoroughly

and intimately mixed with an equal bulk of leaves raked up from a meadow or park, if possible; the intermixture should be made by forks to an extent equal to that which a good Middlesex haymaker carries in the "tedding" of his new-mown grass. This thoroughly blending will ensure equability of temperature, which the leaves will moderate and extend in duration, and the final result will be an improved fertilizer.

Early asparagus can now be obtained from 2 or 3 year old plants, raised in the open air expressly for the purpose, and so protected from frost by deep coverings as to be easily raised from the earth. Leaf-beds, made on purpose, will produce the most regular bottom heat. I have frequently alluded to this method of gently forcing the asparagus plant, on the authority of one of the first gardeners, at a noble establishment, near Epsom. The leaves of all kinds are raked in the park, and being intermixed with much old grass or fog, after the "fall," have time to settle regularly. Next to the hot-water and tank system, which merits every preference, leaves offer the best heating medium.

Some such means may be advantageously employed at this time of the winter, many kinds of vegetables in frames; among these are *lettuce*, *small salading*, and *mint*: for salads and sauce, the last is often extremely valuable till the plant begins to sprout in the open air.

Cauliflowers.—Attend to the plants in frames and under glasses, to remove decayed leaves and weeds. Stir the surface-soil if the weather permit, and give air freely. If frosty cover every night with mats, &c., and generally, in rainy weather, keep the glasses close.

Early in the month sow *curled parsley seed*, partly for transplanting in the summer; it lies long in the ground, and therefore will be prepared to start in the first spring weather.

Radish—short top—sow thickly in a warm border, to be covered with fern and branchy sticks, which remove in mild sunny weather.

Salmon radish. Sow the two separately, about the third week.

Double dig a plot of loamy ground for *spring cabbage*; bury the longer fresh manure deep at the bottom of the furrows (18 inches apart), and enrich the upper soil with shorter old manure; and the earth being somewhat settled, at any time in open weather, plant the York, vanack, sugar-loaf, or nonpareil plants, from 1½ to 2 feet asunder, in

quincunx order, firming each as it is set. At the end of the month also, make up the blanks of the autumn planted cabbages, which have been occasioned by weather or vermin. N.B.—All cabbages are perilled by intense frost; therefore some young plants ought always to be ready in a frame, or in some small bed covered with hoops and mats. The market gardeners soon repair their losses by sowing in gentle heat. *Savoy*s are thoroughly hardy; therefore, as every head is cut, it were wise to cut above the lower leaves, so as to let several eyes remain, which will develop excellent sprouts. *Endive*. Continue to tie up, and cover with large pots some of the best plants.

Broad beans prefer a rather strong, loamy soil, retentive of moisture. The Long-pod is an abundant bearer—early, but not of high flavour: a crop between it and the Broad Windsor seems to combine the qualities of each. I think that phosphated manure must suit this legume, and would manure a bed with bone-dust and horse-droppings, digging the ground full 10 inches deep, a fortnight before sowing the seeds, in rows fully 3 inches deep and 6 asunder.

Peas, the Frame, Warwick, Hastings, or any earliest varieties, in rows, the ground not freshly manured. At the end of the month, if the weather be mild, the peas raised under glass may be safely put out, provided they have been gradually hardened by careful exposure: such peas ought at once to be protected by small branches of spruce fir.

Sow *onions* if intended to produce large bulbs. Dig and manure deeply—make the ground solid, and sow in shallow drills, patting the surface evenly down.

Sow at the end curled *parsley*, horn *carrots*, black-seeded *Gotte lettuce*, also the brown Dutch, Union, or Admirable, and the white cos. Continue to forward *sea-kale* and the scarlet *rhubarbs* in the dark mushroom-house, the heat of which ought to be about 50. deg.

Trench (and manure with fresh long dung at bottom), double dig and ridge unoccupied pieces of ground, from which the crops have been removed. Char cabbage and broccoli stems, and all prunings, so as to merely blacken the substance, mix the carbon with the covering sods, after slaking the whole with sewage slops from the homestead. It is the duty of every gardener—amateur, domestic, or professional—to bring to the test of experience Mr. Jasper Rogers' processes, which promise to prove of such inestimable benefit to the United Kingdom: every collateral experiment will tend to reveal the truth!

FRUIT DEPARTMENT.

Strawberries, planted in brick pits, or in pots plunged in saw-dust therein, should have abun-

dance of air in fine days, but be kept close at night. These pits are not forced, but if well managed I have known to yield enormously.

Begin to prune to the spurs, *apple*, *pear*, *cherry*, and *plum* trees—this will cause the fruitful buds to swell. Spurs ought to be kept short and compact, and never suffered to extend into long and unsightly snags. Espaliers may thus be preserved as handsome objects for many years, and wall-trees especially so. As respects apples, espaliers are gradually giving way to the preference shown to dwarf standards; both, however, require to be kept free from mosses and lichens, and this they readily can be, by frequent or timely brushings with strong lime-water. Among wall pear trees Gansel's Bergamot is often found to be a shy fruiter. I knew a tree in Berkshire, probably the largest within a circle of a hundred miles, that could not be induced to bear any fruit. At length the gardener selected some wood shoots proceeding from old spurs nearest to the wall, and those from every long horizontal branch. These spur-shoots were duly nailed and led on horizontally, gradually developing fruitful buds; and in proportion as such were produced the old spurs were entirely amputated. The young wood set its fruit, and at length not an old spur remained, the parent branches becoming supporters only of an entirely new series of fruit-bearing secondaries. A tree with a central stem supporting lateral branches 50 feet long on each side—all so renewed—became an interesting object; and as such it was regarded by all gardeners during the many years that I had opportunity to witness the fruitfulness of the renewed tree.

Gooseberry, *currant*, and *raspberry* bushes ought to be regulated in mild weather, and then, as required, cleaned from moss and mulched over the roots. I have so frequently described the processes of pruning each, that the readers are referred to past calendars.

We prefer to abstain from touching the *peach*, *nectarine*, *fig*, and *vine*. Planting can be admitted in land naturally firm and retentive of moisture, and in the higher latitudes: in warm, genial, and sandy localities, the autumn season is deservedly preferred. Vines under glass, of the second early viney, should now be urged by 70° day and 62° night temperature. If any amateur is habitually free from the vine acarus, called red spider, we would recommend him to aim at full and rich-flavoured fruit in preference to large swollen and juicy clusters. The fashion of growing in a high and vaporous atmosphere, and in houses drenched with water, is all very well when a gardener's object is to win a prize. The domestic cultivator ought to prefer flavour, and that can be obtained in warm dry houses, prudently aired, exposed to a full but

screened mid-day sun, the vines being planted in a sound and healthy bed. These facts are worthy of attention.

All forcing operations ought to be regulated by the state of the atmosphere. If that be dark and overcast, artificial heat must be in proportion moderate; but, as we have invariably urged, the pine plants must not be checked in their growth.

Little can be done in the ornamental grounds, especially if there be snow; otherwise, attention to sweeping, and every act of cleanliness, with a foresight to future process, constitute the duties of the season. Snow has come on this shortest day, when the sun enters Capricornus, and is in the central

point of his extreme meridional state of depression, being only 15 degrees above the real horizon at noon. This ingress into the most depressed sign of the zodiac we consider the true point of mid-winter, so far as horticulture is concerned; inasmuch as the duration of solar light increases from this day. If the snow, which thawed as it fell till sun-set, be the precursor of real winter, and fall in any quantity after frost, the gardener's attention is directed to his evergreens; for, as before urged, a hot sun falling upon unthawed snow invariably scalds the foliage. The snow, therefore, ought always to be whisked off without loss of time.

Croydon, Dec. 21st.

J. TOWERS.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR DECEMBER.

Notwithstanding that the weather of this month has exhibited numerous changes, it has proved seasonably fine—in many instances vegetative. In nearly all parts of the United Kingdom, the progress of the few out-door farm labours necessary at this period of the year has been interrupted for scarcely a single day. Cattle and sheep had fared remarkably well, owing to the great abundance of dry and other food, and very few serious complaints have reached us respecting the epidemic. The fat-stock markets have, as might be expected, been well and extensively supplied; but we have observed a great falling off in the number of really fat animals brought forward, beasts especially. That they have entailed fewer losses upon the breeders than in the ordinary course of years must, we think, be evident; making, of course, due allowance for the great fall which has taken place in the value of meat all over the country during the present year (fully 25 per cent.); but the limited use of oil cake, the consumption of which has fallen off fully two-thirds as compared with that of last year, and which has depressed prices to a very great extent, has had much to do with the production of unconsumable fat. Surprise, however, must not be expressed on this head. With some few exceptions, the pecuniary position of the graziers is such as to preclude the possibility of their purchasing their usual supplies of cake; and hence, they have been compelled to resort to more natural food for some time past. Fortunately, however, the turnip crop has proved an extremely good one. Swedes have turned out well, and the present season has been very favourable for the grass-lands.

Although there has been more firmness in the demand for wheat, both English and foreign, the

advance in the prices of the best qualities has not exceeded 1s. to 2s. per qr. An opinion is, however, gaining ground that as the navigation in the Baltic is closed, we shall have higher rates during the coming month. That prices may creep up a few shillings per qr. is very likely; but it is a matter of considerable doubt whether the improvement will be maintained during the spring months, as we shall unquestionably be inundated with foreign supplies during the whole of next year. The stocks of foreign grain and flour at this time in private warehouses are extremely small, and no additions can be made to them for some time hence, although we may have parcels of flour from time to time from France and Belgium.

Our accounts respecting the appearance of the winter wheats are very satisfactory. In all parts they are looking remarkably strong and healthy, and give evidence of a good forthcoming crop. A fall of snow would be very beneficial. The yield of the grain crops is complained of in some quarters; but we have every reason to believe that the aggregate yield has come up to the expectations of the growers. Very few complaints of the potato disease have reached us. At one time it was thought that great losses had been sustained from the pits having fallen in. The actual quantity thus sacrificed is, however, comparatively small. The various markets continue to be well supplied with those home-grown; and immense supplies are coming to hand almost daily from various parts of the Continent. Prices have, therefore, declined: the latest quotations in the London market ruling from £2 to £5 10s. per ton. No importations have, as yet, taken place from the Channel Islands.

The leading fat-stock shows have passed off extremely well. The numbers of both beasts and sheep, as well as pigs, exhibited thereat,

have shown a decided excess over those of last year, although the quantity of fat has somewhat fallen off. The markets for the sale of hay and straw have ruled very dull, and prices have not been supported. Really prime meadow hay has sold as low as £3 7s. per load; and prime straw has not produced more than 28s.

Letters from Ireland and Scotland are to the effect that only a moderate business has been doing in corn there: still, however, prices, in the face of large supplies of potatoes, have been well supported. All farm labours appear to be well in their place.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

As might be anticipated, the attention of breeders, feeders, and consumers has been chiefly directed, this month, to the holding of the large cattle shows in the metropolis and various parts of the country. Notwithstanding the efforts of certain parties to write them down, and that prices have ruled low on a comparison of years, the supplies have increased in number, and an extensive business, arising from the large consumption going on, has been transacted. Making every allowance for the great fall in the quotations, the actual losses sustained by the owners have not been so extensive as on some previous occasions. The Smithfield Club's Show has, of course, been the centre of attraction; and certainly it was a remarkably fine one in every particular. Smithfield market came in for its full share of attraction; and it would, we conceive, be a matter of no little difficulty for us to point out a former show containing such a wonderful collection of animals. The actual number of beasts disposed of thereat, for Christmas consumption fell little short of 7,000, taking that shewn during the fortnight. In sheep, calves, and pigs, a moderate business has been doing at full prices.

Owing to the partial closing of the navigation abroad the imports of foreign stock into London have fallen off. They have been as follows:

Beasts	2,442	Head.
Sheep	12,811	
Calves	987	
Pigs	128	
<hr/>		
Total	16,368	
Same month in 1848	12,346	
Same month in 1847	11,028	

The arrivals at the outports have not exceeded 2,400 head, chiefly from Holland.

The annexed statement shows the total supplies exhibited in Smithfield:

	Head.
Beasts	23,853
Cows	442
Sheep	119,180
Calves	1,413
Pigs	2,139

COMPARISON OF SUPPLIES.

	Dec., 1848	Dec., 1847.	Dec., 1846.
Beasts	19,016 ..	18,978 ..	19,639
Cows	490 ..	500 ..	520
Sheep	87,240 ..	101,720 ..	108,610
Calves	1,113 ..	1,240 ..	1,095
Pigs	1,549 ..	2,765 ..	2,150

The past month's quotations have ruled as under: Per silbs., to sink the offals.

	s.	d.	s.	d.
Beef from	3	4	to	4
Mutton	3	6	to	4
Veal	3	2	to	4
Pork	3	4	to	4

COMPARISON OF PRICES.

	Dec., 1848.	Dec., 1847.	Dec., 1846.
	s. d.	s. d.	s. d.
Beef from 3	4 to 4	6 | 3 6 to 5	10 | 2 10 to 4
Mutton.. 3	8 to 5	0 | 3 8 to 5	4 | 3 8 to 5
Veal 3	10 to 4	10 | 3 8 to 4	10 | 3 8 to 4
Pork.... 3	8 to 4	8 | 3 6 to 5	2 | 3 6 to 4

Up to Newgate and Leadenhall markets upwards of 20,000 carcasses of beef, mutton, veal and pork have been received during the month. A large business has been doing at, mostly, somewhat improved quotations, the best beef having sold at 3s. 10d. to 4s. per silbs.

SMITHFIELD MARKET.

THE GREAT CHRISTMAS CATTLE MARKET. MONDAY, Dec. 17.

Although it has been our pleasing duty for a series of years past to report the proceedings in this market (in doing so, we have invariably endeavoured to do justice to the grazier, salesman, and butcher, as the accuracy of our furnished statements, respecting demand and value, fully testify), we—from the number of rumours afloat in various quarters, during last week, on the subject of the supply of beasts expected here this morning, to form what is termed the Great Christmas Market—have seldom felt so much curiosity to ascertain the numerical strength and quality of the stock exhibited as on the present occasion. Ardent admirers as we are of the wonderful perfection to which stock has been brought in most parts of the United Kingdom, through the instrumentality of the extraordinary exertions of the grazing community, we cannot but admit that the show to-day exceeded our most sanguine expectations. Almost every county and district in England appeared to vie with each other for the

palm of excellence, and, as might be expected, we had not a few wonders from Scotland; while Ireland, as well as Holland and some other continental countries, poured in a portion of their superfluous stock. Such was the extensive nature of the "movement" yesterday, that the various railway companies, notwithstanding their vast locomotive powers, experienced no ordinary difficulty in forwarding the Beasts and Sheep along their different lines. Devonshire did its best to outrival its more stately friends—the Herefords. The well-built and powerful Shorthorns were, from this being the height of their "season," by no means second in the race. The men of Norfolk, Suffolk, and Essex showed themselves fully alive to this most interesting exhibition: those of Sussex contributed some "ancient wonders," and those in the midland counties forwarded stock of a first-rate class. Northumberland, Cumberland, Durham, and even Westmoreland, were—thanks to rapid communication—well represented. Aberdeen, Perth, Dundee, and other parts of Scotland, sent their black and mouse-coloured sleek and healthy-looking animals. Years since, seldom was any difficulty experienced in determining, almost at a glance, the actual quarters whence the Beasts were derived on any given market-day; but matters are much altered now. The Devon breeds—which, at one period, were chiefly to be met with only in certain localities—have spread themselves almost over the whole country; and it is a well-ascertained fact that nearly, or quite, as many Short-horns and Herefords are now fattened for this market, in Norfolk and Suffolk, as Scots, for which latter breed these two counties have long stood pre-eminent. The Herefords and Short-horns have, therefore, almost entirely taken the place of the far-famed home-breeds, very few of which have arrived hither for some considerable time past.

A reference to the official returns at foot will show the great extent of the supply here to-day. That its quality, weight, and symmetry exceeded to some considerable extent the exhibition of former periods, has been admitted by all practical men. It was, therefore, somewhat difficult for us to form a just comparison of the different breeds. After a most careful examination, we have arrived at the following conclusions: The general supply of Shorthorns exceeded anything we ever before witnessed in every particular; combining *number and quality*, the Devons stood next. Quality alone considered, added to the weight of a limited number, the Herefords might be classed with the first-mentioned breed; and so, indeed, might be the Scots. The Durhams, Runts, and all other stock, were unusually good. It will, therefore, be perceived that the arrangement of quality, taking weight and age into consideration, has been beset with difficulties, those resulting solely from the evenness of the aggregate supply.

The arrangements made for the reception of the stock were as perfect as the limited space afforded it admitted; but we much regretted to see such a vast amount of property so packed together, as was the case on this occasion. Extreme were the difficulties and risk in getting amongst the beasts, many of which, though sold

in the early part of the day, could not be removed till a late hour. It is here necessary for us to explain that the great market last year was held a week earlier, viz., on the 11th of December. This will account for the great difference in the number of beasts shown this morning, and the same period in 1848. The annexed statement shows the numbers of beasts exhibited, and the prices obtained for them on the "great days" during the last ten years;

Years.	Beasts shown.	Prices.	
		s. d.	s. d.
1839	5,074	3 4	5 0
1840	3,528	4 4	5 8
1841	4,500	3 8	5 0
1842	4,541	3 4	4 8
1843	4,540	2 8	4 4
1844	5,713	3 0	4 6
1845	5,326	3 6	4 8
1846	5,470	3 6	4 6
1847	4,282	4 0	5 8
1848	5,942	3 4	4 8

The appearance of the market long before the break of day was very remarkable. Lights were moving in all directions, in order that the stock might be safely placed, as far as circumstances admitted. As the morning advanced, thousands of persons, including buyers from Bristol, Hull, Newcastle, Birmingham, Liverpool, Southampton, and several other parts of England, came flocking in. The number of foreigners was large; and we need scarcely say that all parties expressed their astonishment at the extraordinary sight presented to them. From the west of England, as well as from some other quarters, the owners of the stock were present as sellers.

The closing of the navigation on some parts of the continent has produced a falling off in the imports of foreign stock into London since Monday last. The total arrival has amounted to 3,720 head, against 1,913 ditto at the same time in 1847, and 3,155 in 1848.

Amongst the Beasts, we observed in common with most other persons, some extraordinary Herefords and shorthorns, the property of Mr. Wm. Goodall, of Market Deeping, Lincolnshire; others belonging to Mr. Thomas, of Holbeach Marsh, Lincolnshire; several sent by Mr. Hewson and Mr. Dunn, of that county; and a very fine drove forwarded by Mr. Alday, of Solehill, near Birmingham. These wonderful Beasts were consigned to Mr. Robert Morgan, whose stand was decidedly the best in the market. Mr. Morgan had also on sale some very good Scots, belonging to Mr. G. Knowles, fletcher, of Aberdeen, which reached the metropolis too late for the show-yard. The runts forwarded to Mr. Morgan by Messrs. Attenborn, of Northamptonshire, were greatly admired.

Respecting the aggregate supply of Sheep, we may state that it was a very excellent one, the time of year considered. The wonders were that portion of it shown by Messrs. Weall. These comprised 48 Downs, bred by E. F. Whittingstall, Esq., of Langley Bury, Herts; 4 sent by S. Addams, Esq., of Ware; 5 Gloucesters, 19 Rylands, and 77 Gloucester ewes, bred and fed by Mr. Rowland, of Onslow, near Aylesbury. Some of the former sold as high as, £5 5s. each.

The number of Beasts from the north of England was about 2,600, the remainder of the supply being derived from various quarters.

We regret to find that several of the salesmen continue to speak widely for space. This has frequently an injurious effect upon the trade, as the butchers almost invariably purchase cautiously in the face of large bespe numbers, which have very little to do with the actual supply in the market.

STATE OF THE TRADE.

Notwithstanding the extensive number of Beasts brought forward, the Beef trade, owing to the numerous attendance of buyers, and to Christmas-day falling early in next week, was steady. Comparatively speaking, however, prices were low; the top figure for the best

Scots and Herefords, including a few of the shorthorns, being 4s. 6d. per 8lbs. It is, however, gratifying to observe that nearly, or quite, the whole of the Beasts were disposed of prior to the close of business.

We were tolerably well, but not to say heavily, supplied with Sheep. Large heavy qualities, such as we have already alluded to, were a slow inquiry. In all other breeds of Sheep a steady business was transacted at fully Friday's quotations, 10-stone Downs realizing 4s. 4d. per 8lbs. without difficulty.

Calves, the supply of which was small, were in moderate request, and last week's prices were well maintained.

Prime small Pigs supported late rates, otherwise the Pork trade ruled dull.

AGRICULTURAL INTELLIGENCE, FAIRS, &c.

BRIDGEND FAIR, (Tuesday last).—There was a great number of cattle offered, and prices and demand seemed to improve on former fairs both in fat and store cattle, the former having advanced 30s. per head in good animals. Sheep maintained former prices.

BEDALE FAIR, (Monday last).—We had a large show of beef and mutton. The demand was not great, on account of the majority of the dealers being at Darlington market. Good beef was tolerably well sold for home use at former rates. Beef, 5s. to 5s. 6d. per stone; mutton, 3½d. to 5¼d. per lb.

BANBURY FAIR.—Both the supply and attendance were somewhat smaller than usual. There were about 2,000 sheep penned for sale, and in the cattle fair about 250 to 300 beasts, mostly of fine quality were shown. There were a few very superior animals, and those made good prices. The horses were few in number; Mr. G. B. Margetts, of Leamington, sold some valuable cart-horses by auction. The trade generally was but too indicative of the depressed state of every commodity connected with agriculture.

CHIPPENHAM GREAT MONTHLY MARKET.—Room being required for the cattle show, the supply of cheese was not so large as is usually the case, only 48 tons being pitched, which met with a ready sale. Broad doubles, 42s. to 47s.; prime Cheddar, 56s. to 62s.; thin, 42s. to 45s.; loaves, 50s. to 56s. per cwt. The show of cattle was of a very superior description, and was visited by His Grace the Duke of Beaufort, the Earl of Shelburne, Hon. H. Howard, &c. The sale by auction (by Mr. Parry) of Mr. B. Baily's Hereford and Devon oxen attracted considerable attention. The animals (21 in number) realized, on an average, upwards of £30 a-head.

GRINGLEY, (Dec. 13).—The attendance was small compared with other years, principally owing to its being one of the new Retford fairs. The quantity of stock brought forward was unusually meagre, yet quite ample to meet the demand. Fat averaged 6s. 3l. to 6s. 9d. per stone, but little sold. Of drapes the prices varied as to quality, but low. In-calfers moved off slowly, and the sales effected were at very moderate figures; whilst Irish stock appeared neglected altogether. Gloom and depression were the most prominent features in the stock fair. There were a few sheep penned, but returned home unsold; and few fat pigs were offered, the price being 5s. with a downward incline. Stores and smaller ones extremely cheap.

HEREFORD GREAT MARKET, Wednesday.—Notwithstanding there was a good show of animals, such as no other county in England could supply, prices were very low indeed—about 1d. per lb. less for fat cattle than at this period last year—whilst stores were almost unsaleable; the former may be quoted at an average of 5d. per lb., some of the finest only realizing 5½d., and that in the early part of the morning. Sheep on the same ratio. Porkers 4s. 9d., and bacon pigs 4s.

6d. per stone. There was a wretched show of horses, and few were disposed of.—*Hereford Journal.*

KIMBOLTON FAIR.—The supply of stock was plentiful, but there was scarcely any business doing, owing to a scarcity of money. The parties attending were all sellers, and there were no buyers.

KELSO FORTNIGHTLY MARKET (Monday).—There was a good show of fat cattle for the season, principally of excellent quality. Though there were a good few buyers in attendance, sales were slowly effected, and a good many were left unsold. Prices were from 5s. 3d. to 5s. 9d. per stone, but a lot of ten very superior oxen, belonging to Robert Oliver, Esq., of Loehside, brought nearly 6s. There were seventeen lean cattle and nine cows, for which the demand was very dull. The sheep market was largely supplied, but there was very little demand for them, and few sales were made. Prices of mutton, 5d. to 5½d. per lb. A considerable number of the sheep were trucked by the Newcastle and Berwick Railway, from Sprouton Station, in the afternoon, for Newcastle market the following day. Number of fat cattle shown, 110; sheep, 535.

LEEDS FORTNIGHT FAIR, Dec. 19.—We have had an average show of horned cattle of most excellent quality. They were generally large well-fed beasts. The buyers were numerous and bought freely. We had one beast led on to the weighing machine, belonging to Messrs. Walker and Phillips, purchased of Mr. Fawkes, of Faruley Hall, which weighed 17½ cwt., being 142 stone, at 14lbs. per stone. Prices for top things 8s. 6d. and as low as 6s. per stone of 16 lb. Number of beasts, 400; sheep, about 2,200; all sold at an average of 4½d. per lb.

LEDBURY FAIR, Dec. 17.—The cattle market was scantily supplied, and fat beasts were quickly bought up, chiefly by Birmingham butchers, at 5½d. to 5¾d. All kinds of store cattle met a dull sale. There were very few sheep in the fair, and fat ones sold readily at 5d. to 5½d. There was a tolerable supply of pigs, which sold at higher prices than of late. In the horse fair little business was done, except in good cart horses, which were in demand.

LINCOLN FORTNIGHT MARKET.—There was not a very large show of beasts for the Christmas market; the quality, however, was very fair. Prices were fully maintained, beef making from 6s. 3d. to 6s. 6d. per stone. The mutton trade was dull; prices, 4d. to 5½d. per lb.

NEWTOWN FAIR.—There was a small show of sheep, the best brought from 4d. to 4½d. per lb., and all sold; best stores very low and few sold; bacon pigs 3½d. per lb.; stores low and many sold. The cattle fair was small, but good bullocks were bought freely, and lean and store cattle very low, and many returned home. The horse fair was very small and few sold.

PERTH MARKET.—Owing to the nature of the morning, which was boisterous and stormy, with a considerable fall of snow, the attendance was not very numerous; however, there was no lack of stock on the ground. In the cattle market milch cows met a ready sale at from £6 to £12, according to age and quality; but the lean beasts went off heavily, and at no improvement in price. Fat was selling at from 6s. to 7s. per stone Dutch, the very best only the latter rate. In the horse market, which was well supplied (there being about 400 animals on the ground), sales were much brisker than for some time past, and prices looking up. The price of good draught horses varied from £20 to £30 according to age, quality, and condition. A good deal of business was transacted.

ST. NEOT'S FAIR, (Monday last.)—There was the largest show of horses remembered by any one for some years. Among them were many prime young colts and fillies. Trade dull. The number of beast was large, and there was a better trade. A very small supply of sheep, which sold readily.

TEWKESBURY FAIR was well supplied with stock which met a ready sale at advanced prices. The business done in the beef trade was of much more lively character than that of late fairs. In the early part of the day large purchases were made of beasts of a useful character, in preference to those of an extra-fine quality. Prices ranged from 5d. to 6d. per lb. Mutton nearly the same. Cows and calves were not much in demand, and there were but few shown. The supply of pigs was small; those offered realized from 7s. 6d. to 8s. per stone. In horses there was not much to be noticed.

WARWICK AND LEAMINGTON FAIR, (Monday last.)—There was a good supply of fat beef, but rather a thin supply of mutton; there was, however, a great demand for both, and the result was an extensive sale at advanced prices, beef fetching from 5½d. to 6d. per lb., and mutton from 5d. to 6d. In the horse-fair there was a good show of second rate horses, that were offered at moderate prices, and some few selections were made. On the whole considerable business was done in the different fairs.

THE WINCHESTER FAT CATTLE CLUB SHOW took place on Wednesday, and was excellent both in quality and numbers. Messrs. Maxwell, Cramp, Webb, and Burrell were the judges, and awarded the respective prizes as follows:—Class A.—Best fat ox, a cup, value £5, to Mr. Twynnam, of Bishopstoke; second best, a cup, value £3, to Mr. M. T. Hodding, of Salisbury. Class B.—Best fat ox under four years old, a cup, value £5, to Mr. Young, of Twyford; second best, a cup, value £3, to Sir W. Heathcote, Bart. Class C.—Best fat cow or heifer, a cup, value £5, to Mr. G. Atkins, of Basingstoke; second best, a cup, value £3, to Mr. Simonds, of St. Cross. Class D.—Five best fat wether sheep, a cup, value £5, to Mr. Watkins, of Winchester; five second best, a cup, value £3, to Mr. J. Stubbs, of Tisted. Class E.—Five best fat wether sheep under two years' old, a cup value £5, to Mr. Smithers, of Winnall; five second best, a cup, value £3, to Mr. W. Spearing, of Chilbolton. Class F.—Five best fat ewes, a cup, value £5; and five second best another cup, value £3, both to Mr. G. Stubbs. Fat pigs, above 26 weeks' old.—The first prize of £2, and the second of £1, were both awarded to Mr. H. Edwards, of Winchester. The Show Club Dinner was held at the George Hotel, at four o'clock, when about 130 gentlemen sat down to an excellent repast; the president, Thomas Chamberlayne, Esq., in the chair, supported on either side by the worshipful the mayor (E. C. Faithful, Esq.); W. Simonds, Esq.; C. M. Deane, Esq.; Rev. F. Maine; W. W. Bulpett, Esq.; C. Woodrudge, Esq.; W. Warner, Esq.; G. W. Johnson, Esq.; James Theobald, Esq.; C. W. Benny, Esq.; R. Smithers, Esq.; H. Spearing, Esq., &c. In the course of the evening, on the health of the judges being given, Mr. Burrell, in thanking the company on his part, said he was sorry that he was prevented by unavoidable means from being in attendance at the early part of the day. He had been in the habit of frequently attending such exhibitions in different parts of the country, but he must say that he never witnessed a better show of Down sheep, or so good, in his life, as had been exhibited for competition that day (cheers).

WORCESTER FAIR.—The supply of all descriptions of stock was quite as large as usual, and as to cattle the dealers declared that they had seldom seen such a collection of really

useful animals at Worcester. The sheep proved a sad dog, many were driven away unsold, and others fetched but low prices. Some of the mutton did not fetch 5d., and only the very prime reached 5½d.; but the demand for beef was much brisker than it has been lately, much of it fetching 5½d., and some 6d. and even 6½d. per lb. Pigs a dull sale, and very little doing in the horse fair. Messrs. Hobbs, Mr. Higgs, and Mr. Geo. Hemming, had several public sales, but with all their eloquence they could not induce liberal purchasers. Mr. Edmund Herbert's lot of cross-bred Down sheep, sold by Messrs. Hobbs, were very fine, and fetched a higher figure than any others, as they averaged pretty nearly £3 a head. Mr. Raester exhibited a very large and symmetrical bull, and some sheep purchased by Mr. Jackson from Mr. Fletcher, of Cheltenham, were of great size; one of them, it was thought, would prove to weigh 60lbs. a quarter, but there was not much promise of a very handsome Christmas show.

YORK FORTNIGHT FAIR, Dec. 20.—We had a short supply of good fat beasts, which sold at from 5s. to 6s. per st., many buyers being in the market. A small number of sheep were readily sold at from 5d. to 5½d. per lb. A good supply of lean beasts had heavy sale.

WOBURN PARK FARM CATTLE SALE.—The Duke of Bedford's annual cattle sale took place on Wednesday last. The attendance was unusually large, and the accommodation for purchasers on the same liberal scale as heretofore. Nearly 200 sat down to a handsome collation laid out in a spacious building near the place of sale. The Abbey omnibus, with a party of the guests, drove on the ground. The auctioneer (Mr. Furze) expressed his delight in submitting so valuable a stock for competition, and in seeing so many of his former customers around him. From their presence he concluded that they were satisfied with last year's bargains. The sale commenced with the sheep, consisting of about 200 South Down and half-bred wethers, which were sold in lots of five. After a smart competition between London and country butchers, they realized 40s. per head. The oxen followed: 15 Scotch and 38 Herefords of the first quality, but not too highly fed. The Herefords were mostly box-fed, Mr. Baker, his Grace's bailiff, having devoted much attention to this method of feeding, which appears to have given great satisfaction to many gentlemen who attended the sale. The Scots averaged £30 per head, and the Herefords £27 per head. The highest price for the latter was £31 10s., and £33 box fed. The sale ended with the pigs, for which there were spirited biddings. Amongst the London buyers were Messrs. Pettifer, Starke, Foulkes, &c. The country buyers were from Woburn, Newport, Dunstable, Leighton, Stony Stratford, &c. the day's sale realized about £1,846.

An Account of the Total Quantities of Foreign Corn imported into the principal ports of Great Britain (viz., London, Liverpool, Hull, Newcastle, Bristol, Gloucester, Plymouth, Leith, Glasgow, Dundee, and Perth) in Forty-four Weeks ending Dec. 12th, 1849, since the 5th of February preceding (including the quantity of Wheat and Wheaten Flour lossed from bond on that day), and the amount that would be available for revenue, if the Tariff proposed by Lord John Russell in 1841 was levied on this supply.

	Quarters.	Tariff per qr.	Amount for Revenue.	
Total Importations from Feb. 8 to Dec. 5, 1849:		s. d.	£	s. d.
Wheat and Wheaten Flour...	1,063,222	8 0	1,627,288	16 0
Rye and Rye Meal	95,554	5 0	23,963	10 0
Barley and Barley Meal	936,891	4 6	216,801	3 0
Oats, Peas, and Beans.....	1,649,989	3 4	274,993	0 0
Imported during the week ending Dec. 12, 1849:				
Wheat and Wheaten Flour...	50,583	8 0	20,233	4 0
Rye and Rye Meal	1,173	5 0	23	5 0
Barley and Barley Meal	26,551	4 6	6,011	9 6
Oats, Peas, and Beans.....	31,366	3 4	5,727	13 4
Total	6,863,932	..	2,169,345	0 10

REVIEW OF THE CORN TRADE DURING THE MONTH OF DECEMBER.

The year now about to close has been one of severe trial to all engaged in agricultural pursuits. The experiment of throwing open our ports for the admission of grain of foreign growth, free of duty, has been followed by effects exactly such as might have been expected—a continued and progressive fall in the value of all descriptions of home produce has taken place, until prices have been depressed to a point altogether inadequate to cover the cost of production.

Quotations of wheat, which had already suffered a considerable fall previous to the 1st of February (the time when the duties were abolished), in anticipation of that event, have since been reduced about 10s. per qr.; and the last weekly average price for the kingdom, published officially, on Thursday, the 27th inst., is lower than any previous return since the year 1835. Under these circumstances, it would be little better than a mockery to congratulate farmers on the position they now hold; and though we sincerely hope that the new year may bring them prosperity and happiness, we must acknowledge, that if matters are to remain as they are at present, our anxious wishes for their welfare are not very likely to be realized. There are, however, some grounds for hope that the legislature will be compelled to give attention to the just complaints of those interested in the cultivation of the soil. Unwilling as the agriculturists are, as a body, to enter into anything like agitation, they have at length been roused, and we trust that the next sessions of Parliament will not be allowed to pass over without such measures being obtained as will place the British farmer on something like a fair footing to compete with the foreign grower.

There has been very little variation in the tone of the grain trade since we last addressed our readers; nor has anything occurred of a character to have a permanent influence on prices hereafter. A slightly increased degree of confidence has arisen, but this has been caused by circumstances which in their very nature must be regarded as temporary. The most important of these has been a falling off in the importations from abroad, and an early setting in of winter in the north of Europe, by which shipments have been stopped. This has naturally led to the belief that for some months to come (probably till April or May next) the arrivals of foreign grain will not be so great as to produce any marked influence on prices, and holders have, therefore,

manifested a disposition to resist any further reduction. Hitherto, however, buyers have not shown much inclination to purchase more than they have needed for immediate wants.

To investigate our present position, in regard to stocks and probable supplies, may perhaps not be altogether useless, inasmuch as it may assist to afford materials for forming a judgment relative to the probable range of prices during the next three or four months. That the quantity of corn of all descriptions in the country were unusually small at the time of harvest, was not only admitted at that period, but has since been proved, by the fact, that shortly after the crops were secured old corn ceased to appear; and further, by the rapid manner in which the supplies of foreign have gone into consumption. We are therefore, we think, justified in concluding that on the 1st of September last there was very little old grain in farmers' hands. We have next to consider the yield of the last crop, and how much of the same has already been consumed. Confining our remarks more particularly to wheat, we have little hesitation in saying, that the estimate we took at harvest time was not far from correct; though in proportion as thrashing was proceeded with, many complained of the yield of grain in proportion to straw, still we believe that the produce was about a fair average. Presuming this to be the case, we should be inclined to think that the growers hold nearly, if not quite, as much of the last crop as is generally the case at the close of the year. We are, however, of opinion that what remains is principally in the hands of the wealthier class of cultivators. The small farmers have not been in a position to hold; they suffered severely from short crops in 1848, and low prices during the latter part of that year; and the depression which the value of their property subsequently underwent, trenched so deeply on their capital as to leave them no other resource to meet current expences but to realize their crops almost as soon as harvested. This is of some importance, when the range of quotations for the next few months is under consideration, because, if our inference be correct, it follows that the parties who are the principal holders, being under no immediate pressure for cash, will not be likely to over-supply the markets, but rather get gradually out of their stocks during the period the northern ports of Europe remain closed by ice. We have only another point to direct attention to

in connexion with this part of our subject; namely, the quantity of wheat which may yet be on passage to this country, and the extent to which the southern ports of Europe may furnish supplies.

The Sound List furnishes proof that a large number of vessels, bound to British ports, passed Elsinore from the 1st to the middle of the month, and the temporary thaw which was experienced on the continent the first week of the new moon (from the 14th to the 20th), renders it probable that some of the ice-bound ships may have been enabled to put to sea, and we are therefore inclined to think that we shall yet receive a not unimportant quantity from the north. We may, however, remark, that by far the greater proportion of the vessels on passage are laden with barley and oats, and the arrivals of wheat are consequently not likely to be large from that quarter.

In France, Holland, and Belgium prices of the article are too high to leave much margin for profit in our markets; still shipments will, no doubt, from time to time be made, and we are not likely to be altogether without foreign supplies. This, and the fact that we have yet a sufficient quantity in granary here to serve us for a time, renders it very doubtful whether any great rise in prices can occur; but we are decidedly of opinion that quotations of wheat will not go lower, and should certainly not be surprised to see an advance of 5s. per qr. on the lowest point of depression between this and next spring. To pretend to foretell what may subsequently take place would be very unwise, as new elements, of which nothing can at present be known, must then come into the calculation.

The weather has been very variable throughout the month, occasionally frosty, but its general character has been mild and wet. The autumn-sown wheat is generally described as wearing a healthy appearance: some consider rather too luxuriant for the time of year, and an interval of frost would certainly do no harm to the plant. There has been very little out-door work to engage attention, and farmers have had ample leisure for thrashing; still the deliveries have not been by any means large, which we are disposed to attribute to the unwillingness to sell at the present ruinously low prices. The prevalence of damp mild weather may also have had some influence, a moist atmosphere being very unfavourable for thrashing. The condition of most of the wheat which has been brought forward has shown evident symptoms of the ill effects of the damp weather, the samples having come to hand soft and rough, lessening the intrinsic value, and increasing the difficulties of effecting sales. A moderate degree of frost would therefore have a very beneficial effect on the trade generally; it would

improve the quality of the grain of last year's growth, check or put a stop to foreign supplies, and stimulate consumption.

The state of the potato crop has excited much less attention this year than during the last two or three seasons. That the produce was better and freer from disease than in any year since 1845 is, we think, certain; still, the crop did not altogether escape the disorder to which it has of late years been liable, and it might therefore have been expected that more anxiety would have been shown than has been manifested in regard to the manner in which the root when in the pits might be found to keep. That in many cases a large proportion has been lost, though apparently sound when pitted, we know to be a fact, but this has created little or no alarm, and has entirely failed to produce any effect on the grain trade; this ceases, however, to be a matter of surprise when we consider the extent of the supplies of foreign potatoes, and the cheapness of those articles of food generally used as substitutes.

We shall now proceed to give our usual retrospect of what has occurred at Mark Lane during the month.

The arrivals of wheat coastwise into the port of London have been decidedly small for the time of year, but rather a large quantity has reached us from the eastern counties per railway. The demand for wheat has at no period of the month been animated, but latterly the trade has assumed a firmer tone than that which characterized it a week or two ago. The greatest pressure occurred on the first Monday in December, when good Lincolnshire red wheat, weighing 63lbs. per bushel, was sold, delivered at the Shoreditch Station of the Eastern Counties Railway, at 39s. to 40s., and fair runs of Kent and Essex at 40s. to 41s. per qr. Since then the millers have manifested more inclination to purchase and factors less anxiety to press sales, the consequence of which has been a gradual though as yet only a slight improvement in prices. On the 10th the turn was decidedly in favour of the seller, and on the 17th fully as high rates were asked as on that day se'nnight, whilst on Monday last, the 24th, an advance of 1s. per qr. was established on fine and good qualities. Our present quotations for the best runs of Essex and Kent red wheat are 41s. to 42s., white 46s. to 48s., and Lincolnshire and Cambridgeshire red 39s. to 41s. per qr. During the first fortnight in December upwards of 35,000 qrs. of foreign wheat entered the port of London; since then, however, the arrivals from abroad have fallen off materially, and the total quantity reported up to the 22nd, the latest date to which the return is at present completed, amounts to 40,000 qrs. Our millers have still fair stocks on hand, and have

not manifested any disposition to buy largely; this and the comparatively retail character of the country demand, have rendered transactions on an extensive scale almost impossible. Importers have consequently been under the necessity of landing a considerable proportion of what has been received, and the stocks in granary have been further augmented. The want of animation in the inquiry has failed to produce much influence on the value of the article, and with the exception of a decline of 1s. per qr. on the 3rd, little or no change has occurred in quotations. Holders appear to calculate confidently on an improved inquiry after the turn of the year, and are satisfied meanwhile to remain quiet. Within the last eight or ten days they have manifested more disposition to raise than to lower their pretensions, and the best qualities of old could certainly not be bought on as easy terms on Monday, the 24th inst., as in the beginning of the month.

The nominal top price of town-manufactured flour has remained stationary, and is not near so much out of proportion to the value of other sorts as is sometimes the case. The highest quotation is 40s., but 2s. being allowed by the millers for cash the net price is only 38s. per sack. In the early part of the month Norfolk household flour was very pressingly offered, and some secondary marks were at one period sold below 30s.; since then, however, a slight rally has occurred, and good samples are now held at 31s. to 32s. per sack. The arrivals of foreign manufactured flour have not been particularly large, though sufficient to interfere more or less with the disposal of that of home-make, and the arrival of a somewhat larger quantity than usual the first week in December, was the cause of the reduction which then occurred in the value of country manufactured. The inferior kinds of French have been and still are very unsaleable, whilst the best sorts have commanded a tolerably free sale at 32s. to 33s. per sack. Prices of American have undergone no change requiring notice.

Barley of home-growth having until lately commanded relatively higher prices than wheat, farmers have, it would appear, preferred thrashing the former, and the arrivals of that grain coastwise into London have been rather large since our last monthly report. The first fall that occurred was on the 3rd, when prices gave way 1s. to 2s. per qr., and the following Monday a further decline of 1s. per qr. took place. The demand has since undergone a slight improvement, but it has not been sufficiently active to allow any portion of the reduction to be recovered, and we consider the value of English barley about 2s. to 3s. per qr. lower than what it was at the close of November. Prices of foreign have likewise suffered an abatement to nearly the same extent, owing to the magnitude of

the arrivals from abroad. About the middle of the month fair qualities were freely offered at 20s., and good heavy parcels, weighing 53lbs. per bushel, at 22s. per qr. These low rates have given rise to an improved inquiry, the article being one of the cheapest which can be employed for feeding purposes at the prices at present current. We have fair stocks in granary, and some quantity may still be expected from the north of Europe, hence any material rise in quotations is not likely to occur, but on the other hand we do not look for any further depreciation.

No change of the slightest importance has occurred in the position of the malt trade; the value of the article has remained nearly stationary, and purchasers have in general conducted their operations with so much caution as to afford but little scope for comment.

The arrivals of oats into London have been only moderate since the close of last month. By far the greater proportion of the supply has consisted of foreign; from Ireland the receipts have been quite unimportant, and the arrivals coastwise and from Scotland by no means large. Many of the cargoes from abroad, having been a long time on passage, have come to hand heated, and only a small portion of the supply has consisted of really good fresh corn. The best descriptions, whether of home or foreign growth, have consequently been held with considerable firmness, and have varied but little in value since our last. Secondary descriptions fell fully 1s. per qr. on the first Monday in the month; this concession induced many of the large dealers, who had previously allowed their stocks to run somewhat low, to purchase rather freely, and the following week the pressure on the market was in a great measure removed. About the same time the receipts from abroad began to fall off, and the dealers were consequently enabled to realize a moderate profit on their previous purchases.

The supplies of English beans have proved more than equal to the demand, and we must quote both old and new 1s. to 2s. per quarter lower than they were at this period of last month. We have had no arrivals of Egyptian, and only small receipts of other foreign beans. Those from the north of Europe have declined in value fully as much as English; but Alexandrian have moved off in small quantities at about previous prices.

The prevalence of mild, open weather has caused the consumption of peas to be much below what is usually the case at this period of the year; and, though the receipts coastwise have been moderate, having had liberal supplies from abroad, quotations have given way about 2s. per qr. on white, and fully 1s. per qr. on maple and grey. The best English boilers are scarcely worth more than 30s.

at present; and foreign may be quoted from 23s. to 27s., according to quality.

There has been very little doing in Indian corn at Mark Lane, but at Liverpool the article has excited some attention during the month, an opinion prevailing there that Ireland will require large importations of the article before the spring of the year. For floating cargoes 27s. to 28s. per qr. has been asked, and at Liverpool there have been more buyers than sellers at the rates named.

Winter set in very early this year in the north of Europe, and the navigation of many rivers became impeded in the beginning of December. The Elbe was at one period frozen over from Hamburg to Cuxhaven; but about the 14th a thaw occurred, and on the 21st the river was again open. Subsequently, however, there was a return of frost, and by this time all is probably again fast.

Hitherto, very few contracts have been entered into for spring shipment from the Baltic, and prices on the other side must be regarded as unsettled at present. Meanwhile, stocks are gradually accumulating at the lower ports, and the probability is, that if nothing occurs to give an impetus to the trade, that fine heavy qualities of wheat will recede to about 32s. per qr., free on board, in the spring. The last quotation from Rostock was, however, still 34s. to 36s.; and at Stettin, on the 20th, the very best Pomeranian red wheat was held at the last named prices. At Anclam, Stralsund, and Greifswald, purchases might already be made at 32s. to 33s. per qr.; but our merchants appear to have made up their minds that it would be unsafe to purchase Baltic red wheat over 30s. per qr., free on board, in spring; and many are of opinion that the price will settle down somewhere thereabout. The most recently received advices from Danzig inform us that holders of wheat had remained exceedingly firm. Frost had put a stop to supplies by water carriage, and the quantity brought forward up to that period by the surrounding farmers had been moderate. The stock in granary was estimated to consist of only 7,000 to 8,000 lasts; and a small proportion of this moderate quantity was composed of fine qualities. High terms had consequently been asked for the best sorts, particularly for high-mixed old. Of really fine high-mixed old none remained on hand. Quotations for new wheat varied from 35s. to 38s.; whilst old had been held at from 34s. to 42s. per qr., free on board, according to quality, weight, &c. At the nearer ports the value of wheat is likewise as yet too high to hold out much inducement to enter into speculative investments. At Hamburg the nominal value of good 61½lbs. Upland was 35s.; but holders were not generally disposed to engage to ship such quality, in spring, below 37s. per qr., free on

board. At Rotterdam old Rhine wheat might be bought at from 35s. 6d. to 40s., and new at from 32s. 6d. to 37s. 6d. per qr., free on board. In Belgium prices were, by the latest accounts, about the same as in the Dutch markets, and at Antwerp good 62lbs. Louvain wheat was quoted 37s. to 38s. per qr. In France, quotations are rather more moderate; and though there is certainly no great margin for profit on consignments to this country, still shipments to a moderate extent are likely to be made during the winter months, particularly if prices should rally a little in our markets.

In the Mediterranean ports, quotations of both wheat and Indian corn are much higher than at places nearer home, and there is consequently very little prospect of business been done with that quarter of the world. In America, prices have hitherto kept up very firmly, and being relatively higher there than in the British markets, it would appear that the bulk of future imports will be from Germany, France, Holland, and Belgium.

CURRENCY PER IMPERIAL MEASURE.

	Shillings per OLD.	Quarter- NEW.
WHEAT, Essex and Kent, white	40 to 48	42 to 47
Ditto, fine selected runs	—	47 48
Ditto, red	38 43	37 42
Ditto, extra	40 42	42 44
Norfolk, Lincolnshire and Yorkshire..	38 40	—
Ditto, white	42 44	—
BARLEY, English, malting and distilling..	—	24 26
Ditto, Chevalier.....	—	26 30
Ditto, grinding	—	21 23
MALT . . . Essex, Norfolk and Suffolk	53 54	55 56
Kingston, Ware, and town made....	54 56	56 58
OATS, Essex and Suffolk	—	15 17
Lincolnshire and Yorkshire (Polands)	—	17 19
Ditto, feed	—	14 16
Devon & West Country, feed	—	13 15
Northumberland and Scotch, feed ..	—	18 23
Dundalk, Newry, and Belfast, potato	—	16 18
Limerick, Sligo, and Westport, potato	—	16 18
Ditto, feed	—	14 16
Cork, Waterford, Dublin, Youghal, and Cloumel, black	—	13 15
Ditto, white	—	14 16
Galway	—	12 14
BEANS, Mazagan	25 27	23 26
Tick	29 31	25 27
Harrow	31 33	27 29
Pigeon, Heligland	33 37	30 32
Windsor	—	26 28
Long pod	—	26 28
PEAS, non-boilers	—	27 28
White, Essex, and Kent, boilers	—	28 29
Ditto, fine Suffolk	—	29 31
Maple	—	27 29
Hog and grey	—	26 27
FLOUR, best marks (per sack of 280 lbs.)..	—	35 40
Norfolk and Suffolk, ex-ship.....	—	30 33
RYE	—	22 23

FOREIGN GRAIN.

WHEAT, American	40 to 43
Canada	36 43
Dantzic and Konigsberg	42 45
Dantzic, fine white, extra quality	46 50
Stettin and Hamburg	38 43
Danish	36 40
Rostock, Pomeranian and Rhine	42 45

IMPERIAL AVERAGES.

FOR THE LAST SIX WEEKS.

WEEK ENDING:	Wheat.		Barley		Oats.		Rye.		Beans.		Peas	
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
Nov. 17, 1849..	40	6	28	3	16	11	23	7	29	7	30	7
Nov. 24, 1849..	40	4	28	3	17	0	24	0	29	8	30	7
Dec. 1, 1849..	40	2	28	1	16	4	24	1	28	6	30	2
Dec. 8, 1849..	39	4	27	5	16	6	23	9	28	4	30	1
Dec. 15, 1849..	38	9	26	9	16	0	22	6	27	9	28	11
Dec. 22, 1849..	38	9	25	9	15	9	22	9	27	5	28	11
Aggregate average of last six weeks	39	7	27	5	16	5	23	5	28	6	29	10
Comparative avege. same time last year	49	7	32	3	19	6	30	0	35	9	39	6
DUTIES	1	0	1	0	1	0	1	0	1	0	1	0

PRICES OF SEEDS.

BRITISH SEEDS.

Cloverseed, red 35s. to 40s.; fine, 45s. to 50s.; white, 35s. to 50s.
 Cow Grass (nominal)..... —s. to —s.
 Linseed (per qr.).. sowing 54s. to 56s.; crushing 40s. to 42s.
 Linseed Cakes (per 1,000 of 3 lbs. each).. £9 0s. to £10 0s.
 Trefoil (per cwt.)..... 14s. to 18s.
 Rapeseed, new (per last) £28 to £29
 Ditto Cake (per ton)..... £4 5s. to £4 10s.
 Mustard (per bushel) white.. 6s. to 9s.; brown, 8s. to 11s.
 Coriander (per cwt.)..... 16s. to 25s.
 Canary (per qr.) new 80s. to 86s.
 Tares, Wiinter, per bush..... 4s. 6d. to 4s. 9d.
 Carraway (per cwt.)..... 28s. to 29s.; new, 30s. to 32s.
 Turnip, white (per bush.) —s. to —s.; do. Swedish, —s. to —s.

FOREIGN SEEDS, &c.

Clover, red (duty 5s. per cwt.) per cwt. (nominally) 33s. to 50s.
 Ditto, white (duty 5s. per cwt.) per cwt. „ 24s. to 42s.
 Linseed (per qr.).. Baltic 38s. to 44s.; Odessa, 42s. to 46s.
 Linseed Cake (per ton)..... £6 0s. to £8 0s.
 Rape Cake (per ton)..... £4 5s. to £4 10s.
 Rye Grass (per qr.)..... —s. to —s.
 Coriander (per cwt.)..... —s. to —s.
 Hempseed, small, (per qr.) 32s. to 33s., Do. Dutch, 33s. to 34s.
 Tares, (per qr.)..... small 20s. to 22s., large 28s. to 33s.

HOP MARKET.

BOROUGH, MONDAY, Dec. 24.

We have no new feature to notice in our market, which remains in a very quiet state, at the currency of this week. HORTON AND HART.

POTATO MARKET.

SOUTHWARK, WATERSIDE, Dec. 24.

Our market continues well supplied both coastwise and continental, which, with a dull demand, makes it difficult to clear ships in time to save demurrage. The following are this day's prices:—

Yorkshire Regents..	80s. to 110s.	per ton.
Wisbech do	60s. „ 75s.	„
Scotch do	60s. „ 75s.	„
Do. cups	40s. „ 60s.	„
French whites	60s. „ 70s.	„
Rhenish & Belgian do.	40s. „ 60s.	„

ENGLISH BUTTER MARKET.

DECEMBER 24.

Notwithstanding the present favourable weather, we have little or nothing passing in sales, save here and there a retail parcel, of the best quality, at barely late rates.

Dorset, fine weekly	90s. to 94s.	per cwt.
Do., middling	60s. „ 80s.	„
Fresh	9s. „ 13s.	per doz. lbs.

WOOL MARKETS.

BRITISH WOOL.

LEEDS, Dec. 21.—We have not any change to note in this branch of trade as regards combing wools; prices of which continue to have an upward tendency. There has been more inquiry for blanket wools and other skin wools, and rather improved prices have been obtained.

LIVERPOOL, Dec. 22.

SCOTCH.—There is still a better enquiry for Laid Highland Wool, but the buyers say they cannot afford to give any advance, and act with great caution. White Highland is not much inquired for. Good Cheviot crossed are still in good demand at full rates, while there is nothing doing in inferior kinds.

	s.	d.	s.	d.
Laid Highland Wool, per 24lbs....	7	9	8	6
White Highland do.....	9	6	10	6
Laid Crossed do...unwashed	9	6	11	0
Do. do...washed	10	6	12	6
Laid Cheviot do...unwashed	10	0	18	0
Do. do...washed	14	0	18	0
White Cheviot do... do.	22	0	24	0

FOREIGN.—The London public sales having closed with some firmness at the full advance, has given a fresh impetus to our markets, and considering our stocks are light, we have a good business doing.

FOREIGN WOOL.

The prices established at the sales are as follows:—

AUSTRALIAN.—Scoured fine, 1s. 6d. to 2s.; ditto skin, 1s. 2d. to 1s. 4d.; fine clean fleeces, 1s. 5d. to 1s. 10d.; inferior, 1s. to 1s. 3d.; pieces and locks, 7d. to 9d.; lambs', 1s. 4d. to 1s. 6d.; unwashed fleeces, 7d. to 8d.

VAN DIEMEN'S LAND.—Scoured fine, 1s. 5d. to 1s. 9d.; ditto skin, 1s. 1d. to 1s. 3d.; fine clean fleeces, 1s. 3d. to 1s. 5d.; inferior, 1s. 1d. to 1s. 2d.; pieces and locks, 7d. to 8d.; lambs, 1s. 5d. to 1s. 10d.; unwashed fleeces, 7d. to 8d.

PORT PHILIP.—Scoured fine, 1s. 6d. to 2s.; ditto skin, 1s. 3d. to 1s. 4d.; fine clean fleeces, 1s. 6d. to 1s. 10d.; inferior, 1s. 2d. to 1s. 3d.; pieces and locks, 7d. to 9d.; lambs', 1s. 4d. to 1s. 8d.; unwashed fleeces, 7d. to 8d.

SOUTH AUSTRALIAN.—Fine clean fleeces, 1s. 2d. to 1s. 4d.; inferior, 1s. to 1s. 1d.; pieces and locks, 7d. to 8d.; lambs', 1s. 2d. to 1s. 4d.; unwashed fleeces, 6½d. to 7½d.

SWAN RIVER.—Fine clean fleeces, 1s. 2d. to 1s. 3½d.; inferior, 1s. 1½d. to 1s. 2d.; pieces and locks, 9d. to 11d.; lambs', 1s. 3d. to 1s. 4½d.; unwashed fleeces, 8d. to 9d.

CAPE.—Fine clean fleeces, 1s. 2d. to 1s. 4d.; inferior, 11d. to 1s. 1d.; pieces and locks, 6½d. to 7d.; lambs', 1s. to 1s. 2d.; unwashed fleeces, 6½d. to 7d.

NEW ZEALAND.—Fine clean fleeces, 1s. 1d. to 1s. 3d.; inferior, 1s. to 1s. 1d.; pieces and locks, 7d.; lambs', 1s. 3d. to 1s. 4d.; unwashed fleeces, 7½d. to 8d.

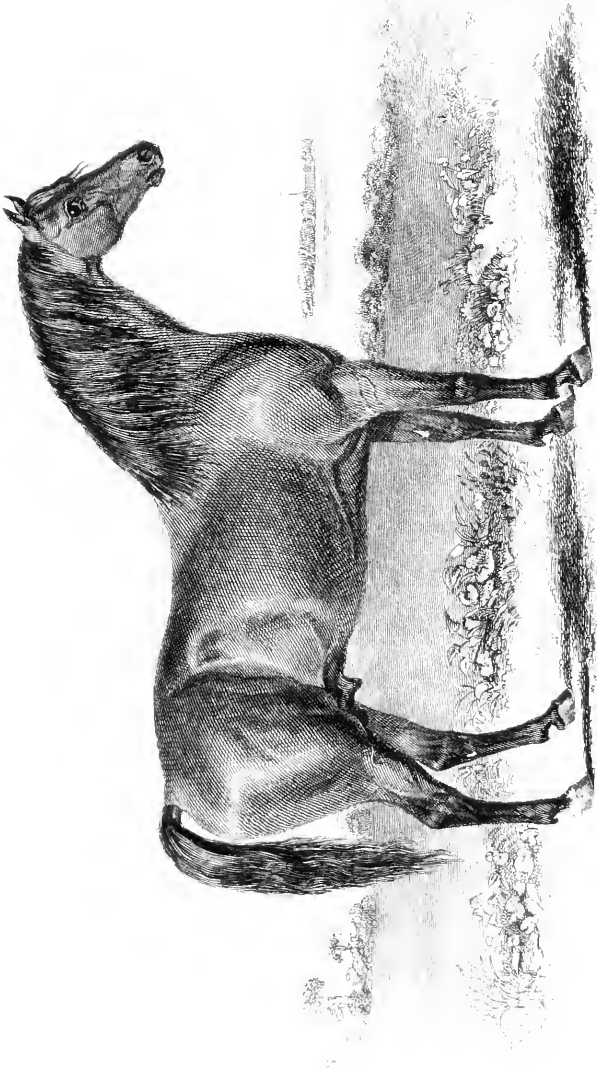
HIDE AND SKIN MARKETS.

Market Hides,	56 to 64lbs.....	s.	d.	s.	d.	per lb.
Do.	64 72lbs.....	9	1½	0	1½	„
Do.	72 80lbs.....	0	2	0	2½	„
Do.	80 88lbs.....	0	2½	0	2½	„
Do.	88 96lbs.....	0	3	0	3½	„
Do.	96 104lbs.....	0	3½	0	3½	„
Do.	104 112lbs.....	0	4	0	0	„
Calf Skins, light	.....	2	0	3	0	each.
Ditto, full	.....	5	6	6	0	„
Horse Hides	.....	6	6	0	0	„
Polled Sheep	.....	5	0	6	6	„
Kents and Half-breds.	.....	4	0	5	3	„
Downs.....	.....	3	0	4	0	„

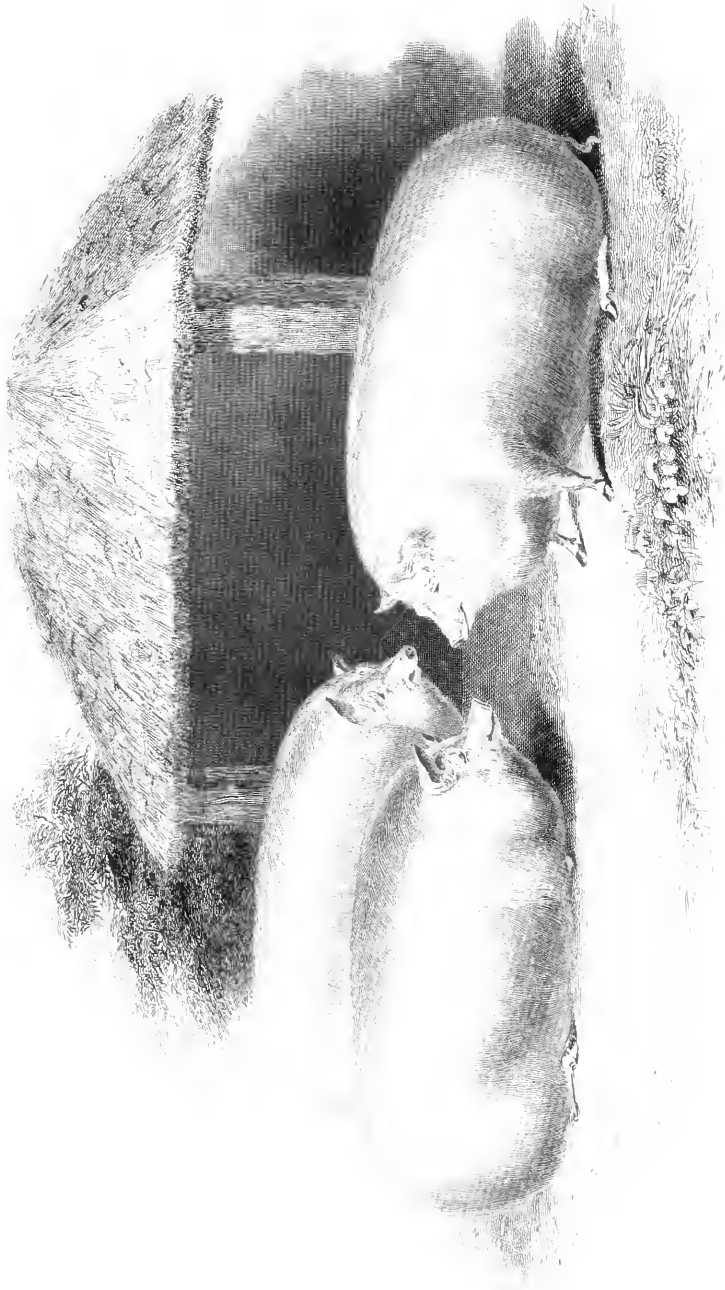
BARK.

Per load of 45 cwt.

English, Tre.....	£14 0 0	to	£15 10 0
Coppice.....	15 0 0		17 0 0







THE FARMER'S MAGAZINE.

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[SECOND SERIES.

PLATE I.

A CLEVELAND STALLION.

The subject of our first plate "Favourite," the property of Mr. John Langdale, of Leckonfield Park, near Beverley, Yorkshire, obtained the local Prize of Twenty Sovereigns in Class 4, as the best Cleveland Stallion, at the Royal Agricultural Society's Show, at York, in 1848. He was bred by Mr. Robert Lakes, of Scarborough, out of a very good mare of the Cleveland breed, is a beautiful rich bay, stands sixteen hands one inch high, and is now rising four years old; he was got by Cleveland (who was sold to go abroad for a considerable sum), d. by Kelsey, g. d. by Forester. Cleveland was got by Roseberry (who was likewise sold to go abroad), d. by Volunteer, g. d. by Victory, gr. g. d. by Wonderful, gr. gr. g. d. by Mr. Dale's noted Horse of Guisbro', in Cleveland, gr. gr. gr. g. d. by the noted Hob Hill Old Horse. Roseberry was got by Conqueror, d. by Forester, g. d. by Champion. Conqueror was got by Mr. Judson's Old Dreadnought, d. by Mr. Agar's Black Legs, g. d. by Mr. Woodhall's noted Horse of Seymour, which was sold to Mr. Ayton for three hundred sovereigns. Kelsey was got by Old Rainbow, and Old Rainbow was got by Old Dart.

PLATE II.

OLD MIDDLESEX BREED OF PIGS.

The subject of this plate, a pen of Three of the Old Middlesex Breed of Pigs, obtained the first prize of Ten Sovereigns at the Smithfield Club Cattle Show, in December, 1848, as the best pigs in Class 18. The silver Medal was awarded to Mr. W. Mills Barker, of the Montague Arms Inn, near Slough, Bucks, as the breeder; and also the Gold Medal for the best pigs in the show.

These pigs were farrowed on the 18th June, 1848, and were fed, from five weeks' old, on middlings, boiled potatoes, and peas up to eleven weeks' old, when they had barley and pea-meal, and boiled potatoes, mixed with water. They consumed in thirteen weeks, twenty-eight bushels of meal and four bushels of potatoes. They were tried on milk, but did not thrive so well on it as on water. In consequence of their great propensity to fatten, they were blind with fat at sixteen weeks old, and when exhibited their eyes were buried two inches in fat, which came over their forehead and lay on the top of their noses full three inches.

The following is a statement of their weight and age while fattening:—

Date.	Weeks Old.	Stones weight of each (slbs. to the stone).		
		First.	Second.	Third.
July	23	3	3	2½
August	13	6½	5½	5
September	3	10	9	8
Ditto	24	13	12	11
October	15	19	18	17
November	5	25	24	24
Ditto	26	29	28	28
December	6	24 and 3 days	29	28

This breed of pigs has been very much improved by Mr. Barker (the exhibitor) in the last seven years. They are of a pure white colour, of great substance and propensity to fatten. They keep in excellent condition while stores on grass, turnips, offal from the barns or garden, and when put up to fat in two or three weeks make excellent porkers. They are fine in the bone and head; small upright ears, which point a little forward. They are of a small size, have good litters, varying from seven to fourteen in number, being very fat while sucking, and thus making very good roasters.

OBSERVATIONS ON THE DRAINAGE OF TENACIOUS CLAY SOILS;*

OR SOILS CONTAINING AN ADMIXTURE OF CLAY AND FINE SAND, BUT FREE FROM SAND OR GRAVEL VEINS, AND LYING WET FROM SURFACE WATER; ALSO UPON THE GREATER DIFFICULTY OF DRAINING SUCH SOILS, WHERE THEY ARE UNDULATING OR LIE WITH A CONSIDERABLE FALL.

BY ROBERT BEART.

In the year 1840, at the request of Mr. Pusey, I gave a statement, in the Journal of the Royal Agricultural Society, of the cost and mode of manufacturing draining tiles and soles in Huntingdonshire, and at the conclusion made the following remarks (vol. ii., part 1, p. 100): "I wish to add a few observations upon furrow-draining tenacious clay soils. The drainage of these soils has generally been done in shallow depths, under the prevailing common opinion that otherwise the water would not get into the drains. The contraction which beds of clay undergo when cut through by parallel drains has thus been entirely overlooked; so much so (as I have found by experience) that drains dug from 30 to 40 inches deep have operated to much greater advantage than those of shallower depth. The bed of clay contracts itself near the drains, as deep as the drains are laid; and the deeper the beds of clay are contracted, the larger will be the fissures for the water to percolate to the drains. In well-drained lands, the water does not enter the drains by the furrows, but percolates through the fissures formed by contraction from the ridge to the drains.

"It is also, I consider, an error to cover tiles with loamy soil, or vegetable substances: these have a tendency after a few years to choke the drains: the best covering upon them is the clay itself: the action of the atmosphere will always so contract the clay that there will be sufficient fissures for carrying the water to the drains."

In writing upon the subject of draining (vol. iv., part 2, p. 411), I laid down the following principles

* The clay soils of the northern, midland, and western counties are light soils in comparison to the stiff clays of this district, and many other parts of the east of England, and their drainage more easily effected: the subsoil is the Oxford clay (upon which, in some parts, rests a very retentive clay containing a few small stones and nodules of chalk), rising generally within five or ten inches of the surface, and computed to be from 100 to 1500 feet thick, generally free from sand veins and springs, and lying wet from surface water. At the depth of three or four feet, the appearance of water ceases. The lands have been cultivated in high ridges for ages, which vary very much in their width and height in the same field; some of the lands rising 1 in 15 from the furrow to the ridge.

as necessary to be carried out in the drainage of tenacious clay soil, lying wet from surface water:

"I hope to show that the drainage of tenacious clay soils is not, as in draining of gravel, peat, or other soils, a mere practical operation; but must be considered in relation with the operation of under-drains by the aid of the atmosphere contracting the subsoil, and thereby increasing the size of the fissures for the water to percolate into the drains; and also with the injurious effect arising from the water lying in the land below the level of the drains (where these are shallow) rising by capillary attraction, expanding the subsoil, and partially closing the fissures, and thus checking the free infiltration of the water; and the levelling of high-ridged lands is of the greatest importance."

My subsequent experience fully confirms the truth of these principles; and they are now generally admitted, so far, at least, as relates to the advantage and superiority of deep under-drains, by parties who are themselves conducting large works of drainage, or have written since that period for the guidance and instruction of the public. But a point of almost equal importance, namely, the merely partial infiltration of rain as it falls, and the consequent flowing of water over the surface or undulating land, as well as the cause of such overflow, is by practical drainers and agriculturists generally overlooked, or but little understood; for, if they regarded the land, as I believe they should do, as a natural filter for the rain which is to percolate or pass through the surface, and consider how it could be kept from choking and in a good working state, they would study those agents, both natural and artificial, which aid or check its operation, varied as their action is by soil, fall, seasons, &c.; and not attribute to imaginary defects in the drainage, that which can only, or at least to a great extent, be remedied by judicious acts of cultivation.

The most important agents which facilitate infiltration are, contraction, the borings of worms, deep surface and subsoil ploughing, levelling high-ridged lands, cultivating where it is practicable across the fall, performing acts of cultivation in dry weather, leaving the land with numerous clods on the surface, and avoiding open furrows.

Those, on the other hand, which check infiltra-

tion, are steep falls, or undulations; high-ridged lands; heavy storms of rain, particularly in the winter season; soils which, by atmospheric changes, rapidly fall or pulverize; expansion of the soil from water lying in the fissures below shallow drains, rising by capillary attraction; acts of cultivation carried on in wet weather; open furrows; pulverizing and rolling the surface; and stocking or trampling with sheep in wet weather, particularly in the winter season.

The most important natural agent for facilitating the infiltration of water is contraction: the fissures formed by it on the surface are produced by evaporation: and in the subsoil increased in size and depth by the combined agency of evaporation, and deep under-drains. During that season of the year in which evaporation is considerable, and in dry winters, the rain, for the most part, percolates through the fissures so formed; and in winter seasons, after they have been closed on the surface, these are sometimes reproduced by frost; but in wet and mild winter seasons, the infiltration of rain is dependent upon the worms and acts of cultivation; for it is not so much the subsoil, as the surface, which then prevents the water from percolating to the drains.

Deep under-drains, combined with evaporation, as stated in my observations in 1840, contract the beds of clay near the drains to the depth at which they are laid; the deeper these are contracted, the larger will be the fissures in the subsoil, through which the water may percolate to the drains; and the greater the distance at which water is withdrawn from the surface, the less injurious will be the effects produced by its rising from capillary attraction, expanding the soil, and thereby closing the fissures.

Deep surface and subsoil ploughing are of considerable importance in promoting the infiltration of rain, though less so upon clay than some lighter soils, which concrete or form "Moor Pan;" still the general utility in reference to drainage should never be lost sight of by the agriculturist.

The levelling of high-ridged lands is of the greatest importance.* Clay soils cannot be well drained where the ridges are allowed to remain; for, as land which is comparatively horizontal will drain or infiltrate rain much better than that which is undulating or has a considerable fall, so high-ridged lands by adding to the fall where the land is undulating, and where it is comparatively horizontal giving it the character of undulating land, will increase the tendency of the water to flow over the surface, and prevent any cultivation across the fall, which, in some degree, by obstructing the flow of

water over the surface, will assist its infiltration. There are many other objections to high-ridged lands, but as they relate more to cultivation and production than drainage, I shall not discuss them.

There can be no question that acts of cultivation in dry weather most effectually aid the infiltration of water; for, not only is the floor upon which the plough traverses more broken with indentations than in wet weather, but the furrow slice also is more open, broken, and lies more open for the rain to infiltrate. On the surface, no land will infiltrate so rapidly as when dug with the spade or fork; for, under such cultivation, not only are open furrows avoided, but the surface being composed of numerous indentations, and the floor (upon which the tilth lies) of the same irregular character, they are very superior to the comparatively smooth floor and furrow slice produced by the plough. In the use of ploughs the turnwrest for drainage has an advantage, by avoiding open furrows, and so increasing the obstructions to the flow of the water; and if the water does at times flow over in the absence of furrows, the obstructions so offered will keep it comparatively clear; and clear water will, in a short time, filter through the soil.

At the approach of winter, wherever practicable, it is of the utmost importance to leave the surface of tenacious clay soils covered with clods, and free from open furrows, as affording somewhat of the advantage of fork or spade husbandry, and where the subsoil is deep drained, enabling the water in heavy rains, especially in mild weather, to percolate more rapidly through the borings of worms* which appear to work more freely where the surface is covered with clods than when smooth. Upon examination during the winter or commencement of spring, worms are generally found under clods, and their borings far more numerous than on a smooth

* Vol. iv. part 2., p. 412, I have made the following remarks. "The utility of the worms in the drainage of land is unquestionable; for it loosens the soil by its boring operations: the bores of the worms alone upon some grass lands would be sufficient for the infiltration of the water if the drains were laid a proper depth to carry it off. I have found the worms bore quite as deep as the main drain, and some of the bores were half an inch in diameter."

A friend of mine noticing in a field of old pasturage land that the soil for eight or ten inches deep was free from stones, when in the fields adjoining under tillage they were mixed with the soil to the surface, concluded the cause to be that the worms, by bringing up the soil continually to the top, the stones gradually recede from the surface: in this opinion I fully concur; and if correct, it proves not only that the worms are great assistants in drainage, but also in fertilizing, by increasing the surface soil.

* The mode of levelling high-ridged lands, see vol. iv., part 2, pp. 419-420.

surface: the clods, therefore, not only themselves offer a resistance to the water flowing over the surface, but the greater number of worm-borings under them facilitate its infiltration or percolation to the fissures of the subsoil and drains.

The greatest natural hindrances to the infiltration of rain are steep falls or undulations; and these, science cannot remove: but high-ridged lands, which considerably augment the evil in such localities, and also produce undulations on land otherwise comparatively horizontal, can and must be removed before anything like good drainage can be effected. I apprehend, however, that land with steep falls will never be perfectly drained by the agency of under-drains and the ordinary acts of cultivation.

Heavy falls of rain (particularly when there is little or no evaporation) upon clay soils, which crumble rapidly from atmospheric changes, or have been pulverized by artificial means, soon choke or fill the fissures on the surface; and in such cases with a continuation of wet and mild weather, the land, though drained in the most scientific manner, will at times lie wet, particularly if on growing wheat, or fallows.

In shallow drained lands, waters lying in the fissures below the drains, and rising by capillary attraction, expand the surface and subsoil; and so, by reducing the size of the fissures, cause them more rapidly to choke than on land which is drained at a greater depth.

Little need be said as to acts of cultivation on clay soils in wet weather, when there is but little evaporation. Such a system (if heavy rains follow) must cause the land to lie wet; for it is not to be supposed that the most scientific system of drainage will render superfluous that care and attention, to which the cultivation of such soils has been carried on; but that, with the exception of high ridges and open furrows, the same precaution should be used as previous to the drainage of the land.

Open furrows which act as channels to carry off water from land not under-drained, and which are there indispensable, are upon under-drained land a great evil; the principle of under-draining being that rain shall infiltrate as it falls, and every means should be adopted by levelling or filling the furrows on fallow lands with clods, to prevent the water running down. The furrows not only carry down a great deal of soil, but the water in its course is drawn by capillary attraction from each side of them, and thus the land lies wet.

At the commencement of winter, as has been before observed, clay lands, lying with numerous clods on the surface, and a deep open tilth, are in the best state for infiltrating water; therefore, pulverising or rolling them is at that season most injurious.

The same may be said of trampling with sheep; for by whatever means the surface of clay soils is made smooth and close, should the weather be unfavourable it will, in the winter, lie wet.

The very tenacious clays are not so difficult for the agriculturist to keep in a satisfactory state, as where the soil is an admixture of clay and fine sand, &c., which falls or pulverizes without the action of frost, simply from the changes of dryness and wet. Such soils generally run together on the surface during heavy rains, and thus present no obstruction to the water flowing over, particularly if the land has a considerable fall.

Rain will generally percolate clay soils upon which seeds are growing after corn, if the surface is free from open furrows, and the trampling of sheep in wet weather; and even should the undulations be considerable, the resistance offered by the plants of the seeds will prevent the water under ordinary circumstances from flowing over; and where it does, as but little sediment* is carried with it, it soon disappears.

I have observed fields drained, and in every respect the same, except the different crops upon them, will, in the state of their drainage, vary considerably. Fields which are in clover or other seeds will generally, during the winter and spring, lie the driest.

Lands with a very steep fall, under-drain and cultivate upon the most scientific principles, the water will at times flow over to a considerable extent. I do suggest (strongly as I am opposed to open furrows under ordinary cultivation) whether an open gutter or deep furrow made obliquely across the slope or fall, so as to catch the water before it accumulates to such an extent as to wash down the soil, would not be beneficial; for I have observed upon the Bagshot sand district in Surrey, early in the month of November last, in a field on Black Bushes farm (the soil being a light sandy loam, with large flints, lying upon gravel, and the gravel upon the white sand, with a fall on the surface of only 1 in 100, and several feet above the outfall) the water flowed very much down the furrows, and washed the fine soil to the lower parts, where the sheep had fed off the turnips; but where the turnips had not been fed, the rain infiltrated as it fell: I consider it would be beneficial, even upon such light soils, to cultivate at times across the fall; for it is evident that the process going on, though slow, will gradually

* The sediment washed down the furrows on clay soils, as shown in my observations on drainage, vol. iv., part 2, is most impervious to infiltration, as a much larger quantity of water than the rain which falls would filter through the soil as clear water; for even upon roads it is not so much the hardness of the surface, as the sediment which is washed into the crevices and low parts, that prevents infiltration.

increase the fertility of the lower, at the expense of that which is now the poorest—the higher parts.

Having as briefly as possible considered the relative position of the drainers and cultivators of undulating tenacious clay soils, or those containing an admixture of clay and fine sand, I have only in

conclusion to observe, that upon the acts of cultivation, in a great degree, must depend whether the surface drainage in wet and unfavourable seasons be in a state as satisfactory as the circumstances of the soil, &c., &c., will admit.

Godmanchester, Huntingdonshire, May 1st, 1848.

MANURE—ITS GENERAL AND PARTICULAR APPLICATION.

BY J. TOWERS, MEMBER OF ROYAL SOCIETIES OF AGRICULTURE AND HORTICULTURE.

In the recent article on earths, I endeavoured to excite the attention of cultivators to the theory promulgated about five years ago by Mr. Newman, wherein the writer endeavoured to prove by induction of facts, that pure simple earths ought to be considered as forming the medium whereby (without deriving one particle of food from it) the roots of every plant became supported in their proper position, and were enabled to ramify in search of food.

Were it possible to find any *real* loam or compound earth wholly void of any vestige of a fibre, or other organic decomposable matter, I could admit the validity of the assumed position; because it is an undoubted truth, that neither pure sand, alumina, chalk, nor the small quantity of per-oxide of iron which is always present as the colouring matter of loams, is soluble in water. But a theory, however fundamentally correct, may be carried too far by the zeal of its advocate; and thus, in the present instance, the assertion that any barren sand, "every common and heath may be made to produce a crop of wheat at the will of the cultivator," tends rather to startle than convince. Sandy heath soil, and a soil nearly all sterile sand, are appropriate severally to the growth and perfecting of heaths and the purple sand-wort; but for the crops of the farm, texture and consistency are indispensably required. To do Mr. Newman justice, I am prepared to admit that to render any soil whatever productive, he himself requires that plants be supplied with food which is suitable to the constitution and wants of each. But then, how are we to discover such food? how, when, and where to apply it effectively? Organic analysis alone can furnish the answer; and that, to a certain extent, has been attempted; but unfortunately with varying and discrepant results; proving that the nature of the soil in different localities has variously affected the several plants which have grown in it. Had such analytic "questions" been carried to a greater extent, and been more uniform in their "answers," it would be equally desirable and instructive to collect in a tabular form the items of the several processes of

eminent chemists; for thus, the practical cultivator might be enabled to manure his land according to the requirements of the individual crop which he intended to propagate. But, as the case yet stands, we must be content to wait "*en attendant*," as the French say. Let us examine general principles, and for the present endeavour to determine what manure is, and by what means it becomes the food of plants.

To Sir Humphrey Davy, I think, we may refer for the first disclosure of the great fact that not a particle, the minutest atom of matter discoverable to the eye, can enter the roots of any plant. Our great chemist proved by experiment, that the impalpable charcoal obtained by washing from gunpowder could not pass into the roots of an herbaceous plant long immersed and growing in water tinged with such charcoal. Many able writers have advocated the principle so laid down; and I venture to assert, from decisive experiments, that coloured fluids, such as the clear, brown drainage of a dung-hill, infusion of logwood, diluted ink, &c., &c., will produce no change of tint in the sap or juices of any plant immersed in them, roots entire, so long as the plant shall live, provided that those roots have received no wound. If, however, a twig or cutting be introduced, the colouring matter will pass through the tissue, and tinge the same, even through the larger veins of the leaves! Thus we may conclude that this great leading fact is fully established.

By the term manure, we understand any substance, mineral or organic, which is susceptible of *change* or decomposition, by the disturbing agency of the living principle of plants, chiefly—and also, though more slowly, in the soil itself, by ground-moisture and heat. Texture becomes the primary consideration. Arable land, *i. e.*, a good loam, if it deserves the name, must be sufficiently firm and consistent to support the roots of plants. If by nature it is so, well and good; if not, whether it be a sharp glary sand, or a stiff and binding clay, it must be meliorated by art; and so far, we cede the principle laid down by Mr. Newman. If substances be ap-

plied as meliorators (*amendments* of French agriculture) it will be proper to class them under two distinct heads:—

First, those which are but partially soluble, yet act chemically, and affect texture after their primary action has ceased.

Secondly, those which, being entirely decomposable, act progressively as manures, in the ordinary acceptance of the term.

Want of space will now restrict the enquiry to the first of these only. If a natural loam so abound in carbonate of lime (chalk) as to hiss freely with a white frothy heading on the application of muriatic acid, lime in any form will rarely be required, until by long tillage vegetable matter superabounds. At this point I think it advantageous to investigate rather closely the theory of liming; as that has been, and is, very much mistaken.

The properties of quicklime as generally understood may thus be curiously detailed: it is slightly soluble in water, and attracts carbonic acid; thus acting most powerfully in softening hard water. Being an alkaline earth it neutralizes acids, and forms peculiar compounds with sundry acids within the body of the soil. It acts as a specific meliorator in reclaiming turbaries on peat-bogs, which, abounding with tannic acid, are thereby rendered effete, and incapable of supporting any agricultural crop. These essential qualities appear to be established beyond question or doubt. On the other hand, I hope the inquiring reader will hesitate before he adopts the theory propounded in the following lines, which are copied from a well-written article on manure:—

“Lime newly burnt has a peculiar effect upon all organic matter, which it burns or dissolves by taking from it (attracting) ‘a portion of the water and of the carbonic acid which it contains. On humus, which is the result of animal and vegetable decay in the earth, it has a peculiar effect; rendering it soluble in water, and thus fit to enter the minute fibres of plants.’”

Here is the great mistake which many have fallen into, by not experimentally appreciating the individual action of the alkalis upon the several acids (if the term be strictly chemical) that are contained in perfected humus. If that substance or its representative, the black remains of an old dunghill, be treated with a hot solution of carbonate of soda, a dark porter-coloured liquor will be produced, which is called humate of soda. If caustic ammonia be substituted for soda, the ulmic acid is extracted, and the result is ultimate of ammonia. Again, if

caustic potash in solution be applied after the previous action of soda, the otherwise insoluble portion of neutralizing matter will combine with this alkali, and produce humate of potassa. Thus far may be traced the specific actions of the three true alkalis. But if, in lieu of these, caustic hot-lime be appealed to in any way, whether in boiling water, or as the strongest clear solution of lime in distilled water, it will be found that no brown colour can be extracted, the whole of the neutralizing principles becoming fixed, and precipitated by the action of the lime. As a proof, let any one of the three alkaline solutions be tested by strong lime-water, and it will be seen that the brown colour is discharged, and deposited in the form of dingy gray flocks.

Lime is therefore the specific antidote of redundant humus, and fixes its acidifying constituents in the condition of a humate and ultimate of lime, slow in decomposition, and scarcely if at all soluble. It also attracts the humic matter from all those alkalis in which it is perfectly and readily soluble: and thus we discover the rationale of the meliorating power which it exerts, when duly applied to inert peat-bogs, and to over-rich garden mould, glutted with decayed manure.

To Mr. Rowlandson, of Liverpool, we are, I believe, indebted for the promulgation of this most important chemical fact, which I felt it a duty rigidly to bring to the proof, and then to render more public by every means in my power, not excepting a written communication to the Council of the Royal Agricultural Society.

‘The profuse “limings” described in Sir John Sinclair’s “Code,” are in part so interpreted, though the specific action of lime was not suspected by that writer. Peat land, it is true, is deficient in calcareous earth, and therefore peculiarly claims its introduction as an “amendment”:—

“Caustic lime,” we are told, “unites with the half-decomposed fibres of vegetable matter, such as straw, heath, and the like: it helps their decomposition, and accelerates it. By its means, the dead fibres of vegetable roots, which remain in the earth when the plant is removed, become soluble; and their elements, entering into new combinations, supply the materials for the various vegetables which are produced. So long as there is a store of organic matter or humus in the soil, lime will be an excellent manure.” Let the agriculturist practically apply Mr. Rowlandson’s verified theory to these acknowledged facts, and the action of lime will then be rendered philosophically intelligible.

THE SULPHATE OF AMMONIA AS A FERTILIZER.

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

The salts of ammonia have hardly had that careful attention paid to them as fertilizers, that their readiness of application, and other good qualities deserve. And yet, when the farmer, who is largely using guano, reflects that it is to these salts of ammonia that the best samples of the South American manure owe their chief value, he might reasonably be incited to experimentalize upon those salts, which also having ammonia for their base, have been long manufactured in this country, and are perhaps the cheapest top-dressings that can, on many soils, be employed. Of these salts, the sulphate, as the most reasonable, and as being a fixed salt (not volatile like the carbonate of ammonia), will always, it is probable, obtain the farmer's preference; and it is to this salt that my remarks will chiefly be restricted in this paper. In some late researches of Dr. Anderson, of Edinburgh, upon the causes of the failure of the clover plant (*Trans. High. Soc.* 1850, p. 206) he remarks:—

“Experience here has, I believe, led the farmers to the conclusion that lime alone has no effect on the clover crop; on the other hand I learn from Mr. Scott, of Criaglochart, that a decided improvement has been observed since the use of sulphate of ammonia has become common in this district. I should have considerable confidence in recommending to the occupier of land which has become ‘clover sick’ the trial of sulphate of ammonia as a top-dressing early in the spring. It has been long maintained that the addition of sulphate of lime to such soils is an excellent restorer of their exhausted power; and it is pretty certain that the sulphate of ammonia, when decomposed by the lime, which all fertile soils contain, may in some way or other form sulphate of lime, in a manner more readily assimilated by the clover plant, than when presented to it in the form of gypsum. It is by following up such hints that many a valuable agricultural discovery has been made; and although it is always highly desirable to understand the chemistry of our operations, yet, amid the mystical operations of nature, we need hardly feel surprised if many useful discoveries have been made to which their authors were not led by any chemical conclusions or analogical reasoning. An instance of this is found in the paper of Dr. Anderson, to which I have alluded; for there is furnished a detail of some very remarkably good effects upon the growth of clover by a “kind of shale” in a field at Craiglochart, and also by the

ashes produced by the burning of the waste small coals of a Newcastle coal-pit. The professor, at the conclusion of his paper, suggests the trial of the following substances, as a remedy for that failure of clover of which most farmers are so well aware. The season, let us not forget, it is now approaching when these may be best applied:— Per Acre.

	lbs.
Sulphate of ammonia	98
———— lime (gypsum) ..	172
———— potash	174
———— soda (Glauber salt)	332
———— magnesia (Epsom salt)	246
Sulphuric acid	98
Saltpetre	202
Common salt	197
Chloride of potassium	149

I had occasion to allude, not long since, (*Bell's Messenger*) to the remarks upon the salts of ammonia of Professor J. F. Johnston, in his valuable work, entitled “Experimental Agriculture,” a section of which will be found in the *Quarterly Journal of Agriculture*, 1849, p. 83). He there traces as clearly as our present limited knowledge will allow the varied action of the salts of ammonia; and amongst other uses, alludes to their property of supplying nitrogen (an element, he well remarks, very necessary to the growing plant) in a form which is immediately available for the production of those nitrogenous compounds, which not only form an important part of the substance of the plant, but appear also to preside over those chemical changes constantly taking place in its sap, and upon which the health and rapidity of its growth depend. They are all either the producers of, or are necessary to the production of, numerous chemical changes in the sap. These changes are as yet by no means understood, but we know that they take place, and that nitrogen, sulphur, phosphorus, &c., are necessary to the production of them. None of the substances, indeed, that we have it in our power to apply to growing plants, is capable of undergoing more varied transmutations than ammonia. Such transmutations it not only itself undergoes in the interior of plants, but, in so changing, it causes, or is accompanied by, similar chemical changes in other substances also, without which constant and varied metamorphoses the healthy growth of plants could not proceed. In all trials with artificial ma-

nures, the primary object is the expense, viewed in connection with the probable return to be expected. This is not always regarded so carefully as it ought, and hence many an experiment, which would have been otherwise valuable, is rendered nearly useless; of such a kind was a trial made some time since by Mr. Barton, of Emsworth, to which I shall presently allude. In the first place the purity of the salt employed, and its price, is an essential object. Now these salts are thus described, and their prices given in the *Farmer's Almanac*, p. 93:—"They in general produce excellent fertilizing results upon vegetation. Their effect, however, is only for one crop. In these salts it is in the ammonia that their fertilizing power is contained. Ammonia is composed of—hydrogen, 74 per cent.; azote or nitrogen, 26 per cent. The following is the composition of its chief salts:—

	Acid.	Ammonia.	Water.	Per cwt.
Sulphate	54.66	14.24	31.1	15s. to 16s.
Carbonate	45.00	43.00	12.0	66s.
Muriate	49.55	319.5	18.5	24s.

If the muriate of ammonia was as beneficial in its action upon plants as the sulphate of ammonia, it would be, as containing the larger portion of ammonia, the cheapest in the list; but as this is not the case, and for the reasons to which I have before alluded the sulphate will be commonly, I think, preferred by the farmer. To this salt, therefore, my attention will be chiefly directed in this paper. The trials of Mr. John Barton are fairly and practically described by their author. He was searching for information, and uses the language of a seeker after truth when he tells us (*Jour. R. A. S.*, vol. v., p. 601)—"In a field of six acres, consisting of gravel of indifferent quality, worth perhaps 14s. or 15s. per acre, I sowed every other ridge, in the month of March last, with sulphate of ammonia; the whole quantity used was 5 cwt. During the first few weeks no difference was visible in the crop; but, as the spring advanced, the blades on the salted land became considerably darker in colour and more vigorous than the rest. Just before harvest I walked through the field with some agricultural friends, and we estimated the difference at six or eight bushels per acre. As such estimates are, however, not to be depended on, I marked off two spaces of 20 rods each, and caused the produce to be separately thrashed. The result is as follows:—

	Wheat.	Straw.
Salted land	4 bush. 2 gallons.	274 lbs.
Unsalted	3 " 6 "	232 "

This gives, per acre, in favour of the sulphate of ammonia:—

	£	s.	d.
4 bush. of wheat, at 6s.	1	4	3
3 cwt. of straw	0	3	0
	<hr/>		
	1	7	0

The five cwt. of sulphate of ammonia cost, including carriage from London, and expenses £4 14 7

This being laid on three acres, gives the cost, per acre 1 11 6
Deduct difference of produce, as above 1 7 0

Making a loss, per acre 0 4 6

Some experiments made in Scotland, with perhaps more careful attention to the purity of the sulphate of ammonia, and the other circumstances of the application, were attended with a very different result; they are collected together by Professor Johnston. First, then, as to its use as a top-dressing for wheat. In 1847, Mr. Main applied it on the 1st February, to a portion of a field of Taunton Dean wheat, with the following result, per acre, in comparison with sulphate of soda:—

	Grain.	Straw.
	Bush.	Cwt.
Soil simple	27½	19
Sulphate of ammonia, 2 cwt	33¼	29
Sulphate of soda, 2 cwt.	32	24

"I have added," remarks the professor, "the result of the action of sulphate of soda for the purpose of marking the difference in the effects of the two sulphates. Both largely increased the produce of grain, and nearly to the same extent; but the sulphate of ammonia added about five cwt. to the produce of the straw. It had the usual effect of the salts of ammonia in promoting growth more than mineral sulphates are observed to do." Secondly, as to the advantage of top-dressing oats with this salt. The following table gives the results of four experiments made upon oats, top-dressed in the spring of 1843, on different farms near Turriff, in Aberdeenshire:—

1. At Darra, after a crop of turnips, the produce per acre was—

	Grain.	Straw.	Chaff.
	Bush.	Cwt.	Lbs.
The soil simple	57	31	302
Sulphate of ammonia, 2 cwt.	59	42	118

At Rothie Brisbane, after lea—

Soil simple	54½	40	610
Sulphate of ammonia, 2 cwt.	86	59	13½

At Mill of Lathers, after lea—

Soil simple	43	20	272
Sulphate of ammonia, 2 cwt.	56	28	412

At Lower Clotburn, after lea—

Soil simple	35½	20	301
Sulphate of ammonia, 2 cwt.	57½	34	336

In all these experiments except the first, after turnips, the increase both of straw and grain was very considerable. The manure employed for the turnip crop of the previous year may account for the smaller increase in grain in the first experiment made at Darra. It will interest the physiologist to observe how very different the weights of chaff are

with which the grain in the several crops was covered.

Again, as regards experiments with the sulphate of ammonia for turnips, few experiments have been made and recorded. Mr. Fleming, in 1842, made one upon yellow turnips, to which no farm-yard manure was added. The land was trenched out of grass, and must have been in good heart, or it would not, unaided, have yielded from 11 to 13 tons of bulbs per acre.

	Tons.	Cwt.
Soil simple, 1st plot produced	11	8
Soil simple, 2nd plot produced	12	17
Sulphate of ammonia, 2 cwt.	24	11
Sulphate of magnesia, 1 cwt.	14	17
Nitrate of soda, 1 cwt.	27	2
Rape dust, 15 cwt.	24	11

"This experiment," continues Professor Johnston, "supposing, as the large differences seem to justify us in doing, that the results are to be depended upon, in the absence of duplicate experiments, is very interesting. In trenched land, it seems to say that substances containing nitrogen are likely to be deficient, and the use of them, therefore, on such land is profitable to the farmer. It is not unimportant to remark, however, that the increase of bulb was by no means in proportion to the absolute quantity of nitrogen in the several manures that contained it. Thus the proportion of nitrogen added, and the increase of bulbs in the three cases, were as follows:—

	Nitrogen added per acre.		Increased produce per acre.	
	Lbs.	Tons.	Cwt.	
Sulphate of ammonia, 1 cwt.	23.7	14	14	
Nitrate of soda, 1 cwt.	18.6	14	5	
Rape cake, 15 cwt.	72.5	11	14	

Lastly, as regards the top-dressing of hay. In 1843 Mr. Melvin, at Ratho, in Mid Lothian, top-dressed his grass with sulphate of ammonia, and with the nitrates of potash and soda. He found the yield per acre of hay of the

	Stones.
Soil simple	306
1 cwt. sulphate of ammonia	396
2 cwt. nitrate of soda	449
1 cwt. nitrate of potash	405

The three following experiments were made at Barrochan in 1845, upon three different fields, the first being sown grasses, the two others old lea. The yield of hay per acre was—

	Sown grasses.	Six years old lea.	Thirty years old lea.
	cwt.	cwt.	cwt.
Soil simple	41½	22½	27½
2 cwt. sulphate of ammonia	76½	40	40
2 cwt. muriate of ammonia	72	48¼	38

"It will appear," concludes the learned professor whom I have so often had the pleasure of quoting, "from the results I have inserted in this section, and which are not selected to prove any view of my own, but are introduced simply as they have come to my hand, that the sulphate of ammonia, skilfully and prudently used, may, in the hands of the intelligent and enlightened farmer, prove a means of considerably augmenting his ordinary profits." With these cautious and important conclusions of the learned Professor, to whom agricultural chemistry is so deeply indebted, I am convinced my readers will readily concur. That the use of ammoniacal salts as fertilizers will gradually and steadily extend, I have little reason to doubt, however their employment may be retarded by adverse circumstances, which now seriously retard the march of improvement in agriculture, and render all science, all skill unavailing, and even the soil of England of greatly diminished value for the purposes of cultivation.

THE PHENOMENA OF DOMESTIC LIFE.—In the last number of this magazine we inserted an article under this head, purporting to be a lecture delivered by George Chapman, Esq., of Wellham Cottage, before the members of the Retford Literary and Scientific Institution, and which we copied from the *Derbyshire Courier*, and acknowledged as having taken it from that paper. We have since found that the above lecture is a verbatim copy of a considerable portion of a very valuable little work published by the Messrs. Longman, entitled "The Phenomena of Domestic Life, by C. F. Gower." The fact of our being so much struck with the excellence of the matter of this supposed lecture as to give it a place in the *Farmer's Magazine*, will afford sufficient evidence of our estimate of the merits of the work. The regret we feel at the circumstance of our cotemporary, the *Derbyshire Courier*, and ourselves being thus misled, can only be exceeded by our astonishment that any individual connected with literature should be found capable of thus surreptitiously appropriating to himself the labour; and property of another. Our object was to diffuse the information contained in the article in question and the untoward circumstance which has occurred may enable us to do so more effectually by earnestly recommending to the attention of heads of families "GOWER'S PHENOMENA OF DOMESTIC LIFE," published by Longman and Co., London.

ON PLEURO-PNEUMONIA IN CATTLE—HOW FAR ATTRIBUTABLE TO THE PERNICIOUS EFFECTS OF ERGOT IN PASTURES.

ITS PATHOLOGY AND TREATMENT.

(Continued.)

BY RICHARD J. JONES, CORK, LATE OF WEST BROMPTON.

Before entering on the consideration of Pleuro-pneumonia, it will be necessary to say a few words relative to the organs implicated in that disease.

The word Pleuro-pneumonia is of Greek extraction, and signifies, as its name implies, an inflammatory affection of the lungs and pleuræ. The pleura may be considered as a kind of membranous sac, enclosing and reflected over the lungs and side of the chest; its uses are, the exhalation of a fluid from the vessels on its internal surface, for the purpose of lubricating—if I may so call it—the lungs, and lessening the friction between them and the ribs during respiration, and thereby facilitating that very important process. The lungs are situated one at either side of the chest internally, surrounding and separated by the heart: by these the respiration is carried on; they are attached at the upper part to the neck by the trachea, or windpipe, and to the heart by the pulmonary vessels. The substance of which they are composed is of four kinds, denominated according to their different uses—the vesicular, the vascular, the bronchial, and the parenchyma. The vesicular is composed of minute air cells, which, being constantly supplied with fresh portions of air, give off to the blood circulating amid them, by means of the capillaries, or very minute blood-vessels, the oxygen contained in the inspired air, and receive instead the carbon taken up by it during its course through the body, which is again thrown off by expiration, and fresh portions of oxygen, so indispensable for the purposes of life and the productions of animal heat, are again with each inspiration received into the lungs; in fact, they are a kind of chemical laboratory, by which the blood is kept in a process of renovation, as it circulates through them. The Vascular is composed of the veins and arteries of the lungs, which ramify upon the air-cells like a delicate net-work. The bronchial is formed by the bronchi, or large air-tubes into which the trachea divides, while these again branch off into more minute ones, and at length terminate in those small air-cells I have before mentioned. The spongy substance which connects all these together is called the parenchyma.

On the due performance of the functions of the lungs depends in a great measure the proper action of the heart, and consequently the health and well-

being of the animal. Whatever tends to inflammation of them, must, as a matter of course, be followed by derangement of the whole circulating system, and *vice versâ*; as all these parts are so intimately connected, that one cannot be affected without more or less affecting the others, and indirectly every other organ in the body; but their importance must be apparent to any one reflecting that the whole current of blood supplying the system, after traversing its various parts, becomes so deteriorated, and vitiated in quality, as to be no longer fit to sustain life in the animal. By the chemical change which it undergoes in passing through the lungs, it becomes oxygenated, or arterialized, and imbued with a fresh vivifying principle; it then passes into the pulmonary veins, and enters the left side of the heart, whence it is again ejected, as from a powerful syringe, into the aorta, or main artery; and from this branch off a number of smaller arteries, by which it is distributed to every part of the body, where it carries new life. Having performed which, and again exhausted itself of oxygen, it returns as before for a fresh supply, again and again to pursue the same course.

In pleuro-pneumonia it is not to be supposed that these are the only organs engaged, as we rarely see it without having reason to suspect that the pericardium—which performs for the heart the same offices that the pleuræ do for the lungs—will be generally found implicated in the mischief, as well as the diaphragm or midriff, which also assists in respiration; in fact, the entire contents of the thoracic cavity will be discovered to be engaged to a greater or less extent, and generally the liver also. When we consider the very important parts which these organs are called on to perform in the vital actions of every animal, and that the injury of any one of them would be sufficient to induce the most fatal consequences, we can no longer be surprised at the effects produced by the morbid changes. The result of disease of so many all-important organs, which, when unchecked by appropriate treatment, rapidly lapses into that typhoid and adynamic state, remarked as the general concomitant of this malady, or in fact of any other where the serous membranes are engaged to such an extent as they are in this.

Having now given, in a manner as concise and devoid of professional terms as I could, some slight idea of the circulation and respiration, I shall return to the more immediate subject of this paper; and I beg most emphatically to impress on the minds of the stock-owners, that the disease may be combated, and successfully, if attended to in proper time; and the object of this article is to point out the simplest and most efficient mode of so doing, untrammelled by that mass of technical language which serves to puzzle instead of enlightening. The essays that I have seen on the subject were either so wrapt up in professional terms, as to be all but entirely unintelligible, except to the initiated few; or on the other hand so perfectly meagre in judicious treatment, as to be worse than useless; while in some were so many very fine hypothetical arguments adduced, that in vainly endeavouring to unravel or follow them, we forget what we are seeking after, and get lost in a mist of theory and conjecture; and finally, after a good deal of wandering, find ourselves just at the point whence we set out so long before, not one whit wiser than when we started.

Pleuro-pneumonia is, then, as its name implies, an inflammatory affection of the lungs and pleuræ; its attacks are particularly prevalent during a wet season, or at any season on low-lying wet marshy pastures, which might be fairly said to be the hot-bed of this disease, and to which it is principally confined. See its effects on the low-lying lands of Hesse, where in 1693 a similar pulmonary disease destroyed all the cattle; on examination, the grasses and vegetables were found to be diseased; also in the marshy plains of Hungary. And in 1713, Italy suffered from an epidemic of much the same kind; it was particularly fatal in the lowlands and in the marshes surrounding Rome. By this, as well as another species of epidemic raging at the same time, of which the symptoms were, *malignant dysentery, tumours, ulcers, and gangrenous affections of the limbs*, nearly 40,000 head of cattle were destroyed: there, too, the grasses were found in a diseased condition, affording strong presumptive proof that ergot had more than a share in producing the fatality. In an extract from a letter by W. H. Wyatt, Esq., Paiswick, Gloucestershire, which I accidentally saw a few days since in the *Veterinarian* for May, 1843, we find the following:—

“SIR,—Perceiving among the queries about the epidemic none specially directed to the possible influence of impure food, such as mildewed turnips or grass, smutty straw, or mouldy hay, I am induced to call the attention of the Veterinary Committee to the similarity of some of the symptoms to those caused by ergot of rye, as noticed by Professor Henslow on the diseases of wheat. The

ulcers on the feet and tongue being common to both, and the feet sloughing off in one case, and the hoofs in the other, are coincidences leading to the suspicion of similarity of cause. We have also the general prevalence during the last two years, in many parts of the country, of MILDEW IN ITS SEVERAL VARIETIES, with the large quantities of *damaged hay, straw, and grain*—facts to be traced to the extraordinary wet summer of 1839.”

Now be it remembered, that at the time this letter was written, the discovery of ergot among grasses was not known in this country, or at least was not generally known; so that this gentleman, not being aware of the circumstance, is yet at a loss how to account for such appearances presenting themselves in animals which were never fed on rye; but the great similarity of the disease with that occurring in the human being, as described by Professor Henslow, strikes him, and he endeavoured to account for it as well as he could; had he known that ergot had been discovered in pasture grasses, it would be easy enough. He then attributes to the effects of “*mildew, smutty straw, mouldy hay, and damaged grasses*” the occurrence of this disease; but in another part he quite unconsciously points to it as “*mildew in its several varieties*,” as one of which ergot was erroneously considered to be, until attention was more directly called to this singular production. Where there is the slightest tendency to inflammatory affections of whatever kind, I have no doubt that ergot serves to excite what may otherwise lie dormant or pass away. We know that particular classes of medicines produce particular effects, though why or how they do so is still matter of physiological argument, and not easily accounted for; for instance, digitalis, hydrocyanic acid, and medicines of that class, lower the action of the heart; opium and its preparations possess narcotic properties; belladonna causes the pupil of the eye to dilate; mercury acts on the glandular system; and is it too much to suppose that ergot may also possess some peculiar property of its own, which time and experiment can alone discover, of predisposing to inflammatory affections of the lungs, &c. &c.? or might it not effect some chemical change in the corpuscles of the blood? Gaspard, in a series of experiments, instituted for the purpose of trying the effects of different medicines mixed with the blood, states of the ergot:—

“1½ oz. of concentrated decoction of ergot was injected into the jugular vein of a dog. Soon afterwards the following symptoms made their appearance: loss of appetite, general uneasiness, plaintive cries, debilitated walk, evident dragging of the posterior extremities, then painful vomiting, and some hours afterwards difficult breathing, with feverish pulse. Next day, had scarcely recovered, when a fresh injection was followed by great pulmonary embarrassment, renewed difficulty of breathing, loss

of power of walking or standing, stupor, intermingled by cries and painful struggles; continual suffering for nine hours, then bilious vomiting; lastly, hiccough and death, thirty hours after the first injection. On examination after death, *the lungs were found studded with small round black patches, gangrenous and soft to the touch, and two black patches on the mucous membrane of the stomach.*"

The action of ergot is, indisputably, on the nervous system, through the circulation; therefore the organs which are most highly supplied with nerves would be the most likely to be affected. In my last article I assigned as a reason for its action on the womb, the "highly nervous structure of that organ," and its being more particularly susceptible when pregnant; the lungs are also well supplied with nerves, and rank next. Where the effects of the ergot, in the case of the dog which I have just mentioned, had such a marked tendency to the lungs, as to cause—through the circulation—gangrene of those organs in the short space of thirty hours from its first administration, would it not be more likely to produce similar effects, though in a more gradual manner, by its continued use in grasses, or any other food in which it may happen to be; and that a tendency to disease being thus set up, abortion and pleuro-pneumonia would follow as a natural result? The post mortem appearances, on examination of a cow which has died in the very advanced stage of pleuro-pneumonia, bear a strong analogy to those I have quoted of the dog; *the lungs being generally found studded with similar black gangrenous patches, with engorgement of their tissues, and soft to the touch; friable, with a quantity of mucus, pus, and blood distributed through their substances; these additional appearances may be ascribed to the more gradual development of the disease in the cow, and the greater length of time which the animal has lived under it. The mucous membrane of the stomach is in general found to partake somewhat in it, as similar black patches will most probably be found here and there through its extent. From what apparently trifling causes diseases sometimes arise, may be inferred from the following, taken from an article on the Distemper in Cattle, by Mr. John Relph:—*

"A very instructive history of a disease that occurred among sheep in the environs of Pesh, in Hungary, is given by Raspail, in the 9th vol. *Med. Times*, p. 158: the disease attacked the flocks at pasture, and set at nought the attempts of veterinary surgeons and learned commissions to discover its nature and impede its progress, until at length it was found to be of mechanical origin; the spiculae of a plant that abounded in the locality penetrated the skin of the sheep, and produced extensive and complicated constitutional derangement and death."

If we look closely into the history of pleuro-pneumonia since its first appearance, we shall find, where it occurs during dry weather, or among stall-fed cattle—and in these it is far less poignant, be it remembered, than in cattle at pasture—that the preceding season has been "extraordinarily wet" (as remarked before, in the extract from Mr. Wyatt's letter), or that the cattle have been *previously pastured* on such lands as I have described; and if fed on hay, the produce perhaps of the previous wet season, and in all probability rank and coarse, such as is usually grown on marshy land, on examination among the seeds, we may perhaps discover a number of small *black-looking GRAINS, curved, bearing a strong resemblance to the excrement of mice, for which it has not unfrequently been mistaken; this is ergot, as it is found in grasses.* It appears matter of surprise that the disease should very often break out under treatment and feeding, which seems the least likely for its development, when in fact the cattle have been long since removed from such pastures as would be considered likely to promote it; but we must recollect that the germs of the disease may have been implanted weeks, nay months, before, in the system, and waits slumbering as it were for the first favourable opportunity, to spring forth into destructive activity, and all at once exhibits itself in its worst features; then where it devastates whole flocks, we perhaps assign to the effects of infection what we can no otherwise account for. That pleuro-pneumonia has been, or can be transmitted by contagion or infection, I cannot readily believe: it has been endeavoured to prove its contagious or infectious nature by analogy with cholera and fever; but the nature of these diseases is still a "*questio vexata*," not one whit more likely to be decided than it was years ago; and with regard to cholera, the balance of evidence is in favour of non-contagion; also with exanthematous, or eruptive diseases of the skin, attended with fever, such as measles, small-pox, scarlatina, &c.; but I cannot see how any comparison can be instituted between such and this disease. Whether dependent on vitiated food, atmospheric influence, or, in fact, whatever its exciting cause, it is only reasonable to suppose that that cause can equally produce many, where it has already produced one, and that the animals subject to the same influences would, *ceteris paribus*, equally suffer. But we must bear in mind, that animals possess a variety of constitutions as well as men; and some are better able to withstand the attacks of disease than others; while some, from even a peculiarity of conformation, such as narrow contracted chests, &c., are more predisposed to it: among these it will be more frequently met with

than those of greater breadth of chest. The symptoms and appearances of pleuro-pneumonia have been so often described, and are besides, I am sorry to say, so well understood from experience by the stock-owners and farmers of this kingdom, that it is almost superfluous to dwell on it; however, I shall say a few words: its approaches are more gradual than is generally supposed; it first begins with slight bronchial irritation, which causes the animal to cough now and then, but not so frequently as to attract attention, the cowherd perhaps imagining that something may have got into the windpipe which causes the cough. This goes on for two or three days, the cough increasing in frequency, until at length attention is drawn to its continuance; the animal falls off somewhat in her feeding, but not perhaps until the disease has made some progress does this excite remark, when she is observed to fall suddenly off; then, and not till then, is it supposed that anything serious is the matter; and on closer observation, the breathing is found shorter, quicker, and more hurried than usual; there is an appearance of anxiety and general uneasiness about her, which they are surprised at not having noticed before; the walk is debilitated, and there is a dragging of the hind quarters, and sometimes a degree of giddiness and vertigo; she makes but a partial inspiration, and the head is turned anxiously towards the flanks, which are observed to heave very much, as, to avoid the pain, the breathing is partly carried on by the abdominal muscles, the disease in such instances having included the diaphragm. On striking the sides of the chest with the fingers, the animal evinces symptoms of great pain, at the same time giving the peculiar "short dry cough;" the breathing gradually becomes more and more laboured as the disease advances, and as the blood becomes more vitiated and poisoned; the carbon, in consequence of the impeded respiration, being no longer eliminated freely as before, the blood being only partially arterialized, supplies an impoverished current to the system. If both lungs are much engaged, the animal will not readily lie down, as by its own weight pressing on the chest in the recumbent position, it lessens the capacity of the thoracic cavity, and diminishes the space required for respiration, and of course increases the difficulty of breathing; this is what is termed the congestive stage; the pulse will be found sharp, quick, and wiry, imparting to the finger that peculiar sensation experienced on pressing the vibrating string of a musical instrument; with this indication, and the short, laboured breathing, the course is plain enough.

TREATMENT.

Bleeding is here called for, the object of which is

to produce on the system as great an effect as possible with as smaⁿ a loss—how is this to be done? The greater the quantity of blood abstracted in a given time, so much better will be the effect; or, in other words, *the quicker it flows the better*: as a smaⁿ quantity taken quickly will be of more service than a much greater taken slowly, or by repeated bleedings. To produce this let the veins at each side of the neck be opened *together*, so that the *flow of blood will proceed from both at the same time*; the effects desired will be thus produced with the smallest possible amount of loss of blood, and consequently with the least expenditure of strength; which in these cases is a very material point, as every portion should be husbanded with the greatest care. The strong impulse of the heart is arrested, and the pulse will be found, by its rapid failing, to indicate the powerful influence on the system, of the sudden depletion induced by the double current.

The *repeated* bleedings resorted to in pleuro-pneumonia are of themselves quite sufficient to bring on the very symptoms they are intended to remove, as the result of experience has fully proved.

In human practice, the ruinous consequences of wholesale blood-letting on the constitution, has long since caused to be exploded that indiscriminate Sangrado system, except in particular cases.

As to quantity, the age, strength, and apparent effects will be the best criterion; but avoid the too common mistake, that a fat animal will bear the loss of more blood than one not in quite such condition; the contrary is the case: and remember that the abstraction of blood is very easy, but it is very difficult to restore it; and also that an animal has need of its stamina to get through the disease; so that we must not needlessly expend its strength. Due discretion must always temper the use of the lancet, the motto of which is very appropriately "*nec temere, nec timide*." While on the subject of bleeding I cannot do better than call attention to the following remarks on that subject by Mr. E. Friend, V. S. Walsall, (copied from the "Veterinarian" for 1841):

"In an extensive and successful practice, I have very rarely indeed bled *twice* for any one case of whatever kind, and *never thrice* for many years; and I attribute my success principally to the extreme caution I have adopted in the use of the lancet. Let us just glance at a case of *diseased lungs*, where *bleeding, bleeding, bleeding*, has generally been held to be the sheet-anchor. In the *early part of the attack*, where *congestion is the leading symptom*, the practical man will avail himself of the advantages of venesection, to an extent of which he and he alone will be able to appreciate the benefit,

Probably on his succeeding visits he will find the inflammation extending to serous or mucous membranes,* or it will present indications of having assumed a typhoid character; or it may be going on to effusion. It matters not: let the owner have been once convinced that the disease is one of inflammation, and evidently not progressing to convalescence, and he will assuredly urge you to bleed: you will be told, perhaps, that the animal is breathing hard, that the pulse is too rapid. I would never bleed after the first time, for these reasons Without there were other indications sufficient to convince me of its absolute necessity. I have seen some instances, where, instead of bleeding, I have found that these symptoms counter-indicated venesection,—*too much has already been abstracted*,—the animal was partially destroyed, the blood was hurried through its vessels by an extra effort of nature, the abdominal muscles were called on for an extra exercise of their powers, amounting sometimes to spasmodic action; and all this, the effects of animal weakness; for instance, you will have all these symptoms occurring after internal hæmorrhage.”

Directly the animal has been bled, cover her up with blankets or horse cloths; and if the bowels are at all confined, give, *before bleeding*, a pint of castor oil, and repeat it every *four* hours till they are moved, drenching occasionally with a little warm bran and water, or thin gruel, avoiding all drinks of a stimulating kind, with ginger, or such things, as they are at this stage highly injurious, only serving to add fresh fuel to the disease. Castor oil is, for many reasons, far preferable to any drastic purgatives, such as Epsom salts, Glauber salts, aloes, farina of croton-nut or croton oil, as beside clearing the bowels without producing any weakening effect, its use is not so likely to be followed by that wasting and troublesome diarrhœa accompanying this disease, and very frequently caused by the injudicious use of purgatives which excite much irritation of the mucous membrane of the bowels; in fact, this diarrhœa is another of the chief causes of the animal's rapid sinking into the typhoid state. Another advantage which castor oil possesses, it is partly a demulcent, and whether it affects the bowels or not, will do no harm by remaining, which is more than can be said of croton oil, &c. If the second dose of castor oil has not the desired effect in [three hours after it has been given, let the animal have a good injection of warm

water, with a pint of linseed oil, every two hours, until the costiveness gives way. With regard to blisters, there are many opinions on the subject, some asserting that they set up too much irritation. This is precisely the end we wish to attain, as the internal irritation cannot exist to the same extent if we produce a severe external inflammation; or, in other words, we cannot have two fires burning so fiercely, as one which would have the material for the two to supply its flame. The blood-vessels of the external part of the chest will bring a larger supply to that part, and must thereby somewhat diminish the excessive congestion of the lungs. I am decidedly in favour of blisters in the early stage, while others prefer them in the latter stages; though what good they can then do, except in increasing the already too weakening hectic fever, I am not aware. To be effective on the thick hide of a cow the blister must be made stronger than ordinary; the following formula will, I think, be found to answer the intention:

- Fresh powdered Cantharides, 1 oz.*
- „ *Hog's lard, 2 oz.*
- „ *Common turpentine, 1½ oz.*
- „ *Strong sulphuric acid, 1½ oz. by weight.*

Mix the hog's lard and turpentine first, then add the sulphuric acid gradually, and lastly mix the cantharides; to be used almost directly after being made. Let the hair be clipped as closely as possible off the sides and front of the chest: let it be then well fomented with hot water, after which a fomentation of warm spirits of turpentine must be used for a quarter of an hour; and lastly, let the blister be well rubbed in by means of a pad of flannel soaked in it. If one application does not suffice, it must be repeated in, by eight hours. When the blistered surface begins to discharge, it would be well to lay over it a large poultice of boiled turnips; this will be rather awkward to arrange; but it can be done by means of straps round the body, met by a kind of martingale which may be made to go round the neck, then between the forelegs, and fastened to the straps encircling the body. The poultice to be changed four times a day. As soon as the bowels are relieved, in order to follow up the impression already produced on the system by the bleeding, and to prevent the recurrence of a necessity for a repetition of that remedy, the most suitable medicines would be those which combine diaphoretic and sedative, with alterative properties, avoiding those which exert such an influence over the action of the heart, as to leave it doubtful whether, in their administration, they do not exert the most pernicious influence by so far weakening or partially paralyzing the impulse of that organ, as to depress the system beyond the power of reaction; I allude to hydrocyanic acid,

* The pleuræ pericardium, and peritoneum, or sac, reflected over the intestines, are serous membranes; the stomach and intestines, as well as the internal lining of the lungs, mouth, throat, &c., are mucous membranes.

digitalis, and medicines whose action is principally on the heart. To produce the effect which would be of benefit, the following formula will, perhaps, be found the most suitable :

Calomel, 1 drachm (60 grains).
Tartar emetic, 2 drachms (120 grains).
Nitrate of potass, 3 drachms.
Powdered opium, 20 grains.

Mix them together for one dose, and give one such every four hours, in a little treacle or something of that consistence, as the calomel from its greater specific gravity would sink in any fluid. While on this subject I cannot avoid remarking the preposterously small doses of these medicines sometimes given to cattle, whether as a purgative, or in order to affect the system in acute diseases. I have seen calomel ordered in doses of 12 grains night and morning, or every 12 hours, with intent to produce ptyalism (salivation). Why the same quantity would, for the same purpose, be given to a man within that space of time, at the rate of four grains every three hours, which just makes 12 grains in 12 hours : what possible good could be expected from such doses? It may be alleged that it would purge in larger doses ; and even if so, the addition of a small quantity of opium would check its tendency to run off by the bowels. The great mistake with regard to cattle medicines generally, appears to me, that the doses of some of the principal medicines are so small as to be worse than useless ; there being actually a great loss of time, when every minute is a question of life or death. Either medicine is necessary, or it is not : if not, why give it ? and if necessary, why waste time on homœopathic doses which can possibly do no good, but by the delay give time for the disease to take firm hold, when by more active treatment it might be subdued? If the treatment above suggested be properly followed up, during the congestive stage, before suppuration or the typhoid symptoms set in, pleuro-pneumonia will not be found the unmanageable disease which it has hitherto proved : in fact, like cholera, it is only dangerous when not checked in the primary stage ; but unfortunately the disease is allowed to proceed until it has already made fearful inroads on the constitution, and the chances are that some ignorant cowherd is allowed to treat it, until typhoid symptoms have shown themselves, and the animal may be considered as lost : if blood be then taken, it only hurries on the fatal termination ; the blood, when drawn, will be found to present a black, sluggish appearance ; but on remaining some time exposed to the air in an open vessel, it parts with its carbon, and attracts oxygen from the atmosphere, which renders it red and florid, exhibiting the phenomenon which takes place on its passage through the lungs.

The relative difference between the treatment of any disease in man and the lower animals, consists in its being, as it is called, more "heroically treated" in the latter. In pleuro-pneumonia, however, the reverse appears to be the case : except in bleeding and *heroically re-bleeding* (the good effect of which is, to say the least of it, very questionable), there is nothing else deserving the name of active treatment resorted to ; while in man, the propriety of the measures adopted is fully borne out by the results. In bleeding, care must be taken not to confound the inflammatory pulse with one with which, I fear, it has been too often confounded, viz. the pulse of debility, arising from a very advanced condition of the disease ; it presents many characteristic appearances, which require some experience to distinguish from the other ; if this mistake be made, it can be followed but by the one result. The pulse by itself can never be taken as a true indication of the progress of disease, so many things may concur in altering its character temporarily. Now with regard to the farther treatment, let the animal have drinks of oatmeal and water ; let the calomel powders be given as previously directed, either until the urgency of the symptoms shall have abated, or until the calomel shall have affected the system ; this may be known by the peculiar factor which mercury causes on the breath—no one who has once observed it can ever mistake it—or by a small margin on the part of the gum surrounding the teeth, which will be observed red, tender, and spongy. If the symptoms do not diminish in severity, the medicine must be continued till either of these effects is produced, when it will be proper to lessen the dose to half a powder every eight hours, to keep up the action of it ; but if the mouth becomes very sore, it must be altogether discontinued, and the mouth washed three or four times a day with a solution of chloride of lime (in the proportion of half an ounce of chloride of lime to one pint of water), giving a quart of beer three times a day, with the usual oatmeal and water, or bran mash, and a powder every night, consisting of

Sulphur - - - 1 oz.
Nitre - - - ½ oz.—Mix.

The state of the bowels must be carefully attended to throughout ; if confined, give castor oil as before directed ; and if much relaxed, give

Catechu
Chalk—of each 1 oz.

three times a day, mixed with about one ounce of gum arabic dissolved in a pint of warm water. During convalescence, great care must be taken not to give improper food, nor to overfeed the

animal. Bran mashes, varied with a little green food occasionally, will be found perhaps the best; a little good hay also; and if the bowels get relaxed, give the catechu, &c.; The best tonic I know is sulphate of zinc, of which some balls might be made, or powders, whichever are most easily given.

Sulphate of zinc - 2 drachms.
Powder of Columba 2 drachms.
Powder of ginger - 1 drachm.—Mix.

Give one, night and morning: this might be made into balls with a little treacle. With regard to the different stages of hepatization, which signifies a solidification of the tissues of the lungs, either by inflammation of its substance, or by having the pleuræ which surround it filled with either pus or serum, so as to press on the lung, and prevent its expansion for the purposes of respiration, so that, when cut into, it presents much the appearance of a liver, hence its name. It will be merely necessary to remark, that the same mode of treatment suggested for congestion will be found the most suitable in this. In a paper such as this, intended for the guidance of the farmer alone, those nice distinctions in the different degrees of the disease cannot be minutely dwelt on, as they would rather serve to puzzle, being only suitable for the veterinary surgeon, who, it is to be hoped, does not need this for his guidance. Of the stethoscope I have not spoken either, as it can be of no use except in the hands of a man who would devote some years to the study of it, and of the use of which he could get no information from a short article like the present.

I have not yet spoken of the suppurative, or more advanced stage of the disease, about which it will be necessary to say a few words. If suppuration, or bursting of the abscesses which form within the lungs, has taken place, or effusion into the cavity of the pleuræ, the extent may be inferred by the breathing being so much more laboured as to give the idea of the animal being asphyxiated from want of breath, the pulse small, quick, and intermittent; if pressed under the finger with any degree of strength, it will not be perceptible; the breath is cold, and of a very offensive odour. When things have come to this point, there is little or no chance; however, the treatment is altogether different; bleeding and blistering are both inadmissible; let the calomel powders be given as first directed, omitting the tartar emetic; and give every three hours a quart of beer, with an ounce and a half of camphorated spirit of wine in it. Should the animal

ultimately recover, there will be, in all probability, such organic lesion of the lungs and pleuræ, that either pulmonary consumption or empyema will follow. Empyema signifies a collection of purulent matter within the cavity of the pleuræ; it generally occurs after inflammation of these membranes; in the treatment of this, the same powders will answer, but *each powder must be divided into three doses*, one of which may be given night and morning. It will be seen how much smaller the dose of calomel ordered in this is, and given only night and morning, instead of every four hours; the reason of which is, this is a chronic disease, while the other is what is called an acute one; the difference in the treatment being, an acute disease calls for very active treatment, while a chronic does not; the effects required must be more gradual, and salivation is not desirable. Iodine, with iodide of potass, has been recommended in the first stage of pleuro-pneumonia; but the only results likely to be arrived at from its exhibition then would be an aggravation of all the symptoms; and even if it did not do so, it is far too slow in its action on the absorbent system to be of any use in a disease which runs its course in such a short time; it would be decidedly of value in the treatment of empyema, given in about the proportion of

Iodine - - - - 30 grains.
Iodide of potass - 40 grains.

Mixed in a pint of water.

It must first be mixed in a teaspoonful or two of water, or it will not dissolve, as the iodide of potass in a small quantity of water renders iodine soluble. While giving the iodine or the calomel in empyema, the following ointment will be found to assist their action—

Iodine - - - - 1½ drachms.
Iodide of potass - 1 drachm.

Water, a few drops.

Rub together in a mortar till the iodine is dissolved, then add—

Strong mercurial ointment 3 oz.
Camphor - - - - ¼ oz.—Mix.

The hair need not be removed for using this; it may be rubbed over the chest every night, and will cause a kind of exudation from its surface, which may be kept up by occasional applications.

FURTHER REMARKS ON THE DISEASED GRASSES AS THE CAUSE OF ABORTION AND DISEASE IN COWS, SHEEP, &c.

BY D. P. MACLEAN.

Since writing my last paper on this subject I have reflected a little more on it, and examined what literature I could command on those diseases of cattle and sheep to which I have before referred, and am now convinced of the truth and importance of the ergot being the most fruitful cause of disease amongst stock. In consequence of this conviction I am induced to give a few further remarks in continuation of the subject.

I observe in the December number of the magazine that Mr. Jones has taken up the matter warmly, and I am glad that he has more clearly pointed out my object. In the paper I make no discovery, for Henslow, Keith, Balfour, and various other authors, have observed the disease on the grasses, consequently I could claim no originality in that. My paper was to bring to the test of experience my views regarding the effects of ergot, viz., *that the ergot is the cause of a great majority of the abortions that take place amongst cattle, of pleuro-pneumonia, and several other diseases prevalent amongst cattle, sheep, &c.*

In referring to Mr. Jones's paper, I must thank him for his able support of the subject, especially in reporting the administration of ergot in the delivery of cattle.

As I stated formerly, the views held by different authors regarding ergot have been very various, and yet it seems a doubtful point whether it is an altered state of the ovary, actually a fungus, or a modification of the grain caused by the fungus. Professor Balfour seems to hold the latter opinion. He writes—"A diseased state of rye and other grasses, called ergot, owes its production to the presence of a species of Spermædia. By the action of the fungus the ovary becomes diseased and altered in its appearance, so as to be dark coloured, and project from the chaff in the form of a spur. The nutritious part of the grain is destroyed, and it acquires certain qualities of an injurious nature. And again in another place he repeats it plainer—"The grains of rye and other grains are liable to a disease called ergot, depending on the attack of a fungus, which alters the texture of the ovary, and makes it assume an elongated spurred form."* Professor Henslow seems inclined to give the weight of his name to Mr. Bauer's theory of its

being "a monstrous development of the seed of corn and other species of the grass tribe," objecting, as the Professor conceives rightly, "to the idea of its being produced by the action of a certain minute fungus, which is found equally on plants not producing the ergot as on those that do so."* Against this theory, besides what I stated formerly, I must place the experiment of Quekett, who "found that he could propagate the ergot by mixing the sporules with water, and applying this to the roots."†

I am inclined to believe that the disease is a fungus itself, but certainly it is at least fungoid in its origin. I intend, however, instituting some experiments to set this at rest, if I can; and also to discover some method of prevention or cure. Meantime I will leave this controversial point, and direct attention to the importance of statistics in settling the question of the ergot being the cause of disease.

In none of the works that I have access to are there statistics of any importance as to the fatality amongst flocks and herds, and all that I can arrive at is, that pleuro-pneumonia is the most ordinary cause of death amongst cattle, and rot the most frequent in sheep; that those diseases have been most prevalent in damp or marshy situations, wet seasons, or after thick foggy weather. I find also that abortion, slinking, or calf-picking, has been most prevalent in the same situations, and the same seasons and weather; also that abortion, pleuro-pneumonia, rot, &c., have been most general in the autumn, with a marked increase and decrease beginning about May or June, gradually increasing till September or October, then diminishing towards midwinter, and localities where they prevail throughout the winter are those where pasturage is had even in that inclement season.

"According to Mr. Youatt, one-tenth of all the lambs and sheep of our island die annually of disease; of cattle, one-fifteenth of their number die annually by inflammatory fever and milk fever, redwater, hoose, and diarrhoea. If, therefore, one-fifteenth of all the cattle of England are annually lost by disease, more than £5,000,000 worth of

* See Professor Henslow's paper on the "Diseases of Wheat," in the "Journal of the Royal Agricultural Society of England," vol. ii., part 1st, 1841.

† See Balfour's "Manual of Botany," p. 333.

* See Balfour's "Manual of Botany," pp. 333 and 541.

cattle perish every year, and with these also die of disease about £3,500,000 worth of sheep.* In the same article, with the above extract, I find the cause of death in 118 cows reported from the records of medical men, and that 72 of that number died of pleuro-pneumonia. It is to be regretted that there is no further report on this subject, as the six months during which these cases are reported are the ones most likely to have the mortality from fungus taint, being from beginning of May to beginning of November. In consequence of what may be considered the increased mortality of the above six months, I will for calculation take one-half as the proportion of mortality for pleuro-pneumonia. This would make the annual loss from that disease alone £2,500,000, or, taking Maculloch's estimate of the number of cattle in Great Britain, viz., 5,100,000, take a fifteenth of that as the annual mortality, and again take one-half of that fifteenth as the average mortality from pleuro-pneumonia, and we find 170,000 head of cattle cut off annually by that disease.

Regarding the frequency of abortion we have no statistics, except of particular herds, which we may consider particularly favoured ones. Earl Spencer estimated them as one in ten in his herd, but he mentions that "if he thought that the observations which he had made would apply to cattle generally, as well as they appear to have done to his own herd, he should think them of considerable use; but he did not think this was likely to be the case."† Although it must be considered a low estimate for the whole country, yet if we calculate the number of calf-bearing beasts to be a tenth of the heads of cattle in Great Britain, or 510,000, and take a tenth of it, according to Earl Spencer's average, as the number of abortions, we have 51,000 calves lost annually. This is a very low average, and I have no doubt that in many districts the abortions bear a much higher ratio.

These are not the only points that require further statistics for their elucidation; we require to know the years and months in which abortion, pleuro-pneumonia, and rot have been most prevalent; whether they have been together or separate in their attacks; a table of the weather for those years, and the nature of the soil and subsoil in the affected localities; likewise the extent of drainage, and the varieties of grass grown.

The classes that are most likely to be able to give us the required information have hitherto been too much engaged with affairs apparently more use-

ful. I say apparently more useful, as I consider that this subject is equal in importance with any operation of the farm, if we look to the immense saving that would be effected by the removal or even the diminution of the mortality from these diseases. But now that attention has been drawn to this subject, I trust that ere long a mass of evidence will be brought to bear on it, that will remove all doubt as to the extent of this ergot influence on cattle, sheep, &c. And to the farmer, grazier, veterinarian, and last, not least, the Cattle Insurance Companies, must we look for facts. It cannot be done by one or two, but it must be the observation and experience of many that will prove or negative these views.

Although we have little direct evidence of the effect of ergot in producing disease amongst cattle, yet, on looking over reports regarding pleuro pneumonia, we find many facts regarding it difficult of explanation, otherwise than by ergotism, as the poisoning with the fungus is called. In a paper on this disease, by Professor Simonds,* he traces its history, and that of allied epizoots; but in extracting from it, I will only mention the most important points. He says that "in 810 they had it recorded that all the cattle in Charlemagne's dominions—that is, Germany—were swept off," and "in 1509 there was a recurrence of these outbreaks. In 1693 *pulmonary phthisis destroyed all the cattle in Hesse, and vegetables were said to have been affected with the red-rust, which was supposed to be originally the cause.* In 1713 Rome and its neighbourhood suffered to an extraordinary extent. 30,000 cattle died in nine months, of malignant dysentery, with tumours and ulcers on the body." Passing over various other epizoots, "in 1735 Dr. Barker described one prevailing," which is undoubtedly the same as pleuro-pneumonia.

Professor Simonds seems to think it is contagious, as it spreads from place to place; but in the same article he acknowledges that "it was true that animals had been attacked with the disease when no diseased animals had been in the neighbourhood." Mr. Finlay Dun, in a prize essay on this disease, mentions that the "disease raged in Ireland for some time before it made its appearance in Great Britain. But whether it was imported thither from the continent, or arose spontaneously, has not yet been ascertained;† and when treating of the cause of it, he states, "It is, however, unfortunate that the causes of pleuro-pneumonia have not yet been satisfactorily ascertained. No department of

* See a paper in "Farmer's Magazine" for February, 1845, by C. W. Johnson, Esq.

† See paper by Earl Spencer, in "Journal of the Royal Agricultural Society of England," vol. ii., part 1st, 1841.

* See the "Farmers' Magazine" for August, 1849.

† See the "Journal of Agriculture" of the Highland and Agricultural Society of Scotland, July, 1849.

the history of the disease is less understood, or more involved in doubt and obscurity." When advocating the theory of contagion, "as producing many cases of it," he says: "Still it is very generally asserted that there must be other *exciting causes* at work capable of generating it, independently of contagion. But if this be so, none of the many theories adduced to account for its exciting causes seem fully to explain its phenomena, and as yet no one cause has been brought forward to the sole operation of which the disease can be satisfactorily referred." After mentioning and combating the various theories of its being impurities or changes in the air, as sulphuretted hydrogen, seleniuretted hydrogen, carburetted hydrogen, ozone, infusoria, electricity, miasmata, &c., he goes on to observe, that "from his preceding statements and inferences, he thinks we are warranted in saying that there has not yet been found among the constituents of the atmosphere, in meteorological changes, or in the products of the earth, an adequate and satisfactory cause to account for the existence of the majority of epizootic diseases." Proceeding further, he denies that food can have anything to do with it, although he expressly states that, "*cattle at pasture seem to be peculiarly liable to its attacks, and the disease among them is still more severe and destructive than in the case of stall-tied animals*;" and again, "many of the first cases that occurred in this island were in *low damp* situations." Lastly, in the closing of his essay, he states that "pleuro-pneumonia seems to result from a modification of the same causes as induce other epidemic or epizootic diseases.* Whatever the other exciting causes may be, contagion is certainly the principal one. Of the many other alleged causes, none possess all the essential characteristics of an exciting cause: some are not uniformly present, and do not constantly precede the disease; while the operation of others is inadequate to produce the effects imputed to them; and therefore, although they may possess some of the properties which characterise exciting causes, they do not exhibit all the characteristics, and consequently are not entitled to be considered as the efficient causes of any epidemic or epizootic disease."

In fact, all writers seem to be of different opinions as to the cause or causes of this disease; and even the two above quoted, although advocating con-

tagion, acknowledge that it does not explain all the cases that occur. So, applying the above sound reasoning of Mr. Finlay Dun to it, it must also be considered a doubtful cause.

I will now give the facts which seem to point to the ergot being the cause of the disease; but first I must mention the localities, states of the atmosphere, and time of the year when and where ergot is likely to be found. It, like most of its class, luxuriates in moisture; it is to be found on roadsides, commons, low boggy or marshy tracts; higher lands, with clay bottom, if ill-drained; and even on the driest fields, if foggy or wet weather prevails; but more in such situations if closed in with plantations, where it will be *very frequently* found; and, lastly, more abundant on poor exhausted soil than on well-farmed land—yet this, I believe, is very exceptional. Such are the localities likely to foster this fungus. It will be most abundant in wet seasons, or alternations of wet and close weather, when the sun seems unable to break the clouds and dispel the vapour that broods over nature. It will mostly be found from the month of May, or even earlier, till the beginning of winter. And in a dry state I have no doubt it will be found on pastures even in mid-winter. It is not many days since I saw several dried stems with it, although this is December. Lastly, *it may be amongst the hay*.

The facts that lead to the suspicion of the ergot being the cause of it are: the insufficiency of any of the heretofore assigned causes, and the sufficiency of this. This will explain various of the phenomena that the others do not, and is not, on the other hand, deficient in the requirements of a cause. Contagion, which has so many advocates, is even by its supporters acknowledged to be insufficient to explain many of the cases that occur; and contagious diseases are considered *generally* to be spread by contagion alone, to require no other cause for their outbreak, and, as having existed uninterruptedly from the earliest ages, constantly moving from place to place, and country to country, as they find susceptible constitutions.

This disease has certainly spread from place to place, but with no greater rapidity than would be gained by the previous spread of the fungus. It has disappeared sometimes without any assigned cause, and broken out in other places without communication. It is acknowledged that in its history it has only shown itself at times, leaving immense gaps unfilled up by any chronicles of its ravages, when again it has broken out with virulence sufficient to sweep a whole nation's herds off, and in those countries chiefly known for the extent of their meadows or their marshes.

Professor Simonds states that this disease "might

* This seems to me nothing more than a tacit acknowledgment of the mystery that envelopes these diseases, without any attempt to clear it away. Like the Irish schoolmaster, who, when asked what nothing was, answered, "Troth, sure I'm not sartin; but ax me the reverse, your honour, and I'll answer something."

fairly be considered as a disease of the present generation." That, however, I think is very doubtful. I am rather of opinion that many of the epizootes described by authors may be classed with it; but I decidedly concur with the Professor in his statement "that the disease must have died, or become lost to us from some cause." Now, if a contagious disease, how or when did it originate? If a contagious disease, how are we to explain the opinion held by the Professor, that it must have died, and now appeared again? Let the contagionist explain these queries according to his theory. I will content myself with remarking, that, as of poisonous fungoid origin, it would explain how it arises; all that is necessary for that is the presence of the ergot on the herbage. With a uniformly dry season the ergot would diminish, and a succession of such seasons would reduce the quantity of affected grains so much as to exercise no influence on cattle, and the epizootic would disappear, only to come forth again by the influence of warm wet seasons again encouraging the extension of the fungus. Now have we nothing to confirm this? In Germany, where an epizootic of similar character has repeatedly appeared, the pastures are frequently marshy: irrigation in other places has long been practised, and large tracts are occasionally overflowed by the rivers. These are the very conditions likely to induce an abundant growth of the ergot. In Hesse the epizootic was ascribed to the prevalence of red rust (*Uredo rubigo*) on the vegetables. Red rust is a fungus of an allied family to the ergot; the same atmosphere and circumstances that induced the abundance of the one fungus would equally encourage the growth of the other. Rome, where 30,000 cattle died in nine months, is well-known to be surrounded with marsh. During the reign of, I think, Leo X. drainage was encouraged and carried on under papal edict, and a great improvement was observed in the health of man and beast; at his death, a gradual relapse to the old state of things occurred, and with it the same difference in health and number of population.

Ireland is blamed for introducing it into this country; her bogs have long been famous, and I fear they have been too encouraging to the ergot. But we have sufficient ill-drained land and marsh in our own island to produce abundance of the ergot, independently of the sister isle. It is stated that it was introduced from Ireland in the spring of 1841; but, on referring to the Report of the Epidemic among Cattle, drawn up by Professor Sewell, I find it there stated that it had not "prevailed extensively before 1840 in England." So we may suppose that Ireland has got more blame in this than is warranted by the circumstances.

As there is nothing in the history of former epi-

zootes to militate against this ergot theory, we may now take a glance at the disease as it now shows itself, and consider whether its appearances are incompatible with it, or, on the contrary, confirm it.

The disease is often observed to show itself in cattle lately driven to or from fairs and markets—hitherto held to be an argument in favour of contagion; but equally explained by the cattle snatching hasty mouthfuls of the affected grass as they go along the roads with empty stomachs, and consequently open to the effects of the poison: the roadsides, it must be remembered, are great favourers of the ergot. The disease has been observed to remain with particular farms, in defiance of fumigation, washing, and every other disinfecting means; this is surely to be explained in some other way than by contagion, and the ergot on the pastures or in the hay is fully equal to that explanation. It has been observed that "*cattle at pasture seem to be peculiarly liable to its attacks, and the disease among them still more severe and destructive than in stall-tied animals.*" This cannot be explained by contagion, but, on the contrary, is, in my opinion, an argument against it, and is fully explained only by the ergot. Some of the first cases were observed in low damp situations, these affording the earliest and most abundant growth of the fungus. It has generally been most severe in autumn, or at any rate it has been more general from May to October: this is the season when the fungus is growing on the pastures. It seems little amenable to treatment; a result to be expected, if we consider it a poison already pervading the body. It has been declared by Professor Simonds not to be an inflammation; and again by Mr. Dun not a fever: if neither fever nor inflammation, how should we find gangrene of the lungs or liver, &c., except as a result of poisoning with such an agent as ergot? The action of that fungus is peculiar; it has been proved by experiments on various animals; and we know of no other agent equally likely to be met with amongst the food of cattle, or in their habits or management sufficient to produce such widespread mischief.

I need not describe all the symptoms of pleuropneumonia: it will be sufficient here to mention a few prominent ones. It is a gradually progressive disease, not a sudden seizure. The animal appears dull, ceases ruminating, the breathing gradually quickens; if a milker, the milk is diminished, the udder hot and tender, the urine scanty and high coloured; the digestion becomes impaired; tenderness down the spine, "pain on percussion of the sides;" if a pregnant cow, abortion generally takes place. After death, the lungs are generally found "congested, black, easily broken up," with abscesses filled with pus; "sometimes the liver is entirely

disorganized." These are the very effects we would expect from the ergot, especially the disorganization of the lungs and liver; and in the symptoms I would especially mark as pointing to the same cause—the heat and pain of the udder, from the well-known effects of the ergot on the uterine system; also from the same I would remark the scantiness of the urine, the tenderness down the spine, and the fact of abortion taking place in the pregnant cow. Further, I would note here that in the murrain the hoofs become diseased and rot off: another effect to be expected from ergot.

I think these arguments are sufficient to show the very great probability there is of the ergot being the cause of this epizootic. It may possibly be questioned whether this cause will explain the frequency of the disease in towns. In Edinburgh, where it has been more fatal than any other town I believe, the quantity of forced grass used is very great. Around the city a great extent of meadow land is irrigated regularly so as to force the grass for stall-feeding, and I know the disease has been very prevalent in dairies using this forced grass.

Indeed, we require no other agent than such a fungus prevailing on the grass to produce all the mischief complained of by the feeder. Yet though holding this opinion regarding the influence of ergot, I am not prepared to assert that it is the sole cause of the disease. I have an idea that mildew (*Uredo linearis*), and possibly other fungi, may lend assistance; as we find that, in some instances, mouldy bread has caused poisoning.* In those seasons when ergot infests the grasses and grains, mildew will attack turnips, beans, peas, &c. This season both have been very prevalent. I know of many fields that have been quite spoiled by mildew, especially swedes.† The ergot also has been abundant in all this neighbourhood; and I may, in passing, remark that the observation of an intelligent farmer to a friend of mine the other day was strongly in favour of its presence constantly in wet seasons; he mentioned that "*abortion in cows* he had found was *always very prevalent after a bad hay season.*" In this quarter the hay season was indifferent; cutting was delayed until the seed was ripe; calf picking was and is exceedingly prevalent, and from two causes I think—the one the ergot, and

the other also the result of it but secondarily; I mean habit, for it is well-known that cows having aborted from any cause have always a tendency to pick afterwards, it becomes habitual.

Having thus given what may be a guide to observation in pleuro-pneumonia, I will now turn to another no less important disease, afflicting as useful an animal—the sheep; I mean the disease called the rot. I have here a simpler task, for I have it already acknowledged that damp meadows, cold clay lands, and ill drained fields, are the peculiar seats of the disease. That being granted, it is a lighter matter to convince that a fungus growing there will cause the disease, than that it is the mere presence of the moisture.

In an article on the drainage of land, by J. F. Burke,* it is mentioned that "stagnant water fills the sward with grasses of the coarsest character. It is, indeed, thought by many intelligent graziers, to engender an insect which spreads itself over marshy ground, and being then eaten by sheep along with the grass, is supposed to occasion the rot; and it is well known that if land which is irrigated be not also thoroughly drained, it will, when pastured, occasion that fatal malady." Dr. E. Harrison observes, "The connection between humidity and the rot is universally admitted by experienced graziers. And it is a matter of observation that since the brooks and rivulets in the county of Lincoln have been better managed, and the system of laying ground dry by open ditches and under draining has been more judiciously practised, the rot has become far less prevalent." He again states that "Mr. Harrison, of Fisherton, near Lincoln, has, by judicious management, laid the greater part of his farm completely dry, and is now little troubled with the rot, unless when he wishes to give it to some particular animals. His neighbours, who have been less provident, are still severe sufferers by it. Nor are their misfortunes confined to sheep alone. Pigs, cows, asses, horses, poultry, hares, and rabbits, become rotten in this lordship, and have flukes in their livers." And also that "the late Mr. Bakewell was of opinion, that *after May day* he could communicate the rot at pleasure, by flooding, and afterwards stocking his closes, while they were drenched and saturated with moisture."† In the same article with the above quotations, Dr. Harrison is again cited as warning the shepherd that after providing drained pasture and avoiding rotting places in the fields, all his care may be frustrated if he do not avoid with equal

* See "The Fungoid Theory of Cholera," in the *Farmer's Magazine* for November, 1849.

† Is not this another argument in favour of the substitution of the Kohl-rabi for turnips? I do not think it is so likely to be attacked by any blight or mildew. If the long droughts of the south are unable to affect it, and mildew in the north equally so, it requires little else to support its claims on the farmer's attention, as it will be equally palatable to stock, and contains as much nutriment as any turnip.

* See the "Journal of the Royal Agricultural Society of England," vol. ii., part 3, 1841.

† See "The Sanitary Effects of Land Draining," in the "Journal of the Royal Agricultural Society of England," vol. iv., part 1st, 1843.

care leading the sheep over wet and miry roads, with stagnant ditches, which are as pernicious as the places in the fields designated "rotting places;" and the following case is given, it seems so applicable for my purpose that I hope to be excused giving it entire. "A gentleman removed ninety sheep from a considerable distance to his own residence. On coming near to a bridge which is thrown over the Barling's river, one of the drove fell into a ditch and fractured its leg. The shepherd immediately took it in his arms to a neighbouring house, and set the limb. During this time, which did not occupy more than one hour, the remainder were left to graze in the ditches and lane. The flock were then driven home, and a month afterwards the other sheep joined its companions. The shepherd soon discovered that all had contracted the rot except the lame sheep, and as they were never separated on any other occasion, it is reasonable to conclude that the disorder was acquired by feeding in the road and ditch bottoms." A parallel instance is given by Henry Cleeve, in his essay on the diseases of sheep.* "A case that occurred in Devonshire, where an action was brought by a farmer, on the warranty of some sheep that died of the rot very speedily after his purchase. It was proved, however, that though the whole lot died but one, *that one* which had remained untainted had wounded its leg on its journey home, and was carried by the farmer in his cart, while the rest were allowed to graze on a common over which they were passing. This was urged and received as conclusive evidence, that the sheep were sound at the time of purchase, and became diseased from the accidental pasturage." He also gives another instance, where a gentleman exchanged rams with a neighbour residing ten miles off. The ram he parted with, in a few days *became diseased in common with all the flock he scurled*, while the exchanged ram, carried back in the same cart, lived many years untainted. He notices that "wet pasturage, as such, does not generate the disorder." And in remarking the peculiar exemption of Romney and the Essex marshes, he suggests that that exemption may be from their proximity to the sea. And lastly, in the conclusion of his remarks on the disease, he mentions "it is a matter of acknowledged experience, that the *sheep fed on salt marshes are not liable to the complaint.*"

Now, what is the result of these extracts? Do they not lead to the conclusion that it is not the wet ground alone, but that it is the ergot, which is almost certain to be there in warm weather?

Mr. Burke states that "although no irrigated

meadow can be said to be *quite safe* for sheep in autumn, they are yet *generally considered* to be free from danger in the spring." This is quite in consonance with my views, and indeed highly favourable to them, for it is from the time of the formation of the seeds in the grasses that the danger will be, as then the ergot will be gradually developed. In the paper from which I have made so many extracts already, it is mentioned that the rot is generally found to exist in May and June; and in a footnote by J. W. Childers, the months of September and October are stated to be those when it is more prevalent. These facts are confirmatory of the ergot influence.

Well, we find that wet alone does not produce the disease; that it is most prevalent after May; that it has been got by pasturing on a common, in ditches, road sides, fresh water marshes, irrigated meadows, close plantations. These are places where ergot will be both luxuriant and abundant. They are the fit nurseries for its growth; nay, the very name of the disease points to the ergot as the cause, being almost the only agent likely to produce gangrene or rot in any part of the body in an animal of the sheep's habits.

I will just glance at another disease amongst sheep, which I would ascribe to the same poison. It has, like the above disease, been referred to wet alone. I mean the foot rot. It generally prevails in the fall of the year. It is most common in small woody enclosures. It was observed that in the autumn of 1829 a flock of 700 ewes became affected without any assignable cause. They were cured; but 10 years after, in the autumn of 1839, it broke out again. Now the autumns of these years were very wet.* One of the most shocking and most constant symptoms of poisoning with ergot in the human species has been gangrene of the limbs, beginning at the fingers and toes. What is so likely then as that the same poison should cause this amongst sheep? Analogy is strongly in favour of such a view.

Having thus given a sketch of the diseases likely to be induced by ergot, with my reasons for believing so, I will now consider what agents promise relief. First of all, I must place thorough draining, more especially in springy land, or in land with clay bottom; next the removal of all spare hedges, as they afford a constant harbour for rank grass; and avoiding grazing and pasturing amongst woods or plantations.

As I stated before, I think steeps afford no protection. I have more faith in washes for grass land or top dressings. From the circumstance of

See the "Journal of the Royal Agricultural Society of England," vol. i., part 3, 1840.

* See foot-note to H. Cleeve's paper, before referred to.

salt marshes being free from the rot, I would infer that salt was adverse to the growth of the fungus, and consequently I would point to that as worthy of experiment, either applied as a top dressing or as a wash. Besides this, I think a wash containing hydro-sulphuret of calcium is worthy of a trial, from what I know of its effects in stopping mildew.*

Besides these hints I would again refer to what was said in my former paper regarding early hay cutting, and I am glad to extract from an article on this subject in the *Farmer's Magazine* for August, 1849. The writer says "the grass must not be permitted to stand until its seeds are formed, much less ripened." "All plants, on arriving at matu-

rity, have their starch and sugar and gum, in large quantities, converted into woody fibre; and as sugar and gum and starch are nutritive elements, it is desirable that these should be preserved, and hence the point for successful grass cutting is when they are in flower."

I must now close this paper; but in doing so, I would impress on the farmer the necessity, in these days, of using observation, as it is the surest way of advancement. He should carefully note and observe the phenomena that take place in nature, and apply his reason to elucidate such, and where his own unaided powers are insufficient, consult others of more extended knowledge in natural science.†

BOCHARA CLOVER.—POTATO DISEASE.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

SIR,—In the spring of last year I received, per letter, from Van Diemen's Land, a small quantity of Bochara clover seed, the produce of some sent from India by Sir George Arthur to one of his personal friends in that distant colony; and, as the result of my experiment in the growth thereof is somewhat surprising, I am induced to send the following remarks, which, if you think them worthy of insertion in your valuable Journal, will probably interest some of your numerous agricultural friends.

The seed was sown in three drills, covering a space not more than three square yards, in ground richly manured the previous year. It was late in vegetating, but soon after this, shoots sprung up rapidly, looked clean and healthy, and eventually attained the height of four feet four inches without flowering. Winter coming on of course stayed further growth. The dead stalks, which at the root were very thick and nearly as hard as wood, stood all winter, but early this last spring I cut them down; fresh shoots soon sprung up, of much stronger growth than the former, and, according to measurement the beginning of last month, reached the extraordinary height of ten feet five inches. The last five feet mounted very rapidly. The

clover produced a beautiful white flower, and the seed was perfectly formed, most of which I gathered in a ripe state. I must mention that the soil in which it was grown consists of black earth, with a slight mixture of sand, having a substratum of sand and gravel; also that the situation is very elevated, bearing a south aspect, but only partially sheltered from the north.

Reasoning from this experiment, I venture to suggest the cultivation of Bochara clover in this country as a green crop for feeding cattle, providing it can be grown successfully on a large scale, more especially as I understand it contains much saccharine matter. It might be cut three or four times each season.

Before concluding I take the liberty of making a few remarks upon another subject. Being in Van Diemen's Land in the year 1846, and there hearing of the extraordinary failure of the potato crops in this country, I thought it worth the experiment, on my return home the following year, to bring a large hamper of colonial potatoes, naturally thinking that from so pure a stock I should certainly be able to raise a sound crop, more especially as no similar disease had exhibited itself in that colony. I reached England the end of May the same year, and early the following month these potatoes, comprising five varieties, almost as fresh looking and firm as when packed, were planted whole, in new ground, and in due time sent their tubers upwards, looking healthy; but, as they approached maturity, the marked premonitor of disease appeared, and on the crop being dug up, full one half the potatoes were infected, being a greater proportion of bad ones than those produced from many English varieties grown the same year and in the same field,

* This wash may be cheaply obtained by throwing fresh gas-lime into water, when a considerable quantity of the hydro-sulphuret will be found in solution.

† The following is a list of the principal grasses on which the ergot has been found, viz., *Lolium perenne* and *arvense* (rye grass), *Festuca pratensis* (fescue grass), *Phleum pratense* (timothy grass), *Dactylis glomerata* (cock's-foot grass), *Anthoxanthum odoratum* (sweet vernal grass), *Phalaris canariensis* (canary grass), and *arundinacea*, &c.

The only difference was, the latter were planted a little earlier.

As another experiment, I also brought from Van Diemen's Land some seed from the potato crab, which I sowed in a hot-bed the same year; but disease made its appearance amongst these also.

Last year the sound potatoes from both sorts were selected and planted at the usual time, and the result was the crops were more diseased that year than the former one. I tried them again this year, and the result has proved similar. I may mention that those potatoes which were taken up sound continue so all through the winter. The soil in which they were grown was only slightly manured, and has a substratum of sand and gravel.

Judging from these experiments, may we not reasonably suppose that the state of the atmosphere has much more to do with this mysterious disease than most people imagine? But, from such facts as above stated, I leave it for you and others, better able than myself, to form probable conclusions.

I remain, Sir,

Yours, very respectfully,

T. MOORE.

Hillcot, Sharples, Bolton-le-Moors.

Nov. 16th, 1849.

P.S.—A letter just received from Australia informs me that the potato crops out there are as yet perfectly free from disease.

HINCKLEY AGRICULTURAL SOCIETY.

The usual Monthly Meeting was held at the George Hotel, on Monday, May 7th, 1849.

C. D. BRETON, of Elmsthorpe, having been called to the chair, announced that the subject for discussion was "The Breeding, Rearing, and Fattening of Cattle;" and called upon Mr. Francis Spencer, of Wibtoft, to state his views on the subject.

Mr. SPENCER then came forward and said: Mr. Chairman and Gentlemen—In opening this discussion I beg to state that I have undertaken it more from a sense of duty than from the slightest presumption to any qualification. It is well known to most of you that I have had some experience in the breeding and feeding of stock, but, like other young men, I am sorry to say I have not devoted that assiduous attention which is so essentially requisite; but what little practical knowledge I have attained, I have great pleasure in laying before you, to further the objects of this society; at the same time I hope it will be the means of inducing other members, more capable than myself, to come forward and diffuse their knowledge, ideas, and experience, on this and other important subjects connected with agriculture, in the same spirit as I have done. I think, gentlemen, if on the present occasion I confine myself to the breeding and rearing of cattle, we shall find an ample field for our discussion this evening; therefore with your permission I will only speak of the breeding and rearing. On this point, I am sorry to say that we have great reason for supposing that there is great neglect and inattention; and it will not require greater proof than what we experience at every fair and market. What a common expression, after walking through the stock, to hear parties say, "What a shocking bad show of stock!" "There is scarcely a thing worth looking

at!" "What a paltry lot!" "I wonder people are not ashamed of standing behind such miserable objects!" "The useful stock are all gone out of the country!" and such like observations. This may in some degree be accounted for by landlords letting their farms to tenants who have not sufficient capital, and I may add *want of education*. But there is another reason, which loudly calls for improvement; it is the miserable condition of the farm premises in this and neighbouring counties: yes, I will venture to assert that half the farming premises of this county are not fit for sparrows to build in, much more for the breeding and rearing of cattle; therefore, when we are told to cultivate the soil and improve our breed of cattle, have we not a just right to ask for premises sufficient for their accommodation? I know our friend, Mr. Ashford and other agricultural chemists would say that many occupiers lose 50 per cent. annually, in not having buildings and yards suitable for the cattle, and for making the produce of their land into manure. Would it not be as reasonable to tell a child six months old to walk, as to tell this class of tenants to improve their breed of stock? Therefore I shall pass by this class of occupiers by simply remarking that the landlords have recommended improvements, which they have not afforded the tenants the means of carrying out. But there are other parties who have shown great indifference and lukewarmness in the improvements of the breed of cattle; such as the man who says—"Anything is good enough for me." The bigoted class who say, "I have got the best," and that wiseacre, who in spite of all improvements ridiculously tells you "that all the breed goes in at the mouth." Gentlemen, I think I shall be able to convince you that in thus neglecting our breed of cattle we are taking a principal source of gain

away, and it is more perceptible when you compare good stock and bad together. Why do we toil so much in preparing the soil for our seed? Look at the heavy expenses attendant on the plough; and shall we leave our stock for instinct to guide, and nature to perfect them? I am well aware that many of you have, and will continue to derive great benefit from a few pounds judiciously laid out in hiring and purchasing good *male animals* for the purpose of improving your stock. I calculate that it will make fifty per cent. difference in leaving a farm between good improved stock, and leaving it with inferior; then, gentlemen, if this be the case we are nearly doubling our capital employed, beside having the advantage of always having had good stock to dispose of; and merely by a little attention and application in selecting the stock for use. I do think it would be wisdom in every young man commencing business, to lay out an extra twenty pounds (or two) in purchasing the best male animals he can lay his hands upon; it would be advantageous both in introducing his stock and recommending him. I think I have shown you clearly that it is to our advantage, as well as a pleasure, to apply our time and money in the selection of good stock; but let it not be supposed that it is to be attained without trouble; for I seriously tell you that without judgment, without constant application, without great research into the proper characteristic traits of breed and formation of animals, we shall never come to anything satisfactory: I consider *character* the main link in the whole chain of breeding; for without character you have nothing to guide you. Then comes the *touch* or *handle*—this is very essential: then there is the hide or pelt; and the colour of a beast is not to be neglected—it must be in character according to their description. Now there are various kinds of beasts which uniformly support a character in themselves; and I may say the same of sheep. I am not disposed to flatter one breed or disparage another, for I really do think they are all useful in their separate localities; but I am decidedly against mixing or crossing distinct breeds, as by those means you get a nondescript kind of animal that no one can depend upon, and must be termed *mongrels*. The great object in breeding is to avoid as far as possible any affinity of blood; and here I perhaps differ with many of my brother breeders, who hold that you cannot retain the character without *in-and-in* breeding. But taking a retrospective view of the breeders of this country, I consider that numbers have lost themselves through persevering in this system. The evil applies to both sheep and beast, though no animal shows the ill effects of close relationship like pigs. Some breeders assert in the present day that they have bred their flocks for 50 years without a cross or

change of blood: it may be so, but they have not convinced me, nor do I think they will the public, that they have bred to the best advantage. I have heard it upon very good authority that the late Mr. Bakewell, of Dishley (who may justly be styled the father of the new Leicester breed of sheep) pursued the *in-and-in* system, until he found his flock degenerating fast, and sought advice from a breeder of fowls: and it was his opinion, as regarded fowls, that you might breed them to bear punishment, but would not have energy to retaliate. I have heard a similar opinion expressed by an eminent surgeon in this county, who said his neighbours intermarried till they had become all fools. I have myself twice experienced the ill effects of the *in-and-in* system of breeding in pigs, in the young ones all dying; and a similar circumstance occurred to a friend of mine last week. Let us now review the various breeds of beasts in our own immediate neighbourhood. First we will take the long-horns, which are now only in the hands of a few individuals. This breed of beasts thirty years ago was nearly the only kind we saw in the county, and I can very well recollect some of the most celebrated herds. There was the Croxall, the Canley, and the Rollwright blood, and various others who were bred from these herds. Now each respective breeder had his prejudices, and seldom exchanged with each other. The Croxall blood differed from the others in this respect—their horns not being so long, but thicker, coarser hides, more lean flesh, and not quite so complete in form, less inclined to milk, but remarkable for their hardihood and feeding properties, and generally were mixed colours.* The Canley beasts were fine fi-

* Mr. Webster, of Canley, near Coventry, was the first scientific breeder of long-horns, and his stock was founded on some good cows purchased of Sir R. Gresley, of Drakelow, near Burton-on-Trent; a gentleman who took much delight in keeping a dairy of cows of similar shape and colour, and in importing bulls from Lancashire and Westmoreland. It has been much disputed what district originally possessed this breed; but general opinion points out Craven in the West Riding of Yorkshire, as the most probable. About the year 1790 very high prices, nearly £300 per head for bulls and cows, were obtained by Messrs. Fowler and Princes, and sixty to eighty guineas for the hire of bulls limited in use. The great length of the back in this breed yields more of the valuable cuts of beef than any other breed, and the flesh is deemed as much superior to the short-horn as the Southdown mutton is to the Leicester or Lincoln. The flesh is more marbled and intermixed with fat; and in the common expression of the butchers, there is more ninepenny than threepenny beef in the carcass: no breed can bear the summer's heat and winter's cold with so much impunity, and no cattle bear the straw-yard keep so well without losing condition. But the short-horn is a powerful rival, and by early

gures, with extreme long horns, great milkers, and consequently lighter of flesh; they were frequently self-coloured, inclining to yellow or pale red, which in my opinion indicated want of constitution.* The Rollwright breed were very similar, but less in size; their symmetry, perhaps, more complete than the two former. Now it may seem to you surprising that these very eminent men, who were engaged in the breeding of long-horned cattle, should in the short space of thirty years have allowed this stock so to degenerate; either there must have been a want of foresight and application, or they must have possessed a bigoted prejudice against change or improvement. I am prepared to tell you this was the case, they being over jealous of each other; they considered it a degradation to ask each other for assistance. Why was only a part of the beast to be considered? Is it not as necessary to have milk as beef, and beef as milk? and why not borrow one from the other the properties most wanting? Bakewell said, "You might stick a patch on a sheep anywhere," and why not on a beast? surely this might have been done without making a rend. But I am led to believe that it was the *in-and-in* system that was a great cause of the falling off in the breed of the long-horns; it was the close affinity of blood that caused the loss of constitution

maturity and a more liberal system of feeding them, has contributed to beat this once, and deservedly, esteemed breed out of general use; but a doubt still remains whether for the quantity and quality of the cheese or butter made they have ever been equalled. Mr. Bakewell's cow "Old Comely" lived to the age of 26 years; and when killed, the fat on her sirloin was four inches in thickness.

* The Rollwright herd appears to have been descended from the Canley herd. Mr. Fowler began with two cows purchased of Mr. Webster at what was then considered a high price, and to these he hired a bull called "Twopenny," of Mr. Bakewell. We see in the prices made at Mr. Fowler's sale in March, 1791, from the following prices obtained, that even high prices were justified in the great increased value of the offspring—

BULLS.

Garrick, 5 years old, purchased by Mr. Stone of Quorndon for £215 5s.
 Washington, 2 years, purchased by Mr. Michael, Buckley, Normanton, for £215 5s.
 Sultan, 2 years, purchased by Mr. Freeman, Hitchcott, for £220 10s.
 Young Garrick, 2 years, purchased for Mr. Fowler, for £49 7s.

COWS.

	£	s.	d.
Young Brindled Beauty	66	3	0
Nell's White Back	89	5	0
Long-horned Beauty	44	2	0
Nancy	52	10	0
Brindled Beauty	273	0	0
Garrick's Sister	120	15	0
Young Nell	126	0	0

and size. Yet there is another cause which suggests itself to me—Was it not in some measure through having *packed* committees at the various local agricultural societies, who have invariably selected for the judges of stock either the bailiffs of noblemen, or landed proprietors; men who had the run of a long purse, and who never knew what rent-paying was; who never thought of anything further than pleasing the eye; and who invariably awarded the premiums to stock that neither you nor I would be at the trouble to drive home if compelled to breed from them. This, no doubt, has hindered the progress of breeding, and had a baneful effect on this once useful breed of stock. We will now proceed to the Durham breed, which we are told entirely originated in the county bearing their name, and first produced by Mr. Collins.* The pedigrees may be traced to his stock, but beyond that we cannot go back. I believe it is admitted on all hands that this breed came to the largest size at the youngest age of any breed in the kingdom (here you have early maturity); and although they were raised from crossing† with different breeds, they have now a peculiar character

* A bull called "Hubback" was the sire of the dam of Mr. Charles Colling's "Foljambe," who was the grandsire of "Favourite;" the dam of "Hubback," was a cow, the property of a person in indigent circumstances, and who grazed the cow in the lanes: still she was a cow possessing a propensity to fatten in a great degree, as, when she was removed to some good land she did not again breed; and "Hubback" was useful as a bull for a very short period. Mr. Collings found he could not, with any certainty breed *large good animals*, and from the outset endeavoured to reduce the size. The celebrated Durham ox was by "Favourite," out of a common cow at 5 years old; it was computed to weigh 168 stones of 14lbs.

† Mr. Collings tried several experiments in crossing, but he generally resorted to breeds smaller than the short-horns. Amongst the most successful was the cross with the polled Galloway: no breed of cattle seemed so likely to improve the old short-horn as this: they were calculated, by their deep massive frames and short legs, to bring the short-horns nearer to the ground, and to dispose of their weight in a more compact manner. Their hardy habits would be essentially useful, and the quality of their flesh and hair was such as to render the experiment still more safe; and being also to be had of a red colour, they appeared the most suitable of all breeds to cross with the Teeswater and original short-horn. Prejudice against this cross was at the height at Mr. Colling's sale; yet a cow, "Lady," 14 years old, sold for 260 guineas; "Countess," her daughter, 9 years old, for 400 guineas; "Laura," another daughter, 4 years old, for 210 guineas; "Major" and "George," two of her sons, sold for 200 guineas and 130 guineas: yet these were directly descended from the cross with the polled Galloway breed.

of their own; their colours red, white, and roan, or hazel; and if ever you see a clear spot on a beast, you may at once conclude it is not a pure Durham. I have found them good milkers, and have a great propensity to fatten; but I am fearful they will meet with the same fate as the long-horns, if not bred with more caution. I have no doubt the Hereford breed, the Devons, and others, are well adapted to their respective counties; but I cannot think any breeds so profitable for dairying and feeding in this county, as the Durham, or the original long-horned.

I will now say a few words about sheep; but being a ram breeder, perhaps I ought not to advance an opinion on the subject; but before I enter on it, let me ask you, Mr. Chairman, one question. Do you think the breed of sheep improved in this neighbourhood within the last five years?

The CHAIRMAN would not undertake to say they were. There were more cross-bred ones than there used to be.

Several gentlemen present did not consider so much care was paid to pure breeding as there used to be.

MR. SPENCER continued, —As you consider that they are not improved, it tends to prove that the rage for crossing* has not had that good effect that many supposed; but, on the contrary, in my opinion it has produced a nondescript sort of animal, without form or character, sadly disproportioned, more bone by half than necessary, and with a long thin back and large stomach, which, as a natural consequence, must require nearly double the quantity of food to make them fat. Perhaps some of the gentlemen who have made the change will tell us by what rule or system they have bred these animals, and how they are in future to proceed to keep this character together; because in all descriptions of stock I must have a character supported. Gentlemen, I hope the friends of cross-breeding will take an opportunity of expressing their opinions. I think it quite out of my province to make any distinction or remark respecting any particular flock of Leicester sheep of the present day,† for I have

* This is not meant to express an exchange of blood of the same breed, and which is supposed to be the true method of successful breeding; but of late the rage has been for South Downs, Shropshires, Lincolns, Cotswold, and other rams to cross with the Leicester ewes; thus the sheep in our fairs are now mostly of a broken breed.

† Amongst the most celebrated of the Leicester breeders were Messrs. Buckley, of Normanton-upon-Soar, Messrs. Burgess (successors to Mr. Stubbins), of Holmepierpoint, near Nottingham, and Mr. Stone, of Quorndon; and there is scarcely a flock of Leicester sheep which has not a strain from one or all of these flocks. Mr. Buckley's plan was

received great benefit in my own flock from *all* the best bred ones; and I do think others may, by making proper selections—so much depends upon the selection, in all stock, especially the male animal. Robert Bakewell, of Dishley, whose name stands immortalized as the father of the new Leicester breed of sheep, commenced his career under great disadvantages: it was not on a sudden that he attained his high celebrity as a sheep breeder. It is recorded of him that the first ram he let out he drove to Leicester fair, and obtained only *sixteen shillings* for the use of him for the season. About the year 1760 his rams did not sell for more than two or three guineas each; and for their hire he received from 15s. to 1 guinea per head: he gradually advanced his prices, and in 1770 he let some of them for 25 guineas. Thus, you see, that although his first produce did not remunerate him, his views were not to be thwarted by trifles; he persevered, and overcame great difficulties. It is said no one ever knew his method of making his crosses; but from statements I have recently heard, he made some crosses in the latter part of his time, that were not approved of by some of his followers, and who would never use any of the produce: and this alloy or cross blood remains a *stigma* and *stain* in the breed of Leicester sheep to this day; yet this is a perceptible feature to those who ever knew the character of it. Robert Bakewell's great object was to gain the greatest weight of meat upon the smallest quantity of bone, and to combine this with symmetry of form, early maturity, fine quality of flesh, and a great propensity to fatten. He proceeded exactly on the same principle in his breed of sheep as cattle; viz., the fattening in the valuable parts of the body,* and the living on much poorer food than other sorts. He found, by experiments in many parts of the kingdom, that *no land is too bad for good*

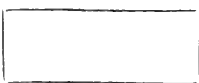
to regard above everything a good constitution, and firmness of flesh; while Mr. Burgess, his cotemporary, pursued a contrary course, looking to size and fatness above everything. The flocks of the late Earls Spencer and Talbot were bred purely from Mr. Buckley's; and we believe he obtained the highest price ever made for the hire of a ram—viz., 1000 guineas. Earl Spencer regarded purity of blood before everything else; then vigour and constitution, then symmetry of form, then aptitude to fatten with early maturity, and last of all beauty. He considered the fleece of secondary importance, as the quantity or fineness only made a few shillings difference, and preferred looking to more important points.

* It has been complained that Bakewell's stock were patchy when fat; but it is a question now, whether his was not the most profitable plan, in having the most weight of meat on the best parts of the body.

stock, and particularly sheep, if dry. With regard to the Southdown sheep, they are a south country breed, well adapted for folding, and suitable for dry hot soils; but I cannot think they would suit Leicestershire, nor do I think the Leicesters would supersede them in the down countries. I have always admired them on account of their character being so uniform. The Shropshire breed has not the same truth of character, and would not be so suitable in the south; I have never seen two flocks of Shropshire Downs alike; and that has led me to the conclusion that their origin cannot be traced to a true source.

A MEMBER here observed that they were a bastard breed between the Cheviot and the Southdowns, and most probably intermixed with many other breeds.

I must, continued Mr. Spencer, apply the same observation to Gloucesters or Cotswolds; they are a mixed medley, being part Lincoln, part Leicester, and divers other breeds; and therefore have no truth of character. I have often wished some of the breeders of these sheep would have weighed their food against the Leicesters, as I think the result would have satisfied a great many who now remain in doubt; but it always happens when our graziers have brought them into this neighbourhood they have never told us how they had been kept, and they are also rather shy at telling us the result of their trial. And there is another observation I have to make, and that is, when they have changed or crossed with these sheep, they invariably began to keep them better and nurse them better than their old friends the Leicesters. I shall now proceed to give you my humble ideas how a selection for breeding purposes should be made: when you order a piece of furniture you are very particular as to the dimensions, the quality, the pattern, and so forth; and when you receive it, if it does not correspond with the order you would reject it. Then, I say, observe the same rule in purchasing or hiring your bull or ram. First picture to yourself the kind of animal you want; keep that picture in your mind's eye, and if you do not find him in one place, look till you do find him; for you may depend upon it a little trouble spent in looking out a good animal is time well spent; and you must always bear in mind that *like will beget like*. If you steadily pursue this plan, you will soon find that you will have what you want, and what is the beauty of all breeding—"a family likeness." I have often thought to myself that an animal to be well shaped should be in the form of parallelogram, the back



from the tail to the shoulder forming one side, and the feet on a level surface the other side; from the tail downwards to the hocks one end, and from the top of the shoulder down the forelegs the other end; the bone flat, and not round, as that at once denotes bad blood, always taking care to have plenty of it, as I think you will seldom have too much bone in a well shaped male animal. The males should always have a strong neck and large broad heads, with prominent bold eyes, and rather hollow faces (the reverse of a Roman nose); indeed I make more points on the head than many other parts, as it is the leading feature in the character of the animal. The quality of the flesh is the next consideration, as it matters little what the form is if not good fleshed; and with this I shall combine the hide or pelt, which if you do err in, let it be with having too much, as in this depends very much the constitution; for how can the animals resist the cold without a proper covering? Yet there is no rule without an exception, and we should be partly guided by our own herds in making the selections as to what properties we want, and what we now possess. In speaking of sheep I must admit there are various opinions about the quality of mutton; some are favourable to *very firm*, or I may say, *hard* mutton, and some prefer loose; but I think there is a medium between the two to be observed, but take care to have plenty of it. All will agree that the animal which produces the greatest weight from the least food given, is the best. Some breeders have been very curious about bone, but I am of opinion that with very fine bone you are apt to lose constitution.

Gentlemen, I have now endeavoured to show you the necessity of breeding good stock, the fallacy of keeping bad; and I have also given you my humble views, and some common practical ideas, how good stock may be bred, and how they may be maintained; but depend upon it, there must not only be application, but skill and perseverance; for one step wrong will often send you many steps backwards; therefore I will again urge caution as to breeding without *pedigree* and *character*.

In this brief sketch I have given up the feeding part of our subject, but I will make a few passing remarks. I do think, of all the mismanagement it is the worst to breed stock and starve them to death; and I am sure that I speak within compass when I say that there are farmers who starve as much stock to death annually as would pay half the rent, if properly attended to; but there is a wide difference between starving and overfeeding them: and there is also a great difference in localities as to the produce of food. I neither advocate high nor low feeding. Young stock require to be kept growing, with plenty of air; by that course

they are more likely to breed and be profitable. I cannot think box feeding can be healthy for young stock, though it may be advantageous on large plough-farms: but in this county our grass lands require attention; and my plan is to winter my young stock in my meadows, giving oilcake and cut chaff; in this practice I have been very successful, not having lost one since I pursued it. These gleanings and observations are now laid before you—they are collected from practical observations, and you may now share them with me. I have had the pleasure of associating with many breeders, and find that all must, sooner or later, stand or fall on their own merits—for profession is nothing without reality. Breeding has been my hobby-horse (if I may be allowed to borrow that phrase), and we have managed to jog together pretty comfortably up to this time; but, contrary to my wishes and spite of my remonstrances, my hobby-horse has been fed on *peeled* corn; and I am much afraid it cannot be depended upon in future.

Mr. Spencer sat down amidst the hearty cheers of the company,

Mr. GILBERT, the secretary, said,—I think we are all convinced that the great thing in breeding is to select the best females we can, and use the males most likely to correct any faults they may possess; and I am of opinion that (all we have heard to the contrary notwithstanding) that the evil is more in not following out the principles and practice of Robert Bakewell, than in too closely following them. (Hear, hear.) I have learned that in his time there was a number of spirited individuals who formed a society or Dishley Club, and who bred from, and exchanged animals from one another, (and in this number my relation, the late Mr. Buckley, of Normanton, was one of the foremost): thus they had a choice selection of pure-bred animals that they could rely upon, sufficient change of blood to answer all the objections against close affinity, and no fears of degeneracy from breeding from bad-bred animals; therefore I contend for the practice of Bakewell, and that it is the want of following his footsteps in this particular that the long-horned breed of cattle and the new Leicester breed of sheep have degenerated. I think there are sadly too many bulls kept of an inferior kind. Many of you buy the one that is old enough for your purpose at the lowest possible cost—say at £5 or £6: now in many cases one bull would suffice for three or four farms, in some cases for a parish, and by each putting their £5 together an animal that would improve each herd, and in a surprising degree, could be obtained; and in most cases the improved stock would cost less than the present inferior. In walking through our fairs I have seen half-horned bulls purchased for use, and upon

remonstrating with the buyer on breeding from a broken stock, have been told that his cows were long-horns, or not true bred, and that he did not want to get into the breed too fast. Gentlemen, can you expect good stock when you put males and females together, the produce of which must be mongrels and probably of defective shape, without size, colour, or constitution? Pedigree is necessary to guide you as to what the offspring will be; generally, I think, animals breed backwards—that is, the young generally resemble the sires or dams of their parents, and frequently cry back for several generations to any defect. I look upon pedigree to be, having been bred for certain points of excellence from *selected* parents through successive generations; a pedigree on paper is of little use without judicious selections has been constantly made in the animals bred from. The man who uses Mr. So-and-So's breed one year and then uses Mr. So-and-So's because they are the best in the neighbourhood, without considering over the why and the wherefore of that excellence, will never arrive at perfection. He must say I want size, or muscle, or hide, or what not, and look out where it is to be found in abundance—for perfect animals we do not possess.

Mr. WARNER, of Weston-Hill, begged to make a few remarks as regarded the long-horned breed of cattle, and he would add that he agreed with every word Mr. Spencer had said. The long-horned breed of cattle he had always kept, and he should be sorry to change them; he thought they made more cheese; his village used to be noted as a cheese neighbourhood, and frequently five hundred weight per cow had been made in a season, and in lots of nine or ten cows: can the short-horn cows do more? (No, no). Some of my neighbours have changed them, and instead of cows have got a dairy of skeletons; in fact, if they were on my Hill I think a good wind would almost blow them away. I have heard of a gentleman selling fifty long-horned barren cows at twenty guineas each; and can the short-horned breed say more as regards their feeding propensities than that? I am only sorry the breed is degenerated, and that they are so much smaller than they used to be; and from the small number kept, there is a difficulty in getting any fresh blood into your stock. Now, as to Leicester sheep I prefer them to any cross-breeds, or breed whatever; I am not a good keeper, and use no cake or corn, and have frequently sold my tegs *bareshorn* in the month of May at fifty shillings per head; and last year I sold them out of the wool about Coventry fair to average two guineas each; and I question if any half-breeds, kept as mine were, averaged more (Hear, hear).

Mr. GILBERT begged to remark that the teg

trade appeared to have the most injurious effect on the breed of sheep, by selling off lambs at 8 to 12 or 14 months old. The object seemed to be, to produce a lamb that stood a good height up in a pen, with a long neck, a long back; and frequently these were found with their forelegs close together: a fat back, and a long leg were sought for, to the prejudice of every other point; yet, although these made several shillings per head more than others, the apparently smaller ones, that were much thicker and better proportioned, would be pounds per quarter the heaviest when they came to be fattened. It was the teg trade that more than all others had raised the half-bred Downs and Shropshires into such repute; but he fancied graziers were now beginning to object to these flat sided, long-legged animals. Perhaps, per head, the half-breds had the advantage; but he thought per acre the profit was in favour of the Leicesters, as they would bear running thicker.

Mr. MACEWAN begged to ask Mr. Warner one question. Did that gentleman think the long-horns were ever better than some of Mr. Warner's present cows, and such as the Hon. Mr. Nugent's "Lady Godiva?"

Mr. WARNER.—I think they are not much above half the size they used to be: "Lady Godiva" was almost the best cow I ever saw; but I do not think they are nearly so good as they were thirty or forty years ago; but I think we stock harder than we used, we do not give them the extent of ground.

A Gentleman remarked that formerly several cows in a dairy were seen not less than 10 or 12 score per quarter in weight, while in milk and good thick beef, too; but now 7 to 8 score frames, up to 9, was the general size.

Mr. COLEMAN, of Coventry, wished to ask Mr. Warner if he had ever tried crossing by way of improving his breed of cattle, which he admitted were degenerated. It was a well-ascertained fact that the human species were much improved by cross-breeding. The Bourbon family of France were a proof of this, and by intermarrying became imbecile, while the reigning family of Great Britain by German marriages were a proof how beneficial a change was in the numerous and healthy off-

spring. He thought by analogy it would hold good as regards cattle; and with deference to the superior practical skill of the present company, that superior strength and courage would result from cross breeding.

Mr. WARNER had abstained from crossing with other breeds; and vindicated the pure-breds from some of the aspersions cast upon them, and though the butchers had mainly influenced the dairy farmers from keeping long-horns, and ridiculed those who would listen to interested men who did not find so much loose fat or butcher's profit in the carcass; he for one would not part with that breed to please the butchers.

The CHAIRMAN said he had abstained from crossing, as he considered that in beauty and weight the pure-breds had the preference; yet sometimes he had seen the cross-breds carry off the buyers, and saw some queer-looking animals sold for more money than he could sell his for; but he consoled himself with the idea that some parties would purchase a jackass if found in the form of a sheep (laughter). He was anxious to obtain the best breed he could; and asked if any gentleman knew of a good bull; as, if he could find a really good one, he, the chairman, would send half-a-dozen cows to him.

Several gentlemen remarked that there was not a good rough bull in the neighbourhood, the three best having been lately sold by Mr. Croslands, Mr. Ortons, and the Rev. S. A. Procters.

A gentleman suggested that Mr. Ward, of Keresley, near Coventry, had the best he knew of; but that was said to be of doubtful pedigree, or pedigree on the side of its sire only; and it is much to be regretted that in a circle of twelve miles there is scarcely a bull that a tenant-farmer would be at the trouble to send cows to, the better bred ones being too fine in bone, and generally with too little hair upon them.

The CHAIRMAN asked if Mr. Spencer would continue his interesting paper as regards the fattening part of the subject.

Mr. SPENCER agreed to do his best on that point, if it were the wish of the meeting.

Thanks were then given to Mr. Spencer and the Chairman by acclamation.

GLEANINGS IN AGRICULTURE.

(Continued.)

63. In the sheep districts of the north of England the farms are seldom large, and yet many of the farmers manage to keep pretty numerous flocks of sheep, varying from three to four hundred to the same number of thousands. This, however, is effected only where the population is scanty, and where the commons are very extensive, and upon which the owners or occupiers of the enclosed land or farms enjoy an unlimited right of

pasturage. Hence it frequently happens that the occupier of 80 or 100 acres of enclosed land, and much of it of but an indifferent nature, if he possess sufficient capital, and the farm be conveniently situated, will keep a flock of 1,000 or 2,000 sheep.

64. The real goodness of a soil consists principally, perhaps, in the power it possesses of maintaining a certain degree of moisture; for without this the plant could have no power of deriving nourishment from any aliment; it might be planted on a dunghill, but if this had no moisture in it, no nutriment would be yielded; but as long as the soil possesses a moisture, either by its own constituent parts, or by means of a retentive substratum, vegetation goes on. Continue the moisture and increase the aliment, and the plant will flourish in proportion; but let the moisture be denied by soil, substratum, or manure, and vegetation ceases; for though certain plants will long subsist by moisture obtained from the air, yet, generally speaking, without a supply by the root they will languish and fade.

65. Though sheep, like most other animals, are endowed with a certain degree of instinct, yet it does not follow as a matter of course that it always operates towards ensuring their safety. Persons who have had the most frequent opportunities of observing them generally appear to have come to this conclusion, that when a storm is approaching they are seldom taken by surprise, for, in fact, before it actually comes on, they have endeavoured to find a place to shelter themselves from its fury.

66. There are numerous districts in Great Britain where wheaten bread is not commonly used, but bread or cakes made of rye, barley, or oats; which districts, some 40 or 50 years ago, did not produce a single blade of wheat; in fact, the farmers would almost as soon have thought of raising a crop of rice as a crop of wheat. But of late years very good crops of wheat have been reared in the place of indifferent oats and barley; and, singular as it may now appear, the parties who were the first to attempt the culture of wheat in the districts above alluded to, were invariably laughed at and ridiculed. These experiments were made at first upon a small scale, and with wheat sown early in spring; when, to the utter astonishment, as well as to the no little disappointment of their scoffing neighbours, it became satisfactorily proved that a fair crop of wheat might be grown—there is nothing impossible.

67. We are decidedly of opinion that farm-labourers, taking them as a whole, are the most contented and happy body of persons, that earn their daily bread by the labour of their hands, to be met with in this country: not that they are better off than other classes of the lower orders, quite the reverse; but their ideas and associations do not lead them into those situations of uneasiness and excitement common to manufacturing populous districts. Generally speaking, however, they are far from being liberally treated by their employers; for when farm produce is at a low rate, the farm labourer's wages, which are always proportionately low, become lower; but when the markets advance 60 or 70 per cent., the wages of the labourer are rarely advanced in anything

like a corresponding degree; yet they seldom grumble; they have no aspirings beyond their lowly dependent condition, with their 6s. or 7s. or 8s. per week, and wife and family.

68. *Farming in Iceland.*—The most important branch of rural labour in Iceland is the hay-making. About the middle of July the peasant begins to cut down the grass, which is immediately gathered to a convenient place, in order to dry, and, after having been turned once or twice, is conveyed home on horseback to the yard, where it is made up into stacks. At the poorer farms both men and women handle the scythe, but in general the women only assist in making the hay after it is cut. In many parts of the island, where there is much hay, the peasants hire men from the fishing plains, who are paid for their labour at the rate of 30 lbs. of butter a week. They cut by measurement, the daily task being about 30 square fathoms. Hay harvest being over, the sheep and cattle that had been out all summer on the mountains are collected; the houses are put in a state of repair for winter. The fine hay is given to the cows only.—*Henderson's Iceland.*

69. *Mode of Preserving Butter fresh.*—To render butter capable of being kept for any length of time in a fresh condition, that is, as a pure solid oil, all that is necessary is to boil it in a pan till the water is removed, which is marked by the cessation of violent ebullition. By allowing the liquid oil to stand for a little, the curd subsides, and the oil may then be poured off, or it may be strained through calico or muslin into a bottle, and corked up. When it is to be used it may be gently heated and poured out of the bottle, or cut out by means of a knife or cheese gouge. This is the usual method of preserving butter in India, and also on the continent; and it is rather remarkable that it is not generally in use in this country. It will then keep for any length of time, and is the best form of this substance to use for sauces.

70. *Shoeing Horses.*—It appears that the practice of shoeing horses was brought into England about the time of William the Conqueror. It is said that Welbeck, in Nottinghamshire, belonged to a Saxon chief named Gamelbere, who held it on condition of shoeing the king's palfrey, whenever he should lie at the manor of Mansfield, and that if he should lame the palfrey he should give the king another worth four marks. William the Conqueror is said also to have given the town of Northampton as a fief to a certain person in consideration of his paying a certain sum yearly for the shoeing of his horses; and it is generally believed that Henry de Ferrers, who came over with William, and whose descendants still bear on their arms six horses-hoes, received that surname because he was entrusted with the inspection of the farriers. At what period horses-shoes, as we now have them, were introduced, is, like many other things, lost to us for ever. Historians inform us that the emperor Nero, when he undertook short journeys, was drawn by mules which had silver shoes, and those of his wife, Poppæa, had shoes of gold. But these shoes appear to have been a kind of plait of gold and silver stripes, covering the hoofs. About the year

1038, when the Marquis of Tuscany, one of the richest princes of his time, went to meet his affianced bride (Beatrix), his horses were shod with silver: the nails were of the same material. Yet in much more modern times an English ambassador at the court of Paris had silver shoes to his horses, and caused them to be so slightly fixed that they soon came off. This appears to us, in the 19th century, extravagant folly, and scarcely to be believed; yet we have evidence of the truth of it.

71. *Wool*.—From the earliest periods of our history we find the growth and manufacture of wool enjoying the attention of successive governments. The sheep is, in all probability, one of the indigenous animals of our country, as there are no records—at least, as far as we are aware—of its introduction; and we find the Romans estimating so highly our wool, and the garments made from it, as to establish a manufactory at Winchester, the fountain-head of the now mighty stream of British woollen manufacture. From this time the growth and spinning of wool became an object of universal concernment to all. Towards the end of the seventeenth century the value of wool shorn in England was estimated at two millions yearly, which, supposed to be quadrupled in value in the manufacture, made the entire value of the articles manufactured eight millions, of which about two millions were exported. In 1700 the official value of woollens exported amounted to three millions; in 1800 it had only increased half a million. By 1802, however, exports had increased enormously, the amount for that year being £7,321,021, and which has only been exceeded once, in 1833, when they amounted to £7,788,842. The revolution of the trade with the United States caused a startling reduction in 1837, when the official value of the exports had fallen to £4,681,625. This decline can only, however, be considered temporary. Mr. McCulloch estimates the yearly amount of wool produced in Great Britain at 520,000 packs. In addition to this immense quantity for our manufacturers, we import largely from other countries. In 1837 about 200,000 packs were thus received, of which about 12,000 packs were re-exported. The produce for the supply of our manufacture Mr. McCulloch estimates at 22½ millions, and to employ about 335,000 persons.

72. *Feeding Cattle in Madagascar*.—The provision is sometimes placed in a kind of rack, but it is also placed so high that the animal is compelled to stand, the whole time of feeding, in a position that forces the chief weight of its body on its hind-legs. Whether this custom originated by accident or design is uncertain, but it is universal, and is supposed to aid in fattening the cattle better than our European mode of allowing them to stand on a level floor. Sometimes animals are fed in this manner for three or four years, and attain an enormous size.—*Ellis's History of Madagascar*, Vol. I.

73. *The Norfolk Mode of Cutting and Burning Ant-hills*.—The process is to cut them up with a heart-shaped sharp spade or shovel, in irregular lumps of from ten to fifteen inches in diameter, and from two to five inches thick. These are to be turned the grass side downwards, until the mould side is thoroughly dry, and then to set the grass side outwards until they are dry

enough to burn. The fire may be kindled with brush-wood, and kept smothering, by laying the sods on gradually as the fire breaks out, until 10 or 15 loads of ashes are raised in one heap, which the workmen formerly completed for 1s. or 1s. 6d. per load. The places from which the ant-hills have been removed may be sown with grass seeds. Besides destroying the ants, this is a ready, though by no means an economical way of raising manure, and in some cases ought not to be neglected on those grounds where such a process is required.

74. *Savings Bank for Corn*.—Laing, in his "Journal of a Residence in Norway," says, "There are no dealers or weekly markets attended by purchasers who buy at one place and sell at another. If the farmer has any grain to spare, he can do nothing with it unless he happens by chance to find a customer on the spot: there is no intermediate dealer between the corn grower and the consumer. Under such a system agriculture can never flourish, nor can the country be independent of foreign supply. From the want of a certain and ready market for his farm produce, the farmer naturally wastes it. His housekeeping, with his four meals a day—its consumption of brandy, ale, butter, cheese, milk, and other farm produce, besides his keeping superfluous horses and servants, is far from frugal. A Scotch farmer's family, from the same extent of land, and from an equal crop, would have at least one-half to sell. Norway could probably subsist its own population in ordinary seasons if its domestic trade were free—if the agriculturist had the stimulus of ready and free markets, and his habits of living were formed upon the certainty of being able to turn into money all he could save or spare. At it is, however, there is more surplus grain without dealers to buy it, and these magazines (the savings banks, which are large red painted buildings) are very ingenious institutions for supplying the want of this intermediate agency between the producer and consumers. The farmer takes his surplus grain to it, and for the time it remains he receives at the rate of one-eighth of increase per annum—if he deposit eight bushels he can take out nine at the end of twelve months; and he is charged at the same rate of one-eighth per annum for any portions of his quantity he may take out. If he overdraws, or had none deposited, but receives a quantity in loan, he pays for such advance at the rate of one-fourth of increase per annum; thus, if he takes eight bushels he pays back ten at the end of the twelve months, or at that rate for the time he has the loan. It often occurs that night frosts blight the crops on particular farms, even in seasons when those around in general are good. But for these ingenious establishments the farmer might be in great distress for seed or bread. The small profit which occurs upon the transactions defrays the expense of a building, a clerk, and such items, and the concern is entirely under the management of the bondor or peasant proprietors.

75. The meadows in the neighbourhood of Edinburgh irrigated by the manure from the town yield four to six crops of grass annually, of excellent quality, and are let at rates varying from £24 to £30 per acre. One hundred and ten acres belonging to a Mr. Miller, in 1827

yielded a clear profit of £2,010; and in 1826 part of the Earl of Moray's meadows fetched £37 per acre. So much for manure which is too generally allowed to pollute rivers and brooks.

76. It will be found on inquiry that good horses are becoming very scarce in our fairs, and many of what was considered the most useful sorts have now entirely disappeared. The breed appears to be quite extinct. Where, for example, do we find the fine, short-legged, handsome cob, whose action and strength enabled him to go any pace, and carry almost any weight that could ride? How few of the splendid carriage horses which were met with fifteen years ago are now to be seen; nay, how few of any thing that is really good is now to be met with? The fact is, railroads have now become so common, and exportation has of late years been carried on to such an extent that we soon shall have no horse to ride at all.

77. *According to Linnaeus*, the Laplanders preserve the milk of the rein-deer in frozen pieces like cheese. When melted, after a lapse of several months, it still tastes fresh and good. When a stranger enters their dwelling, whom they wish to welcome, the frozen pieces of milk is immediately set to the fire; the guest receives a spoon, with which he skims off the softened exterior as it melts; when he has had enough the rest is preserved in the cold for other guests.

78. *To Destroy Rats.*—In or near the places frequented by these pests place upon a slate some dry oatmeal, lay it thin, and press it flat, so that you may easily know what has been taken away. The rats, if not disturbed, will come regularly to feed upon this. Supply them thus with fresh oatmeal for two or three days, then add two or three drops of oil of aniseeds, stir the mixture well together, feed them well with this for two or

three days, then for one day give them only half the quantity they have usually eaten, and on the following day place the following mixture: to four ounces of dry oatmeal, scented with six drops of oil of aniseeds, add half an ounce of carbonate of barytes pounded, mix this well with the scented oatmeal, then lay the mixture on the slate as the oatmeal had been placed, and allow the rats to come and eat of it without interruption. A few hours after partaking of this meal they may be seen running about as if drunk or paralytic, retiring to their haunts to die. Rats are extremely sagacious, therefore where they have eaten only a small portion of the mixture it should not be disturbed for some time. The oil of aniseeds is disagreeable to dogs and many other animals, but, in small quantities, alluring to rats.

79. *Lime.*—Lime-stone is a substance of great importance in the arts; it gives us quick-lime when burnt, and the base of many cements, forming a mortar when mixed with sand. It is also of great use in agriculture, to say nothing of its ornamental applications, which are very numerous. The fact is that lime is one of the most important manures which we possess; quick-lime has the power of acting on animal and vegetable substances so as to render them soluble in water, and it is in this way that the different animal and vegetable substances are rendered fit for the nourishment of plants, the lime itself becoming inert, and forming a valuable part of the soil. The lime, therefore, ought to be applied to the soil or mixed with the other manures as quickly as possible after it comes from the kiln, and hence the great impropriety of leaving heaps of it about fields and road-sides as we too often see done, by which it loses its activity and usefulness.

J. M'INTOSH.

Millon Abbey.

(To be continued.)

ON THE MOST ECONOMICAL AND USEFUL CONSUMPTION OF THE TURNIP CROP.

The most economical and useful consumption of the turnip crop is a subject which cannot fail to be, at this season at least, one of the greatest interest to every farmer; because, while few do not cultivate more or less of that root, and would sacrifice their characters as agriculturists if they did not, there is now additional interest involved in the investigation by the fact that many of the most promising crops of turnips have manifested a strong tendency to disease, and a considerable per centage of the best crops have fallen victims to decay; but the worst of all is, that, so far, the products of the turnip crop, in the shape of beef and mutton, have been so unremunerative, that it requires the greatest economy in their consumption to render the probabilities of paying more considerable than we fear they are in ordinary cases.

We have too often discussed in our pages the

question of turnip-cutting for stock, to render it necessary for us to add anything on the subject here. If fat is the object speedily and certainly, there can be no doubt but cutting is one of the conditions most essential to the development of that condition; but the question of the relative economy and propriety of carting off the whole or a part of the crop, top or bulb, or both, is one which admits of a great deal of debatable ground, and, even extraordinary circumstances excluded, will bear viewing in a variety of aspects.

We apprehend, however, that, as regards strong clay soils, there can be no question that it is highly judicious to cart off the bulbs, as the poaching of sheep will do far more injury, by kneading and rendering the soil impervious to the air and to water, than any advantage to result from the droppings from their tails and their fleeces. Apart, however,

from this consideration is the one of whether it is more judicious to cart off and consume the tops in the yards or in the pastures; or whether it is better to plough them in, and allow them to remain as a tillage to the subsequent corn crops.

Turnip-tops, either alone or with other food, in great proportion, have not been found very desirable to consume in any great quantity; and though they have relatively a greater amount both of the flesh and fat forming principles, still they do not appear to be eliminated in the leaf-structure in a very favourable condition to the feeding of animals, either for the grazier or the butcher.

The quantity of leaf, as compared with the bulb, is of very great consequence. Mr. Lawes, in a great variety of experiments, with nearly all kinds of manure, had something like an average of eleven tons of bulbs per acre, and six tons of leaves; or something like fifty per cent. as much of the latter as the former. The bulbs had something like an average of 8 per cent. of dry matter, while the leaves had 13: so that it would not be far from the truth to assume that, inasmuch as the water of either could, in itself, possess no feeding qualities, there was as much *food in an acre of turnip-tops as in an acre of turnip-bulbs*.

Taking the nitrogen as representing the flesh-forming as apart from fat-forming quality, we have something like three per cent. of nitrogen in the dry matter of the bulbs, and nearer four per cent. in that of the tops. And again, looking at the ash of each respectively, we have nine per cent. of ash in the leaf and upwards, and less than seven per cent. in the bulbs!

Thus, *theoretically*, the acre of turnip-tops is, or ought to be, more absolutely nutritive than an acre of bulbs: *practically*, however, we know this is incorrect. A considerable mass of the tops is refused by all kinds of stock; and if forced to feed on the parts they do not choose to eat, they are *scoured* and become unhealthy, and evidently do not thrive. Mr. Lawes appears to be satisfied of this, for he says:—"The fact that notwithstanding the large nitrogenous contents of turnip leaves, they should only be to a small extent valued as food, doubtless arises from the large amount of matters which they contain only brought within the range of the organism, themselves as yet unorganized, and existing as saline and other changeable fluids, to which we may readily attribute a *medicinal* and *purgative* rather than a direct *nutritive* effect—elaboration to some extent being, as we are aware, an important element in the condition of food for animals" (*Jour. R. A. S.*, vol. viii. p. 552). The value of the top, however, as food for *plants*, is undoubtedly great; and ploughed in, there can be no doubt that, abounding

in ammonia and in saline matter, having a tendency to decay rapidly, and at once give off their elements to a new race of plants, they exert a highly beneficial influence on the subsequent corn crops. Nay, it is more than probable that one of the advantages of consuming turnips on the land, with sheep, is the great mass of top which is trampled down and intermixed with the soil in a state of semi-decomposition. Still, there can be no doubt that there must be means of making so valuable a pabulum as the turnip-top available for food; and if this can be done acceptably to the animals, there can be no doubt of its profitableness and value. At one time, linseed could not be given except in the imperfect form of oil-cake; whereas now it is universally admitted that the entire seed may, when cooked or prepared, be given with advantage.

And it occurs to us very forcibly that the same advantage may result from consumption of the top, by some mode of preparation. The very fact that the great mass of the tops which beautify our fields in autumn become shrivelled, decayed, and dissipated in the winter, shows that there is a great annual waste; and those who cut off the whole of the bulbs will do well to accomplish this before the frosts have commenced their work of destruction—the bulbs can then be much more easily preserved, and the tops may be either ploughed in, or used as food, in any way most congenial to the views or wishes of the owner.

We have recently witnessed a successful mode of inducing cattle to eat the turnip-tops, and have seen advantage in the result rather than any injurious or purgative effects. A gentleman making experiments in cattle-feeding, and who has to purchase his turnips, and hence wishes to economise them as far as possible, mixes the tops, properly cut, amongst the chaff, and pours upon the mixture the boiling compound of linseed and barley-meal. This so changes the character of the mass, that the whole is readily eaten up; and as the mixed linseed and barley have rather a costive effect upon the stock than otherwise, the turnip-tops, so cooked, do not seem to have any purgative effect whatever. How far this can be generally adopted, or how far it will succeed in feeding or fattening the animals, we are not, at the present stage of the process, prepared exactly to say, but we shall watch the experiment with great interest.

The policy of pulling off turnips on *light* soils is one which admits of much being said on both sides of the question. There are those who insist that the farm buildings should, as a centre, be the manufactory of all the raw material of agricultural produce. The clover, the grass, the turnips, as well as the corn, hay, and potatoes, they urge, should be carried to that as a centre: the manure should all

be made there; the stock all kept there; and from it, again, as a centre, all the appliances to the land should radiate. The theory of all this is perfect. The arguments for it, on scientific grounds, are so cogent, that we admit they appear impossible to be got over. A few of them are these:—The food is economised; more cattle and sheep can be kept on the same amount of food; more manure, and that of a better quality, can be made, and if preserved from the agency of wet and evaporation, it will have a better effect on the soil than if it were dropped and exposed to the wasting influence of the elements: the cattle, again, will be better attended, more under the immediate eye of the master; they will not be exposed to the deteriorating influence of wet and cold; they will not have to expend carbon in searching after food; they will not waste it by exercise; and all the labour of the farm will be under the personal observation of the master—an element of success in labour operations of no mean consideration. All this is perfectly true; but there is one little inquiry which must be put, and which may completely draw the teeth of the whole—undermine the very foundation of the entire superstructure. All this may not *repay* the cost consequent upon it, and then it is buying theoretical hypotheses too dear!

We have seen farmers—ay, “high farmers,” too—who had been at immense cost and outlay in bringing up their crops to the farmstead (and though we could mention names, it would be too much of a breach of hospitality to do so); but we have seen the rich liquid flowing away in a carefully covered drain from the farmstead into a neighbouring brook, in one case, and in another, overflowing the tank, with great waste and loss, amongst those who were very particular in consuming all their produce at the farmstead! Indeed, the cost of so conveying it, and of transporting the manure back, is so great, that, though theoretically correct, practically it will not pay; and the fact of every horse costing £20 to £25 per annum, exclusive of interest of first cost, and wear and tear, and depreciated value, is quite sufficient to enable the farmer to calculate with the utmost certainty that, on light land at least, the carting away of the whole of the produce will not remunerate for the cost.

Granted that manure deposited on grass is partly lost or dissipated, still it is a fact that many feeding pastures have been so for a vast number of years—no manure has been applied, the droppings of the cattle fed upon it, exposed to all the variations of the weather, have been its only supply; and yet it is impossible to find it deteriorate in a century, but rather the reverse; nay, contrast with this the exposure, the waste, the washing to which too much of the manure so collected is exposed, and we ques-

tion whether, in many cases, after all the labour, the land gets more real manure in the one case than in the other. Unless the manure is made and kept *under cover*—is preserved and economised in the transit—the liquid all carefully preserved and applied, it is a question whether the less brought to the farmstead of the green crops is not the best, consistent with the converting of the straw into manure; and then the cost of extra buildings, of machinery, of covers, and tanks, and all the *et ceteras* of preservation, are a serious expense to be borne by a landlord, and quite impossible to be defrayed by a tenant.

Then there is the loss of corn crop. Light soils need consolidation as well as frequent manurings; and it is a great question if anything will do it so effectually as the kneading of the sheep's feet and the application of droppings arising from consuming on the land the turnips and the clover. True it is alleged that the manure will come to the land from the farmstead, and the treading may be obviated by the clod-crusher roller. But this is a mistake. The fleece drops its unctuous and consolidating exudation, the urine and solid excrements are dropped and kneaded and sealed into the soil, while the carbonic acid gas from the nostrils of animals who are ground feeders is of great value to the soil, and especially to such soils, which thus doubtless become highly charged with this gas—so necessary and so useful to the future race of plants. Nor will the clod crusher, nor any other implement, how useful soever it may be, replace the want of the animals. The former will press particles of sand, indeed, more firmly against other particles, but it will not cause any cohesion of these particles. It will reduce the soil to a state much more fit for blowing away with the wind, if that were any advantage, but this is just the reverse of what is wanted; whereas the kneading by the foot, of soil already supplied with cohesive matter, is to make particle cohere to particle, preventing the admission of drought and too extensive stimulus of oxygen to the roots of plants, which many at least are unable to bear. The deficiency in the corn crops which so invariably follows the pulling off of turnips in light soils, spreading over the barley and the wheat crops following, is a drawback so serious that it is difficult to counterbalance it by any other process. And though there may be a loss to the animals in searching for their food, and there may be some waste of food when taken *ad libitum*, still it is worth considering whether the expense of horse-flesh is not less than that of cattle or sheep flesh; and the grass or turnips or green food wasted is only so far ploughing-in a green crop for manure, and it is thus available for the purposes of the farm.

Some advise the cutting off and ploughing in of the tops, as a compensation for the removing of the bulbs; and we showed, last week, that the tops must be a very valuable manure to the land, and that it was desirable not to waste them. But though they may answer to a very considerable extent, as a manurial application, they will not tend to that peculiar consolidation of the soil, resulting from sheep-treading, so valuable to light soils.

We are disposed to think, that, as regards the pulling off of swedes, it is not safe on light soils of ordinary quality to pull off more than every four alternate ridges, so as to spread the consolidation equally over the fields, nor of white turnips to pull off more than is necessary for setting the hurdles for the breaks. — Gardeners' and Farmers' Journal.

HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND.

The first monthly meeting of the society for the season, was held in the Museum, on Wednesday, the 12th December, 1849, and was attended by a large body of proprietors and farmers, and by many strangers.—The Earl of Rosebery, as Chairman of the monthly meetings, presided.

Mr. HALL MAXWELL, the secretary, said, that before proceeding with the subject which had been selected for discussion, he wished to state to his lordship and the meeting the nature of the arrangement which had been made with the view of giving increased interest and efficiency to these meetings. When first instituted, the prize essays and reports of the society were read. These papers were often voluminous, and sometimes accompanied by tables too elaborate for elucidation at such a meeting. More recently, shorter papers had been brought forward, and discussion encouraged, and it was found that the meetings thus became more popular and useful. It was lately suggested that their value as a medium for interchange of opinion and comparison of results, might be much enhanced if the practical farmers of the Lothians could be induced to take a more prominent part in their management. He was happy to state that these gentlemen, when applied to, had readily consented to lend their assistance. The subject had sometime ago been submitted by him to a numerous meeting of farmers, when it was unanimously resolved to meet the wishes of the directors, by assisting them in selecting subjects, and in finding gentlemen to take part in the discussions. A committee was named at the time for that purpose, and it was arranged that the first subject should be that now on the paper—the storing of turnips and other roots, to be introduced by Mr. Scott, Craiglockhart.

Mr. SCOTT—My lord, I regret that it should have been announced that I was to introduce the present day's discussion, for I am persuaded there are many present much better able to do so than I am. I will, therefore, endeavour to occupy the time of the meeting as shortly as possible with the observations I am about to make, trusting that

others will freely state the result of their experience; and although I confine my observations to the storing of only two varieties of roots generally cultivated, that they will not so restrict themselves. First, with regard to turnips, I believe it is generally admitted that such of the white or yellow varieties as require to be kept over winter should be protected from the weather, and even swedes will, in the majority of seasons, derive benefit from protection; for not only are turnips liable to be injured by frost, but after the spring growth takes place, much of the nutritive matter is lost by being converted into woody fibre. Where it is necessary that the turnips remain on the ground till spring, much benefit will be derived by having the bulbs covered with earth, which can be done on light land by passing a double boarded plough between the rows; but where the land is stiff, a common plough will answer the purpose better. Where turnips are to be removed from the ground, it will be better that they be lifted and stored before any severe frost sets in. In cases when they cannot be directly carted off, they may be stored in quantities of one or two cart-loads in the form of a potato pit, and slightly covered with earth; but I believe the better way is to have the turnips carted off to a convenient situation, and put up in ridges of about six feet in width and four feet in height, to covered with straw firmly tied down with straw ropes, the ends of which are easily fastened by putting a spadeful of earth on the end of each. Turnips stored in this way may be kept fresh till the end of May; but when it is wished to keep them so long, it may be necessary to turn them over in the month of April, to check the growth, covering them as before. In removing the stems and roots, care should be taken not to injure the bulbs; and they ought never to be stored in a frozen state, otherwise they will be liable to spoil; however, if not convenient to cart them off the field immediately on being pulled, by placing them in rows on the field of four or five drills, and covering them with the stems, they will be protected from slight frosts, and may

be carted off the first dry or frosty day. Second, with regard to potatoes, it is almost unnecessary to say that these roots must be protected from the influence of the weather, that they be kept dry, cool, and free from frost. At one time it was no uncommon practice to store potatoes in large houses to the depth of six or seven feet, or in large pits six or seven feet in width, all that was considered necessary, if they were lifted dry, being to keep them free from frost; but of late years, such a proceeding would be a most hazardous experiment. When potatoes are lifted from the ground, however dry they may be, and put together in quantities, they throw off a considerable quantity of moisture, or, as it is technically called, sweating takes place, which is repeated to a less or greater extent every time they are moved or turned over; and of late years, since the appearance of the potato disease, even with sound potatoes this appears to take place to a greater extent than formerly; and if means be not taken to allow the moisture thus generated to escape, there is great risk of heating or fermentation taking place by which the whole mass may be destroyed. Potatoes for storing should be moderately ripe, and lifted dry, and probably the best mode of keeping them is to put them in a cool well-ventilated house to a depth not exceeding $2\frac{1}{2}$ feet; but care must be taken to exclude any strong light, otherwise those on the surface will turn green and acquire a bitter taste; but where potatoes are grown to any extent, such an amount of accommodation as would be required for this purpose is seldom to be obtained, and, therefore, recourse must be had to pitting. The pits should not exceed 4 feet in width, raised to a point in the centre of about $3\frac{1}{2}$ feet in height; and with a view to facilitate the drying of the potatoes, and carrying off the moisture generated, lines of drain tiles or pipes may be put along the centre of the pits, and at short intervals carried up to the top, and also cross lines opening to the outside. The potatoes are then to be covered with straw or turf, above which a moderate quantity of earth. Of course, on the approach of frost, the openings of the tiles or pipes must be carefully closed, and there is no doubt this plan will, to a certain extent, have a beneficial effect; but, where it can be done with safety, a better mode is to cover the pits with straw only, until the potatoes have become quite dry, and if the straw be put on to a depth of 9 or 10 inches in the same manner as in thatching a stack, and firmly roped down, they will dry better, and the straw thus put on will resist a considerable amount of bad weather; but on the approach of severe frost it may be necessary to put on an additional covering, which may be of stable litter, or they may be covered up with a light coat of earth; in this way potatoes will keep well although there be a good

many diseased ones amongst them; but if these are to a considerable extent, it may be prudent to separate them before storing.

Mr. MACLAGAN, jun., of Pumpherston—My lord, I beg to express the satisfaction with which I have listened to the manner in which Mr. Scott has introduced the subject. It is one of the greatest importance to the farmer, whether we regard the intrinsic value of the root being always in a proper condition for the market, or the advantage it gives the farmer, in having in all seasons and weathers a regular and constant supply of equally nourishing food. So far as my own experience extends, I can only speak of the storing of the potato and the turnip, as Mr. Scott has done; but I am certain that the same principles which guide us in storing these roots, will also be applicable to the storing of any other roots cultivated by the farmer. There are three things to be guarded against in storing the potato; viz., dampness, frost, and heating or fermentation. In as far as I have been led to form an opinion, I think this object can best be accomplished by storing in pits. When potatoes are stored in a house, there is generally too great a quantity of them put together, even though they are not heaped too high; and this is apt to induce fermentation, and produce rapid decay. From the extensive use of the potato, and its acknowledged importance as food for man and beast, public attention has been more than ordinarily directed to its proper preservation, and various methods have been recommended for this purpose. I have found the common triangular pit to be as good, with a few simple precautions for preserving the potato, as any method recommended. It should not be wider than four or five feet at the base, and as high as the potatoes will lie when thrown up with the hand; and the ground about the pit should be well drained of all superfluous water. When the potatoes are pitted they should be well picked, so that not a bad one should be put into the pit, and well drawn straw should then be put on them, covered with earth in the usual way. The potatoes are very apt to heat when they are laid in a body, even though that should not be large, and a moisture exudes from them, or they are said to sweat. Now, precautions should be taken to remove the dampness, that if sweating should occur it may be attended with no worse consequences. This may be best done either by evaporation or by absorption. It is done by evaporation, when the pits are ventilated, by opening a connection between the interior of the pit and the external atmosphere, which is most conveniently effected by placing ventilators of straw on the top of the pits, or causing a circulation of air through the potatoes by means of tiles placed across the pit at different places. Those who have tried this plan

have recommended it as most efficient; but the objection to it is that, if not properly attended to during frost, the potatoes are very apt to get frosted. Or the dampness may be removed by absorption, by throwing any absorbing material, such as saw-dust, or simply dry earth, among the potatoes, during the process of pitting; these substances, by absorbing the moisture exuded by the potato, keep it always dry, and thus render it more certain of keeping. I know an instance where, before the present failure of the potatoes, a farmer made a practice of throwing in some soil among the potatoes as they were pitted; and his, in one season particularly, were the only potatoes preserved sound in the pits in that neighbourhood, though other farmers had the same variety, but neglected this precaution, thinking the potato could not be stored too clean. Now, as regards the turnip. If turnips are placed in a large heap, they soon give symptoms of fermentation and decay at the bottom, and in the middle of the heap; if, on the other hand, they are exposed singly to a withering draught, the feeding substance is soon evaporated, and nothing is left but the skeleton of the turnip—its woody fibre. These are two extremes against which we must guard. And here, again, our object is best gained by storing in pits rather than in a house. In storing turnips the ground on which they are to be put should be freed of all stagnant water, and the turnips should first be thrown down in a body from three to four feet high, with a flat top, and straw thrown over them to preserve them from the frost; the rain falling from above, and passing through the heap, does no harm in my opinion, but rather good, in keeping the turnips fresh. The great difficulty I have felt in getting turnips stored, is the removing of them from the field, which is generally so wet, that it is not only oppressive to my horses to take them off, but injurious to the field for the next crop; and, besides, when the cartage of such a bulky material is to take place, a due regard ought to be had to the general economy of the labour on the farm. We are better ploughing our stubble land than injuring our turnip field, and cutting up our roads by such great cartage. I allude only to when the weather is wet, which in nine seasons out of ten is the case at the very time we are most anxious to store our turnips. It is, therefore, necessary that we should take some preparatory steps to preserve them in the field from the frost till we are enabled to get them home. Various methods have been recommended for this, such as ploughing in, &c.; but the objection I have to many of these is, that I cannot cart them home fresh at the very time I desire, viz., during frost. The plan I have adopted latterly is to shaw them all, and then throw them into heaps six yards apart in the field, and

cover them with the shaws; and then when a frosty morning comes sufficient to bear the carts, the whole force is put on, and the turnips are got home as fresh as the day they are pulled. This additional labour costs about 2s. 6d. per Scotch acre; but certainly when we consider every advantage attending it, it is well-spent money. The poaching of the ground and the cutting up the roads are avoided, while it is done when the horses can be best spared from the plough.

MR. BLACK, Dalkeith, said—The system of storing turnips which I have adopted for several years past, and with satisfactory results, is this:—All the turnips I expect to be consumed previous to the 1st February, are topped and tailed, and put up in heaps of 6 feet in width at the base, and 3½ feet in height; this size of heap I would recommend as the most convenient for covering—they are covered with loose straw next to the turnips, and then with a coat of well-dried thatch, similar to that used on corn and hay-stacks; the ropes are put on horizontally, and fastened with pegs stuck into the heap, having the ropes twisted once round them. This finishes the storing for winter's use. Those intended for spring feeding are bulked up with a double-moulded plough, similar to potatoes, men following the plough with spades to cover any high-standing turnips that may be left uncovered by the plough; they are left in this state till wanted, and are brought once more into sight by the application of a pair of heavy harrows crossing the drills. Those that remain till seed-time approaches should be stored in a similar way to those intended for winter's use; but less care is necessary: all that is then needed is to protect them from the effects of droughty weather. This method of storing turnips not only protects them from the effects of frost, but also from the ravages of hares, rooks, and rabbits. I may mention that I was much pleased with the plan of storing potatoes followed by Mr. George Watson, Libberton Mains, this season. He covered them with a coat of well-drawn straw and ropes, allowed them to remain in this state till the fermentation which usually takes place had abated, and then covered them with earth when the straw had become completely dry—thus obviating the injurious effects that invariably follow from covering them closely up while the process of fermentation is going on, particularly to those intended for seed. Mr. Watson tells me that the potatoes stored in this manner have kept better than any other method of storing he has tried this season.

MR. MELVIN, Bonnington, Ratho, said—I believe it was Professor Johnston that, in one of his addresses to farmers, told us that when we were at a loss to know what was agricultural truth, we ought at once to ask a question of nature—meaning

by that to perform an experiment for ourselves, and read there the answer. Now, on the subject of the storing of roots, it appears to me that, however much general knowledge there may be regarding the subject—and those gentlemen who have preceded me in this discussion have most thoroughly shown their possession of it—in regard to some minor points, a little exact knowledge would be of use. I do not mean now to enter upon the propriety of taking up turnips before winter, as I have nothing to offer on that head, but to acquiesce in the views previously rendered, although I must confess it would be very desirable to have had some accurate series of experiments prepared in different localities to have learned the actual gain therefrom. But what I now propose to submit to the meeting is the actual results which follow the adoption of different modes of storing turnips. The first experiment undertaken was to ascertain if any or what amount, of loss of weight arose from having turnips topped and rooted in the usual way, and left exposed on the fields for a period of time. A quantity were taken up on the 19th October last, cleaned, weighed, and heaped up, allowed to remain exposed to wind and weather, until yesterday, when they were again re-weighed, and the loss per ton amounted to 1 cwt. 91 lbs., after having lain 52 days. This fact speaks volumes against the pulling, and allowing to lie in the fields, of turnips, for any length of time. It seemed a matter of some importance to test accurately the loss of weight that turnips suffered from being stored in the usual way in rather small heaps, and covered with straw in an open exposed place. A portion so weighed on the 19th October, and re-weighed on the 11th December, showed a loss of 1 cwt. 60 lbs. in the ton; rather an unlooked for fact, to me at least, as I was of the belief that the straw kept out a portion of the air from blowing so freely through them. The next subject of inquiry was, whether or not it is possible so to preserve turnips, after being taken up, that no loss of weight shall result. A quantity, therefore, was sunk into the ground, the bottom of the hole laid with straw, and the bulbs all closely covered over with this also, and one foot depth of earth laid above all. The rain that fell was also shaded off. When this portion was re-weighed, it was found not to have lost any weight whatever. It would appear that, by hermetically sealing them up, as the chemists would say, at this period of the year, they can be preserved without loss. After the able statements we have heard from those so well qualified to lead opinion on this subject, it is not for me to presume to say in what manner the turnip heap should be spread, but I would merely point to what the experiments above detailed would lead, and it is every one's duty to satisfy themselves on

this head, which they can easily and cheaply do, as their experience may differ from mine. And first of all, it appears obvious that turnips ought to be received from the field so soon as possible after being pulled; and next, that they be laid into as large masses as possible; for in this way they are easier protected from external influence. But here again another subject must be guarded against, and that is the danger arising from internal decomposition. There are few crops of turnips but contain many rotten ones, and even many bulbs, apparently sound when taken up and put into the store, soon manifest symptoms of decay; and as substances when in this state evolve heat, the temperature of the mass rises; for we are all aware that the low temperature is the cause of the bulbs being checked from growing during winter. So soon, therefore, as the heat of the heap increases, a fresh growth commences; this very growth again produces more heat, as we can easily prove from the rise in the temperature that takes place when barley is malted. The store is now in a changed state: the vital powers of the bulbs being excited, they have no rootlets to push out into the moist earth, wherefrom to draw nourishment, but the stores contained within the bulb must be resorted to, and immediate deterioration takes place; should there be any slightly unsound, the warmth produces decomposition among these, and the decaying virus spreads. We therefore see that between the two extremes we must choose that degree of heat, which, while preventing the external influence of frost, rain, sunshine, and of drought from injuriously affecting its contents, and permitting the free egress of internal heat, is the best. The free passage of the air through the mass must be checked, while either the covering or quantity put together must not be too great. Rows of heaps, about six feet wide and four feet high, ranged parallel to each other, and the whole surface levelled over with straw so soon as the frost sets in, is the form that appears to combine most advantages; while the straw from thatching of stacks, or any short damp portions, that are found about all yards, are much superior as a covering to new-thrashed dry straw. There is another matter deserving some consideration in reference to this subject, and that is the manner in which the operation of topping and tailing of the bulb ought to be performed. We sometimes see broad slips from the top of the bulb slipped off along with the shaw, and at other times the root is taken off too far up. Since the chemical analysis of the shaw showed that there is nearly as much solid matter in it as in the bulb, it would naturally be expected that more attention should be paid it for the purpose of being consumed with stock, but this does not seem to be the case; and after all, perhaps, the best application

of it is to plough it in green; still there is a portion of the thick end of the leaves that may be left attached to the bulb, and cattle do not seem to reject it as they do the rest of the blade. Now it occurred to me that it is possible that when the leaves and root are cut off, as they are in the usual method, close into the bulb, there may be an emission of more of the juice than when part of the leaves and root is left. To ascertain this point, three other experiments were tried: first, then, a quantity had two inches of shaw, and the main root left at the bulb, weighed, and exposed for 52 days, and before being re-weighed were found to have lost 2 cwt. 25 lbs. per ton. Another portion was weighed, topped and tailed as the preceding, covered with straw in the usual way, and re-weighed again yesterday, and was found to have lost 2 cwt. per ton. A third portion, similar to the last, was closely covered up beneath a foot of soil, and kept from the ingress of water, and on again trying their weight were found to have lost 57lbs. per ton, a portion corresponding to the loss resulting from the two inches of leaf that were left on them having fallen off in the handling of them a second time, it having very much rotted; and otherwise, these three other trials just corroborate the former ones.

Mr. M'LEAN, Braidwood, said—I have had much pleasure in listening to the remarks which have been made by my friend Mr. Scott, in opening this important subject, the storing of turnips—a crop which has become far more important and more generally grown since the failure in the potatoes. I cordially agree with the general opinion of those gentlemen who followed him; but, as their remarks principally applied to the lower districts, I trust I may be permitted to state some of the modes practised in the higher ones in which I reside, and where greater care is requisite to preserve them from the nipping frosts and vermin by which they are liable to be assailed when lifting them in November, and storing them in pits for winter use. I have found earth alone preferable to straw, not being so apt to take in rain. When storing, great care should be taken not to break the turnip by the shawing-knife, but left in the same state as those now upon the table, neatly topped but not tailed, as those cut are more likely to be decayed. Bulking up by the plough, as mentioned by Mr. Black, is an excellent mode of preserving them, besides benefiting the land by stirring up the subsoil; I have left portions undone, and have found the following crop better where bulked up. A plan very generally adopted is to run up a double-moulded plough through every third or fourth drill, according to the weight of the crop, by careful shawing, putting them neatly into the opened furrow, and with the common plough once round completely covers them.

This mode is found beneficial in sheep-farms, as they may be allowed to pasture near them with safety. When wanted, by running up the double-moulded plough, you scatter them to both sides, and get them easily removed, and I have invariably found them fresher than when stored in pits.

Mr. FINNIE, Swanston, said—My lord, after what has fallen from those who have preceded me on the storing of potatoes, I am not aware of anything in my practice which I could state, likely to throw additional light on that part of the subject under discussion; and as it is desirable, on such occasions as the present, to narrow our observations as much as possible, I will confine myself to one or two remarks on the storing of turnips, which well deserves more of our attention. Wherever I have been in either England or Scotland, there appears one uniform practice of storing turnips; viz., throwing them together in large heaps, and in general regardless of their exposure to wind and weather—the quantity put into one mass—and whether, as the season advances, the stock actually get them in the state most likely to afford the greatest amount of nourishment, I have been most solicitous to obtain better information on that part of my practice; and the remarks, therefore, I am about to make are not so much with the view of holding out a system for adoption, as to induce others to point out its defects. I believe every farmer will admit that it is most undesirable to go to the fields during the winter months for a supply of turnips for either rearing or feeding cattle. Two evils result from it—first, the poaching of the land; and, secondly, the injury done to the stock from the quantity of clay and earth which is unavoidably brought home along with them. In another respect, I think I will be supported when I state, that turnips, raised before frost sets in, are much more nutritive and, to use a homely expression, stand much more eating than those left exposed to the winter blasts; and that, in short, hardly a season passes without many being entirely destroyed with frost and other causes. My object, therefore, has been to endeavour to adopt some systematic plan by which the cattle may have their supply of turnips during the winter months in a way most likely to forward the fattening process. Towards the end of October, generally speaking, the turnip crop may be said to cease growing for the season. I therefore calculate the quantity required for the months of November and December, root and stem them in the field, and convey them home to some convenient spot about the steading, not laying too many together, and give them a covering of straw. Those needed for January I store in pits similar in shape to the potato, but restricting the quantity to 15 cwt. per lineal yard. What is intended for February

and the two first weeks of March, I cut off the tops but leave the roots, as I find they keep that length of time in a much fresher state than when the roots are taken off; but the quantity per lineal yard is reduced to 12 cwt. Those, again, intended for spring feed, and until the grass is ready, are left untouched in the field, beyond doing what Mr. Black practises—running a double-moulder plough between the drills, covering them as completely as possible with earth, and there they remain until the land must be cleared for the sowing of the barley, when they are stored in pits of similar size as those already referred to. I should have stated that I first gave the pits a thin sprinkling of straw, over which the slightest covering of earth is thrown. I would prefer the earth alone; but in going to the pits in frosty weather, the straw prevents the earth sticking to the turnips, and admits of them being taken to the cattle in a much cleaner state. Before sitting down, I would take the liberty of congratulating the society on the prospect that its monthly meetings are now likely to be attended by farmers discussing practical subjects. I trust in future we will, as a body, show more anxiety to meet and exchange our sentiments with regard to our practice. Other professions have reaped benefit by acting in concert, whatever their object was; and what should prevent us, by following their example, obtaining similar results?

Mr. DICKSON, Saughton Mains, alluded to a different mode of storing turnips, particularly Swedish. They are removed from the fields where grown, and taken to a field convenient to the farmstead, where they are placed, the leaves and roots being placed closely together. In this way one acre will hold the produce of from 10 to 15. Mr. Melvin's experiments brought out a great deficiency in weight by storing. It would be desirable to learn from Professor Gregory or Dr. Anderson if this was attended with any serious loss to their feeding properties.

The CHAIRMAN said from personal observation when in England, he could confirm Mr. Dickson's remark. In one of the most important turnip counties of England, Norfolk, and especially the western parts of it, the plan referred to by Mr. Dickson was very extensively adopted, and found the cheapest and most efficient. From being possessed of an estate in that district he was well acquainted with its rural economy.

Professor GREGORY said, the mere loss of weight by no means proved an equal deterioration in the feeding qualities of the turnip. It must first be determined whether the whole, or how much of that loss is caused by evaporation, or exudation of the juices of the plant. If the latter, the loss would be great. From the experiments made by Mr. Mel-

vin, a very great loss took place, and the quality might be deteriorated by losing too much moisture. This could only be determined by analysis and different experiments on the feeding properties of the turnip in their different states.

Mr. THOMSON, Peffermill, said—turnips, like other plants, must have a ripe season, when he thought they should be raised and preserved as dry as possible. The turnip, he thought, was ripe in November, and by storing them then he had for six or seven years found them to keep till May or June. He had uniformly found, when turnips were drawn from the field in March, that it was impossible to keep them without their giving way. They must be well stored previously to frost. Cutting close to the roots should be carefully guarded against. He had also another remark to make—he had often observed a quantity of stuff like treacle given out by the turnips, and he was anxious to know how far this affected their feeding qualities.

Professor GREGORY remarked, that the fact mentioned by Mr. Thomson, of the appearance of a syrupy liquid among the turnips would seem to show that exudation of the juices actually does sometimes occur. It was obvious that the exudation of that liquid must have been highly injurious to the feeding power of the roots; and it remained to be seen under what circumstances that exudation took place, as well as how it was to be avoided.

Dr. ANDERSON said that, of course, if the diminution of weight was due to exudation, it would involve a serious loss, and it was not easy to ascertain whether or not this was the case. In the course of some experiments, however, in which he was then engaged, he had been led to observe that exudation took place very slowly in the turnip, and he was inclined to attribute the main loss to evaporation. In so far as he could venture to give an opinion, which, of course, must be only a theoretical one, on the subject of the preservation of turnips, he was inclined to think that storing them was preferable to keeping them in the ground after they had reached maturity, because any further growth must be attended with a diminution of their value; when in the ground they are in the condition to take advantage of any warm day, and to deteriorate by the consequent growth. He might be permitted to observe, that he thought there was a want of definite information regarding the alleged diminution of feeding value consequent upon the prolonged preservation of the turnip. He was then engaged in a series of experiments on the feeding value of that root, which he hoped on some future occasion to communicate to the society; and he remarked that if Mr. Finnie could be induced to store some turnips in different ways, their analysis would

in all probability throw some light on the subject.

Sir JOHN OGILVY asked Dr. Anderson whether he was right in supposing him to say that the turnips grew in the ground during the winter months; for in his part of the country, the great objection against the early raising of the turnip was, that it prevented this growth. Now, he was anxious to know from Dr. Anderson if the growth in the field detracted from the feeding qualities.

Dr. ANDERSON explained, that his observations referred to the turnips after they had arrived at full maturity. Any further growth after that would be expended upon the flowering stem at the expense of the root, which would necessarily undergo deterioration.

The SECRETARY stated, that the next meeting

would be held on Wednesday, the 16th of January, and that the subject for discussion would be "The advantages or disadvantages of subsoil ploughing, and of trench ploughing;" and, at the request of the meeting, Mr. Dickson, Saughton Mains, undertook to introduce the subject.

Professor GREGORY had great pleasure in proposing the thanks of the meeting to Lord Rosebery for presiding.

The Earl of ROSEBERY expressed the pleasure it gave him in presiding at the first monthly meeting conducted on the new plan. There was the greatest reason to anticipate, from the valuable practical details brought forward, that the method now adopted would be attended with very satisfactory results.

REPORT OF THE JUDGES APPOINTED TO INSPECT THE FARMS ENTERED FOR THE PRIZES PROPOSED BY THE BAKEWELL FARMERS' CLUB, 1849.

TO THE COMMITTEE.

GENTLEMEN,—The inspection of these farms, which we were honoured by your instructions to commence on Thursday the 1st day of November, has been completed. Three farms being submitted to us for inspection, we took them in the following order of route:—

LARGE FARMS.

OCCUPIERS.	SITUATE AT	OWNER	ACRES
Robert Sybray	Snitterton Hall	C. Turner, Esq.	347
L. & G. Furniss	Birchill Farm	Duke of Devonshire	292

SMALL FARM.

Wm. Jepson	Edensor	Duke of Devonshire	80
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Mr. Robert Sybray has occupied the Snitterton Hall farm four years. This farm, with the exception of from 30 to 40 acres, is permanent pasture and meadow; the low land of good quality, well adapted for the dairy; the hill pasture suitable for young cattle, and cattle and sheep. On the north-west side of the farm lies the arable land, consisting of a heavy soil, with a clay subsoil well calculated for the growth of wheat. Ten acres of this land has, during the present and preceding years, been thoroughly drained with tile and stone; the drains are cut in the same direction as the furrows, 36 inches deep and 18 feet apart. In addition to this, 400 rods, seven yards to the rod, have been put in on the grass lands; the drainage being skilfully and effectively performed.

The fences and gates are in good order; the hedges which surround the arable land are annually cut and kept low, so as not to obstruct the

influence of the sun and air from the grain and other crops.

The buildings at the farmery are in good repair; the order and neatness about the homestead was a pleasing feature on this establishment.

Judging from the quantity of hay produced on the farm during the present year from a given quantity of land, we should pronounce such land in first-rate condition. We are decidedly of opinion that Mr. Sybray's system of farming his present occupation is the best that could be adopted. Average number of cattle and sheep on the farm:—76 head of cattle, 200 sheep, 9 horses.

Birchill farm, half arable, half permanent pasture and meadow; the soil of that quality well adapted to the four-course system practised on this farm. That portion of the land that required draining is nearly completed. The whole of the buildings on the farm, with the door ways, are in excellent repair, the arrangements of the same being of a superior order. Especially would we notice the newly-erected sheep sheds, with foal yards connected therewith, capable of accommodating 150 sheep. The arrangements of these sheds are excellent; they are placed at a short distance from the farm-yard. The sheep can have access to them at pleasure from the north and south side of the farm. From 50 to 60 lamb hogs can be fattened in one portion of these sheds during the winter months on Swede turnips, hay, and corn, with a small portion of oil-cake. The in-lambd ewes are supplied with hay and turnips, in the other portion of the sheds

during the same period. The result is early maturity in reference to the fattening of sheep, economy in food, a dry layer for the breeding ewes, with a quantity of valuable manure.

Fences: The Messrs. Furniss being desirous of making the fields of uniform size of from 10 to 12 acres each, have taken down, removed, and rebuilt in straight lines many hundred rods of walled fences; in connexion with this great improvement, they have grubbed up several hundred rods (seven yards to the rod) of old wide crooked hedges, new ones being planted where necessary. All the hedges (with two or three exceptions for the shelter of cattle) are regularly cut and kept low; and every field on the farm has its gate, well hung, in complete repair, and painted. No expense and labour have been spared to render the whole of these arrangements most complete.

Turnip and other crops, the preparation for which commences as soon as the corn is carried, by paring, harrowing, and clearing of the stubbles; making a deep ploughing to give the greatest exposition of the soil during the winter. The turnips manured with farm-yard manure, bones, guano, and rape cake, drilled on the ridge 27 inches apart. We found these crops most excellent and remarkably clean, there being nearly 20 acres grown this season.

Barley drilled 8 inches apart, 3 bushels to the acre.

Oats drilled 8 inches apart, 4 bushels to the acre.

Wheat drilled 10 inches a-part, 2 bushels to the acre.

Judging from the appearance of the stubbles, barn and stack-yard, we are decidedly of opinion that great crops of the above description of grain must have been produced the last season. Stacks in the yard are large, well built, neatly thatched, presenting a most creditable appearance.

Artificial grasses: We found a large breadth of these grasses growing in the stubbles, exceedingly full of promise; they had been sown by machinery, and covered the entire surface of the ground, which exhibited a most luxuriant appearance.

Agricultural implements, a large and good selection.

Cattle and sheep, the character of which is well

known from the circumstance of the Messrs. Furniss having been invariably successful exhibitors of stock at the "North Derbyshire Shows;" in addition to which, they carried off seven prizes at the recent stock show of the Bakewell Farmers' Club. Average number of cattle and sheep maintained on the farm:—Upwards of 200 sheep, 70 head of short-horns, with a due proportion of work and young horses.

The character of these two farms being so entirely dissimilar, we could not with any degree of propriety regard them as competitors; consequently we consider them perfectly distinct and apart from each other in the race of competition, so much credit being due to the occupiers we thought it right to divide the prize, and have done so accordingly.

Mr. Jepson was the only competitor in the class for small farms. The drainage on this farm has been completed; thirty acres of the land being arable, the other portion permanent pasture and meadow. The arable is well calculated for the growth of root crops; a considerable quantity of turnips, potatoes and vetches, is annually produced, the vetches being principally consumed by the horses. Mr. Jepson is most successful in the growth of Swedish turnips, having carried off the prize given by the North Derbyshire Society and Bakewell Farmers' Club for several years in succession. They are sown on the ridge, 27 inches apart; manured with farm-yard dung, the refuse of malt, coal-ashes, &c.

Wheat and oats are the principal grain crops grown; put in part by the drill and part broadcast, after the presser.

Stock: Cattle, short-horns of good quality. Sheep (foresters), the ewes bought in the autumn and put to a Leicester ram. Ewes and lambs fed off the summer following.

The gates, fences, and the whole of the buildings at the farmery in good repair.

The neatness and good order exhibiting itself over the whole of this farm, we are of opinion, fully entitle Mr. Jepson to the prize.

PETER P. FIDLER.

BENJAMIN SWAFFIELD.

WILLIAM WAGER.

CHEMISTRY APPLIED TO AGRICULTURE.

No. VII.

BY A FARMER.

"SALT AS A MANURE;" by M. BECQUEREL.

Though the work before us has the above title, its object, we strongly suspect to be, to force the question of the duty on salt on the French government, rather than to afford any particular information to the farmer. Upon the general question of manures, the author acknowledges himself to be indebted to the labour of others. His attention has been directed to the use of salt as a manure, by an appointment which he holds as manager of some government salt works, and by having accidentally remarked the extraordinary luxuriance of the vegetation near some salt mines in the department of Jura. In the year 1847, the French government deputed MM. Dumas and Milne Edwards to inquire into the estimation in which salt was held as a manure in England. Having visited many of the best districts in both England and Scotland, M. Dumas wrote to the secretary of the Newcastle-upon-Tyne Farmers' Club, as follows :

"I quit England with the conviction, that the employment of salt as a manure is chimerical. We have been sent from county to county without result. Here they send us into the neighbourhood of the salt mines; when we were there, we were told that salt was not a prophet in its own country. I am convinced that the most desirable mode of preparing a good manure is by employing the phosphates and ammoniacal salts rather than sea salts, however cheap the latter."

The latter opinion coincides exactly with our own: it is rarely that such a substance as salt will be of any service to the farmer, as it contains only two of the substances required by his crops.

M. Becquerel thus recapitulates the results of his experiments and researches:

1st. Lime acts (1) *mechanically*, by mixing with stiff soils, and rendering them lighter; and (2) *chemically*, by decomposing the vegetable matter in the soil. It acts on the vegetable and animal matters, and produces compounds more readily taken up into the plants, and probably (according to Liebig) acts also on clay, and separating silica in a soluble state.

Marl acts in a similar manner. The bad effects which have been attributed to magnesian lime is said to be owing to the great affinity which magnesia has for water, thus keeping the land too dry. [We are disposed to attribute the bad effect of mag-

nesia in lime (if it really be injurious) to the more powerful caustic nature of the magnesia as compared with ordinary lime.]

2nd. The existence of potash and soda in vegetables, proves that these substances, in some form or other, must either be present in the soil, or must be added in manures.

In general, potash is only found in soils in small proportions; but wherever it abounds (as in all soils derived from granite) the vegetation is proportionably more abundant.

Turf and wood ashes, amongst other reasons, owe their power as manures to the small quantity of alkali they contain.

3rd. Gypsum (sulphate of lime), along with organic manures, acts powerfully as a manure for plants allied to the clover. In opposition to Davy's theory, Boussingault has shown that sulphate of lime is not in that combination absorbed and assimilated by these plants.

Liebig has suggested that gypsum possesses the property of absorbing ammonia from the atmosphere; and that it is to this power that the benefits it produces on vegetation is to be attributed.

Boussingault has disputed the value of this theory; his opinion (as the result of experiments) being that gypsum acts by supplying lime to the land. But the celebrated Arthur Young has shown that gypsum is equally beneficial on chalk soils as on those which are comparatively poor in lime. Every theory that has hitherto been advanced on this subject leaves the question in a very unsatisfactory state.

4th. The existence of phosphoric acid in vegetables, and in the grains of cereals, shows the necessity of introducing it into soils in which it may happen to be deficient.

Bones act both by the phosphoric acid, and the azotised substances they contain. It is necessary to add to the soil not only the phosphate of lime in bones, we must also furnish some means by which carbonic acid can be derived, *common salt*, the alkaline salts, and the salts of ammonia. [The way in which the author has introduced the words "*common salt*" as above, is, to say the least, begging the question; our opinion being, that *any source of soda* is what must be added to the soil—the more easily the salt of soda can be decomposed,

the more valuable it will be to the soil—in this respect common salt is the worst of all compounds of soda.—*Trans.*]

5th. *Sulphate of Iron*.—On the action of this substance as a manure, our author certainly makes some new observations. The effect of the salts of iron as a medicine has long been known; it appears that they have precisely a similar influence on vegetation. Their effects are summed up as follows:

(1.) They stimulate the formation of the colouring matter.

(2.) The action is probably the same as in the animal kingdom, by stimulating the digestive and assimilating organs.

6th. The nitrates act efficaciously* on wheat (*we doubt this*), and upon all green fodder.

7th. Ammoniacal salts, according to the experiments of Schathenman and Kuhlmann (already reported in this Magazine), produce remarkable effects.

8th. As to common salt, the following is the result of M. Becquerel's inquiries: The well-known richness of salt marshes surely shows that salt is valuable. [Here, again, is a very weak argument, for the luxuriant vegetation of these marshes has never been proved to be owing to the salt alone].

It has been proved that salt has the effect of retarding the germination of seeds. This delay is due to the power which salt possesses of stopping the decay of vegetable substances, and does no further harm to the seed.

The germination of the seed once commenced, salt is introduced into the vegetable, either unchanged, or by the decomposition of chalk as carbonate of lime. [If chalk has this power of decomposing salt in the soil, it is a widely different power from what it possesses in manufactures under similar circumstances. Common soda is now made in great quantities from salt, by first converting it into the sulphate, and then decomposing the sulphate by a most tedious and difficult process. Any attempt at converting the common salt at once into carbonate of soda has hitherto failed. This difficulty in a manufactory has always led us to doubt the value of salt when its benefits were to be dependent on its conversion in the presence of lime into carbonate of soda.—*Trans.*]

Does the salt act as a stimulant? or does it, in case of a deficiency of potash, supply soda to the plant?

These two questions have always been disputed between agriculturists and chemists. It is said on the one hand, that as very little salt is found in the ashes of plants, very little must be added to the soil; on the other side it is answered, that admitting this view of the case, there is reason to believe, that as salt is necessary in the animal economy, so is it also necessary to enable the plant to

form all the compounds requisite to perfect vegetation.

As the result of my experiments, I have found that both the quantity and quality of the crop have been improved by the addition of salt as a manure.

Upon rice the effect is singular; when the salt is applied after the seed has vegetated, the plant dies, being forced at once into too rapid vegetation, and then becomes etiolated and perishes; whilst if the salt be applied before the seed has vegetated, *it becomes habituated to its action*, and though delayed in the first stages of its existence, it afterwards grows so much more vigorously, as to ripen some days before that to which no salt had been applied.

[The conclusion we would draw from this experiment is, that in the first instance the plant was killed by the salt, and in the second that it vegetated in spite of the salt applied.]

The quantity of salt to be applied to the soil varies with the nature of the soil and subsoil. If the subsoil be very open, there is great probability that the whole of the salt will be washed out. If the subsoil be very retentive, of course much less of the soluble matter it contains will be removed by rain.

Upon sandy soils salt must always be mixed with partially-decomposed manure; if this be not attended to, the salts acts injuriously.

Clay soils are those which seem best adapted to the use of salt, probably on account of the constant state of moisture in which such soils are kept. Water, salt, clay, lime, and ammoniacal salts, are, when present in a soil in proper proportions, sure to produce a healthy vegetation! [There is little doubt as to the truth of this assertion; but why should we, out of such a mixture, select salt as the most important ingredient?]

It is also possible that when salt is supplied to a crop, it may act as a preventive to some of the diseases to which our cultivated crops are liable. This is a question as yet quite unanswered by any experiments which have hitherto been tried.

The result of the whole of the preceding remarks is, that the employment of salt in agriculture is a very complicated question.

In this very sage conclusion of M. Becquerel we are disposed entirely to agree; and whilst we think this plan which he has adopted, of giving a condensed view of his opinions at the end of his book, is one well worthy of imitation, we think he has quite failed in his attempt to prove the importance of salt as a manure. This book is only one amongst a multitude of others which have been lately published on agricultural subjects, in which the very least possible part of the motive for publication appears on the title-page.

A BALANCE-SHEET.

DEAR SIR,—The following statement of my balance-sheet I beg to submit for your inspection, feeling certain it is all I may expect to receive now free trade is come into full operation. I occupy a farm consisting of 103 acres of good heavy land. Eighty acres are arable, and 20 acres good pasture; the remaining 3 acres allow for roads and fences. Cropped as follows: 25 acres wheat (calculate 5 qrs. per acre); 15 acres barley, at 5 qrs.; 15 acres beans, at 7 qrs. per acre. I am tied to consume all hay, chaff, green crops, and manure (made and grown) on the farm; therefore, I put down what I make of stock to pay for the 10 acres clover, 5 acres mangel, 5 acres swedes, 5 acres tares (2 acres, after tares, to be planted with white turnips, and 3 acres after ditto with mustard to feed off or plough in, and the pasture). The stock I keep consist of 4 work-horses, and a pony for odd jobs, &c.; 8 grazing bullocks; 8 little bulds, to run on meadows, and eat offal from fat beasts; from 16 to 20 pigs; 2 cows; and 10 sheep, grazed fat on meadows. My bullocks I purchased on October 16th, for which I gave £7 7s. each; allowed them, till the 25th December, half a peck of pollard each daily, at 4d.; then gave them, in addition to pollard, 4lbs. of linseed-cake each; and afterwards increased the quantity of cake to 6lbs. daily, with a liberal allowance of cut swedes or mangel, and all the hay-chaff they would eat, until I sold them on May 22nd, at £16 each, which was considered a great price.

The grazing account will stand thus:

	£	s.	d.
8 bullocks, at £7 7s.	58	16	0
Pollard for 70 days, at 2s. 8d.	9	6	8
Cake for 65 days, at 2s. 8d.	8	13	4
Pollard for 65 days, at 2s. 8d.	8	13	4
Cake for 83 days, at 4s.	16	12	0
Pollard for 83 days, at 2s. 8d.	11	1	4
Balance for hay, stover, turnips, and attendance. .	14	17	4
	£128	0	0
8 bullocks, at £16	128	0	0

My 8 small bulds paid £3 each. The sheep I gave 26s. for on October 11th, and sold fat, about July, at 42s., including wool. Pigs paid £10, for shack of stubbles and yards; fowls £4; and apples from orchards, £3. My receipts and disbursements will be as below:

DISBURSEMENTS.

Year's rent	150	0	0
Labour	180	0	0
Title	39	3	0
Poor's rate	25	6	0
Horse-corn	50	0	0
Blacksmith's bills	5	4	0
Wheelwrights.....	2	3	0
Carpenter	1	9	0
For ropes, cords, and mending harness.....	2	18	0
For grease and plough-irons	1	10	0
Dairy-brushes and sundries	0	10	0

Thatcher's bill	4	5	0
Seed-wheat, 10s. per acre	12	10	0
Seed-barley, 12s. per acre	9	0	0
Seed-beans, 7s. per acre	5	5	0
Seed-tares	5	0	0
Small seeds	7	0	0
Market expenses.....	2	12	0
Wear and tear of horses and implements, losses, &c.	—	—	—
	£503	15	0

RECEIPTS.

	£	s.	d.
25 acres wheat, 10 coombs per acre, at 20s.....	250	0	0
15 acres barley, 10 coombs per acre, 14s.....	105	0	0
15 acres beans, 7 coombs per acre, 14s.	73	10	0
10 acres clover	—	—	—
5 acres mangel	—	—	—
5 acres swedes	—	—	—
5 acres tares and turnips and mustard	—	—	—
8 fat bullocks paid ..	14	17	4
8 lean ditto	24	0	0
2 cows	18	0	0
10 sheep, 16s.....	8	0	0
Fowls	4	0	0
Orchard	3	0	0
Pigs.....	10	0	0
40lbs. mangel-seed grown, at 6d.	2	0	0
	512	7	4
Disbursements	503	15	0
Balance for interest of money, &c.....	£8	12	4

"A poor living, indeed!" probably you would say. "If grazing pay so badly, why continue it?" Now, if I give it up, I must also take one coomb per acre from my wheat crop, and should produce proportionably less of all my other crops. "Verax" would doubtless say my expenses are too great; but before we shall listen to him, he must say whether he is a farmer. I strongly suspect he is not. If so, why, then, does he not mind his own business, and let other people's alone? It would be wrong to state we could not grow corn at less money than twenty years since; and the public certainly ought not to pay more for bread than it is possible to be produced at. I feel confident in asserting that, in the position the agriculturist is now placed in, there is nothing but ruin staring him in the face, and only a moderate fixed duty, which would ensure a fair price for corn (say 26s. for wheat, and 14s. for barley), can save him.

I must beg you to accept my sincere thanks for your exertions in our (the agriculturists') behalf, and subscribe myself,

Yours respectfully,

A SUFFOLK FARMER.

—Mark Lane Express.

BRITISH AGRICULTURE AND FOREIGN COMPETITION.

Returns of Produce from a 500 acre farm in Strathmore, county of Forfar, on a five-shift rotation of crops, with an improved stock of cattle and sheep, on an average of years previous to free trade in corn, cattle, &c. ; and Comparative Statement of what may be calculated upon as the returns from the same farm under the present legislative measures affecting British agriculture.

Rent of the farm, as fixed for 19 years, assuming former average price of corn, cattle, &c..	£300	0	0
Invested capital of £6 per acre at entry, £3000.			
Interest upon this sum at rate of 10 per cent.	300	0	0
Floating capital of £4 per acre, £2,000. Interest thereon, 5 per cent.	100	0	0
Expenses of management, wages, tradesmen's accounts, insurances, grass seeds, &c., at the rate of 20s. per acre per annum	500	0	0
Annual loss by casualties on live stock by disease and accidents	100	0	0
Public burdens leviable upon the farmer, including poor-rates.	50	0	0
Sum chargeable against the farm annually	£1850	0	0

To meet this sum there is the produce of 200 acres of corn crop, and the profits on live stock, (the whole grass and green crop being consumed on the farm).

	Bush.		
100 acres of oats, producing 43 bush. per acre	4800		
Off for servants, horses seed, &c.	2400		
Leaves disposable oats	2400	at 3s.	£360 0 0
40 acres of spring wheat, producing 32 bush. per acre	1280		
Off for seed.	160		
Disposable wheat	1120	at 7s.	392 0 0
60 acres of barley, producing 42 bush. per acre	2520		
Off for seed, horses &c.	500		
Disposable barley	2020	at 4s.	404 0 0
			£1156 0 0
Profits from live stock, fed upon 200 acres grass, and 100 acres green crop	800		800 0 0
Total returns			£1956 0 0
Leaving annually to the farmer, for his skill and industry, over interest of capital employed, a sum of.			£106 0 0
Convert the above disposable produce into money, at the present prices, or rather at what			

may be fairly calculated upon for future seasons, under a system of free trade, and the following is the result—

2100 bush. of oats, at 2s. per do.	£240	0	0
1120 bush. of wheat, at 5s. per do.	280	0	0
2020 bush. of barley, at 2s. 9d. per do.	277	15	0
			£797 15 0
Live stock (as above, £800), less 20 per cent. on former prices, leaves	640	0	0
Net return	£1437	15	0
Sum chargeable as above against the farm	1850	0	0

Leaving the farmer minus for rent, capital, and expenses of management	£412	5	0	412	5	0
Total loss annually incurred by difference in price occasioned by free trade				£518	5	0

HUGH WATSON,
Keillor, 1st December, 1849.

Statement of the average Produce of a farm in a full state of productiveness, managed agreeably to the five-shift course, as usually adopted in the south-eastern Borders of Scotland, where the returns of stock form a very considerable means of remuneration, and the price of which, of course, is a material element in the calculation as to the rent to be given.

Thus, then, assuming the rent of 500 acres of useful land for this purpose—upon the estimate of the price of grain and stock, as warranted by their value previous to the introduction of the new corn law and tariff to be

	£800	0	0
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This farm has been put into good productive condition by means of the tenant's capital, at a cost in draining and lime (sunk) of £2500. It is well known that nearly twice this amount has in many instances been thus expended; but we assume this as a fair average on a farm so rented

Interest upon which sum, to enable him to recover the same during an ordinary lease of from nineteen to twenty-one years, at 10 per cent

	£250	0	0
Interest on capital invested in stock, &c., yielding an annual return of £1500, at 5 per cent.	75	0	0

Expenses of management—wages, tradesmen's accounts, extra manures, &c.	550	0	0
Casualties, loss on stock, &c.	50	0	0
Public and Parish Burdens	45	0	0
			£970 0 0
			£1770 0 0

To meet this sum there is the produce of 200 acres of grain, in each year, distributed as follows:—

Acres.	Bushels.	Bushels.
100 Oats, at 48 per acre		4800
60 Wheat, 33 "		1980
40 Barley, 40 "		1600
Off seed, horses, and servants		2420
Off seed		180
Off seed, servants.. ..		210

Remain disposable at the prices on which his calculations were founded, and warranted by the rates, as is proved, under protection:—

Bushels.			
2380 Oats, at 3s.	£357	0	0
1800 Wheat, at 7s.	630	0	0
1390 Barley, at 4s	278	0	0
	£1265	0	0
Returns upon stock estimated, at prices then current, to yield	750	0	0
	£2015	0	0

Profit — remuneration for tenants' industry and skill .. £245 0

The above grain produce yields, at the highest average 1 feel warranted in assuming, under free trade—

Bushels			
2380 Oats, at 2s.	£238	0	0
1800 Wheat, at 5s.	450	0	0
1390 Barley, at 2s. 9d.	191	0	0
	£879	0	0
In place of, as above.	1265	0	0
	£386	0	0

Thus the difference of proceeds of *grain crop alone* more than absorbs all the tenant's remuneration by £141 0 0

JOHN DUDGEON,
Spylaw, 3rd December, 1849.*

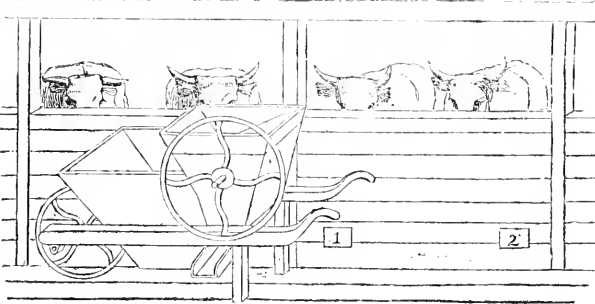


FIG. 1.

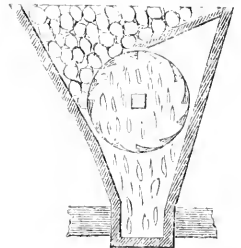


FIG. 2.

BARROW TURNIP-CUTTER.

[We insert this at the request of our correspondent without pledging ourselves as to its merit.—ED. F. M.]

SIR,—The barrow turnip-cutter is, I think, a considerable improvement upon my turnip-cutting machine, as by its means turnips can be cut and delivered at the very place where the cattle are standing, by merely having apertures in the bosting, as shown at 1 and 2, opposite to each cow, so that they will descend through a moveable spout from either side of the cutter. By these

means, a man can cut and deliver the turnips to the cows, through such apertures in the bosting, at the rate of from one to two bushels per minute. The turnips are put on the top of the machine from the barrow, as shown by Fig. 1, and Fig. 2 is the section of the machine. The operation is performed by a cylinder, about fourteen inches long and twelve in diameter; there are twelve knives, or cutters, fixed on the two ends of the cylinder, which may be either wood or iron, with hoop, nails, or screws; the cutters are 1½ inch broad, and about 1½ inch opening between each cutter. The turnips, in coming into contact with the cutters, pass through the cylinder, as shown by Fig. 2, into the spout below, and thereby conveyed through the apertures in the bosting in front of the cows. The handle is made to screw on to either end of the shaft of the cylinder. There is a fly-wheel, as shown by Fig. 1, which gives a velocity and power, so that even a boy or girl can work it with the greatest ease. Your agricultural friends will find no difficulty in getting these cutters made in their own neighbourhood, and at a trifling cost.

* Since the above statement was drawn up and submitted by us to the consideration of various farmers throughout the country, Mr. Dudgeon has requested us to state that, after consultation with several of these gentlemen in his own neighbourhood (who, he was gratified to find, entirely concurred in the essential particulars of the statement), he is of opinion that he had deducted rather too small quantity of oats and barley for seed, according to the average usual in the district. Any alteration which this involves would be a deduction from the tenant's original profit, and an addition to the amount of loss already brought out.

Mr. Dudgeon also says—"I omit at present adding to this deficit the depreciation which it may be further estimated will result permanently from the open trade in live stock and cured provisions. But it may be stated that the recent depression in the value of stock from that of late seasons, amounting to at least 15 per cent., shows a farther present loss on the calculated profits of this farm to the extent of £112 10s."

By allowing the above a place in the Farmer's Magazine, you will oblige
Yours, &c., M. SAUL.
Garstang, December 27, 1849.

SPADE HUSBANDRY.—SUCCESSFUL CULTIVATION OF THREE HUNDRED ACRES IN THE WEST.

A very successful practical proof of the advantages derivable from the substitution of the spade for the plough, has occurred during the last season on the estates of that truly energetic, indefatigable, and enterprising gentleman, Col. Knox Gore, near Ballina, in the County Mayo.

We have been favoured with a very able and business-like report, drawn up by the Colonel, which will be found at length in our columns of this day. Colonel Gore, seeing the destitution of the poor inhabitants of the Ballina union, took the humane resolution of mitigating their destitution, by employing them in the cultivation of a portion of his extensive estates, thrown on his hands by emigrating tenants, in an exhausted condition, and by that means enabling them to support themselves and families, reducing the number of claimants for out-door relief, and improve his property, establish a means, by practical proof, of removing the frightful blotch on the country, of thousands of acres going out of tillage, and a whole nation dropping piecemeal into the grave by starvation.

The result has been, from the combined forethought, energy, and determination of one man, that, from December to July, with untrained, half-starved, emaciated men, there were 100 Irish acres dug 14 inches deep, sown with flax; 100 acres dug 10 inches deep, sown with oats; and 100 acres dug twice, drills opened, manure deposited, covered with the spade, and sown with turnips, which, deducting all expenses of labour, manure, and seed, has left a profit on the

100 acres of oats, at £2 2s. per acre	£210
100 acres of flax, at £2 10s. per acre	250
100 acres of turnips, at £2 16s. per acre (a low average)	280

Rendering a total, on 300 acres, of £740

to meet rent, rates, and taxes. It has been said, and that truly, that one established fact is worth one thousand arguments; but here is a fact that puts to confusion millions of frothy arguments. Here is a man who has put his shoulder manfully to the wheel, rising up early, and at late going to rest; arranging and keeping steadily in their proper places an army of his destitute, grateful fellow-creatures, and paying each individual every night. What a work of labour! Colonel Gore at first intended to employ those poor people by task-work; this arrangement would have saved him great personal exertion, both mental and bodily; but this

was found impracticable from the utter poverty of the employed, who could not subsist unless paid every night. Nine hundred and ninety-nine out of a thousand would have given it up in despair, but Colonel Gore determined to brave every difficulty.

We now beg to request the attention of our readers to this most satisfactory report; it is a practical proof that men can be profitably and extensively employed, and that, although in some cases horses may be a little more profitably employed, still the statements so often put forth by us, during the last four years, on the necessity, on the score of humanity and thorough development of the hitherto neglected and hidden resources of our fertile soil, by the substitution of the spade and manual power, for the plough and animal power, was not altogether visionary.

Ignorant or interested disputants will be thoroughly at fault here. Col. Gore is a gentleman moving in the highest rank, of extensive property, and of active, cool, calculating habits. The experiment has not been tried on a small patch of ground, but on some hundreds of acres, and did not involve only a few days, but several months of unwearied application, and continued bodily exertion; and we are much inclined to think that the difficult query is now solved, whether the spade can be as well or more profitably employed than the plough.

It is a most gratifying thing to find that Col. Gore has not been a loser by his humane and philanthropic exertions; and that, instead of having a wild, desolate, uncultivated, unprofitable tract of land to look at, the senses are relieved by the prospect of a fine tract, producing all the necessaries of life, and a surplus after the expense of cultivation, to the amount of a fair rent and taxes. But we are not blind to the fact, that though this is so far satisfactory to him as a landlord, if the case were a tenant farmer's it would be ruinous; for after paying the expenses of cultivation, rent and taxes, nothing, or very little, would remain to compensate him for his time, capital employed and hazarded, or yield any support to himself or family. So that we cannot come to the conclusion which the Colonel has come to, namely, that this example would tend to the encouragement of farmers, of skill and sufficient capital, to take land and settle amongst us. It rather goes to confirm an opinion formed by us, that landlords should turn farmers, and employ the people on the land they were no longer able to till on their own account, and not

permit the land to run out of tillage, by which the distress and famine, which have since continued, would have been averted, and the land preserved in a productive state, and, under superior management, go on improving progressively, the necessity of which we endeavoured to enforce upon more than one noble proprietor. The property would not then be sinking in value, as it has done since, till at the present time it has become not only profitless, but an insupportable burden to many.

We hope many more will follow the example of Colonel Gore, and no longer leave the land waste, and trust to better times for a better class of tenant farmers.—Ed. Irish Farmers' Gazette.

SUCCESSFUL CULTIVATION OF THREE HUNDRED ACRES IN ONE SEASON, BY THE SPADE.

SIR,—Last December I saw such destitution amongst the labouring population of the Ballina Union, that I felt most anxious to alleviate it, if possible, by giving employment; I therefore determined on a trial of spade cultivation, and as I had in my possession a quantity of land lying for some years in a neglected state (since the tenants had emigrated to America), I saw it would be also beneficial to myself, if it could be effected on remunerative terms.

I accordingly commenced to dig, 14 inches deep, 100 acres of clay ground; and, to give a just idea, not only of its state, but also of a vast proportion of the best land in this district, I will just mention that, to prepare these 100 acres for farming purposes, I was obliged to level 1,400 perches of small useless ditch and bank, to drain 10 acres of land hitherto unproductive, and to subsoil about 10 acres that, from its shallowness, had never been cultivated before. These operations were carried on under the Land Improvement Act. The yearly instalment, payable for 22 years, for these improvements, amounts to £8.

I endeavoured to get the digging done by task, and I offered the price per acre at which it has been done in other parts of Ireland; but the people were so wretched, and had so little confidence in each other, that they declared they could only work by the day, saying they could not subsist 24 hours without being paid their wages, depending almost entirely on outdoor relief, which would cease when they began to work for me. I, therefore, most reluctantly felt obliged either to give up my project, or employ the men by the day, at the usual wages of the country, and I promised to pay them every evening. I thus engaged in an undertaking, the difficulty of which none can appreciate who have not tried it; and though I was assisted by a most

efficient and energetic steward (Mr. James O'Connor), yet, as he had to attend to my usual farm operations, which are on an extensive scale (having had 200 head of cattle tied up last winter), the principal duty of overseeing and paying these labourers devolved on me, and from it I never flinched from December to July, being out each morning before light in winter, and five o'clock during the other months, and not home till dark or eight o'clock, according to the season. I mention this solely for the purpose of shewing proprietors, who are similarly circumstanced, that, if they seriously wish to regenerate their country or their estates, they must not be stopped by difficulties which can be overcome by energy and resolution.

To return to my detail. I continued digging land after the 100 acres were completed; so that by the beginning of April the quantity had reached to 200 acres, 100 of which, having been dug 10 inches deep, was sown at once with oats or barley, and with the assistance of a moderate dressing of guano, has proved a good crop. The other 100 acres were dug at least 12 or 14 inches deep, being intended for turnips; but having been fortunate enough to induce Messrs. Bernard, Hay, and Co., to form an establishment at Ballina for the steeping of flax on the patent system, where I have built a scutching-mill for them, I found it necessary to sow near 100 acres of flax, the land for which I principally selected from that intended and dug for turnips. I, however, still determined to have 100 acres of turnips; so I continued digging fresh ground, and by the 1st of June my operations extended over 300 acres.

The flax crop was put down after the oat crop was finished, and was not completed until the 3rd of June; it also has proved a fair crop and remunerative, as can be seen by reference to the concluding table of expenses and returns of each crop. For the reasons before stated, I was unable to begin my turnip crop till June; I then dug over, a second time, 100 acres, harrowing and rolling after this as well as the preceding digging, new marked out the drills along a line by men with spades, opened the drills, put in the manure, and closed the drills—all the operations, except the harrowing and rolling, being performed by men, women, and boys. The seed was sown by a pony with a machine, sowing two drills at a time. There was no failure over the entire 100 acres; but, owing to an uninterrupted drought during the month of June and beginning of July, the seed lay dormant for several weeks, particularly in the strongest and best land; so that the crop, as far as the swedes were concerned, became a late crop. The moment it was possible, the plants were singled and wed with the hand and hoe, and afterwards the whole extent was dug over between the drills, the land now presenting a garden-

like appearance—not a weed to be seen and not a blank in the crop—it will, at a low estimate, pay all expenses, and a fair rent for the land, which has been transformed, by the cultivation, from a mangled, exhausted waste, to a fertile, highly-cultivated field, quite equal to any Scotch or English farm, and which will yield, next year, a superior grain or flax crop at a small expense.

During these operations I have employed almost every person asking for work, most of them unknown to me by name or appearance. The thankfulness with which these poor people received their wages each evening was most gratifying, and, as a proof of their gratitude and kind feeling, I may mention that my cattle and sheep were the only stock unwatched in this county, and yet I never lost one, nor can I complain of any injury done my property.

At first I found the people unable to work, being weak, ill-fed, and unskilled (except those who had been employed by the excellent Society of Friends last year), but in a short time they improved, and we got on tolerably well; men actually came each morning six miles to my work. When I found a family was large, I employed a sufficient number to make their wages enough to support the entire family; and I thus gave employment to children who had never earned a penny before. I am convinced if this system was generally adopted, even to a small extent, by each proprietor and landholder in each electoral division, the labourer and the land would soon rise in value; for I do not think the labouring population too great for the requirements of this country, were its agricultural resources fully developed.

The deductions of public interest to be drawn from detail and annexed table are, I think, as follows:—That the upland of this large district (a great part of which is now lying a barren waste) is capable of giving, even without manure, a remunerative crop of flax, of which we cannot grow too great a quantity, *if good*. The land is also capable of giving a good crop of oats or barley, with a little dressing, or of turnips, at an expense which the crop will fully pay.

That, by thus employing the labouring population, there would be an end to out-door relief and its attendant evils; that, by adopting the system here detailed, a farmer of capital, settling in the county, could, within one year, put the land, which now strikes the eye of the stranger as so unmanageable and valueless, into a suitable state for profitable farming, at no greater outlay than the crop of the year would repay.

That to enable this class of, farmers so much required, to take land in the country, the provisions of the "Land Improvement Act" should be

extended to the building of farmsteads; as farmers are unwilling to employ their capital in the erection of buildings, and proprietors, with scarcely any exception, are unable to do so.

Table of Expenses and Returns.

OAT CROP.

	£	s.	d.
Digging, nine to twelve inches deep, per Irish acre	0	15	0
Four cwt. of best Peruvian guano	2	0	0
Twenty stone of seed, at 1s. per stone ..	1	0	0
Harrowing and rolling.....	0	3	0
		<hr/>	
		3	18
The value of the straw is set against the expenses of harvesting and thrashing			
Produce 24 cwt. of oats, at 5s.....	6	0	0
		<hr/>	
Deduct expenses	3	18	0
Profit.....	2	2	0

FLAX CROP.

Expenses.

Digging twice, per Irish acre	1	7	0
Weeding	0	2	0
Harrowing and rolling.....	0	4	0
One barrel of Riga seed	1	16	0
Pulling, stooking, and ricking	1	0	0
		<hr/>	
Total expense	4	9	0
		<hr/>	
Produce.....	7	0	0
I have sold my crop to the Messrs. Hay, for £7 per Irish acre.			
Deduct expenses	4	10	0
		<hr/>	
Profit.....	2	10	0

TURNIP CROP.

Expenses.

Digging twice, per Irish acre	1	10	0
Harrowing and rolling.....	0	4	0
Opening and closing drills, and putting in manure	0	12	0
Six lbs. of seed.....	0	6	0
The manure was either—per Irish acre—twenty cubic yards of farm-yard manure, and four cwt. of Peruvian guano; or three tons of dry sea-weed, and four cwt of guano; or three cwt. of best Peruvian guano, and four cwt. of vitriolized bones; or seven cwt. of best Peruvian guano. The average cost of manure being, per Irish acre.....			
	4	0	0
Singling, weeding, and digging between the rows.....	0	12	0
		<hr/>	
Total expenses	7	4	0
		<hr/>	
Produce, per Irish acre, 15 to 20 tons of Swedes, or 25 to 30 tons of yellows ..	10	0	0
Deduct expenses	7	4	0
		<hr/>	
Profit.....	2	16	0

The turnip crop varies much in produce, per acre: some descriptions of swedes (the earliest sown) will reach 35 tons the acre, whilst others (late sown) will not reach 25. I, however, calculated the entire ten tons per acre under the estimate

of persons capable of judging, being determined not to overstate anything.—Yours, &c.,

F. A. KNOX GORE,
Lieutenant Colonel, and Custos,
Co. Sligo, December 3, 1849.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A Weekly Council was held at the Society's House, in Hanover-square, on Tuesday, the 11th Dec., 1849: present, Mr. Thomas Raymond Barker, V.P., in the Chair; Hon. H. W. Wilson, Colonel Austen, Dr. Calvert, Colonel Challoner, Mr. Bell Crompton, Mr. Dyer, Mr. C. E. Frere, Mr. Fisher Hobbs, Mr. Kinder, Mr. W. Perkins, Prof. Sewell, Mr. H. A. Smith, Mr. C. Steward, Mr. C. Stokes, Mr. G. Turner, Prof. Way, and Mr. Jonas Webb.

The following new Members were elected:—

Abraham, Thomas, Dunster, Taunton, Somerset
Allies, Robert, The Hill, Worcester
Baswell, John, Iver, Buckingham
Batley, William, 140, Strand, London
Darling, Charles, St. John's Abbey, Colechester, Essex
Farish, James, Dormanstead, Carlisle, Cumberland
Harvey, Thomas Chapman, Coburg Terrace, Sidmouth, Devon
Hudson, Rev. George Townshend, Hart Hill, Rotherham, Yorkshire
Lakin, Henry, Newland, Worcester
Parson, Rev. H. W., Lynchmere, Liphook, Hants
Peece, Fowler Boyd, Huntington Court, Hereford
Raper, Henry, Chapel Street, Grosvenor Sq., London
Solomon, Richard, Watton, Norfolk
Stevens, Rev. Thomas, Bredfield Rectory, Reading, Berks
Thexton, John Yeates, Ashton House, Milnthorpe, Westmoreland
Walker, George J. Alexander, Norton, Worcester
Thursby, Rev. J., Abingdon Rectory, Northampton.

The names of nine Candidates for election at the next meeting were then read.

Adulteration of Guano.—Mr. Pusey, M.P., transmitted to the Council a communication he had received on the subject of the extensive adulteration of Guano carried on at the present time by intermixture with a fine light-yellow earthy powder of an ochreous character, obtained by the calcination of a stone found near the line of the Greenwich Railway, and ground down into powder for the express and sole purpose of effecting the adulteration in question. Mr. Pusey transmitted to the Council a sample of the powder thus prepared; along with an intimation, on the part of the gentleman who had furnished him with it, that "he scarcely knew a greater service which could be rendered to Cultivators than a series of Papers upon the adulterations of Manures, Oilcake, &c., published in the Society's Journal." This communication led to an interesting discussion on this important subject; and to interesting details of practical experience from Col. Challoner, Prof. Way, Hon. H. W. Wilson, Mr. Fisher Hobbs, Mr. Geo. Turner, Mr. E. Parkins, and Mr. C. Stokes. Reference was made,

during the discussion, to the valuable Paper of Prof. Way on Guano, published in the last part of the Society's Journal, and which the Spanish Government had ordered to be translated into that language, for distribution throughout their South-American dependencies. It was considered that there were only two modes by which a farmer could avoid the disappointment and loss he would incur in purchasing spurious Guano—namely, either by a chemical analysis to ascertain its actual composition, or by his obtaining the article of dealers on whose commercial integrity perfect reliance could be placed.

Indian Corn.—Specimens of Indian Corn of different varieties, and grown this season in different parts of England, along with detailed statements connected with their respective cultivation and produce, were received from Mr. James P. Cobbett, of St. James's-square, Manchester; Messrs. Knott and Panzera, of Little Canford, Dorset; Messrs. Cooper and Co., of Covent Garden; and Mr. John Spencer, of Bowood Gardens, Wilts. Professor Sewell and Mr. B. Gibbs also presented Specimens of Indian Corn, and Mr. Keene transmitted additional specimens of his Forty-day Maize. The Council having directed their thanks to be conveyed to the several parties who had thus so kindly taken the trouble of favouring the Society with their results of cultivation, gave orders that the Specimens then presented to them, along with the details by which they were accompanied, should be exhibited to the Members in the rooms of the Society during the current week of their General Meeting.

Peruvian Potatoes.—Mr. Henry Manning, of 251, High Holborn, favoured the Council with the following result of his cultivation of Potatoes from South American Seeds, with a supply of which Mr. Miles, M.P., had kindly favoured the Members on the 15th of March, last year:—

"The Peruvian Potato Seed was set in ordinary garden ground at Shacklewell in 1848, and in due course showed fair stems and leaf; but on opening the ground last autumn, the result was found to be only a few small bulbs about the size of very small marbles, which, consequently, were disregarded. This year, however, from the seed left accidentally in the ground, there sprung up several vigorous stems, some of which had leaves of extraordinary size, the plants flowering in a variety of colours. The yield from these, considering the small set, was large, and the size of tuber considerably increased."

The Council ordered their thanks to Mr. Manning for the favour of his communication, and for the sample of potatoes by which it was accompanied. Communications

were also received, with the thanks of the Council, from his Grace the Duke of Rutland, K.G., on keeping farm accounts; from Dr. Lambe, of Henwood, on the construction of labourers' cottages; from Mr. Brandreth, a report of his trial of Brown's anti-attribution grease for carts and waggons, and from Messrs. Brown a statement of its mode of manufacture; from Dr. Calvert, specimens of grasses bearing affinity to the Tussac grass, with a statement of their cultivation, and a reference to his geometrical roofing-tiles, to be used instead of slates or other covering for buildings; from Mr. Rogers, V.S., on diseases in cattle; from Mr. Harris, of Braunston Mill, a drawing of a new cultivating implement of his own invention; from Mr. Donaldson, on his farming without ploughing; from Mr. Robertson, on restoring decayed trees; and from Mr. Pond, of Edinburgh, a copy of his table for distances in drainage.

The ordinary meetings of the Council were then adjourned over the Christmas recess to the first Wednesday in February.

A SPECIAL COUNCIL on the State of the Finances of the Society was held on Wednesday, the 12th of December—present, the Right Hon. Lord Portman, trustee, in the chair; Hon. H. W. Wilson; Colonel Austen; Mr. Raymond Barker; Colonel Challoner; Mr. Fisher Hobbs; Mr. Hudson (Castleacre); Mr. Jonas; Mr. Kinder; Mr. Shaw (London); Mr. Villiers Shelley; Mr. Robert Smith; Mr. Thompson; and Mr. George Turner.

Colonel Challoner, Chairman of the Finance Committee, laid before the Council the state of the arrears of the Society, and reported the various steps taken by the Committee acting under the authority of the Council for their recovery. The Council then took this important question into their serious consideration, and unanimously agreed to the following resolution:

"That the Finance Committee be directed to proceed in the County Courts; and that notice be sent by the Secretary to each person more than two years in arrear that, unless the money is paid on or before the 1st of February next, process will issue from the County Court of his respective district; the Finance Committee being desired to proceed in each case in such order as they may determine, and to report at each Monthly Council the proceedings taken in furtherance of this order."

A SPECIAL COUNCIL for deciding on the Live Stock Prizes for the Exeter Meeting was held on Thursday, the 13th of December—present, Mr. Thomas Raymond Barker, V.P., in the chair; Hon. H. W. Wilson; Mr. Grantham; Mr. Fisher Hobbs; Mr. Hudson (Castleacre); Mr. Shaw (London); Mr. Shaw (Northampton); Mr. Villiers Shelley; and Mr. Robert Smith.—The Council finally agreed to the terms and conditions of the prizes to be offered for live stock at the Exeter meeting.

The half-yearly AUDIT OF ACCOUNTS was held on Friday, the 14th of December, at Eleven A.M. Present: Colonel Challoner, Chairman, and Colonel Austen,

and Mr. Raymond Barker, Members of the Finance Committee; Mr. Thomas Knight, of Edmonton, Mr. Robert Beman, of Donnington, Glouc., and Mr. John Bell Crompton, of Driffield Hall, near Derby, Auditors on the part of the Society. The accounts were duly examined and certified to be correct.

A SPECIAL COUNCIL for agreeing to the Report of Council to the ensuing General Meeting, was held on the same day, at one P.M. Present: Mr. Raymond Barker, V. P., in the Chair, Hon. Capt. Dudley Pelham, R.N., M.P., Colonel Challoner, Mr. Grantham, Mr. Jonas, Prof. Sewell, and Mr. Jonas Webb. The Council considered, and agreed to, the Report to be made by the Council to the ensuing General Meeting.

The half-yearly GENERAL MEETING was held at the Society's House, in Hanover-square, on Saturday, the 15th of December, his Grace the Duke of Richmond, K.G., trustee, in the Chair, of which we gave a full report in our last week's publication.

Bog-land Cultivation.—The Right Hon. W. G. Hayter, M.P., Secretary to the Treasury, transmitted, as one of the Governors of the Society, striking specimens of the results of modern cultivation, for the inspection of the members during the period of their present General Meeting. These specimens consisted of magnificent turnips and swedes grown this year on reclaimed bog-land, the property of Lieut.-General Sir Robert Arbuthnot, near Hollymount, county of Mayo, Ireland, and received much attention from the members present. Mr. Hayter, for the information of the Society, had kindly addressed to Sir Robert Arbuthnot such inquiries connected with the reclamation of the bog, and the cultivation of these roots, as might prove interesting in explaining the circumstances of the case, and had obtained from him the answers required.

1. The situation and quantity of the land, and what fall there was to the river after it was lowered?—The situation of the land is low, but has a gradual descent to the river Robe; which, though not yet lowered, so high up, still by sinking a deep drain there was a sufficient fall. The soil is of a moorish quality.
2. The nature of the soil, that is, the depth of bog before coming to the limestone gravel?—The soil moorish; but at the depth of a foot to a foot and a-half marl and limestone gravel appeared. The main drains were five feet, and the sub-draining ones four feet and a-half, at, I believe, 20 feet apart.
3. The measures taken for reclaiming the bog; namely, the depth and plan of the drainage, and the trenching or other operations?—The measures taken for reclaiming the bog, &c., have been chiefly remarked on in the preceding answer.
4. The nature of the top-dressing, or other cultivation?—The land, twenty Irish acres (thirty-two English) consisted of a quantity of rushes and coarse grass; was ploughed, after being drained; was left to dry, when the roots and all were burnt, and the ashes spread on the land, ploughed again, harrowed, and sowed with swedes, turnips, &c.
5. What sown, and what results?—Sown with swedes,

turnips (Aberdeen, purple and green tops), oats, barley, the large white Belgian carrot, and mangold. All did well excepting the barley.

6. What was the cost per acre of the drainage and subsequent labour?—As near as it can be ascertained, the cost was £5 the English acre.

Wheat.—The Hon. George Agar, of Boyton, near Heytesbury, favoured the members with an inspection of a spe-

cimen of wheat grown on a neighbour's land, and which was considered a great curiosity even in that corn-growing part of Wiltshire. The variety was "Spalding's," and it was sown in Nov., 1848, by the Rev. Mason Anderson, of Sherrington, on a chalk soil, where there was not much depth of earth. The plants had ample space to branch, and in March they began to throw out their stems. Each plant had thirty-two stems.

THE LONDON FARMERS' CLUB.

MONDAY, DECEMBER 10, 1849.

MONTHLY MEETING OF THE COMMITTEE OF MANAGEMENT.—Present: Messrs. W. Bennett, J. Carter, S. Chectham, W. Fisher Hobbs, T. Knight, I. J. Mechi, J. Pain, W. Shaw (Strand), and J. Tyler. W. Fisher Hobbs, Esq., in the chair.

The minutes of the last meeting were read, confirmed, and signed by the chairman of this day.

The following gentlemen were elected members of the club:—

J. Anderson, Hampstead; J. J. Cleghorn, Lombard-street; Rev. J. E. Cox, Burton-crescent; W. Denison, jun., Kilbrook Manor Farm, Blackheath; J. Goldfinch, Compton, Winchester; J. Gould, Poltimore, Exeter; T. Harryman, Mereworth, Maidstone; J. Hunt, Montague House, Westham, Sussex; W. Pain, Compton, Winchester; R. Remmett, The Temple; A. Styles, New House Farm, Gravesend; W. Taylor, Manor House, Alresford, Hants; T. Twynam, Bishopstoke, Winchester. Some other names were read for the first time.

Mr. W. Shaw of Coton, Northampton, was elected Vice-Chairman of the Discussion Meetings for the year. A selection of Discussion Subjects for the year was entered on, but not completed.

THURSDAY, DECEMBER 13TH, 1849.

GENERAL ANNUAL MEETING.

George EMERY, Esq., in the Chair.

Mr. CORBET, the Secretary, read the following Report from the Committee:—

FARMERS' CLUB HOUSE.

REPORT OF COMMITTEE, DEC. 10TH, 1849.

In reporting on the present position of the London Farmers' Club, and the progress it has made during the past year, the Committee feel that their task is as pleasant as it may be considered brief. The experience of each succeeding season shows the Club as still more firmly established—as more generally acknowledged by that body for whose interest and convenience it was originally instituted.

Fifty new members have enrolled their names since the last annual meeting; many of these gentlemen from districts in which hitherto the club could count on but little support. Now, however, the Committee can report—and it is with sincere pleasure they do so—that in few parts of the country is the Club to be found without its representatives; while they have

equal justice for saying that in those counties where it had been least known the best and most eminent agriculturists were the first to appreciate its aim and object.

A reference to the card will show that the subjects selected for monthly discussion have been very appropriately timed to the occasions on which they were introduced; and the committee, fully conscious how important a feature this is in the management, will take every care to choose only such matters for consideration as they feel can be discussed with propriety and advantage by the yeomanry of England.

The detail of the balance sheet, subjoined, gives the income in a very satisfactory state compared with the expenditure of the year, and leaves the club in a healthy and promising condition.

On the motion of Mr. J. Parsons, of Stoneham, this report was received and adopted.

The following members of the committee went out by rotation, all of whom were subsequently re-elected:—E. Aitchison, R. Baker, W. Bennett, W. Cheffins, C. W. Johnson, C. H. Lattimore, H. Overman, J. Pain, G. Parsons, and W. Shaw (Strand).

The following gentlemen were also elected on the committee, to fill up vacancies which had occurred:—T. W. Granger, Strettham Grange, Ely; G. H. Ramsey, Derwent Villa, Newcastle-on-Tyne; W. Spearing, Chilton, Andover; W. Bullock Webster, Hounslow, Southampton.

The following gentlemen were elected auditors for the year:—T. Barker, W. Bell, and E. Purser.

A vote of thanks having been given Mr. Emery for his conduct in the chair, the meeting broke up.

MONTHLY MEETING OF THE COMMITTEE OF MANAGEMENT.

JANUARY 7, 1850.

Present—Messrs. J. Beadel, S. Cheetham, W. Cheffins, T. W. Granger, W. Fisher Hobbs, J. J. Mechi, and W. Shaw, Strand. W. Fisher Hobbs, Esq., in the chair.

The minutes of the last meeting were read, confirmed, and signed by the Chairman of this day.

The minutes of the General Annual Meeting were also read.

The following gentlemen were elected Members of the Club:—

- E. C. Barwell, Northampton
- W. G. Cowdry, Bath Easton, Somerset
- Jasper Rogers, 88, St. James'-street
- B. P. Shearer, Swanmore House, Bishop's Waltham.

Several new members were proposed, and the names were read for the first time.

The following gentlemen were re-elected as the House Committee for the year:—E. Aitchison, J. Beadel, W. Fisher Hobbs, T. Knight, and W. Shaw.

The thanks of the Committee were ordered to Messrs. Raynbird, for a copy of their work on the "Farming of Suffolk."

The following subjects were selected for discussion during the year:—

February 4.—On the evils resulting from the present imperfect mode of taking the corn averages, with a view to an amendment of the present system, proposed by Mr. W. Bennett, of Cambridge.

March 4.—The extension of rating and settlements to unions instead of parishes, by Mr. J. A. Gordon, of Naish House, Bristol.

April 1.—On the principles which should regulate the valuation between the landlord or the incoming and the outgoing tenant, under an equitable system of tenant-right, by Mr. W. Shaw, of the Strand.

May 6.—What is the best mode of securing a heavy crop of swedes? What is the cost per acre? And what proportion of such cost is chargeable to the succeeding crops in rotation? by Mr. C. Lawrence, of Cirencester.

June 3.—Upon high farming—showing how, and to what extent, capital can be applied to a given quantity of land, to insure the greatest amount of profit, by Mr. R. Baker, of Writtle, Essex.

November 4.—On the importance of some geological knowledge to the farmer, by Mr. W. Bullock Webster, of Hounslow, Southampton.

December 11.—On the qualities of different kinds of food, and the best methods of fattening stock, by Mr. J. C. Nashit, of Kennington-lane.

EXPENSE OF RAISING AND CULTIVATING AN ACRE OF FLAX.

SIR,—It is announced in your last wide-spread and valuable Gazette, of December 1, that a general meeting of the Society for the Promotion of the Growth of Flax in Ireland is to be held soon, to receive reports. I would respectfully suggest that the society, at their ensuing meeting, would adopt a rule, that for the time coming, they should order a report to be sent forward, from four of the largest flax-growing farmers in each parish in Ulster. Then, and then only, will the Flax Society and the public come at the truth.

One grower is fortunate—numbers unfortunate: the latter remain in the shade—never noticed. And to make a beginning, as a flax-grower for many

years, I beg leave to send forward my report, and first of all, the cost of raising and cultivating an acre of flax, on suitable land, with the produce. In a form of 24 acres four are lost in waste.

	£	s.	d.
Rent (as such ground required cost to fit it for flax)	2	10	0
County-cess, twice a year, 2s. 6d. in the pound	0	6	3
Poor-rate, tenant's part, 1s. 6d., do.	0	3	9
Tithe rent-charge, 3s. do.	0	7	6
Two ploughings (often three), and harrowings	1	5	0
Three rollings, handpicking weeds, carting off some.	0	13	0
One barrel Riga Flax-seed (sometimes good, often bad)	2	0	0
Weeding, 2s.; bands for binding, 3s.; cleaning dams and repairing, 4s.	0	9	0
Pulling, 12s. per acre	0	12	0
Cartage to steep, stoning or sodding, 6s.; caring during steep, 1s.	0	7	0
From steep to spread-field, 7s. 6d.; 8 women spreading, 4s.	0	12	0
Four women lifting, 2s.; 3 men binding, 3s.; stacking and thatching, 7s. 6d.	0	12	6
Eight men, one day breaking	0	8	0
Cartage to mill (often eight miles)	0	10	0
Cleaning or milling, say 5 cwt., at 5s. per cwt. (before market)	1	5	0
Marketing (the seller has always to travel the night)	0	7	0
Deterioration of land	1	0	0

To cost of the cultivation of one acre of flax 13 8 0
 By 5 cwt. sold, at 45s. per cwt 11 5 0

Loss £2 3 0

And for one cwt. sold at the above figure, tons are bought and sold under; and for every cwt. sold at 71s., two are sold under 40s. per cwt. of 124 lbs. nett; and for one acre producing 5 cwt. nett, of 124 lbs., there are, at least, five acres whose yield is under 4 cwt.; and bear in mind, that the cost to the grower is the same, be the crop or produce good or bad, or nearly so; and to satisfy the society that I can cultivate much better than I write, let the society send one of their trained instructors here—let him rent four acres of land, of his choice, for his management and cultivation of the flax crop, within a circle of one mile, of a field of four acres (more or less), I intend for flax, and I agree that the successful candidate shall claim the sum of £10 from the unsuccessful one.

This is the way to go to work. We know spirits are sometimes called from their recesses. Do they come?—Yours, &c., AN ULSTER FARMER.

Strabane, December 5, 1849.

—Irish Farmers' Gazette.

THE ADVANTAGES OR DISADVANTAGES OF SUBSOIL PLOUGHING AND OF TRENCH PLOUGHING.

HIGHLAND AND AGRICULTURAL SOCIETY.

A monthly meeting was held in the Museum Hall, on Wednesday, the 16th of January, His Grace the Duke of Buccleuch in the chair, supported by the Earl of Morton; Sir James Drummond; Mr. Murray, of Henderland; Mr. Callander, of Prestonhall; Mr. Campbell, of Jura; Col. Graham, of Mossknow; Mr. Thomson, of Balgowan; Mr. Dundas, of Arniston; Mr. Pringle, of Whytbank, &c.

Mr. HALL MAXWELL, the secretary, said, that in accordance with the resolution adopted by last meeting, it was necessary to fix on a subject to be discussed in February, and before commencing the business of the day he might mention that the following one had been selected by the committee, "The best and most economical mode of feeding farm horses," and that it was proposed to ask Mr. Gibson, Woolmet, to introduce it, and the following gentlemen to take part in the discussion: Mr. Thomson, Hanging-side; Mr. Rt. Dudgeon, Hunbie; Mr. D. Scott, Northfield; Mr. J. Steedman, Boghall. He had farther to submit to his grace and the meeting a suggestion which had been made to him by several members, viz., that the result of each discussion should be embodied in a resolution expressive of the opinion of the meeting. The only difficulty was, as to the best mode of effecting this. It might occupy too much time, and be unsatisfactorily arranged at the end of a meeting; but perhaps the duty might be remitted to a small committee, whose summing up would be read to the meeting.

The DUKE OF BUCCLEUCH observed that it might be very serviceable to have the arguments advanced on either side of a debate collected as proposed, and the meeting to adopt such resolutions from the evidence as they might think fit. He thought the suggestion of Mr. Maxwell a very good one, though it had not before been proposed.

Mr. MAXWELL stated that he would try at least how the plan worked, and the society could then judge for themselves (Applause).

The noble CHAIRMAN then stated that the discussion for to-day was "the advantages or disadvantages of subsoil ploughing and of trench ploughing," to be introduced by Mr. Dickson, Soughton Mains.

Mr. DICKSON said—"In introducing this subject to the meeting, I will endeavour to state shortly my views of the advantages and disadvantages of subsoil ploughing and trench ploughing; my method

of conducting these operations; with the expense incurred; and the result of my practical experience, so far as I have already had an opportunity of observing the effect produced. The effect of subsoil ploughing is, in process of time, to deepen the surface soil. It breaks up and loosens the subsoil, mixing it partially with the soil, greatly increasing the efficiency of the drainage, and by the admission of atmospheric influence to a much greater depth than formerly, renders what was previously a barren subsoil, and an obstruction to the effectual drainage of the soil, suitable for the reception of the roots of plants, thereby increasing their fertility, more particularly in seasons of either excessive drought or moisture. Besides these advantages, there is also the greatly increased facility and saving of labour in the subsequent working of the land, and the ease with which, at any later period, the soil can be deepened by trench ploughing, and bringing up a portion of the loosened and prepared subsoil. As to the disadvantages, the chief objection which I have heard urged against subsoil ploughing, is the expense of the operation; this, I am glad to say, has now been materially diminished, or rather reduced to one-half of what it cost with the ploughs formerly in use, by the introduction and use of Reid's subsoil plough, as improved by Mr. Slight. I have seen wet undrained land, where the operation of subsoil ploughing was positively injurious: but this was an injudicious application, the effect produced being to increase the depth of the wet soil, and make it more difficult to work, and longer of drying; as it is now well understood that on wet land draining should in all cases precede subsoil ploughing or trench ploughing. I have also seen a dry sandy loam with a gravelly and sandy subsoil, subsoil-ploughed without any apparent beneficial result: this was obviously also an injudicious application, as the cause of the inferiority of *this soil* previously arose from the deficiency of alumina or clay to enable it to retain sufficient moisture in dry weather, while the subsoil ploughing increased the porosity of the subsoil without adding to the soil, clay, or any other substance that could improve the quality of it. The plan I follow in subsoil ploughing, is to take a furrow with the common plough from 9 to 10 inches deep, at right angles with the lines of the drain, the subsoil plough following and breaking up the subsoil 6 inches deeper, thus working in all to the

depth of 15 or 16 inches; this I have been able to do with one pair of powerful horses in each plough: the cost of operation (exclusive of the ordinary ploughing) is about ten shillings per acre, and I find that I can save the whole of this extra labour in spring, when I come to work the land for green crops, as from the depth to which the atmosphere has affected the land that has been subsoil ploughed, it is in better condition for drilling up for turnips, after being grubbed and harrowed to level and mix the soil, than is the land that had not been subsoil-ploughed after having got an additional ploughing with harrowing and rolling. My experience in subsoil-ploughing extends over the last ten years, and with the exception of the first experiment, which was made on a soil consisting of a deep dry loam, or a tolerably porous subsoil, where I observed no beneficial results, the whole of the other fields which I have subsoil-ploughed have been much improved thereby: and, during the last three years, I have left a portion undone of each of the fields which I subsoil-ploughed that I might be better able to judge of the result of the operation. On all these fields I have observed that the portion not subsoil-ploughed was longer of drying in spring than that which was subsoil ploughed, and was about two days later of being in a fit state for working; and also that the crops of beans, potatoes, turnips, and wheat were superior on the land which had been subsoil ploughed, to those on the portions of the fields that had not been so treated. In November last I had much gratification in witnessing the very effectual deep working of the French plough and subsoil plough on the Marquis of Tweeddale's home farm at Yester; and also of observing the successful result of the deep working of the soil in the preceding year, as shown in the immense crop of turnips raised on inferior soil, with a very moderate application of manure. This confirmed my own experience of the beneficial result of deep working land that had previously been thoroughly drained. I may here state that I never saw a plough which, to my mind, so completely executed its work in turning over a deep furrow as that plough lately invented by the Marquis of Tweeddale; and having ordered one of the same, which I expect to have at work in the course of a few days, it being probably the only one yet in this district, any person wishing to see it at work may have an opportunity of doing so on my farm, as I intend to have it going before the subsoil plough during the ensuing six weeks, when the weather is favourable. I believe it requires only to be known to be appreciated, and that it will form a valuable addition to our stock of agricultural implements. I am of opinion that subsoil ploughing is an operation which may be profitably repeated on the same land pe-

riodically, previous to the application of manure, by each time going two inches deeper, and bringing up two inches of the previously loosened subsoil, and the subsoil plough also penetrating two inches deeper than formerly. I am not prepared to say how often this may be repeated with profit: but this I know, that it would be a very great advantage to, and would materially increase the produce of the land I farm, had I the whole of it cultivated to the depth of eighteen inches. In conclusion, it appears to me that the question of the advantages or disadvantages of subsoil and trench ploughing resolve into the comparative advantage or disadvantage of a deep or of a shallow soil; and seeing that it is well known that the roots of many of our cultivated plants—more particularly turnips, wheat, and red clover—will go down in search of food to the depth of three feet, where the soil and subsoil are made fit for their reception, it can scarcely be said to remain an open question whether or not it is advisable so to deepen the soil at such a moderate outlay as I have here shown it to cost.

Mr. HOPE, Fentonbarns, said: I feel a great degree of reluctance to do or say anything which has a tendency to throw doubt on what any practical man may deem an improvement in the practice of agriculture. Still it does not suit at all times to keep silence, and particularly on the present occasion, when I believe a frank expression of our united observations and experience may have the effect, if not to put money in our pockets, at least to keep what little there is there. I do not mean, in every case, to deny the utility of subsoiling and of trench or extra deep ploughing; but I do say that on arable land that has been long under the plough, and in fair condition, that they are operations requiring to be performed with great caution. If the soil has actually to be made, I grant at once their beneficial tendency; in fact, I do not think you can get well on without either one or both being efficiently attended to. But it is a very different matter if you take an ordinary Lothian farm, thoroughly drained, and say you must now subsoil-plough it, and afterwards turn it over 18 or 20 inches deep. In the first place, this will be a heavy expense; and in the second, I believe it will serve no good purpose. I am aware that in 1843 Mr. Brodie, Abbeymains, obtained a premium from the East Lothian Agricultural Society for a report of an experiment in subsoiling, from which it appeared that, at the end of the fifth year, there was a profit of £1 10s. 1d. per acre, after deducting the original cost of the operation. Mr. Brodie is well known as one of the first practical farmers in Scotland, and who is not to be frightened at trouble or expense, if he sees any prospect of being repaid, but now Mr. Brodie has dropped the practice, and he perceives no differ-

ence in his crops. I could mention one or two other gentlemen who have tried it without benefit, though one thought the loss on his first wheat crop more than compensated by the superiority of the oats, but since then he has observed no difference. We all know that oats require more moisture than any of the other cereals. I have tried subsoil ploughing in three different fields. On the first two it was unfortunately done up and down the ridge, or in the direction of the drains, being unaware at the time that it was considered necessary to have it done across the drains; so I will not insist on the loss sustained on the wheat crop as telling against subsoiling; but a year or two afterwards, when tried on the third field of thin moorish soil, with a subsoil of rather hard yellow sand, and where I thought it would have a good effect if anywhere, it was done across the drains. It is now upwards of eight years since then, but I have never been able to perceive the slightest difference on the crop where it was done, from where it was not done. A cleverly written and ingeniously reasoned pamphlet, styled "A Practical Essay on Deep Ploughing, by an East Lothian Agriculturist," was published two years ago. I believe it is no secret that the author resides near Dunbar, which, if not the land of Goshen, is very near it. The only experiment mentioned directly bearing on the point is in these words—"That land of the same quality ploughed 18 inches deep produced one-fifth more than that which was ploughed only 12 inches deep. Both these rates are beyond the common depth of field culture, and on the least of them there was an excellent crop in a very unfruitful season. The result strongly shows the utility of deep-ploughing." It would have been more satisfactory if we had got over and above this meagre account a description of the soil, its previous management, and the kind of crop, of which there was one-fifth more. What might do on the well-known Dunbar Glebe, might be very unsuitable on Fenton Muir. I recollect, two years ago, of trenching being in vogue, and some of the best fields in the county did not recover the effects of the operation for at least one rotation. I have sometimes lifted soils from headlands, and have had no crops on the bared space until it was again thoroughly saturated with manure. But two years ago, I lifted fully 12 inches of one, composed of strong alluvial clay, and found below that such a quantity of lime that when again turned up by the plough it had all the appearance of a rich compound. It ploughed much easier than the top soil that had been carted off, and the succeeding crop of barley, without manure, was as strong as could grow. But there is not two acres of this description of soil on my farm. If I had ploughed this piece of land 20 inches or 2 feet deep I would have

had an excellent crop; and had I allowed myself to be hurried away by one experiment, and gone over my whole farm as recommended by the East Lothian Agriculturist, I think the chances are at least equal that my name would before this have found its way to the *Gazette*. I find it difficult enough to keep 6 or 8 inches on the surface so full of manure as I could wish; I confess I am unable to stand the expense of doubling this depth, let alone quadrupling it. No doubt it might be a very nice thing to have a farm with a depth of 2 feet of rich soil; however, I would prefer entering on such a possession, to having the honour of making it. We have been told by a high authority in agricultural matters that Swedish turnips may be grown on a deal table if certain chemical ingredients were properly served up to them. Without going this length, I may tell you I have eaten peas grown in the neck of a glass-bottle filled with common water, the original pea having only a small quantity of cotton wrapped round it to keep it moist. I look upon the soil simply as the storehouse in which is laid up, to be given forth when required, the necessary food for the growing crop, and the medium by which plants are enabled to take their food. The soil itself may or may not be naturally composed of the required ingredients, but whether these may have been placed there naturally or artificially, the generality of soils in this country may be viewed merely as the mechanical means by which the food of plants is conveyed to them. Constant cropping soon renders requisite to the richest and poorest, or removal or addition by the hand of man, of the materials that form the crops previously, and to be extracted from it. I have frequently heard of roots of various plants penetrating to great depths in search of nourishment, but I am inclined to believe that this only happens when the necessary food is wanting near the surface, and it may happen that the crop may be lost, or its growth so materially retarded before the roots reach the substance on which it feeds, that the proper season of growth may have passed away. I once borrowed a machine from Mr. Ainslie, of Elvingston, for dibbling bones immediately below the turnip seed. I tried it with guano and bones mixed, and though from the quantity of guano it did not work so pleasantly as I would have liked, yet the crop of Swedish turnips grown after it was decidedly better than where the same quantity of manure was sown in the drills. I could only account for this by the whole manure being placed in such close proximity to the seed that the roots seized upon it at once, and by that means the plants got a start which they kept to the end. I generally plough deeper for the turnip crop than any other time during the rotation, principally because I think that

deep ploughing assists in retaining the moisture longer, and consequently that the turnips are not so apt to be hurt by drought, but the drills in which guano is sown (and turnips now-a-days positively will not grow without it), are made quite ebb so that the roots may get as quickly to it as possible. It is unquestionable that the richest part of all arable soils is usually on the surface, and that the cream is on the top. I see only harm in burying this out of the reach of plants. For all practical purposes I find a plough furrow of 7 or 8 inches deep all that is required. For white crops, after either beans, potatoes, or turnips, I think 6 or 8 inches quite enough. I once saw an experiment after potatoes, where the field, having had Finlayson's harrow run through it, two ridges were not ploughed at all, and on them the wheat crop was decidedly the thickest and best. A great deal depends on the mechanical texture of the soil, and what is suitable for one kind of crop and land does not answer for others. But I have ever found that it is a safe rule, on every description of soil, to make the land dry, keep it clean, to take care to plough it always at the proper time; obtain the finest possible tilth for all descriptions of green crops; turn over a neat, clean furrow for grain crops; but, above and beyond all, never to forget manure, for *muck* is emphatically the *mother of money*.

Mr. ROBB, Gorgie, said: My Lord Duke, having been requested to state my views as to the advantages and disadvantages of subsoil ploughing, I regret my experience is rather limited. It is right that those who hear me should know on what experience I presume to speak. About thirteen or fourteen years ago I subsoil-ploughed about 10 acres of the farm on which I reside. Two years after that I subsoiled some more of the same farm. About eight years ago I subsoiled some fields in Dumbartonshire, and this season I have subsoiled about twelve acres of the farm I reside on, and intend doing more this season. The first mentioned fields were ploughed with one of the earliest made subsoil-ploughs from the neighbourhood of Stirling. The fields in Dumbartonshire were done by a plough improved by the late Mr. Stirling, of Glenbervie. The operation this season was performed with a plough invented by Mr. Slight, I believe. The two first mentioned ploughs are powerful, were worked by two men and four horses, and were difficult to guide; hence the work was rather irregularly done, notwithstanding strict attention was bestowed on it. I am inclined to think that very few fields have been thoroughly and uniformly subsoiled by such ploughs; sometimes they worked too deep, sometimes too shallow, sometimes too broad, sometimes too narrow, so that subsoils in many cases have been scooped out into a series of irregular hollows.

During winter the hollow places were saturated with, and soured by, the stagnant water; I have no hesitation in saying that a worse crop might be produced, over these hollows, the first year after such subsoiling than would have been produced on the same soil if the field had not been so subsoiled. The imperfect manner of performing the operation I believe to be the chief cause of disappointment. Subsoiling with the first named ploughs was expensive, and in many cases, though not in all, unsatisfactory; six horses and three men being necessary, a little commotion took place in the establishment when one subsoiled. Now, with Mr. Slight's plough, two men, with four horses, go a subsoiling as quickly and coolly as they go to ordinary ploughing. The common plough with two horses making a furrow about ten inches broad, and as deep as they can, not being over nice about the proportions, the subsoil plough following, drawn by two horses, and stirring the subsoil from three to five inches deeper without raising it, a boy follows throwing out the loose stones, and marking with pins any stones that require fork and spade to remove them. It is essential that the first plough cuts a furrow no broader than the subsoil plough can stir thoroughly and truly, as, upon this thorough and uniform stirring, depends the success of the operation. I am afraid many persons may expect too much benefit to be apparent on the first crop after subsoiling. When the operation is imperfectly performed little or no benefit can accrue. Even when the work is done in the very best manner, according to our present means, I would not look for a *very* marked increase of crop, the first year after the operation. If we take a man who has not been taught the A B C, and teach him to read, we cannot say to ourselves—We have made him a learned man, or that we have taught him knowledge. No, we have only given him the means of acquiring knowledge, influence, and power. So, when we thoroughly stir our subsoils, we do not make them fit to produce superior crops immediately; we only put them in a condition which facilitates the changes necessary to make them more subservient in assisting the soil to produce superior crops. We merely put them in a condition to acquire influence and power. I need not tell those who hear me that the changes in the texture of the subsoil are produced by the admission and transmission of water, and the circulation of atmospheric air—for we all know that where water can percolate air can permeate—and I will take the liberty of reminding you that simply by an intermittent admission and transmission of water alone (air always being present) a clay soil can be changed into a loam, or at least a very friable clay. If any one is sceptical on this point, let him take a piece of clay soil, break it down, place

in a wooden box well perforated, so as the air and water may have free access and egress; suspending the box with the clay, water it, and let it dry alternately, that is, let the application of the water be "intermitting," stirring it in the intervals: I guarantee the clay soil shall be converted into something like loam. If my views are correct (and my experience induces me to believe they are), we can, by judicious thorough subsoil ploughing, convert a clay soil into a loam; we can acquire a deeper soil that shall absorb a greater quantity of rain in a given time without being injured by it, that shall afford the roots of plants a larger field through which to ramify in search of food, that shall dry earlier and more uniformly in the spring, thereby admitting the plough earlier; that shall retain and give out by slow degrees a greater quantity of air and moisture, nourishing the crops for a longer period; that shall produce a crop more uniform as to bulk—a crop that shall ripen more equally, and be of more equal quality. These results I shall name—"The advantages to be derived from judicious, thorough, uniform, subsoil ploughing." As to the disadvantages attending the operation, I think they are few. I will take the liberty to state an extreme case, just by way of index. Suppose a park or a field, known by the name of a "sandy knowe;" suppose on this knowe we find a loam ten or twelve inches deep, incumbent on a porous sand; two or three inches of the inferior part of the loam may be indurated by the plough passing over it. This indurated part helps to prevent the water rushing through the loam into the sand. A disadvantage would attend subsoil ploughing in this case, because the subsoil would then transmit the water too rapidly, and worse crops would be produced. Mr. Robb concluded by observing that he had in the course of his remarks taken no notice of trench ploughing; but he thought there could be no objection to that, provided too much was not taken up at a time. It should be taken up slowly and thoroughly, and then mixed with a better soil (applause).

MR. PATERSON, Meadowfield, said: Several years ago I tried some experiments in trench ploughing; but I never, in any instance, thought it paid for the additional expense incurred. One field upon which I experimented lay upon a considerable slope; the upper part of it was a dry gravelly soil, upon an open gravelly subsoil; the lower part of the field was gravel mixed with clay, upon a close, retentive subsoil: no part of it was furrow-drained. The lower and wet part was partially cross drained. Upon the dry land I think the operations made no perceptible difference; the wet land evidently was injured by it. Since then I have never either subsoiled or trench ploughed any. But the system

having been advocated by men of high standing in the agricultural community, I have turned my thoughts a good deal to the subject; and although I would not say that in some soils and certain situations it might not prove beneficial, yet am of opinion its universal adoption would be a waste of money, and never would remunerate those who practised it indiscriminately on all kinds of soils. On wet and undrained soil its effects have been admitted by all to be injurious, and although, on the same kind of lands when drained, its injurious effects have been less apparent, yet nevertheless I think they may still have been so to a certain extent. One advantage said to be derived from the operation, is the facilitating the ingress of the water into the drains; my opinion is, that if land is thoroughly deep drained, nothing will prevent the water getting into the drains; and subsoiling clayey land, I believe, has the effect rather of retarding than accelerating the descent of the water into the drains, and upon open bottomed land the operation is not required for this purpose. In confirmation of this opinion, every person must have observed when preparing his land for green crop in a wet spring, that if, while he ploughed shallow (which is generally done at first if the land is dirty), he was overtaken with a heavy fall of rain, the land soon dried and was little the worse; whereas, if immediately before a heavy rain he had given it a very deep furrow, the consequences were far more injurious, and the land longer in drying, which shows that the deeper the soil is stirred so much the longer will it be in drying; and on this account I am of opinion that trench ploughing and subsoiling has not the effect of facilitating the ingress of water into the drains. Another advantage said to be derived from subsoiling is the loosening the soil to a greater extent, and thereby allowing the roots of plants to penetrate more easily into it in quest of food. This advantage, like the former, I think, is often over-estimated; for in land in good heart, the roots of plants do not go very far down in quest of food: and I think the common two-horse plough efficiently used, goes quite deep enough for this purpose. I have often thought that if the advantages of subsoiling were as great as its supporters would make us believe, what immense crops would we not see on the tops of our drains, where we have subsoiling in the most perfect manner; yet what do we here experience on a well-drained field? I have never yet been able to see the smallest difference between that part immediately over the drains and the rest of the field. The only kinds of land upon which I think subsoiling to be of advantage are upon moorish land, where, under a thin covering of moss or clay there is a sort of muir-bound pan, which the common

plough will not penetrate, and which it is necessary to break through in order to get a sufficiency of loosened soil to produce a crop; and also on land that has been long under an imperfect cultivation, and become so very hard by continued shallow ploughing, that subsoiling is the only way in which it can be got ploughed to an ordinary depth. My practice is never to plough very deep, except once during the rotation, and that either in the autumn ploughing, immediately before the green crop, if the land is clean; or if not, after the land is properly cleaned, and before I put in my green crop in the spring: then I plough very narrow, and as deep as two horses can draw—saw about 10 or 11 inches. This, I think, in most cases, is all that is necessary in the way of stirring and turning over the soil, for keeping the land in the greatest state of fertility.

Mr. LAING, Addinstone, said—My lord duke and gentlemen, having been requested to state my experience, regarding the important operation in agriculture now under discussion, allow me to say that I quite concur in the opinion so ably expressed by Mr. Dickson, who opened the subject. Instigated by the pamphlet published about 14 years ago by Mr. Smith, of Deanston, who is well known to have first introduced subsoil ploughing, I was induced to commence that operation on the farm of Somerside, near Dalkeith, the subsoil of which consisted generally of tenacious clay, the land having been formerly furrow-drained: the beneficial results were such as to give encouragement to proceed with the operation till the whole farm had been gone over. I may mention an experiment I then made. A portion of the most retentive land, consisting of three acres, was set apart for it. One acre was drained 15 feet wide, another 30 feet, and the third portion was not drained at all; the first portion was not subsoil ploughed, the second and third portions were subsoiled. The results proved that subsoil ploughing with drains 30 feet apart produced better crops than with drains 15 feet without that operation; while the undrained land was soured, and did not recover its fertility till it was drained and subsoil ploughed. These facts, although visible from the appearance of the crops, were tested from the produce having been weighed successively, but from being unable to find my notes on the subject I cannot give the results. After entering in 1840 to the farm of Addinstone, in Berwickshire, the property of the Marquis of Tweeddale, I continued the use of the implement with success; but, from the land, which I then supposed only required that work, consisting of portions at the bottom of some of the fields, while the upper part is dry turnip land on a gravel subsoil—in some seasons apt to suffer from drought, and laying on a considerable declivity, I was induced to subsoil the

whole field. This would have been tedious work with the Deanston plough, from the extent to be gone over; consequently, it suggested itself to me to convert the common plough into a subsoil one, which was easily accomplished, by taking off the mould-board and putting on subsoil apparatus. By this means, the land being free from frost, stones have been ploughed from fourteen to sixteen inches deep, both through the clay and gravel subsoil, the effect from which has amply repaid the expense—the dry land producing turnips of greater size, and the grain crops not being nearly so much affected with drought, while the wet land, at the bottom of the fields, having been previously thorough drained, was rendered comparatively dry, producing luxuriant crops. With regard to deep or trench-ploughing, I would consider that on land where the subsoil consists of retentive sterile clay, it would not be prudent to bring such under that operation, unless it had been subsoil ploughed at the beginning of the previous rotation; that the subsoil would be ameliorated, from the admission of air and water, and brought into a fit state for mixing with the active soil. I am aware that some farmers prefer using the French plough in all cases at first. Such the nature of the subsoil of their land may admit of. I can add testimony to this so far, from having portions of my farm, consisting of dry loam, and the same description of land with clay and sand in the subsoil that required draining, which I have successfully turned over to the depth of fifteen or sixteen inches, with three horses yoked abreast with the equalizing draught swingtrees, which system I would strongly recommend, as there can be no doubt that three horses yoked in that manner have as much power as five horses, two-and-two. I would finally state that, in my opinion, there can be no fixed rule whether land ought to be deep ploughed at once or not, as that must entirely depend on the nature of the subsoil. One of these operations is, however, indispensable, not only for the working and deepening of the land, but also from giving more effect to the drains, from the land having been ploughed at right angles to them, and that, from the substrata laying transversely to the declivity, making a drain of the whole field. The system now practised by my noble landlord, is certainly the most efficient that has come under my notice, being a combination of the two methods. To those proprietors or farmers who still may have doubts regarding the efficacy of such operations, I would strongly recommend a visit to Broadwoodside, his lordship's experimental farm. There they will see land that was valued a few years ago at a rent of 7s. per acre, yielding abundant crops of corn and turnips. These results have been produced by thorough draining, and ploughing to the depth of

fourteen inches ; and now several of the fields have been operated on with these efficient implements, the Tweeddale and the subsoil trench-ploughs, lately invented by his lordship, the former turning, in the most substantial and satisfactory manner, a furrow fourteen inches deep, and the latter stirring up and mixing the subsoil, making nearly a uniform soil to the depth of twenty inches. For the perfecting and introducing these implements, the Marquis of Tweeddale well merits the thanks of the agricultural community. With these remarks my Lord Duke and gentlemen, I will conclude, trusting they will be approved of by more experienced agriculturists than myself.

Mr. M'LEAN, Braidwood, said I had no intention of troubling the meeting with any remarks, but being called upon, I shall state my opinions regarding the subject of discussion as being one of vast importance to agriculture. I am greatly at a loss to understand why so much difference of opinion exists amongst the most experienced and practical agriculturists. I impute this in a great measure to the injudicious mode of performing the operation, this arises from an ever anxious desire to increase too quickly the depth of the soil. I believe to do justice to subsoiling, the under soil should only be loosened or stirred up, so as to allow a more easy and immediate escape of the water into the drains or subsoil, and to give more easy access to the roots of plants. I think it will generally be admitted that six or eight inches of the upper soil contains the soil and substance of fertility, this arises from the continued action of the atmosphere, the repeated tillage, the frequent manurings, the droppings from the cattle and sheep when under pasturage, and withal, the constant working of the worms and other small animals which a wise Providence has so wisely arranged to increase the fertility of the soil, or in adding largely to the hitherto enriched soil, by a poor and likely unproductive subsoil, you deteriorate to a certain extent the value of the whole. I have made a number of experiments upon a small scale, and from the great varieties of the soil which I occupy, they may apply to other localities, and may be pronounced to be generally satisfactory ; besides the right hon. Sir George Clerk has been draining extensively, I believe to the extent of 130 acres, which I have examined with great care, and can pronounce entirely in favour of the operation. I differ with many, however, in thinking that subsoiling can be beneficially practised upon lands which have not been drained, and indeed which do not require it, a great extent of land upon the sloping side of our mountains, as well as land stretching across our fertile valleys, has a subsoil composed of the debris from the granite formation and of the most fertile description, which has been cor-

roborated by Mr. Laing, of Addinston, and is found to add materially to the production of better crops. The greatest caution should be used in bringing up the subsoil to mix with the soil, and by every rotation bringing up small portions to deepen the soil, and give better fertility to the whole mass.

Mr. FINNIE, Swanston, said—When subsoiling, or rather, I should say, a discussion arose in this place some time ago in consequence of a paper being read by my friend, Mr. Dickson, in recommendation of the subsoil plough, I then took the liberty of stating that I had extreme doubts whether the eulogiums passed from time to time on subsoil ploughing were altogether merited, as I had more faith to put in an effectual stirring or turning up of the soil by means of the common plough, where a depth of active or upper soil existed—say from 8 inches and upwards. I then stated that I believed that many who practised subsoiling laboured under a delusion as to the depths obtained ; as in some cases that came under my own observation, while the parties were supposing that 14, 16, nay even the length of 18 inches was arrived at, upon actual measurement, little more than the half of that depth, upon an average, was found to be the true estimate. I should be sorry for one moment to be supposed that I gave an unqualified condemnation of subsoiling ; so far from that I believe in certain cases deep cultivation by this method was most desirable, especially when there was a less depth than 8 inches of active soil ; and it would be dangerous from the large proportion of inferior subsoil being brought to the surface by trench ploughing. In such a case, likewise, it might be commendable. But what I would wish to argue is, that as deep cultivation was the exception and not the rule, I should conclude that farmers had better try its effects before putting themselves to the expense of subsoil ploughing. It is the tendency of all manures to sink into the ground. Such a furrow as I have pointed at will bring again the unexhausted manure to the surface, and place it in more immediate contact with the plants. Some say the plants will find it out ; but, in my experience as a farmer, I find that it is better to have the manure brought within the reach of the roots in the early stage of the plant, and trust to the rains washing it down. Some say, why not do both ? Now the practical conclusion is—let the most, in the first instance, be made of the upper or active soil, by turning it over to the greatest possible depth, and as this can only be done by the aid of additional horses being put into the ordinary ploughs—these having received a slight adjustment of the irons for the purpose ; and, as it is unlikely this extra strength can be applied in one year both to subsoiling, and as it may be termed trench ploughing, better have the

whole fallow break gone over at an extra depth than the larger part imperfectly done, in order to have the horses engaged in subsoiling. I have both subsoiled and trench ploughed, but while I never could say that the same crops stated by the advocates of subsoiling were realized, from trench ploughing I have experienced decided benefit. As your Grace is aware in such a locality as this, and where the land is so much dosed with manure from the town, annual weeds are very troublesome. These I have found disappear to a very great extent by the trench ploughing. My grass and after crops have likewise been very much improved; but, my lord, it is a singular fact that, notwithstanding all that has been advanced in favour of subsoiling, not one accredited statement has ever reached my eye, showing the comparative advantages arising from it above a similar piece of ground, judiciously and substantially cultivated by the ordinary plough; and as I have no prejudice to subsoiling, my anxiety is to have the problem solved by actual and comprehensive results.

Mr. BERTRAM SMEATON observed that any man who opposed subsoil ploughing out-and-out did so at the risk of being considered a fool. (Laughter) It so happened that part of his farm was to subsoiled at one time, and he demurred to it, but the work was proceeded with. Eight additional horses were put on his farm, and he attended the operation with great pleasure. Had the ghost of Mr. Martin appeared at the time the operation was going on, he (Mr. B.) was certain that all concerned would have been indicted for cruelty to animals. (Laughter.) The work was, no doubt, beautifully done, and he watched, with great interest, the progress of the crops. He was certain that he visited the crops at least twenty times, but no shade of difference could he detect between the subsoiled and the un-subsoiled, the drained and the undrained. (Laughter.) He one day applied his spade to the ground, and found it all one aggregate mass. He carefully compared the two crops, and found no difference. All he could say in favour of the subsoiling was that it did no harm. (Laughter.) It was his impression that the land would have been injured, but he could not say that it had that effect. The result of the operation after all the additional strength employed, so far as he could perceive, was just exactly *nihil*. (Laughter.)

Mr. DAVIDSON, factor to the Marquis of Tweeddale, regretted the absence of His Lordship from the meeting. He could state, however, that Lord Tweeddale had long been of opinion that there were great advantages attendant upon deep ploughing, and he had gradually been ploughing his land deeper and deeper for several years past, and he was still

pursuing the practice. Lands which were formerly very wet, and only a few inches of surface soil by being operated on by deep ploughing, had now a good soil 12 or 14 inches deep. His lordship was so satisfied of the value of this plan, that his whole land had undergone the process of being gradually ploughed deeper and deeper. The crops on his lordship's home farm had increased considerably. Before his lordship went to India, he had an experimental farm of 120 acres, which was originally a poor, sterile soil, and the result of the deep ploughing, which was put in operation, has been, that the land now looks as well as any land in the country (Applause). His lordship, seeing such beneficial results, resolved on ploughing deeper still, and he got one of Reid's subsoil ploughs, on which various improvements, suggested by his lordship, were effected, as would be seen by reference to the Quarterly Journal. By this plough and another one, his lordship is now cutting to the depth of 18 inches. The produce of the land, which was once so poor, had been most satisfactory. A crop of thirty tons of turnips, from the Scotch acre, had been produced. The growth of the wheat now in the soil, promised to be most luxuriant before the late fall of snow (Applause).

Mr. DICKSON observed that though land was subsoiled it was not to be expected that great results were to be immediately realized (Hear). Years might be requisite to bring about a satisfactory result. So convinced was he of this, that on land of which he had just now a nineteen years' lease he had commenced the subsoil ploughing, while on land of which he had now only seven years to run he did not mean to interfere, until the lease of nineteen years should be renewed.

Mr. SCOTT, Craiglockhart, said that he had not tried subsoil ploughing on his own farm. He had, however, tried trench ploughing, and had found no benefit from it. Wherever he went, he could not find any unanimous opinion on the subject of subsoil ploughing. He would like to ask those who had tried the subsoiling, what proportion of benefit they may have realized from that operation, and what from deep draining? (Hear, hear). He thought that some experiments might be advantageously made with a view to ascertain so important a piece of information (Hear).

Mr. DICKSON, in reference to a remark as to the relative value of deep ploughing and subsoil ploughing, remarked that his experience taught him that the value per acre was 20s. or 30s. in

favour of subsoil ploughing. That at all events was his honest opinion.

Mr. MELVIN, Bonnington, said—In reference to the remarks made by Mr. Dickson, that subsoil ploughing did not show at the first—it happened to be the reverse with me, for soon after Mr. Smith had published his description of his plough, I had an opportunity of seeing it at work, and certainly praise the way in which his six horses wrought the massive implement, and the effectual manner in which the subsoil was broken up. As it was but reasonable to expect good to result from its use, I resolved to attempt the operation, and procured a smaller plough to which three horses were attached, but it was found that the horses had not sufficient power, and the work was done as described by Mr. Robb. A larger plough and four horses were then employed, and with this about 100 acres of land was gone over, a report of the results of part of which was submitted to the Society; but since then I have seen reason somewhat to modify my views, as, although on forty acres for the first two or three years the cost of the operation was returned, yet afterwards the crops did not appear better, as was the case on the remaining portion, judging by the eye, as Mr. Dickson says he did. Remarks have been made regarding subsoil ploughing deepening soil, but we must recollect that the soil has required thousands of years for its formation, and forcing a piece of steel and iron through the subsoil will hardly convert it at once into soil. However, the means now proposed to effect the thorough performance of the operation, seems hardly equal to the work; for to do the work effectually it took six horses in the Deanston plough; two are only required for the one now recommended; let us recollect for a moment that the surface soil requires the power of two horses in the common plough to work it to the depth of seven or eight inches, and it appears to me unreasonable to expect, that the same two horses can plough to eight inches deep the firm tenacious subsoil which has remained undisturbed for ages.

Mr. BINNING HOME said, that having carried on subsoil ploughing, he might be allowed to say a few words. First, that a wheeled subsoil plough would not do when there were fast stones, which were easily loosened and thrown out by the old shaped Deanston subsoil plough. That he had had the experience of turnips on drained land, one field subsoiled, the other not, that the turnips were equal on the subsoiled, being all good; those on the not subsoiled being good above and near the drains, becoming worse to the centre between them. That he subsoiled

with three horses in each plough; the first turning over 10 inches, the subsoil plough going to the depth of 4 or 6 inches, according to the practicability of the subsoil; that he considered subsoiling necessary to complete draining, which did not act fully without it. As the hour was so late, he would not detain the meeting with many other remarks on the subject which he could have given, but must observe that the red clover maintained itself much better during winter, and permanent grass did not suffer at all from summer drought.

The noble CHAIRMAN then observed that what he had that day heard both for and against the system of subsoiling, satisfied him that still there was a great deal to be done before coming to any really sound conclusion on the subject. With regard to the cruelty to animals referred to by Mr. Bertram—(laughter)—he was not really aware that he could plead guilty; and whatever injury was done was suffered only by himself: by Mr. Bertram's own statement no injury had been done to the farm by the system of subsoiling (Hear, hear). On the subject of trench ploughing nothing that day had been said—at least nothing of importance. In certain circumstances trench ploughing had been of great importance, and those who wished to see an exemplification of that he would refer to the farm of Mr. Spottiswoode, of Spottiswoode. The conclusion at which he had arrived from the discussion was this, that it was impossible to lay down any rule suitable and proper to all parties and in all circumstances (Hear, hear). In some localities the subsoil ploughing may do very little good, while in others it may be most advantageous (Hear). In some cases he believed that subsoil ploughing was preparatory to deep ploughing. He was perfectly satisfied that on some land of his own he has experienced much benefit from subsoiling (Hear, hear). A question had with much fairness been raised as to how much the benefits of subsoiling may not be attributable to deep and thorough draining. In one field where the two followed each other—being drained one year and subsoiled the next—the produce in oats was double the amount which it was previous to these operations (Applause). He was glad that he had heard the discussion that day, and he must say that he heard nothing—not even from his friend Mr. Bertram—to shake his faith in the value of deep ploughing or subsoiling (Applause). Where draining was not an accompaniment of the subsoiling, he considered it to be no better than throwing away money. He only hoped that the discussion that day would lead the wise heads amongst them to reflect, and that, by the coming round of their next discussion, they would be enabled to arrive at some practical results.

After a cordial vote of thanks to the noble CHAIRMAN, the meeting separated.

R E V I E W .

SEWERAGE OF LONDON: a Communication addressed to THE COMMISSIONERS OF SEWERS, conveying a PROPOSAL FOR THE IMPROVED DRAINAGE OF THE METROPOLIS AND AN IMPROVED SUPPLY OF WATER TO ITS INHABITANTS.—By J. BAILEY DENTON, Surveyor, Assoc. Inst. C. E. Metchim, 20, Parliament Street, 1849.

The more careful and efficient conservation of the public health having been at length provided for by a special act of parliament, it becomes a question of great and growing interest by what plan, or conjunction of plans, the various provisions of that act can be best practically carried out so as to attain the desired ends at the least cost, and with the most durable effect. That a constant and ample supply of pure water, together with perfect sewerage, are the primary essentials to be secured, is beyond any doubt: these *must* be provided for, whatever other operations may be deemed advantageous; and hence the means by which the sewage itself may be profitably applied to agricultural and horticultural purposes is, as compared with the two main objects, a secondary matter. At the same time however, since *cost*, both as to first outlay and subsequent maintenance, will unquestionably be the test by which *ratepayers* will judge of efficiency, we consider it highly necessary to determine by actual and sufficient experiment, should any addition to existing evidence be needed, the practicability of profitably applying the sewage. For our parts, we see no more difficulty in conveying and distributing the polluted water out of a town than there is in bringing and distributing pure water in it: the question is solely one of profit and loss—will the money value of the sewage leave any and what annual surplus over interest and all incidental charges which shall be available for the reduction of the rate to be levied in support of the water and sewerage works? Our conviction simply is, that if, as experience shews, the water companies of the kingdom pay ample dividends to shareholders for supplying not always the purest water; so with, in most instances, a much less original outlay, the sewage from our towns will yield as compensating a return for its distribution in the suburban districts.

We shall be curious to learn, not only for the sake of our town neighbours and their pockets, but also for the sake of that class to whose interests our columns are more especially devoted, what plan of operations will be generally recommended to the Board of Health for adoption in those places which have already been visited by their inspectors. We say we shall be very anxious to learn whether any and

what specific mode is laid down by these authorities, who, from their being specially selected for the business, are more particularly the parties from whom the public will expect to derive information.

Meanwhile the Metropolitan Commissioners of Sewers, actuated as became them by a high sense of the practical importance of their duties—and possibly having some misgivings as to their own definite perception of the several objects to be attained—have very wisely and very properly determined upon publicly seeking for plans and suggestions of the *modus operandi* in the metropolis, before committing themselves on the subject. The result, as in other national instances of public competition, has shewn that “there are as good fish in the sea as ever came out of it,” and not only abundantly proved the wisdom of the commissioners’ determination, but as fully justified any delay that may be thereby occasioned.

We have before us the scheme proposed by Mr. Denton, whose qualifications for the task have been so frequently and ably evidenced by publications from his pen on subjects connected with arterial and other drainage, contour mapping, &c., as to need no additional introduction from us to give weight to his suggestions. Indeed we should ourselves have much liked to have seen more of our drainage engineers as competitors. Mr. Smith’s valuable services are, we know, enlisted as one of the General Inspectors under the Board of Health; but where are Mr. Parkes, Mr. Charnock, and others we might mention? Surely they would not be out of their depth in these town sewers! Let us, however, proceed with the consideration of the plan before us, which may be regarded as the more valuable from the fact of the author’s personal knowledge of the metropolis and its surrounding localities. Mr. Denton commences by laying down a principle, in the correctness of which we must fully concur.

“All experience,” says he, “in the matter of drainage points to the fact, that the closer its operations are guided by nature’s laws, and the greater the advantage taken of the natural capabilities of the surface to be operated upon, the more perfect and economical are the works by which such drainage is effected.

“In dealing with cities and towns, and in fact all

thickly-inhabited districts where the requirements of commerce and the increase of population have called forth the contrivances of the people to effect encroachments on the surrounding lower grounds, it is doubtless necessary to apply the more advanced powers of art of the present time to overcome and remedy the accumulated evils arising from the past.

“But as in former days the reason of man led him to select for habitation such spots as were naturally dry and healthy and susceptible of drainage, so, if we now desire to promote an effective and economical remedy for the disorder we have gradually fallen into, we must be actuated by the same intuitive reason, and commence the remedial work by a separation of the higher and dryer portions from the low and wet portions.”

Our author then proceeds to state that the general contour of the metropolis, and much of the surrounding district, presents facilities for drainage of a superior description; but that there are low-lying portions which must necessarily be dealt with separately, and hence explains that—

“It is designed, in the first place, with respect to the *higher districts*, to take advantage of the present system of sewers where available, and by an increase of water obtained for and devoted to the object, and by means of outfalls *distinct from those required for the lower districts*, to depend upon the natural force of gravitation to secure a delivery of the sewage at points suitable for manufacture, distribution, or, if necessary, *immediate discharge* into the river beyond the return-influence of the tide.

And, in the next place, with respect to the *lower districts*, which, being pent up by the action of the tides, have no natural outlet by which the sewage may be *at all times* discharged, recourse must be had to mechanical power. But it is designed to limit to the utmost the application of mechanical power, by determining the outfall of the main drains, by which the lower districts will be freed from their sewage, at a depth simply sufficient to secure a constant discharge of the subordinate sewers, on a level as little as possible below *the low-water line of the Thames*, under a conviction that any attempt to provide a lower drainage than this natural line of demarcation is repugnant to true and economical principles, and would be attended with expense not to be compensated by any anticipated advantages—advantages, in fact, never to be realized; for it may be confidently assumed that the low-water line or inclination of the river—which is the natural drain of the country it traverses—is the lowest depth to which the soil could be free from damp and the soakage of the river water itself.

“It is considered that by this separation of the Metropolis into *two* characteristic divisions—one discharging its sewage by natural agency at high-water level, and the *other* discharging its sewage by mechanical power just below low-water-line—by supplying an ample quantity of water to cleanse the sewers—by limiting the application of mechanical agency to a space and power consistent with a due and perfect performance of the ob-

ject, without seeking to do more—and by retaining the whole of the present combined system of sewers (amended and altered as may be required) as subservient to this division of outfalls; that the *minimum* cost of construction consistent with efficacy will be secured at the same time that the *cost of maintenance* will be reduced to a *minimum* also.”

Mr. Denton then goes on to explain, *seriatim*, the objects to be attained; and since that explanation is concise, and at the same time comprehensive, we deem it only justice to our author to give it entire.

“To carry out effectively and economically the principles I have described as superinduced by local circumstances, in conjunction with those general rules which science and practice have established as essential to perfect drainage, it is proposed:—

OBJECTS.

“*First*.—To provide a pure, abundant, and constant supply of water, to be substituted for the impure, scanty, and intermittent supply now furnished by the Chelsea, West Middlesex, Grand Junction, Southwark, Lambeth, and Vauxhall Water Companies; to use their present supply for the purposes of *sewerage only*; and to consolidate the whole water supply of London under the jurisdiction and future management of the Sewers Commission.

“*Second*.—Taking a mean height of 12 feet above Trinity datum, as a line dividing (on the principle before described) the higher from the lower portions of the metropolis, to subdivide the former into districts, each discharging, by the simple and natural force of gravitation, its liquid refuse by intercepting drains at heights sufficient to command constant, perfect, and unobjectionable outfalls, at points where the prospect is immediate, and the circumstances favourable for the use of the sewage to the *purposes of agriculture and horticulture*, and to construct reservoirs and filtering beds at the depôts in connection with such intercepting drains, for the purpose of extracting and retaining for sale the fertilizing matter in a consolidated form, when irrigation may be the less profitable means of distribution.

“*Third*.—To convey by two low level main drains, with several intercepting branch drains communicating therewith, the whole of the sewage of the lower portions of the metropolis, to two depôts, one in Plumstead Marsh on the south of the Thames, and the other at Barking Creek on the north; there to be raised by steam power for irrigation, or immediate discharge, or delivered into reservoirs and filtering beds for consolidation and sale in a manufactured state. And

“*Fourth*.—To extend the proposed operations to the low meadows and marsh lands along each side of the River Lea, and along the Thames, from Bow Creek on the one side, and Greenwich on the other, as far as the limits of the City Conservancy, with a view to effect a *systematic drainage* of the several tracts or levels of which they are composed. Many of these large tracts, now generating disease and producing but a fractional part of the vegetation

they are capable of producing, *would be converted into healthy and exceedingly profitable districts.* The soil, abounding in the elements of fertility, would immediately become available as market-garden ground, and in that character would afford a wide space for irrigation and the application of the sewage manure. Moreover, by including these works and wide-reaching lands within the intended operations and jurisdiction of the Commission, *a continuous outfall to the sea may be secured and for ever maintained on each side of the river, independent of its tidal action, with all the advantage of intermediate outlets at differences of time afforded by the ebb of the tide down the river for a distance of more than 40 miles."*

The mode of effecting these several objects are then explained in the order in which they are stated; and as the plan for obtaining a supply of water is of the highest importance, we shall let the author speak for himself on this head.

"With respect to the *supply of water*, a knowledge of the potent nature of the opposition which would be raised to any scheme affecting the navigation of the Thames above the run of the tide, and the interests of the several before-mentioned Companies, has led to a combination of resources by which the ground of opposition may be removed.

"It is proposed to unite by an open or covered channel the *surplus* water of the Thames—i. e., as much as may be required and attainable after a due provision for navigation—with the water of the Colne, a little above Colnbrook, and by the course of that branch of the Colne, called the Queen's River, convey it to *Feltham*, at a point where the latter crosses the Windsor, Staines, and South-Western Railway, at the summit of that line.

"The point from which it is proposed to take the water from the Thames is a little above *Boulter's Lock*, the height of which is about 67 feet above Trinity datum, and 12 feet above the level of the water in the Queen's River, at the point where the Windsor, Staines, and South-Western Railway crosses it. Reservoirs here constructed adjacent to the railway would receive and collect a supply amply sufficient for the districts served by the before-mentioned Companies for at least nine months in the year, without infringing upon the quantity necessary for the river navigation.

"To secure a command of the Colne for the remaining three months, so as to render its waters available when those of the Thames are denied, it would be necessary to purchase the comparatively few mills situated between Colnbrook and its junction with the Thames, or to compensate the owners for the loss which may possibly occur during those three months. The better plan would, doubtless, be to become possessors of the mills, and to re-let them subject to such *possible* deficiency; for, by extending the size of the reservoirs, a very large quantity of water might be conserved in time of plenty, to furnish a supply independent of both rivers in the time of drought.

"From these three resources, *the Thames, the Colne, and Conserving Reservoirs*, an ample supply of pure water would be at disposal, at a minimum height of 50 feet above Trinity high-wa-

ter datum. From Feltham the water would be economically conveyed by pipes laid within the property of the *South Western Railway* Company to such points as it would be most convenient for diverting into courses of supply, or for raising to a higher level for high service. Feltham is 15 miles distant from the Waterloo Bridge Station of the South Western Railway, and $6\frac{1}{2}$ miles from the Kew Bridge Station, on the loop line of the same railway; and there exists a fall, broken only by intermediate undulations of insignificant magnitude, between the proposed reservoirs at Feltham and the ground surface in Kennington and Lambeth (taking the mean height of the ground upon which the railway is constructed), of 55 feet, and a similar fall of 50 feet between Feltham and Strand Green, near Kew Bridge. Thus it will be seen, that facilities exist for supplying with water, by the simple and costless action of gravity, all those low, wide, and thickly-populated portions of the metropolis, which are distinguished in this communication as the '*Westminster Low Level District*,' and the '*Southern Low Level District*,' and which it is proposed to drain by one of the main low level drains hereafter described, and which is marked on the accompanying maps as the '*Westminster Low Level Outlet drain*.' Within these districts there are about 35,000 tenements *not supplied with water* by the existing Water Companies, but which derive their supply from neighbouring pumps and ponds, or from itinerant water-carriers, who charge as much as a half-penny per pail for the water they sell. At this rate of payment the cost of 120 gallons (the necessary average daily supply to each house), is 1s., or £18 5s. per annum. It is estimated that in these low lying districts—to which the simple and cheap agency of gravitation would apply—the future cost to each tenement may be reduced to *seven shillings and sixpence* per annum for 120 gallons daily.

"At Strand Green, where the '*Westminster Low Level Outlet Drain*' would commence, the water would be diverted from the railway, and following the course of that drain would be brought into the heart of these districts, and from thence distributed by means of the present and additional water mains and pipes to the inhabitants, without mechanical aid, at a height approximating 35 feet above the surface, which is practically efficient for every domestic purpose. One or more mains might also be laid along the South Western Railway by Nine Elms and Vauxhall, to divide with this conduit the supply to the districts now served by the Lambeth, Southwark, and South London Companies, close to whose works the railway passes, and into whose reservoirs the pure water from Feltham might be at once discharged, in lieu of the tidal water which now undergoes filtration; and by arranging the water supply now proposed, in concert with the future drainage of these low districts, a command of water to cleanse the sewers generally, as well as a current of water to flow constantly through the '*Westminster Low Level Outlet Drain*,' to supply public baths and washhouses, to provide against fire, and to water the streets, would be secured, independent of the supply it is proposed to gain for those purposes by the agency of the pre-

sent water-works; and thus a design, perfect in itself, might be carried out, to the vast benefit of the inhabitants. For *high service* it is proposed to construct a small reservoir near the Richmond Railway (near Putney, for instance), to receive, by the flow of gravity, the water from Feltham, at a height as nearly the same as the Feltham reservoirs as the loss by friction in the pipes by which it would be conveyed will permit, and from thence to raise it by steam power into reservoirs in Richmond Park, or rather *Wimbledon Common, about 150 feet above Trinity high water datum*. Another and distinct source of supply for high service presents itself as identified with this neighbourhood. Near the junction of the Richmond Railway with the South Western Railway, water may be tapped and brought to the surface by its own hydraulic pressure, which, being collected, may be pumped up into the same reservoir; and thus the cheapest form of artesian well may be made available to furnish some portion of the supply when drought may have reduced the quantity from the Thames and Colne. The water thus raised and collected at a height of 150 feet above high-water datum, may be delivered to the top of every house in the highest portions of the Grand Junction and West Middlesex districts. It is not proposed to interfere with the districts supplied by the New River and East London Water Companies, except it should be found by the Sewers Commission, that with such a supply at their command, and under consolidated arrangement, the inhabitants of those districts can receive an additional supply not attainable from the present sources.

“Your Honourable Court can anticipate, without any explanation here, the arrangements which it would be necessary to carry out, in consolidating the present water districts; but it will be well to remember, in considering the present proposal, that when compensating the shareholders of these Companies, a valuable plant will be purchased still serviceable for the purposes of distributing the improved supply under the jurisdiction of the Commission.”

Without dwelling on the details of this plan, which our space necessarily precludes, we would, nevertheless, express approval of its general features as possessing to our notions a far greater degree of practicability, in all respects, than any we have yet seen proposed. If we might venture a suggestion, it would be, whether or not a supply for a portion of the western and northern sides of the town might not be secured by the concentration, at suitable levels, of the brooks and streams flowing to the Thames from those directions; aided also by the conservation, in reservoirs of suitable extent, of the drainage from the higher lands of those districts.

The directions of the several main sewers are then given, both in the letter-press and on the accompanying map, with a sufficiency of detail for any one ordinarily conversant with such matters to fully understand, and therefore need not be here further

noticed, except so far as they are planned with a view to make the sewage itself available. On this portion of the proposal Mr. Denton remarks:—

“But in dealing with the question of outfall, it is essentially requisite that we should not only provide for an effective discharge, but that we should consider an object which, though inferior in importance, is still of vast magnitude, that of turning to profit the sewage we are designing to eject. It is with some diffidence that I venture here to express an opinion that has influenced me in designing the course of the outlet drains.

“Much has been said on the value of liquid manure for irrigation, and the extraordinary yield from certain meadow grounds thus treated has been adduced as a reason why we should look to such an application as a means of securing to the rate-payers of the metropolis some return for the costs of the proposed improved drainage.

“London is surrounded for more than three parts of its circumference with grass land; and if these arguments were to prevail, there exists a wide scope for this mode of applying the sewage. But experience daily shows that to produce a profitable effect upon grass land, the liquid refuse must be applied in a state so highly charged with feculent matter that the pumps applying it would be liable to become choked; or, if that difficulty be overcome, that the atmosphere around the irrigated ground would become so impregnated with injurious exhalations, that the anticipated benefit would become a positive evil.

“The reason of this is obvious; the close matted nature of the roots and the herbage of grass resists the downward action of the feculent liquid into the ground, and exhalation proceeds more rapidly than the absorbent action of the soil. Not so with garden ground, which, being constantly stirred and rendered open and porous in its texture, is capable of immediately receiving and retaining all the fertilizing matter of which water may be the vehicle for conveying to it. Moreover, irrigation, as a mode of watering garden ground, is in itself a highly profitable process. For these reasons it is proposed to direct the sewage of one considerable portion of the metropolis towards those suburban parishes where market gardens are most numerous, and where the London Sewage Manure Company have already raised an Establishment for the distribution of the liquid; and for the same reasons the drainage of the meadows of the Lea and the Marsh Lands of the Thames is urged as a part of the *general scheme*, in order that the operation may lead to the more profitable cultivation of those large flats of meadow and marsh as *market garden ground*.”

One more extract, in justice to this able scheme, and we have done.

“We now come to the fourth and concluding point in the design, viz., the improvement of the marshes on each side of the Thames, and the provision of an effective and constant outfall for the water now stagnating in the low meadow grounds on each side of the Lea, and rendering their cultivation as grass land a permanent and obligatory proceeding. It is needless to repeat the reasons why

it is advisable, when dealing with the vast undertaking of metropolitan sewerage and the application of the refuse, to encourage the conversion of these adjacent lands into vegetable garden culture, by rendering them capable of under draining, which, in their present pent up state, is an impracticability.

"The reasons have been already stated; and it appears only necessary to point out the inexpensive means at hand, in the constant motive power of the ebb and flow of the river, as a ready mode of freeing them from the water, to prove the practicability of effecting by a general measure, and with the compulsory powers of a public act, that which private individuals are not competent to undertake in their single capacities.

"Tidal mills might be established at various points of discharge along the river banks, to be employed in raising the water now retained in the soil, and the tidal water of the river, conserved at its highest level, will supply a vehicle for sewage irrigation, *only to be appreciated after the lauds are so*

drained. But the application of steam power has been attended with such effect and economy in the Fens of Cambridgeshire and Lincolnshire, that there can exist no doubt as to the capability and profit of draining lands of the description of those in question, nor the value of steam, as a mechanical power, where natural force is beyond reach. It is therefore suggested, in the present instance, as an alternative, for application at points where tidal mills would be less profitably effective."

In conclusion, we know not how we can better express our opinion of the proposal under review than by quoting that of a morning cotemporary, who has preceded us in a brief notice of its merits: "The scheme which struck us as most rational in its suggestions, and clear, comprehensive, and consistent in its details, is one by Mr. J. Bailey Denton, the author of an excellent paper on irrigation, which we published a short time since."

HIGH FARMING.

1. *High Farming under Liberal Covenants, the best Substitute for Protection.* By James Caird, Farmer, Baldoon. Fifth edition. Blackwood: London and Edinburgh. pp. 33.

2. *Landlords' Rents and Tenants' Profits; or Corn Farming in Scotland.* By David Munro, Esq. London and Edinburgh: Blackwood. pp. 31.

3. *Remarks on Mr. Caird's Pamphlet on "High Farming under Liberal Covenants, the best Substitute for Protection."* By a Perthshire Farmer. Stirling: John Hewitt. pp. 20.

4. *The Edinburgh Review for October, No. 182; article—Agriculture and Science.*

5. *Blackwood's Magazine for January, No 409; article—British Agriculture and Foreign Competition.*

It is not always easy, nay, it is absolutely difficult, to separate questions purely economical from those which are political—in other words, to prevent questions affecting individual or commercial production, from touching those questions of legislative enactment which affect that production. And this is not surprising, for it is the mass of individual producers which form the aggregate of political classes; and it may be supposed that the laws which affect the transactions implied in the production, sale, or exchange of their several commodities, have formed, and will ever form, the subject of party contention. And especially in times like these, when the agricultural community is in an anomalous, if not a transition, state, it is not surprising that the practical treads more generally and more closely on the heels of the political than

ever, more especially as *price* as well as *quality* are elements of controversy. Hence the term we have adopted for the heading of this article will be considered by some to be really startling, and not a few may suppose that a violent party article of a "protectionist," or "free trade" character, will be the epilogue of a motto so significant. We hope, however, to disappoint the hopes of those who might wish to see these abstract political questions discussed in this paper, as well as to satisfy those who wish for purely practical and economical investigation into a subject now a matter of controversy, and which we will endeavour to place in as fair a light as possible, stripping the real question at issue of all party assumptions, and investigating the real merits of the subject-matter of the whole controversy, which is practical—we mean *High Farming.*

The pamphlet at the head of our list may have been written for a purpose; it may have had for its object a desire to create in hostile minds a love of free trade. It was indeed stated at its very outset, that its object was, "to show that the cause of agriculture was not desperate." He typifies the agriculturist as having lost his crutch, and he asks the question—was he an enemy bent on mischief, or a kind and judicious physician who did this? With all this we have nothing to do. We will dismiss from our minds, as much as possible, all allusions to the present state of the agricultural mind, and endeavour to sift the practical matters before us to their very bottom, by that most difficult of all objects of pursuit, at any rate in times of excitement like this—the truth.

High farming we will take then, as much as possible, in the sense in which it is meant by the writer—a large outlay of capital, with a view to its repayment for the investment. It is possible to lay out *any* amount of money—it may be done judiciously or injudiciously, wisely or foolishly; and it may be so expended that the farming is so high that every pound's worth of produce costs thirty shillings in its production. This is farming more highly than profitably, and hence we apprehend that it is impossible to suppose that the writer of the first pamphlet on our list can by possibility but intend to place the instance given as a pattern for imitation, for he gives it as “a farm of comparatively moderate extent. . . both because of the excellence of its management, and as affording greater facility of comparison with the average farms in Great Britain.” We apprehend, therefore, that the writer gives it as a sample of profitable and remunerative outlay of capital, as such we must take it, and as such all parties who have written on the subject may be understood as applying their remarks.

It matters not to us that the writer of the pamphlet on “High Farming,” though paying a money rent of more than one thousand pounds per annum, entertaining none of the fears of his neighbours, but advocating self-reliance, does not give us his facts or figures from his own farm. To our inquiry it is of no consequence whether he gives us his own, or has reasons best known to himself for keeping that silent, and giving those of Mr. McCulloch—a gentleman who was not, it seems, bred a farmer, and who, therefore, had no prejudices to overcome, and who has, happily, always had a farm “too small for his capital.” Albeit the farm is situate at the southern extremity of Scotland, with a warm S.E. aspect, and sheltered from prevailing winds. The soil is all of the lighter description, in the following proportions:—

30	acres of reclaimed moss.
40	„ black moorish soil, intermixed with white sand.
125	„ light sandy soil, better adapted for wheat than for barley, hence a rich loam.
65	„ superior red turnip soil.

260 acres.

The rent at the outset was £152, or 19s. 4d. per acre. The labour bestowed upon it was £142 8s. Now, however, it yields a rent of £262, or an increase of £110; and the labour now expended upon it is £417 3s. 8d., or an increase of £274 15s. 8d., while manure and food are purchased amounting to £526—so that there is, as far as can be ascertained, an increased expenditure of £910 15s. 8d.,

or nearly 70s. per acre annually. The surprise at these figures, great as it may be at first sight, totally disappears when we find that one-half of the entire farm, or 130 acres, required drainage; and, therefore, as this could have been worth very little before, and much of it was not in all probability at all cultivated, it is not surprising that the rent should be increased by £110, and the labour by £274. As far, therefore, as the community is concerned, there can be no doubt but Auchness farm is in a far more favourable state than it was at the period of the commencement of Mr. McCulloch's tenancy. It is quite evident that the whole pamphlet stripped of any political tendency or bias, real or implied, it may have, resolves itself into two leading features—first, the modes of improvement adopted, and the present manner of its cultivation; and secondly, the *money profit* made by the investment.

Before, however, we investigate either of these, we must ascertain how the capital was obtained for the purpose of these permanent improvements. If from the tenant, it must be of a very serious extent: if from the landlord, it should be known. We infer it was the latter, and that the tenant had interest only to pay for the outlay in draining, and in the erection of farm buildings. The latter, to Mr. McCulloch's principle is everything, for his is an entire system of green crop and stock feeding, as against that of growing *corn*.

The peculiarity of his farm buildings is quite sufficient to demand a notice at this point, and we think that the contrivances are not those best adapted to that greatest of all subjects of economy, that of labour. Different from most farmsteads, there are no fold-yards, but all the cattle are stall-fed, and the dung is conveyed to a dung house, which is covered, and into which the liquid drainage from the stalls is conveyed by two covered drains. This is situate at an outside of the farm-buildings. Into this moss is conveyed, and it is mixed with the manure stratum after stratum, and the whole saturated with the liquid manure from the tank below, which thus supplies moisture when the mixture is too dry, and prevents it from being soaked with too much wet; and when there is any excess of the latter it is carted to the Italian grass. The cartage of the moss as an absorbent material to the liquid is far preferable to carting the liquid to the land; but the hand labour which is necessarily involved in removing all the manure to this comparatively distant point is also very objectionable and costly. Nor is the situation of the cooking-house less objectionable. It appears to be at a distance of some 80 feet from the nearest stall, and 200 feet from the farthest; so that if the amount of compound per animal per day is only 7lbs., there will be 140 feet

on an average to be travelled for each journey to convey 40 stones of compound per day.

The moss reclamation is certainly of the most creditable kind to Mr. M'Culloch. Drains four and a-half feet were first cut at intervals of 18 to 24 feet apart, but these were in the first instance cut to within 18 inches of the full depth, for the purpose of subsidence and consolidation; then the remainder taken out, and the whole laid with tiles and soles. The heather was taken off to level the inequalities of surface; the under moss is mixed with sand or gravel, the entire expense of which is £10 per acre; yet it is very remunerative, "as the potato crop on this land is comparatively exempt from disease." As the potato cultivation is a very material part of Mr. M'Culloch's system we cannot help giving his own pamphleteer's description. "Being heavily manured," he says "it is very prolific, and at the present high price of potatoes yields a large money return. On this account the potato has been grown on the moss land successively year after year; but the earlier reclaimed portions, from being so frequently manured, are becoming too rich, and the crop is beginning to show signs of disease." This he endeavours to obviate by casting off the top soil, and ploughing up a new stratum of moss.

His draining of light sand at 26 inches deep and 18 feet apart is a very powerful set off against his freedom from prejudices, and we had scarcely thought any person could have been so foolish, or any landlords so inattentive as to allow a tenant to waste his capital in any way so reckless. How much he so wasted we know not, nor whether he took up the tiles and relaid them when he found his mistake, nor whether this was done at the expense of the landlord or himself; and hence whether he had to find the capital, or only to pay interest. But it is quite corroborative of Mr. Caird's statement that he was not brought up to farming. He generally drained the grass broken up, and gave 80 bushels of lime per acre and sub-soiled.

Besides the manure made on the farm, he collects annually 2,000 loads of peat-moss and 500 loads of sea-ware, and thus he states that 5,000 loads of manure are annually applied to the green crops. It seems that the manure made by the stock is about as much as this extraneous matter, or 2,500 loads; and as this is applied to 175 acres of green crop which he grows, it gives some 28 loads of manure per acre. In addition to this he gives the turnips 15 bushels of bones and 3 cwt. of guano per acre; potatoes, 4 cwt. per acre: oats, 1 to 3 cwt. per acre; wheat, 1½ to 2 cwt. per acre. Hence, we have on his crops in one year:—

	55 acres grass, liquid manure or dilute guano,	Cwt.
	say ½ cwt. per acre average	27
30	„ oats, say 2 cwt. do.	60
25	„ potatoes, 4 cwt. do.	100
55	„ turnips, 3 cwt. do.	165
55	„ wheat, 2 cwt. do.	110
30	„ moss-land potatoes, 4 cwt. do.	120

Cwt. 582

Or, 29 tons of guano annually.

The stock at Auchness are thus treated:—70 two-year-old cattle and 10 draught horses are summer soiled: 130 cattle are sold off fat every year, and the same number of young stock annually purchased to fill up their place; 150 sheep are also sold off fat. To feed these, it appears, hay, linseed, beans, and other feeding stuffs are purchased to the tune of £270, and the purchases of manures are £256.

We believe we have fairly stated, as far as a very brief summary can, the proceedings at Auchness farm; and the comparison the writer gives between the present and past amount of crops grown is one on which he bases his argument as a difference between high farming and low farming. These are his own words:—

	£	s.	d.
The total value of the crop and stock together, annually produced on the land formerly, may be taken at	642	0	0
The total average value of the annual produce of stock and crop now is not less than	2,518	0	0
Being an increase of	£1,876	0	0

It must, however, be borne in mind that before this gentleman took the Auchness farm one half of it only was naturally dry; and therefore inasmuch as the landlord made one half of it fit for cultivation to Mr. M'Culloch's hands, it would be more fair to take the land actually cultivated by the previous tenant; and as undrained sand, where drainage is necessary, is not generally worth cultivating, we think it would only be fair to compare one half of the farm; and this being done, we should have £1,259 as the produce of Auchness proper, giving a difference of £617 instead of £1,876; a difference in all conscience sufficient to show that high farming gives a gross produce far beyond low; but it will easily be seen that this does not give us the most vital point of all—profit.

He seems to have some little compunction on this head, and gives reasons for not presenting us with a balance-sheet, for which some have called, which we must beg to give to our readers; and if they will be so civil as to allow them to be cogent,

we will not interfere. He says — “ In reply to the demand made on him from some quarters for more ample details of the expenses, he begs to repeat that he *purposely avoided giving a balance-sheet*, because, while in his opinion it would have *convinced nobody*, it might have withdrawn attention from that portion of the pamphlet which the author was most anxious to press on the notice of his brother farmers, namely, the description of the different processes of husbandry, with the admirable economy and arrangement displayed in the whole management of the farm.” Had he described this economy and arrangement of the different processes without the figures, and without adducing his facts, as being a substitute for protection, we believe his object, as stated, might have been served, and his reasoning cogent ; but, as he has given expenses of some kind, and gross produce, it is only fair that he should have shown profit. He has, however, so far listened to the demands of the agriculturists as, in his later edition, to give them the details of gross produce which he did not before, and as they may not have been seen by those who have only read the first edition of his pamphlet, we beg to give them.

“ Detailed Account of Annual Produce of Auchness, the total amount of which is stated at page 24 :—

	£	s.
“ 1,350 bushels of oats, at 2s. 6d.	168	15
1,980 bushels of wheat, at 6s.	594	0
373 tons of potatoes, at 40s.	756	0
Difference of price paid and price received for 130 cattle fed off during the year, at an average advance of £6 10s. each.	845	0
Produce of 5 cows	50	0
150 sheep, at 12s. each, for winter feeding	90	0
3 young horses, at £5 each.	15	0
	<hr/>	
	£2518	15”

As we have given some statements he has added to his fifth edition, we beg also to give a sentence or two he has omitted—why we know not, but here it is. The italics are ours :—

“ On *clay tillage lands*, such as are too stiff for the profitable cultivation of green crops, and where the value of the produce must therefore be *entirely dependent on the price of grain*, it may probably be necessary for landlords and tenants to revise their arrangement. The owners of this kind of property will, in that case, be in no worse position than the tradesman or manufacturer who finds his profits suddenly diminished by the discovery of a cheaper

process, or on the expiry of a patent, by the general supply of a commodity of which he had been hitherto the privileged producer. *A mere copy of the particular mode of management here detailed is not perhaps anywhere applicable.*”

Why he has now omitted this we know not, and how he reconciles this statement with his reasons for not giving a balance sheet we cannot tell. All he does give as to figures is this :—

	£	s.	d.
That the gross produce of the farm is	2518	15	0
	<hr/>		
	£	s.	d.
That he pays rent.	262	0	0
labour	417	3	8
manure	256	0	0
stock food	270	0	0
	<hr/>		
	1205	3	8
	<hr/>		
Difference.	£1313	11	4

This, he says, is sufficient to pay the increased expenditure, and leave a rich return for the tenant's capital and enterprise besides ; and he has added, in the fifth edition, these significant words—“ after deducting the value of *seed*, keep of *horses*, *rates* and *taxes*, wear and tear of working stock and implements, and other *incidental* expenses.” As he had omitted this fact *before*, what a pity he had not *now* given the items !

Leaving now Mr. Caird, we arrive at Mr. Munro's statement contained in the pamphlet numbered 2 on the head of this paper, who, without ceremony or apology, enters upon an examination of Mr. Caird's statement with a very masterly hand ; and taking up the point left deficient in Mr. Caird's early editions, gives the details of what Auchness produce must be, and the nearness of his estimate shows that he has rightly appreciated the question. First, however, he protests against the setting up of Auchness as a fair criterion. The following statement is, at any rate, honest and straightforward ; he says (p. 7) :—“ One begins to be a little suspicious of the extraordinary profits one hears of made by farming. I look upon the majority of them as clap-traps, unattainable by the farming community, either from the exorbitant expenditure or advantages of situation, entirely exceptional to the average arable farms of either England or Scotland. For instance, how many farms in Britain can command 500 loads of seaweed, or 2,000 loads of peat-moss, as the farm of Auchness does? I hold that, in bringing forward the example of a farm, to in some degree regulate the rents, and show the profits of farming, one should be taken as nearly as possible possessing the average advantages of the country, in situation, climate, and soil.”

At the time Mr. Monro's pamphlet was written, the details of Auchness produce had not been given; but Mr. Monro, with the consciousness of practical knowledge of the productive powers of the soil, enters upon an estimate which, from the paucity of details, is remarkably accurate, as the subsequently published statement shows. He thus values the produce:—

	£
55 acres turnips, at £6 per acres	330
55 acres wheat, at £12 per acre	660
55 acres clover, at £5 per acre	270
30 acres oats, 9 qrs. per acre, at £9 per acre	270

—
This produces the sum of £1530

Leaving the sum of £1,000 nearly, to be accounted for; and as all his crops but one are taken up, and that crop is potatoes, it must be made up of them. Add to the above sum one thousand pounds, and it will be, in round numbers, Mr. Caird's total, viz., £2,530.

Mr. Monro, however, premises thus, that though he has put the turnips at the definite sum of £6 per acre, he states that some years they cannot make £2 per acre—"unless, indeed," he says, "cattle and sheep in Wigtonshire are sold warranted to leave a profit."

Having shown that at least £1,000 is to be placed to the credit of potatoes, he dilates upon the fact with an unsparing hand, and his withering attack upon such a system of farming deserves to be preserved as an important part of the controversy. He says this £1,000 is arrived at "by putting 25 acres of leas or grass under potatoes, and laying 40 acres of moss land year after year under potatoes. In this alone lies the secret of Mr. Caird's high and most remunerative farming, growing most extensively the most uncertain root known, under a system quite opposed to the acknowledged rules of good farming, by which the same plants or grain should be, as seldom as possible, repeated on the same land; 65 acres of potatoes upon a 260 acre farm, 40 acres of which are to be perpetually growing there, appears to me to be one of the most extraordinary propositions ever made to the agriculturists of Britain. Not much more unfair would it be in me, or any extensive farmer, to lay down all his farm in wheat; and were it in such a year as 1846-7, to announce with a flourish of trumpets to the farming world that now under a new system £10,000 would be the gross proceeds of a farm yearly." Mr. Munro, then, to show the real state of the case as regards landlords' rents and tenants' profits, gives the results as regards his own

farm as a beacon to the ignorant, of the outlay and cost of cultivating an ordinary farm, to show that there are drawbacks from gross produce so great, that unless they are known, disappointment and ruin may be the consequence.

His own farm, as we apprehend, of 464 Scots acres, is in average circumstances, as to climate, soil, distance from markets, &c., 226 acres farmed on the four course, and 238 on the six course rotation, the expenses of cultivation of which amount (including artificial manures) to £1231 18 1 or £2 12s. 6d., per Scotch acre
The produce is £2030 8 0

Leaving to pay rent and farmer's profits £798 9 11

That this is not low farming we may fairly infer, for the farm is credited with 6 quarters of barley, 5 quarters of wheat, and 7 quarters of oats per acre. The rent of the farm is taken at 30s. per acre, or in all £698, leaving £102 as the farmer's profit, or 4s. 4d. per acre.

This is calculated on prices being as follows:—Wheat, 40s.; barley, 23s.; oats, 20s. But as the prices in his neighbourhood had fallen, wheat to 36s. barley to 21s., and oats to 18s., he makes the statement as follows:—

Gross proceeds	£1874 10 0
Expenses and rent.	£1907 5 1

Loss to the tenant £32 15 1

Now, though it is evident Mr. Munro is mainly in the right; and his statement bears, on its very front, the stamp of practical acquaintance with fact, still we must in all fairness admit that it is not the very best evidence we could have, of Mr. Caird's statements being in themselves fallacious. For instance, Mr. Caird declares that certain things are done in general; but that, in particular, in 1848 he had a rich return for the tenant's capital and enterprise besides. Now, though this was from potatoes alone; still if it be a fact, it is one; and though Mr. Munro's seven acres were not worth raising, still those at Auchness were good; and though it proves this crutch to be a partial one, yet still it applies in that particular way. And it may also be said that though a well-managed farm may cost £2 12s. 8d. per acre in expense of cultivation, and though it renders it less probable that Mr. M'Culloch had so large a profit, still it does not show it to be absolutely impossible. As a matter-of-fact and common-sense book, Mr. Munro's pamphlet stands confessedly high; but it is not a refutation of Mr.

Caird's statements, much doubt as it may and does cast upon them.

The *Edinburgh Review*, in its article, mentions Mr. Caird only incidentally, advising the farmers to follow Mr. M'Culloch's extensive stock-feeding, heavy manuring, and green-crop growing, but admits that these remarks apply only to those districts where farming is low, and that such cannot, by any possibility, apply where the farming is already high, as in the Lothians and Lincolnshire. The light this article throws on the subject is therefore extremely slight, and he leaves it, as we think, to a man "farther north," a "Perthshire farmer," to settle the whole controversy; and a pamphlet of greater ability we have seldom had the pleasure of reading. An advocate for high farming himself, nay, believing that it may be carried higher than even the point Mr. M'Culloch has carried it, he still commences with the startling asseveration that that gentleman's farming is by no means a lucrative concern. On the subject of balance sheet, which some of the many nondescripts yclept "high farmers" are so unwilling to exhibit, he says, he considers "it would have been of very great importance; seeing that certain results have been obtained, it surely would have been more satisfactory to have stated the *cost* at which these results were obtained."

To commence, he shows that the landlord, though the rent is increased from £152 to £262 per annum, has done little more than obtain change for his shilling. This, perhaps, may be gathered from the face of the recent edition; but it could not be gleaned, sifted, nor inferred from the first edition, because he did not give the landlord's entire outlay. Now, however, he gives it, and here it is:—

	£	s.	d.
Present rent	262	0	0
	£	s.	d.
Former rent	152	0	0
Interest on drainage	48	0	0
Ditto on £900 expended in building, 5 per cent. ..	45	0	0
	245	0	0

The increase of rent is therefore *only* £17 0 0

The "Perthshire farmer" passes over in review rapidly before him, and awards praise where he thinks it due to the cultivator of Auchness; and in all of his remarks here, we are by no means prepared to agree. For instance, he says that the buildings are apparently very convenient, and praises the mode of cultivating potatoes, oats, and wheat; and especially approves of the mode of cultivating moss. To his two first propositions we cannot subscribe. The buildings we have shown are *not* convenient, inasmuch as they cause an undue expen-

diture of labour; nor can it be considered, we should imagine, quite up to the mark in farming to grow potatoes on the same land year after year. But we must also award our strictest and most decided approbation to the strictures on the carting of the liquid manure with the water-cart, when each pair of horses has to work land for 23 acres of green crops, per annum. He well says, "It is now acknowledged by the first agricultural authorities, that the carting of liquid manure is too expensive to be remunerative. Might it not be advantageous to Mr. M'Culloch, when he has such a fine command of water-power, to send it over his land in pipes?"

He also animadverts on the fact of no rotation of crops being observed on the farm in question, and on the fact of attempting draining within the last seven years, only two feet two inches deep; but all this is mere skirmishing, compared with the attack he makes on the figures supplied by the canny Scotsman; and here he commences an attack so murderous, that he might have taken the motto of another cultivator and controversialist, and said—"Oh! that mine enemy had written a book!" The Perthshire farmer complains that the figures given do not at all answer the main question, nor prove the leading statement of the pamphlet—nay, he shows that from the nature of things they *cannot*. He proves, and most satisfactorily, that it is nothing to say that Mr. M'Culloch farms better, and gets more crops, and pays more rent, and expends more money than his predecessor, because it is quite clear that they may *both* be farming for no profit; and, if Mr. Caird's reasoning is to be taken, the syllogism will stand thus, which is too manifestly erroneous to need any comment:—

1° Mr. M'Culloch's predecessor spent little money, and produced small crops.

2° Mr. M'Culloch spends much money, and produces great crops.

3° Therefore Mr. M'Culloch's farming is *remunerative*.

The absurdity of the proposition needs not the slightest comment!

Well, says the critic, "the writer is at a loss to conceive how it can be ascertained by the test of figures, whether this great additional expenditure is remunerative, merely by comparing the produce of the former system, with that of the present. He considers it impossible to solve the question by this mode; indeed, there are no facts regarding the former system, either as to expense of cultivation or amount of produce." "The writer is of opinion that the best mode to solve this question of remuneration, will be to compare the expenses of the *present system* with the value of the produce of the same system." And this he commences with an

unsparing hand. We have not space for his details, but will give the results of his calculations under the different heads, and for details will leave those anxious to ascertain them to purchase the work for themselves.

	£	s.	d.
First, there are the items stated by Mr. Caird, and to which we have before adverted, making in all	1,205	3	8
The Perthshire farmer adds—			
1. Seed.....	594	10	0
2. Keep of horses	300	0	0
3. Tear and wear of horses	47	0	0
4. Tradesmen's accounts	42	10	0
5. Tear and wear of implements, &c.	49	0	0
6. Travelling, market expenses, taxes, rates, &c.	60	10	0
7. Risk on live stock or insurance	88	0	0
8. Interest of capital	150	0	0
Total	£2,536	13	8
The ascertained value of the gross produce is	2,518	15	0
Result: <i>Loss</i> to the extent of	£17	18	8

It is quite impossible to escape attention, that some of the Perthshire farmer's statements are open to discussion; but, making every allowance for any excess of estimate, it is also proved most irresistibly that he has annihilated the Scotsman's superstructure. We know there are those who quarrel, and who have perhaps a right to doubt his prices of potato seed, taken at £6 per ton, while the credit given for the sales is but £2 per ton. It must be borne in mind, however, that there is a very wide margin between the value of the indiscriminate crop, including the small, and that of the seed at seed time, which must not only be those of the best quality, but such as have withstood all the malignant influence of the disease through the winter—sometimes more destructive than the autumn; and thus practically every farmer finds that his seed potatoes cost him much more per ton than his crop, great and small, is worth at ripening time. And the same of seed corn: the Perthshire farmer charges 3s. 6d. per bushel for the feed oats, while the crop makes but 2s. 6d.; and this was perfectly true in 1848, not only as regards a better sample being selected for seed than the bulk could be expected to be, but they were worth more per bushel at seed time than they were at selling time. He might have applied the same principle to the wheat, but he has not—acting probably on the prices he gave, himself.

On the same side follows *Blackwood's Magazine*, and if any evidence were needed to ruin the case of Mr. Caird, or to give the last grasp at the strangulation of his bantling, this article affords both. First comes Mr. Stephens, the author of the "Book of the Farm," and the Editor of the *Quarterly Journal of Agriculture*. That gentleman arrives at

the conclusion that "without potatoes, and such an extent of potatoes as would be plainly ludicrous if adopted as a general rule, Auchness never could have paid. With potatoes it has failed, in the very year wherein Mr. Caird has chosen to exhibit it as a universal model;" for it is a fact which must now come out, and which has hitherto been kept secret, that *since July last disease has attacked the potatoes at Auchness*.

This astounding fact, which has happened since April, when the first edition of the pamphlet was published, ought *honestly* to have been noticed, and proper allowances made for it by the writer in his subsequent editions; but *he has not!* We will say no more.

Blackwood, moreover, adduces the evidence of two high farmers, who tell a very different tale. Mr. Hugh Watson, of Keillor, on a farm of 500 acres in Strathmore, shows a loss last year of £518 5s.; and Mr. Dudgeon, of Spylaw, a man equally eminent, takes another farm of 500 acres on the S. E. border of Scotland, and shows a difference on a similar area of £141 from the grain crop alone. A fearful array of clever Scotsmen follow, who all give evidence more or less of the loss they sustain by present prices, and the correctness of the above gentleman's estimates proves that high farming itself is *not* a substitute for protection.

With all the fairness which we are capable of exercising—looking at all the facts of the case—the peculiarities of Auchness—its facilities for obtaining valuable extraneous manure—its dependence for large profits upon a root, which is at best very unstable, and now unduly high in price, but a general cultivation of which would render worthless as an article of sale—we must say, that the opponents of Mr. Caird have demolished his superstructure; have smashed his most pointed and cogent statements to shivers, and ruined his reputation as a practical agricultural teacher.

He may say that his object is to call the attention of his brother farmers to admirable economy and arrangements displayed in the whole management of the farm; but every farmer from John o'Groat's to Land's-end will din in his ears—"DOES IT PAY?" If he has not shown this, he has shown *nothing*—his statements are delusive, and calculated to do harm; and hence the whole object and tendency of his pamphlet is defeated and annihilated; for if he cannot show a favourable balance sheet, it is not all worth one rush, and will only excite the scornful and derisive laugh of all practical and thinking men; and until he does, we can hold him up to no severer punishment than the castigation inflicted upon him by Mr. Monro and the Perthshire Farmer, who are both too far north for him.

M.

PROBABLE FUTURE PRICES OF GRAIN.

The price of corn was not to be lowered in England by free trade, but raised throughout the world by the repeal of the English Corn-law. We always said the price throughout the world would be lowered by free trade, after it had been in operation long enough to arrange the respective forces of demand and supply to the altered circumstances affecting them. Sir Robert Peel has never uttered a word to show that his assumed standard of 56s. for the quarter of wheat was not the proper remunerative standard of price for English farmers. Yet after so deluding them when in power, and pledging his honour that no foreign corn should be allowed to be imported when the price of wheat in England was under 51s. the quarter, he now seeks to evade his personal pecuniary responsibility in the matter by a quirkling bargain with his tenants all in his own favour. No man can say how low the price of wheat may descend under free trade. If in the year 1815 any one had predicted that the prices of cotton and of sugar would fall to threepence the pound, pursuant to the policy to be introduced by the son of Sir Robert Peel, that person would have been considered a crazy man. Yet we have seen those articles sold at that price, for no short period and in no limited quantities. We have always expected that with continuous free trade for a term of years, the price would ultimately settle down at some point between the present average of 39s. and 30s. the quarter of wheat. Not that we anticipate any such consequence during the period to elapse between January and the ensuing harvest; but we hold to the opinion that a price not exceeding 35s. the quarter for wheat will mark the average in England in seasons of average abundance. Mr. Samuel Sandars, who knows in their combination more of the theory of taxation, the productive cost of wheat in many countries, and the course of the corn-trade, better than any other person known to us, has, in a pamphlet just sent to us—"Observations on the Elements of Taxation, and the productive Cost of Corn"—given the following solution of this problem:—

"The honourable baronet (Sir R. Peel), in his address to his tenants, says that a 'free trade in corn will maintain a low rate of prices in average seasons, and prevent high prices in seasons of dearth.' What the honourable baronet means by 'low prices' we are left to conjecture; it may be 30s., 40s., or 50s. per qr., according to his own peculiar views on the question; but to ourselves it is evident that, with free competition, the price of British wheat must ultimately settle down to the level of the cheapest markets from whence we may derive any considerable supplies; and our opinion is much in accordance with that of the editor of the *Examiner*, which is, '30s. may be a low price, and 40s. a high one.'

"Free trade in corn means British wheat at its natural price, irrespective of our Government and local taxation. And when Sir Robert Peel assumes the existing prices of wheat abroad as being *unnaturally* low, we beg to differ with him, for the following reasons:—

We have personally had opportunities of ascertaining its productive cost in most of the exporting countries in the north of Europe, which we assume, in average seasons, to be as follows:—

"In France, from its protective corn laws and high taxation (the land-tax alone being ten millions sterling), we assume its cost in the northern department to be about 40s. per qr.

"Belgium and Holland 32s. to 35s., the Upper Rhine districts 26s. to 28s.

"Denmark 21s. to 25s., and Holstein 25s. to 28s.

"Mecklenburg and Prussia Proper 26s. to 28s.

"Polish wheat 14s. to 16s. per qr. (that may be delivered at the shipping port of Dantzic); Odessa and Wallachian wheats 20s. to 22s., free on board (in unlimited quantities); if there were a constant and regular demand for the British markets, at 22s. to 25s. per qr.

"Egyptian, 14s. to 18s. per qr.

"In America the productive cost of wheat, in the Western States, varies from 20s. to 22s. per qr.; and when sent to New York, in the shape of flour, can be supplied at 30s. to 32s. per qr. for wheat, free on board.

"With wheat at the assumed prices above indicated, we shall not enter into the question as to what extent of importation, or at what low range of prices, competition *might* produce in abundant harvests at home or abroad; but we have one clear example before us—that of the harvest of 1844. By referring to a return of the House of Commons of the imports of wheat and flour (*vide* return, June 1849, No. 439), we find that the 20s. duty was paid on foreign wheats for fifty consecutive weeks; and that such was the abundance of the British crop of wheat in 1844, the whole quantity entered for consumption for the following twelve months (whether *required* or not) was only 310,000 qrs.! and an able statist on agricultural products asserted 'there was sufficient quantity of old wheat left on hand after the harvest of 1845 to last till Christmas.' * * * * *

"Perhaps we could not adduce a stronger corroboration of our views as to the cheap production of corn in the northern states of Europe, than the fact that oats have been, for the last twelve months, regularly shipped to our markets, to the extent of nearly 1½ million of quarters, at prices to the foreign grower of some 8s. to 10s. per qr.; and they are now offered, free on board, for spring shipment, from the Dutch ports, from Denmark, and the Russian Baltic ports, at similar rates."

In the year 1842, just after the judicious, well-considered Corn-law of that session had been broached, we had a conversation with Sir James Graham on the subject; when we asked him if he had formed a conclusion in his own mind whether the largest quantity of wheat taken out of bond in some years would not be at the highest point of the duty—viz., 20s. the quarter—a question which seemed to astonish the right honourable baronet not a little. Mr. S. Sandars throws light upon this point when he says that the 20s. duty was paid on foreign wheat for fifty consecutive weeks. Surely such a fact as this, recorded in the Government's own statistics, would have admonished any sober-minded men of

the probable consequences of a repeal of the Corn-law. And then to seek to elude the penalties to themselves in their own personal affairs—what a spectacle of character the combination of rashness and meanness exhibits to our humiliated contemplation! Mr. S. Sandars omits to notice an element of price to which we attach considerable importance. We all know that when a merchant or manufacturer is burdened with stock, he will be ready to preserve himself in his position by a sacrifice of five or ten per cent. on the article he holds; if he see an opportunity, as he may sanguinely imagine, of

making a profit of fifty per cent. by another speculation; in that case he will sell the dead stock on his hands at a loss. The same influence will operate on the holders of corn from Dantzic to Sydney, from Odessa to Montreal and Buffalo. The area of a supply which centres mainly in England is so vast, and subject to such varying influences, that there is no doubt in our mind that England will, under confirmed free trade, be the cheapest large grain-market of Europe.—Bankers' Circular.

ANNANDALE FARMERS' CLUB.—WEIGHT OF TURNIPS.

After the last meeting of the club, it occurred to several members, that it would be desirable to have an inspection made of a number of the fields of turnips over the district—not for the purpose of any competition among the farmers, but to give general information as to the real produce of the district, and also by comparing the weights of different fields and under varying circumstances, that useful and practical suggestions might be elicited.

The inspection has accordingly been made between the 10th and 22nd of November, over 34 farms, of which 15 are occupied by members of the club, the others being those of neighbours immediately adjoining, and the whole are, with the exception of 5, occupied by tenant farmers.

The mode adopted was by taking the weight of 10 lineal yards in different parts of the fields, selected as affording fair averages of the different shades of bulk, the top and small roots being cut off before weighing.

The inspections were made by two members of the club, who have endeavoured to give the results correctly and in a uniform mode; but, from various causes, it so happened that they could not obtain in some cases exact information of the quantity of manure and time of sowing, and thus the table in these respects is incomplete. It, however, may be said to exhibit a fair estimate of the crops in the regularly managed arable farms of the middle and upper districts of Annandale.

The inspectors in making the return of weight have added a variety of remarks and inferences, and the whole subject has undergone full discussion at the meeting of the club this day. But as for this year the data on which to found suggestions are necessarily imperfect, in place of appending these remarks to the table, it is considered sufficient to express in the minutes of the club the following general observations, which were agreed on by the majority of the members.

I. TIME OF SOWING.

Early sowing has invariably been advantageous this year. In the case of swedes, those sown before the middle of May, have been several tons beyond those sown about the 1st of June in similar circumstances; and common or yellow, sown within May, have in a like proportion exceeded those sown two or three weeks later.

Although in certain seasons this may not be the rule, yet where it is practicable, from a due preparation of the soil and favourable weather, a large portion of the swedes and some white should be sown in May, the latter being specially valuable on many farms for giving to cattle in the end of September and beginning of October. To accomplish this, preparation of the soil immediately after harvest should be more resorted to in early dry autumns. And probably in many cases a variation in the accustomed rotation of crops—putting turnips after the potato crop, or crop intervening, may be profitably practised, the state of the land in this case admitting of very early preparation.

II. WIDTH OF SOWING.

The width of the drill has averaged 28 inches, but varying from 25 to 30 inches—most of the farmers have thought their spaces too narrow for this year's great growth of shaw; and, with the proper quantity of manure, it seems the general impression that on land of ordinary fertility the spaces should run from 28 to 30 inches.

III. WIDTH OF HOEING.

This has for the first time attracted much notice and discussion—generally in the majority of farms it has been the habit to thin from 7 to 8 inches, and the number of turnips on the fields inspected indicate that this is a very common practice. The special exception is the fields of Hardgrave, which are thinned to fully 13 inches; and Mr. Elliot, the

tenant, expresses his conviction that the most advantageous thinning in ordinary circumstances should be 14 inches when full manure is given, more especially if all the manures of dung, bones, and guano are sown together (a practice he besides strongly recommends), and the result of the weight in his field, which are rather of inferior quality of land, as well as observation in other cases, induce the club to believe that at least this should in future be extensively and generally tried experimentally. Deficiency of manure, (which, however, should never be) late sowing, or cold situations or soils, will of course be good reasons for modifying the extent of the practice in the first instance. It may be noticed, however, that in some cases, as at Millbank, Beckton, Kirkburn, &c., crops of 30 tons per Scots acre of swedes have been produced at hoeing from 6 to 7, or 7½ inches. In the case of common white or red, more especially with full-mixed manure, it seems quite ascertained that the general practice of hoeing at 7 or even 9 inches is much under the proper width.

IV. MANURE.

The advantage of large quantities of rich and well-made farm-yard dung as the manure to be principally depended on has been exemplified in many instances, especially in the case of swedes at Kirkburn, Becton, Balgray, &c. When crops are to be even only half pulled, the quantity on ordinary soils should never be under 20 yards per Scots acre, unless with a large addition of ground bone manure as well as guano.

Again, when crops have been sown with farm-yard manure alone in small quantities, such as 20 yards or under, and imperfectly made, the want of guano is most apparent in the irregularity of size and deficiency of weight. The 2 or 2½ cwt. of Peruvian guano added appears, in cases of indifferent dunging, almost invariably to increase the produce one-third or one-fourth, or 5 to 7 tons per acre—thus paying 200 or 300 per cent. on the outlay.

It appears to be a very general practice to apply, in addition to 16 or 18 yards of dung per Scots

acre, about 2 or 2½ cwt. of guano, or 15 bushels of bones; but while these manures do not exceed the present prices, viz., 2s. 3d. per bushel for bones, and £9 to £10 per ton for Peruvian guano, and if the best beef and mutton reach about 6d. per lb., there seems no question, but a large quantity of extra manure should generally be applied; the club adhering to an opinion expressed in a former discussion, that the value of 40s. per Scots acre of purchased manure be applied in addition where the farm-yard manure gives 15 yards over the whole green crop on the farm. The first and most material point evidently to be attained, however, is an addition to the quality and quantity of farm-yard manure.

As to elevation and climate, with the exception of one or two farms, the whole are from 150 to 400 feet above the sea level; but the farm of Kirkhill, on which the crops are above an average, is more than 500 feet.

In circulating in this shape, among their own members and their neighbours in the district, these general observations, it is scarcely necessary to observe that in the cultivation of any farm crops, and more especially that of turnips, so much depends on the peculiarities of soil and climate, and the more temporary causes of weather and season, that it should be the object of every farmer to give the most minute attention to the result of each operation he performs, as well as the quantities of manure and time of sowing and all other causes on which the success of his crop depends. And it is mainly by this minute observation, and giving publicity to the results, that improved practice will be rapidly and successfully introduced.

On this principle the club hope that by previous arrangements a variety of experiments will be made over the district in the course of the following year, and it is principally with the view of furthering these, and giving interest to the subject, they now circulate with these remarks the table.

November 22, 1849.

TABLE OF FIELDS OF TURNIPS,

Inspected between 20th and 22nd of November, 1849.

KIND OF TURNIPS.	Drills apart Inches.	No. of Turnips in 10 yds.	WEIGHT.		MANURE PER SCOTCH ACRE.				When Sown.
			Per Scotch Acre. Tns. Cwt.	Per Imp. Acre. Tns. Cwt.	Farm yard dung. cub. yd.	Guano. Cwt.	Dis- solved Bones. Cwt.	Ground Bones. Bush.	
Hardgrave, Dalton Parish—									
Swedes.....	28	28	35 12	28 9	15	4	0	17	May 23 & 25.
Purple Top Yellow....	28	28	31 8	25 2	15	2½	0	13	June 1 to 6.
White Globe.....	28	26	33 3	26 10	12	2	0	10	June 8 to 24.
Hardy Green.....	28	29	31 14	25 7	15	2½	0	13	June 12.
Smallholm, Lochmaben—									
Swedes.....	26	42	26 13	21 6	15	1	1	0	
Yellow Bullock.....	26	43	27 9	21 19	15	1	1	0	
Preston House, Lochmaben—									
Swedes.....	28	45	29 13	23 14	28	1	1	0	
Yellow.....	28	41	26 10	21 4	28	1	1	0	
Greenhillhead, Lochmaben--									
Swedes.....	26	44	24 6	19 9	26	3	0	0	
Yellow Bullock.....	25	35	37 0	21 12	25	2	0	6	
White Globe.....	25	32	31 0	24 16	25	2	0	6	
Dalfilble, Kirkmichael—									
Swedes.....	27	44	30 0	24 0	20	2½	0	0	
Ditto.....	27	44	27 17	22 5	20	0	0	15	
Yellow Bullock.....	27	44	22 16	18 5	20	2½	0	0	
White Globe.....	27	43	32 11	26 0	20	2½	0	0	
Ditto.....	27	46	32 4	25 15	0	2½	0	15	
Hillside, Dryfesdale—									
Swedes.....	28	33	26 10	21 2	25	2	2	0	May 15 to 20.
Yellow Bullock.....	25	57	22 16	18 3	20	2	0	16	June 12.
Common Red.....	28	44	27 0	21 9	20	0	2	0	June 20.
Yellow Bullock.....	26	48	30 16	24 10	20	2	0	0	May 25.
Dryfeholm, Dryfesdale—									
Swedes.....	28	40	29 6	23 7	24	2½	0	0	May 12.
Ditto.....	29	37	22 18	18 5	24	2½	0	0	June 1.
Beckton, Dryfesdale—									
Swedes.....	27	43	31 16	25 6	20	2½	0	0	
Yellow Bullock.....	28	52	32 12	25 19	20	2½	0	0	
Kirkburn, Dryfesdale--									
Swedes.....	29	42	34 16	27 14	30	2	0	0	May 12.
Ditto.....	29	40	29 0	23 4	30	0	0	0	May 6.
Yellow Bullock.....	27½	34	26 12	21 4	20	2	0	0	May 28.
Lockerby Townhead, Dryfesdale—									
Swedes, alternate....	26	41	24 10	19 12	35	0	0	0	June 6.
Yellow Bullock.....	26	41	32 0	25 9	35	0	0	0	June 6.
Broomhouses, Dryfesdale—									
Yellow.....	29	36	26 16	21 7	26	0	0	0	
Swedes.....	30	44	32 6	25 14	26	2	0	0	
Millbank, Applegarth—									
Swedes.....	29	56	31 9	25 1	20	2½	0	0	May 30.
Yellow Bullock.....	29	42	29 11	23 11	20	2½	0	0	June 2.
Ditto, undrained.....	30	50	17 3	13 13	0	2½	0	16	June 9.
Muirhousefoot, Applegarth—									
Swedes.....	30	34	21 10	17 2	20	2½	0	0	
Yellow.....	27	62	26 18	21 9	18	0	0	0	
Muirhousehead, Applegarth—									
Swedes.....	27	36	26 18	21 9					
Balgray, Applegarth—									
Swedes.....	29	45	28 6	22 11	35	0	0	0	
Yellow Bullock.....	29	43	36 14	29 3	35	0	0	0	
Lang's Green Top Swede	29	43	33 0	26 5	35	0	0	0	
Bellcathill, Applegarth—									
Swedes.....	29	50	26 6	20 19	30	0	0	0	
Yellow Bullock.....	29	42	23 12	18 16	30	0	0	0	
Ditto.....	29	66	23 5	10 10	0	4	0	0	

KIND OF TURNIPS.	Drills apart, Inches.	No. of Turnips in 10 yds.	WEIGHT.		MANURE PER SCOTCH ACRE.				When Sown.	
			Per Scotch Acre. Tns. Cwt.	Per Imp. Acre. Tns. Cwt.	Farm yard dung. cub. yd.	Guano. Cwt.	Dis-solved Bones. Cwt.	Ground Bones. Bush.		
Cleughheads, Applegarth—										
Swedes.....	30½	56	27 10	21 17	30	0	0	0		
Yellow.....	29	35	23 13	18 17	30	0	0	0		
White.....	30½	45	25 0	19 18	25	0	0	0		
Dinwoodie Mains, Applegarth—										
Swedes.....	29	41	27 13	22 2	20	1½	0	0		
Yellow Bullock.....	28	41	21 12	17 5	15	1½	0	0		
Dalmacadder, Applegarth—										
Swedes.....	29	41	26 12	21 5	25	3	0	0	May 26,	
Barnsdale, Hutton—										
Swedes.....	28	41	23 17	19 0	20	2½	0	15	May 27.	
Yellow Bullock.....	28	41	22 2	17 12	20	2	0	0	June 5.	
Shaw, Hutton—										
Swedes.....	30	37	27 19	22 4	20	2½	0	0	May 23.	
Yellow Bullock.....	26½	34	21 8	17 1	0	2	0	18	May 20.	
Ditto.....	26½	36	25 0	19 18	0	2	0	18		
Closs, Hutton—										
Common White.....	30	39	23 9	18 13	20	2	0	0		
Annanbank, Johnstone—										
Swedes.....	28	39	26 3	20 18	20	1½	0	0		
Yellow Bullock.....	28	40	23 14	18 19	20	2	0	0		
Red Top White.....	28	45	27 11	22 1	20	2	0	0		
Skimrigg, Johnstone—										
Swedes.....	28	49	31 0	24 16	0	3	0	10	May 28.	
Yellow Bullock.....	28	42	30 7	24 5	15	0	2	0	June 15.	
Corshua, Johnstone—										
Swedes.....	29	42	32 4	25 15						
Yellow Bullock.....	29	38	18 10	14 16						
Cleugh, Johnstone—										
Swedes.....	28	46	18 10	14 16	20	0	0	15	May 25.	
Yellow Bullock.....	28	44	26 10	21 4	20*	0	0	15*	May 25.	
Yett, Johnstone—										
Swedes.....	31	48	23 16	18 17	35	0	0	0	End of May.	
Yellow Bullock.....	30	56	28 0	22 8	35	0	0	0	End of May.	
Raehills, Johnstone—										
Swedes (Skirving's) ..	0	44	21 5	16 18	30	2½	0	0		
Purple Top Yellow.....	0	44	25 7	20 4	25	2	0	0		
Lochbrow, Johnstone—										
Green Top White.....	0	51	22 4	17 13	0		0	0		
Yellow Bullock.....	0	41	21 2	16 16	25	3	0	0		
Kirkhill, Wamphray—										
Swedes.....	28	50	29 4	23 5	26	2	1	0	End of May.	
Yellow Bullock.....	28	50	25 3	22 2	20	2	1	0	Beg. of June.	
Wamphraygate, Wamphray—										
Swedes.....	28	45	27 15	22 4	21	2	0	0	End of May.	
Yellow Bullock.....	28	48	22 7	17 17	18	1¾	0	0	2d week June	
Globe.....	28	50	27 0	21 11	18	1¾	0	0	2d week June	
Pumpleburn, Wamphray—										
Swedes.....	29	46	23 0	18 5	18	2	0	0		
Yellow Bullock.....	28	56	20 0	16 3	18	1½	0	0		
Globe.....	28	38	20 0	16 3	18	1½	0	0		
Craigbeck, Moffat—										
Swedes.....	27	59	27 17	22 5	22	2½	0	0		
Yellow Bullock.....	27	45	23 5	18 16	20	2½	0	0		
Woodhead, Moffat—										
Swedes.....	28	46	28 12	22 16						
Yellow Bullock.....	28	54	26 3	21 0						

The Weights were taken in different portions of each field, and those here stated show the average; the heaviest and lightest not being particularized—the top and root excluded.

The average Weights of the whole Fields are:—

	SCOTS ACRE.		IMP. ACRE.	
	Tons	Cwt.	Tons	Cwt.
For Swedes.....	27	9	21	16
— Yellow.....	25	6	20	2
— Common.....	28	2	22	7

* Alternate rows.

CALENDAR OF HORTICULTURE.—FEBRUARY.

RETROSPECT.—I commence at the middle of January, deferring to complete the retrospect to the last paragraph. That has occurred which at the period of the autumnal equinox (22nd Sept.) was contemplated as probable: winter has reigned paramount throughout the half of this first month of the year, and has been rendered more than ordinarily gloomy by the prevailing absence of sun. The previous ten days—*i. e.*, from the 21st to 31st of December—were frosty; and more keenly so on the 28th, with 8 degrees, and, after much snow, on the 29th, with 13 degrees below the freezing point before sunrise, but the atmosphere was clearer and more bright. Some occasional driving snow fell again in the present month, but not sufficient to cover the grass, till the morning of the 16th, after the lull of the piercing easterly wind of the 13th and 14th. So far, the frost has rarely exceeded 7 or 8 degrees with us; and therefore vegetation may be considered safe.

I propose, in order to keep pace with the advances of analytic discoveries (so far as our best tables will warrant the attempt), to give the inorganic elements of one of the most approved garden vegetables monthly, and as nearly as possible at the time when it is usual to sow or plant the same. Thus I commence with the garden bean, February being the month wherein the seed should be sown, as early as convenient, in order to forestall the approach of the black aphid, which is almost sure to attack the tops and blossoms of late-sown beans. In citing such analyses, if two or more are at hand, the *mean* average of each tabulated element will be given, because the calculations are generally so discrepant as to throw considerable doubt upon the accuracy of individual experiments. The ripe seeds of the garden bean, on the authority of Boussingault and Dr. Daubeny, yield as nearly as possible, of ashes, by combustion, 5.12 per cent., or in the gross 5 $\frac{12}{100}$ lbs. in 100lbs. This ash was found to contain of

1. Potash.....	27.28
2. Soda.....	3.61
3. Common salt.....	1.60
4. Lime.....	23.0
5. Magnesia.....	4.68
6. Peroxide of iron.....	3.45
7. Silica.....	3.65
8. Sulphuric acid.....	2.25
9. Phosphoric acid.....	12.27
10. Carbonic acid.....	14.17
11. Chlorine.....	.70
12. Carbon and sand.....	7.27

The individual analyses differ very much, and the averages of four return 3.93 above the 100 parts of the ashes supposed to be analyzed. However, they indicate a predominance of potash, lime, phosphoric acid, and carbonic acid. The chief constituents in the 100 parts of bean-straw are, according to Sprengel:

Potash.....	53.06
Lime.....	20.
Magnesia.....	6.09
Silica.....	7.03
Phosphoric acid.....	7.24

Guano, if good, contains all these elements; and so would farm-yard manure blended with superphosphate of lime (bones and sulphuric acid), and sulphate of magnesia: ammonia, to represent soda and nitrogen, is not indicated. If, then, the loam be rather strong, deep, and of a hazel colour, and its constituents be correctly ascertained, a sufficiency of potassa and silica will be present; and beans must prosper, when very moderately enriched as above, for the quantity of ash from 100 parts of the seeds and haulm of each is very limited. The great advantage to be derived from farm and fold manure will always depend upon the quantity of decomposable organic substances which they furnish to the ground—a remark which claims universal attention, but now is too much overlooked in consequence of our zeal for the artificial inorganic theory.

OPERATIONS IN THE KITCHEN GARDEN.

If the frost continue, all those directed in the January "Calendar" are yet required to be early attended to. So soon, however, as the ground shall be open and workable (for a poshy condition is quite unavailable), *Long-pod* and *Sandwich Beans* should be sown in rows three feet asunder.

Peas also, of the early kinds, may be sown in like distant rows—the seeds in drills three inches deep, and those which have been raised under glass may be transferred to the open ground, being immediately protected by short bushy sticks, or spray of the spruce fir.

To give the amateur some idea of the discrepant results of analyses, peas (the seeds), according to Boussingault, yield 3.1 per cent. of ash, 100 parts of which gave:

Potassa.....	35.30
Soda.....	2.50
Lime.....	10.10
Magnesia.....	11.90
Silica.....	1.50
Sulphuric acid.....	4.70
Phosphoric acid.....	30.10

According to Sprengel:

Potassa.....	32.10
Soda.....	29.90
Lime.....	2.35
Magnesia.....	5.51
Silica.....	16.63
Sulphuric acid.....	2.11
Phosphoric acid.....	7.71

Both indicate the presence of alkalis, and the former of much bone-phosphate, acidulated. The soil may be a light or sandy loam, in good heart, and pretty deep, manured in the previous autumn with very old "linings" manure, mixed with a small portion of common salt. Lime will be of great utility if the land be deficient of chalk, and do not hiss when strong spirit of salt is dropped upon it. At all events, air-slaked lime, sprinkled close to and between the rows of plants, will protect them from slugs.

Cabbage and Savoys.—If, through severity of the weather, the young plants of "hearting" spring cabbage have failed, no time should be lost in sowing seed under glass, with gentle heat. But, on the other hand, if a seed or nurse-bed have been duly protected by coverings or frames, the plants ought to be removed to the beds where they are to remain. Here it will be in place to recommend that all ground intended for *Brassicæ* be trenched at least 18 or 20 inches deep, and that a layer of fresh long dung, wet with urine, be placed at the bottom of each trench, three inches deep when trodden down, to furnish a supply of ammoniacal and hydro-carbonic gases to the loamy soil thrown upon the manure. This tribe of plants delights in ammonia; and dung so buried will not only develop gases, but be gradually converted to organic humus, which will ultimately prove serviceable to celery, celeriac, artichokes, and asparagus. Cabbages profit much, in calcareous loams, by guano; a few pounds of that substance can, therefore, be incorporated with the upper soil of a bed. I have been assured that, in some cottage-gardens, the night-soil, fresh from the cess-pool, has been poured from the nozzle of a garden-pot into a hole bored sloping by a strong dibble or crow-bar toward the root of each cabbage, and that a very luxuriant growth was thus produced. Asparagus will flourish with such manure; but another process will in its proper time be described. Sow the seeds of cabbage, savoy, Brussels sprouts, borecole, and kale at any time after the middle of February, when the ground is free from frost, and in working condition.

Sow *curled Parsley* for transplanting, *horn Carrots*, *Lettuces*, and *Onions*; *Parsnips*, *Leeks*, *Radish* twice; also *Peas* and *broad Beans*.

Plant *Cabbage*, *Garlic*, *Chives*, *Shallots*, *Horse-*

radish, deep in rich native loam, free from stones. It is probable that guano, as abounding with ammonia, would suit this potent, odorous plant.

Prepare, early, a rich and deep bed for the *Potato-onion*. Select little bulbs of the large onion, none larger than a pigeon's egg. Force each root downward nearly its whole length into the earth, in drills three in a four-foot-wide bed, the bulbs nine inches apart. Watch the progress, which, with the future treatment, must be noticed in due time.

HARDY FRUIT DEPARTMENT.

If the weather be mild, prune *Wall-fruit trees*, always bearing in mind that the future progress of the trees must be provided for. Cut, therefore, clean away all shoots which are so situated as to fill the space with redundant, crowding wood. The habits of trees must be studied and remembered, otherwise they will deteriorate rapidly. Disbudding in May will be the most important of all operations. "In pruning apples, pears, plums, and cherries, against walls, in espaliers," says Abercrombie, "observe that, as the same branches or bearers remain many years in a proper fruitful state, continue them trained close and straight to the wall, &c., not shortening their ends, but training each at full length as far as the limited space admits. Lay them in from about seven to twelve inches apart." Practice justifies these directions, which, so far as fruit-spurs are concerned, apply to spur dwarf standards. In them, however, the leading shoots must be regulated by shortening at some *outer* bud to their limited height.

Currant-trees, excepting the black (*Ribes nigrum*), must be rigidly spur-pruned, as I have frequently urged. The London market-gardens also exhibit proofs of the excellence of this fertilizing mode of treatment. At the same time cut away all cross-growing and straggling branches.

Do the same with the *Gooseberry-bushes*, avoiding, however, general "spurring," and shortening of the leading shoots. Many varieties of this tree produce, by habit, short spur processes, with a fruitful bud at its base. So far, each may be cut back to half-an-inch above that bud, so as to prevent the advance of lateral shoots. These berry-bearing shrubs are apt to become mossy. To destroy all the cryptogamous intruders, dust every bush, after pruning, with powdered lime, or syringe them with lime-water; then point in, with a fork, mellow horse-droppings, or short, reduced dung, two or three inches deep, among the soil around the roots.

Raspberries.—Clear away all but four to six strong canes. Carefully fork up every wandering

sucker. Cut back to the *head* of each fruitful cane, and fork in manure around the roots; but do not dig the ground. The canes are secured either by simple ties, so as just to connect the tips of each; or against a light trellis. I dislike stakes.

FORCING DEPARTMENT.

Little need be said now of pine-apples and grapes: but hot-beds or pits should be prepared for *Melons* and *Cucumbers*. Seed of the former ought to be sown immediately. Cucumbers do admirably in large pots of rich, light earth, placed in propagation-houses, or even in pine-stoves heated by hot-water tanks. *Kidney Beans* could thus be advanced in regular succession.

Strawberry-plants in pots have every advantage in long pits, either heated by linings or by hot-water pipes, provided abundance of air can be given.

Remarks on the floral and ornamental grounds can well be deferred to March, inasmuch as the frost still continues to lock up the ground; and no advantage could result from early disturbance.

Our averages may be cited as lowest, by night or before sunrise, at 26 to 27 deg.; by day, 30 to 33 deg.; late at night, 28 deg. The gloom is persistent, almost without relief. A thaw occurred, with wind at south by east, on the 19th; but, the current varying to north-west, a black, biting frost took up yesterday, and continues. As the average of January is estimated at 36 deg., and that of February at 38 deg., we may look forward to a continuance of cold weather, subject to snow, scuds of cold rain, and sleet. To be wise, gardeners and amateurs ought to be guided by the power of sun in glass houses. Spring is on the advance, and certain it is that a sunbeam produces more positive heat at that season than during the hottest period of summer.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR JANUARY.

As might be anticipated, the all-engrossing subject of discussion and deep consideration amongst the agricultural body, during the whole of the month, has been the alarming depreciation in the value of their produce. At one period it was thought that, owing to the navigation up the Baltic being closed, the importations of foreign grain and flour would materially fall off, and that an advance would take place in the quotations of grain, thereby allaying to some extent the fears entertained of very low prices during the winter. The operations of free trade have, however, completely falsified this opinion. The proximity of France and Belgium, the advantages derived from steam communication, and the abundant supplies of wheat produced in those countries last year, have had a most depressing effect upon our markets. The corn trade generally has assumed new phases. The continental millers, instead of consigning their produce, in the ordinary course of things, to respectable factors, have made their appearance in the metropolis in *propria persona*, and gone the tour of most of the large bakers' shops, accompanied by interpreters; thus *hawking* their flour for sale at prices from 1s. to 2s. per sack under those at which it could be obtained in the open market. In this way from 8,000 to 12,000 sacks have been disposed of. Here, then, is one of the leading causes why the value of wheat has not improved, and this state of things has rendered it a

matter of no little difficulty for the English speculator to know when and at what price it is safe to make investments in any article, particularly in wheat, the value of which is held to be very uncertain for the whole of the present year. The consumption of bread in this country is extremely large; yet the foreign importations—chiefly in a state, be it observed, for immediate use—have continued on so extensive a scale, and such is the anxiety manifested to realize, that it has become a matter of extreme difficulty to effect sales of home-grown produce at any price. As the producers appear to have made up their minds to realize at almost any sacrifice, and as the supplies of English grain on hand are seasonably large, the prospect before us is a very unfavourable one. Even the abundance of money in the coffers of the Bank of England, and in the hands of private bankers, has failed to have its wonted effect upon the corn trade. Fortunately, the provincial bankers have been in a position to make advances upon farming produce, or not a few of our farmers must have "gone to the wall" long ago. Notwithstanding the distrust which prevails as regards the future, large orders have, we find, been forwarded to the various continental ports, at certain limits, for spring delivery. Much anxiety has been of late manifested to ascertain the quantities of foreign and colonial produce on hand in private warehouses in the United Kingdom. In the absence of statistical details furnished by the government, much difficulty has presented itself in arriving at an accurate and

satisfactory conclusion on this vitally-important point. The annexed statement has been handed to us, which, we are informed, represents the supplies now on hand:—

Wheat	250,000	quarters.
Barley	110,000	„
Oats	70,000	„
Rye	8,000	„
Beans	12,800	„
Peas	13,500	„
Indian corn	620,000	„
Flour and meal..	200,000	cwts.

The actual consumption of Indian corn last year was not less than 1,997,700 qrs., or at the rate of 35,417 qrs. weekly.

In the early part of the month the weather was exceedingly severe in nearly all parts of England. The cold was, on some days, from 12 to 15 degrees below freezing. Fortunately, the winter wheats in the north were well protected by a somewhat deep fall of snow, but the fall in the south was comparatively trifling. The return of mild weather has greatly improved the appearance of the wheats, yet farm labours have made but little progress, as the flail and thrashing-machine have been in constant requisition.

The early lambing season, arising from the severity of the atmosphere, has been attended with some rather heavy losses, especially in Dorsetshire and Hampshire. Owing to the immense supplies of country-killed meat forwarded to the metropolis, the cattle trade in Smithfield has been in a very depressed state, and prices have tended downwards. The quantities of stock at this time in our principal grazing districts are extensive. The severity of the weather in Holland has prevented the shipment of large supplies of stock to England; but we understand that, on the breaking up of the frost, very large exports will be made to this country. The trade with Spain has been re-opened.

Potatoes, notwithstanding the statements put forth some months ago that a large portion had been lost, are still very plentiful. Since our last the imports from abroad have fallen off to some extent, and higher prices have consequently been realized for most descriptions. The average weekly inportations last year from abroad were 1,156 tons.

Depastured and stall-fed stock has fared tolerably well, as the supplies of dry food have proved extensive. Very few complaints of the epidemic have reached us.

The hay and straw markets have continued very inactive, at low prices.

In Ireland and Scotland the corn trade has ruled heavy, but the fall in the quotations has not been equal to that at Mark Lane.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

The low prices of all agricultural produce have been productive of numerous speculative theories as respects the future. Although they are mere speculations, it may be useful to glance at some of them. In the first place we are told, that if the graziers desire to increase their returns, an increased consumption of oil-cake is necessary; and in the next, that early maturity has invariably paid the best. We ourselves have long entertained other views than these, as we are firmly convinced that more money has been realized by what we may term the old-fashioned feeders, than by many that we could name. Be that as it may, it is absolutely ridiculous to tell the owners of stock that they ought to use additional supplies of artificial food, when the means by which they were once enabled to purchase them have been wrested out of their hands by free trade. The admission of oil-cake at reduced duties was, we know, looked upon as a great boon; and the speculators in the article felt pretty certain of realizing large profits. Of late, however, scarcely any business has been done in it; and the quotations are now quite £4 per 1,000 less than they were twelve months since! The value of linseed has equally suffered; and to show its disuse we may observe, that the falling off in the importations last year were little short of 400,000. So much for free trade improving the position of some of its most sanguine supporters! Prospectively, the cattle trade, if due caution be exercised, is not surrounded with the many difficulties with which we have known it formerly to be beset at this particular period of the year; not that we mean to assert that the graziers' prospects are improving, but the dealers are unquestionably in a better position to calculate what their profits may be from their forthcoming purchases in the large fairs.

The trade in Smithfield has ruled exceedingly inactive; and prices, though low, have had a downward tendency. The annexed supplies have been on offer:—

Beasts	15,553	Head.
Cows	442	
Sheep	95,560	
Calves	1,014	
Pigs	1,783	

CORRESPONDING PERIODS.

	Jan. 1847.	Jan. 1848.	Jan. 1849.
Beasts	14,893	15,589	16,623
Cows	420	480	568
Sheep	94,680	91,880	93,150
Calves	842	770	873
Pigs	2,250	2,435	1,185

The average prices have ruled thus :—

Per 8lbs., to sink the offals.

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

CORRESPONDING PERIODS.

	Jan., 1847.		Jan., 1848.		Jan., 1849.										
	s.	d.	s.	d.	s.	d.									
Beef from 2	8	to	4	6	3	4	to	5	0	3	0	to	4	0	
Mutton . . .	3	8	to	5	2	3	8	to	5	4	3	8	to	4	10
Veal	4	0	to	5	0	4	4	to	5	6	3	6	to	4	8
Pork	3	8	to	5	0	3	8	to	5	2	3	4	to	4	8

The bullock supplies have come to hand as under:—

Norfolk, Suffolk, &c.	5,300
Northern districts	3,250
Other parts of England.....	3,350
Scotland	450
Ireland	170

The imports from abroad into London have been confined to the annexed totals:—

	Head.
Beasts	687
Sheep	2,161
Calves	372
Total	3,220

Corresponding month in 1849 .. 4,495

Same month in 1848 .. 5,485

At the outports, the arrivals have been very small.

Newgate and Leadenhall have ruled heavy, at drooping prices, owing to the unusually large supplies of meat forwarded from various parts of the country.

NORTH NORTHUMBERLAND.

In taking a retrospective view of the past weeks since our last report was penned, although three full weeks of the old year were then unexpired, a continuance of the same unsettled weather we notified at that period continued with slight variations to the end of the year; field labour of all descriptions, which at the close of November was in a forward state, was, during the following month, quite impracticable, from the damp state of all except soils of the very driest description. Willingly we would thus take a final leave of 1849, but alas! "sooner said than done"—the lee-way made in the reckonings of the great agricultural Ark will require very superior nautical skill to bring her to windward, and set her once more on a proper course. With other "high farmers,"—although we cannot follow all their nostrums, we must at least follow in the wake at present—"our hope must be in the future." The first three weeks in the year were frosty, and from the 12th up to the 22nd a very considerable quantity of snow fell, and on exposed situations, was drifted by the wind into great masses; many

of our roads, public and private, were completely blocked up for several days. On the evening of the 22nd a rapid thaw set in, and for the last two days all low grounds are much flooded by the rapid melting of snow. The young wheat plant has got a complete check, but we do not anticipate any serious injury; yet at present the blade is completely fallen and withered. Our markets continue to recede for farm produce of every description: best samples of red wheats are fetching from 33s. to 36s. per qr.; barley about 20s. for best runs, and oats obtainable at 6d. to 7d. per stone of 14lbs. Best beef and mutton have never realized to the grazier more than 4½d. to 5d. per lb., and looking at the supplies and depressed state of the market, it seems likely that we shall only have the manure heap with "ammonia" instead of money; and how our free-trade customers and landlords are to be met in cash payments by such inconvertible commodities is a problem which will soon solve itself. Many farms in this county have been in the market, the competition for which has not been keen, yet part have found takers at or nearly the former terms. We can only attribute such arrangements to the high speculative character of our farming brethren, whose hope must, like gentlemen born in higher latitudes, "be in the future;" for certainly present appearances indicate a very miserable return for toil and expenditure for tillage. A great complaint is everywhere to be met with about potato failure; certain it is that few seem likely to keep in store suitable for planting, and very probably a small breadth will be seeded the ensuing season. Thrashing has been very liberally prevalent for the last few weeks, and the grain has been quite as generally consigned to the consumer; hence the glutted state of the market: the yield seems about an average. Cattle and sheep have done well so far on turnips, although there are still complaints of epidemic disease in certain localities. Such visitations every grazier is liable to, but to labour and feed season after season, and find at the summing up all is done for nothing, will work a certain cure. *Maybe* the merchant may find out too late the farmer *was* his friend.—Jan. 25.

DURHAM.

Up to Christmas the weather was favourable for outdoor farming operation, when frost set in and continued until the 13th inst.; snow succeeded, and we have now a very heavy and regular cover, which is highly beneficial in protecting the turnips, young wheat, and clover from the frost. The farmers have been busily engaged in carting out manure, &c.; the thrashing-mill is in full operation; farm stock requires great attention, and the consumption of provender is considerable. Wheat and other grain come freely to market, and out of condition, and to effect sales ruinous prices have to be submitted to. The position of our farmers is daily becoming more deplorable; the depreciation in the value of their property still continues; and though prices have been reduced to a point quite inadequate to cover the cost of production, foreign produce pours into this country, and the British farmer is completely beaten out of his own market. The poor tillage land is not worth a shilling,

and will cease to be cultivated, and it is quite impossible that we can compete with the foreign grower. There is a party crying up high farming and their great profits: we think their statements are very incorrect, and their preaching is calculated to mislead landlords, and perhaps some tenants who, like themselves, have an imperfect knowledge of their business. They tell us we are to farm higher and grow greater crops. It does not follow that crops are increased by having land in a high state of cultivation and superior management; in a wet season the crop is very precarious and uncertain; it is dangerous to force the land too much, or to increase the fertility of the soil to that degree as to render the crop of little value; the crop becomes lodged, clover is smothered, and the soil becomes in a worse condition for future crops. He is the best farmer who produces the greatest quantity of food at the least expense. Mr. Caird, of Auchness, the high farmer, grows 65 acres of potatoes every year on his small farm of 260 acres: they are a very precarious crop, and he had better not be too san-

guine with regard to his profits. The greatest part of his farm is managed on a four course shift; on another part of the farm, consisting of 40 acres, he grows potatoes every year. This seems strange management; for we were always led to suppose that the grand secret in farming was to vary your crops as much as possible. There is Mr. Mechi of London, the great agriculturist in Essex, who has taken a great antipathy to the growth of turnips, and a great predilection for feeding pigs. Of the Rev. Mr. Huxtable, we have not seen his pamphlet, but he stated he had been losing lots of money. Mr. Davis is partial to travelling; he has taken a tour in Norfolk; he states the graziers there buy animals at £16 each, and feed them on roots for six months, and sell them to the London market at £25. Now we really think the Norfolk farmers have no ground for complaint if this is a fact. Mr. Davies and Mr. Mechi seem to differ widely as regards the value of roots, but probably Mr. M. may be prejudiced in this case. We recommend Mr. M. to stick to the shop.

AGRICULTURAL INTELLIGENCE, FAIRS, &c.

AYLESBURY CATTLE FAIR (Jan. 25) was the largest that has been seen here for many years, both as to the quantity of stock exhibited, and the number of dealers who attended, many of the latter coming from Birmingham. There was a large supply of prime fat heifers, which met a ready sale at from 3s. to 3s. 6d. per stone, and a good clearance was effected. Calving heifers were also in abundance, but the trade in that kind of stock was dull, and many remained unsold at the close of the fair. Good milch cows were a good supply, and a good business was done in them at from £15 to £18 each. Several fat bulls were in the fair, and were sold at good prices; one belonging to Mr. Hurst, of Hardwick, near Aylesbury, sold for £20. There was a good number of oxen at the fair, which sold at remunerating prices. Twelve fine Herefords belonging to Mr. Peter Hughes, of Watton Hill, near Aylesbury, sold at prices averaging £22 each. There was a plentiful supply of sheep, mostly fat wethers, which were all sold at from 3s. 10d. to 4s. per stone. For horses, the supply of which was good, the trade was dull. There were some excellent cart horses, one, a splendid animal, fetching £50; others according to quality, but not much business done. Pigs were in good supply, and a good trade was done, almost the whole at market changing hands, at prices varying from 10s. to £1 each for stores; others according to quality.

BANBURY FAIR.—The largest horse fair for some years commenced on Monday, at Banbury. Hundreds of horses changed hands. Good horses fetched fair prices. The town has been full of buyers and sellers, farmers and others.

BANWELL FAIR.—There was, on the whole, a better supply of stock than was expected. The attendance of dealers was very large, but the prices remained much the same as those in Bristol market for the last fortnight. Good beef was worth 70s. per cwt., but it must have been a superior animal to fetch that sum.

BERWICK FORTNIGHTLY CATTLE MARKET, Jan. 21.—The show of cattle and sheep was much larger than our previous market. The number shown were, fat cattle, 68; lean, 40; cows, 10; sheep, 387; and pigs, 9. The following are the principal lots of fat:—Mr. Clay, Winfield, 6 good steers; Mr. Cockburn, Harlaw, 4 steers; Mr. Middleton, Aytou Corklaw, 8 heifers; Mr. Clay, Kerchesters, 7 steers; Mr. Craw, Laws, 4 good kylees, which sold at 5s. 9d. per st.; and 3 heifers from Drow, East Lothian, were considered the best in the market. Mr. Clay, of Kerchesters, had a fine lot of Southdown and half-bred sheep, which sold at 129s. 6d. per

head. The prices were—beef, from 5s. 3d. to 5s. 9d. per st.; lean cattle, from £5 to £7 7s. each; cows, from £5 to £12 each; mutton, from 4½d. to 5½d. per lb.; and pigs, from 3s. 6d. to 4s. 6d. per st. Upon the whole it was a dull market, although there were a good many buyers from the south, yet they could not purchase the fat to repay them for sending south.

GRAMFOND FAIR was rather smaller than on former occasions, in consequence of the rain. There was a pretty good amount of business done. Fat sheep fetched about 5d. per lb., good beef 44s. to 47s. per cwt. Plough oxen very few, and scarcely any sales.

GLOUCESTER MONTHLY MARKET (Monday) was but thinly supplied. In fat beef there were very few beasts of prime quality; the best fetched 5½d. per lb., inferior 4½d. to 5d. In mutton, 6d. per lb. was obtained for nice small wethers, larger ones and ewes, 5d. to 5½d., at which prices a good clearance was made.

LOCHMABEN PORK MARKET, Jan. 22.—There were 241 carcasses, 3,201 stones, sold. In consequence of a fall in the price of bacon in Newcastle, the price of pork receded a little. Carcasses of moderate weights readily brought 4s. 8d. per stone, and for heavier weights 4s. 6d. was about the selling price. Mr. Steel, of Aunan, bought upwards of 100 swine, and obtained the premium as largest buyer. The premium of the largest seller was gained by Mr. Jardine, Lochrighead, who returned 5s. to the market funds.

MELTON FAIR, Monday and Tuesday last.—The show of horses on Monday was very limited. Some stout useful ones were shown, but little or no business was done. On Tuesday the beast and sheep fair was on a larger scale. There was a large show of both, but buyers were very wary, and consequently but little business was done.

NEWARK FORTNIGHT MARKET.—There was a very liberal show of stock, which was of good quality. Many sales were effected, and prices were brisk. There were 310 sheep and 72 beasts penned.

PETERBOROUGH FAT STOCK MARKET was well supplied with cattle and sheep on Wednesday, when several were sold, but upon the whole it could not be said to have been a brisk market.

WORCESTER FAIR, Monday.—The attendance was exceedingly large, and there was a good show both of beef and

mutton. Barreners obtained a slight advance on our late fair, but cows and calves were somewhat lower in prices; the quotations were at from 5*l.* to 6*l.*, and all that was prime obtained purchasers. Mutton fetched from 5*l.* to 6*l.*, and but few sheep went back unsold. Pork, 8*s.* to 8*s.* 6*d.* per score. Of horses but few were shown, and the transactions were consequently limited.

AGRICULTURAL QUERIES.

SIR,—I shall feel much obliged if any of your numerous subscribers will inform me, through the medium of your columns, the cause which affects turnips with the "Finger and Toe" disease.

In a field of 10 acres, six in swedes and mangold wurtzel and four in Dale's hybrids and white stone turnips, the former are an excellent crop, sound and good, but the latter were not only affected with the before-named disease, but the crop destroyed before September. Up to the end of July they looked exceedingly prosperous, being well set out with the hoe in drills 20 inches apart on the flat surface, manured with farm-yard dung, ploughed down in December and January, and drilled in with bone-dust and guano. The soil is light on the granwacke, and has not borne turnips for 40 years, except once, and that three years ago; since then it has produced a crop of oats and clover.

A YOUNG FARMER.

SIR,—In the present times it becomes every one having any farming pursuits, either as a business or a pastime, to make the most of everything, and also not to wait for the actual experiment, if he can be satisfied by inquiry. The question I seek to have solved is this, viz., Which is the most profitable procedure, to sell off your last year's lambs (called in this part "hogs") in April, or just at the time the turnips are finished, or to keep them on all the summer and turnip them a second winter? I may here state that the lambs are kept on sliced swedes, 4 oz. of oilcake, and half a pint of barley daily.

A SUBSCRIBER.

A Fen Farmer writes as follows:—"At a meeting of the London Farmers' Club Mr. Mechi affirmed that 'he who has a bog has a treasure.' Now, having myself a fen farm, with a depth of peat varying from 10 to 15 feet, I wish to be informed through the medium of your valuable paper the cheapest, best, and most expeditious method of charring that peat; and also the best purpose that a farmer can put it to—whether as a decomposer in his farm-yard, or the most suitable crop that he can apply it to as a manure."

A correspondent inquires "the best mode of mixing salt and lime; whether the lime should be slacked before it is mixed with the salt, or not; does it require turning before it is fit for use; how long it is before it is fit for use; and what is its appearance when it is fit for use?"

A correspondent asks: "Which is the best system of giving carrots to cart-horses, either whole or cut, with or without chaff, the quantity per day, and the weight of carrots that is considered an equivalent for a bushel of oats?"

A correspondent from Thurlow inquires where of whom he can purchase twenty dozen wadded hurdles, the same as is used in folding sheep in the west of England.

A tenant-farmer of West Suffolk inquires, what quality of land is best adapted for lucerne. Which is the best way of sowing it, broadcast or drilled? How much seed per acre, and when to sow it? And if with another crop (that is, with barley, oat, or straw crop)?

A correspondent asks—"Is charcoal-dust a good manure? If so, what kind of soil is it applicable to; and what is its cost or market value?"

ANSWERS TO AGRICULTURAL QUERIES.

FINGERS AND TOES IN TURNIPS.

We have received the following answer to "A Young Farmer" from a most trustworthy correspondent:—

"The disease of fingers and toes in turnips is prevalent in a certain district in this neighbourhood; it is on the outcropping ridge of the lower green sand (Woburn sand). I have taken some pains to ascertain the cause. I find, on analyzing the soil, an almost total absence of lime. The disease has been prevented by a dressing of the scrapings of roads made with limestone, or calcareous gravel, which contains about 50 per cent. of lime. Lime in any form would produce the same effect. The disease varies with certain seasons.

"A SMALL FARMER.

"Berkshire, Jan. 2, 1850."

THE BEST MODE OF MIXING SALT AND LIME.

"Soda made according to the plan of J. Benet, Esq., M.P. for Wiltshire, I have found a good application to land at the proper time. Lay three inches of unslaked lime, ten feet long and six wide, as a bed, and then spread one inch thick of common salt. Repeat these layers till a bed two feet high is formed. If the mixture is made in summer, when it is dry, it may be in the open air; at other times, under cover. After ten days, turn it over, and repeat the turnings five or six times, at intervals of seven days; spread from a cart about sixty bushels per acre, covering the horse with a sheet or cloth, to prevent burning the hair off. It should be ploughed in before wheat-sowing."—*Hillyard's Practical Farming.*

LIME AND SALT.

SIR,—The direction given in your last for mixing these articles is imperfect. When thus heaped together dry, they do not act upon each other, and might just as well be strewed separately. They should be made damp—not pasty, but heavy, crumbly, and free from dust (like a mellow arable soil), and intimately mixed, not left in layers.

They may be laid down according to Mr. Hillyard's direction, but watering each layer of salt as it is put on, and mixing all intimately together, the next day sprinkling in more water, if necessary, till there is no dust to fly, but taking care not to add too much, so as to leak away the salt. It should be kept damp, turned over frequently, and the longer it remains (in reason) the better; three weeks will do, but not so well as three months.

J. PRIDEAUX.

METEOROLOGICAL DIARY.

BAROMETER.			THERMOMETER.			WIND AND STATE.		ATMOSPHERE.			WEATH.
Day.	8-9 a.m.	10 p.m.	Min.	Max.	10 p.m.	Direction.	Force.	8 a.m.	2 p.m.	10 p.m.	
Dec. 22	30.47	30.50	30	33	33	N. East	brisk	cloudy	cloudy	cloudy	dry
23	30.50	30.50	29	35	30	Easterly, N.W.	airy	fine	sun	fine	dry
24	30.38	30.40	27	38	33	S.W., W. by N.	gentle	cloudy	cloudy	cloudy	drizzle
25	30.50	30.40	29	34	33	S.W., Northly.	gentle	fine	fine	cloudy	dry
26	30.13	29.80	32	38	38	W. by North	variab.	cloudy	fog	cloudy	small rain
27	29.50	29.45	37	40	32	N. by West	lively	fine	sun	fine	dry
28	29.28	29.55	24	28	22	N.W., N.	strong	fine	sun	fine	snow
29	29.54	29.64	19	33	31	N. Westerly	lively	cloudy	sun	cloudy	dry
30	29.94	30.20	30	35	32	N., N. by East	gentle	fine	sun	cloudy	snow
31	30.30	30.32	28	35	30	Various	gentle	fine	sun	cloudy	dry
Jan. 1	30.28	30.23	27	35	30	W. by North	gentle	fine	fine	cloudy	dry
2	30.20	30.23	30	33	32	West	gentle	cloudy	cloudy	cloudy	dry
3	30.19	30.03	31	38	39	S. West	gentle	cloudy	cloudy	cloudy	hint rain
4	29.77	29.49	34	45	37	W. by S. by N.	variab.	cloudy	cloudy	fine	idem
5	29.44	29.44	31	37	31	West by South	lively	fine	sun	fine	dry
6	29.39	29.56	30	37	31	N., Easterly	gentle	fine	sun	fine	snow
7	29.89	30.13	26	33	27	N.N. East	gentle	fog	sun	fine	dry
8	30.28	30.30	23	32	32	N.W., N.E.	calm	fog	cloudy	cloudy	dry
9	30.20	30.10	30	32	30	Var., N. by E.	calm	fog	cloudy	cloudy	snow
10	29.90	29.50	30	32	30	N. East	calm	cloudy	cloudy	cloudy	dry
11	29.87	29.77	27	30	27	E. by South	calm	cloudy	cloudy	cloudy	dry
12	29.50	29.96	27	31	29	N. East	gentle	fine	cloudy	cloudy	hint snow
13	29.95	29.95	27	30	26	East	lively	cloudy	cloudy	fine	idem
14	29.77	29.55	26	29	27	East	strong	cloudy	cloudy	cloudy	dry
15	29.40	29.36	25	28	26	N. East	brisk	cloudy	cloudy	cloudy	snow
16	29.36	29.55	26	30	30	N. East	gentle	cloudy	cloudy	cloudy	more
17	29.72	29.94	29	33	32	N. by East	gentle	cloudy	cloudy	cloudy	again
18	29.96	29.64	29	35	35	S. by East	variab.	fog	cloudy	cloudy	sleet
19	29.55	29.74	44	44	35	N. Westerly	gentle	cloudy	cloudy	cloudy	drizzle
20	30.00	30.20	28	30	29	N. East	gentle	cloudy	cloudy	cloudy	dry
21	30.20	30.35	28	31	30	S. Easterly	gentle	cloudy	cloudy	cloudy	dry

ESTIMATED AVERAGES OF JANUARY.

Barometer.		Thermometer.		
High.	Low.	High.	Low.	Mean.
30.77	28.89	52	11	36.

REAL AVERAGE TEMPERATURE OF THE PERIOD.		
Highest.	Lowest.	Mean.
34	28.8	31

WEATHER AND PHENOMENA.

1849, December 22.—Cold, dirty day. 23.—Fine throughout. 24.—Overcast. 25.—Cirrostratus, finely tinted at sun-rise. 26.—Fog and gloom. 27.—Lively fine day. 28.—Severe after much snow. 29.—Great sudden change. 30 and 31.—Fine mild days.

LUNATIONS.—Last quarter, 22nd day, 7h. 40m., aft.; full, 29th, 2 h. aft.

1850, January 1.—Fine. 2.—Dull and overcast. 3.—Gradual cold thaw. 4.—Thaw con-

firmed. 5.—Again frosty. 6.—Fine after snow. 7.—Keen at night. 8.—Severe early. 9 and 10.—These mornings foggy. 11.—Wind at night. 12.—Few flakes of snow from a clear sky. 13 and 14.—Keen forcible wind; a gleam of sun. 15.—Wind lulled. 16 and 17.—Early snow on each. 18.—Gradual thaw. 19.—Thaw. 20.—Sudden black frost. 21.—Continuous gloom.

LUNATIONS.—Last quarter, 5th day, 8 h. 37 m., morn.; new moon, 13th day, 11 h. 19 m., forenoon; first quarter, 21st day, 9h. 40 min. ditto.

REMARKS REFERRING TO AGRICULTURE.—A low, shady, average temperature, very mild as to frost, and although durable yet propitious. Crops are, or have been unseen, being under snow many days.

Croydon, Jan. 21st.

J. TOWERS.

REVIEW OF THE CORN TRADE

DURING THE MONTH OF JANUARY.

When we last addressed our readers there were symptoms about the grain trade which led to a very general impression that the greatest point of depression had been passed, and that prices of agricultural produce were about to undergo a rally. This belief was, in a great measure, based on the presumption that the arrivals from abroad would, during the winter months, be on so reduced a scale as to give our growers a temporary command of the markets. The opening of the new year was consequently looked for with some degree of confidence, and though few were so sanguine as to expect any great rise, an advance of 4s. to 5s. per quarter on wheat, and a proportionate improvement in the value of other articles were deemed by no means improbable. This anticipation has, we are sorry to say, been disappointed; and after a week or two of comparative activity, matters have relapsed into as complete a state of lethargy as at any previous period. The cause is sufficiently obvious; all parties view the future with distrust. This feeling is so strong as to act as a powerful inducement on holders of corn to avail themselves of any and every opportunity which may from time to time occur for realizing; whilst it indisposes merchants, millers, and dealers to purchase more than they may require to meet immediate wants.

The falling off in the arrivals from abroad was naturally viewed by our farmers as a circumstance by which they ought to endeavour to profit, and feeling perfectly convinced that with the opening of spring they would again have to compete with large receipts of foreign, they at once availed themselves of the frosty state of the weather to thrash out freely. All the leading markets in the agricultural districts began therefore to be well supplied in the early part of the month, and purchasers having bought rather freely in December were unwilling to follow up their operations on finding that more was brought forward than they had calculated on; hence the reaction which has taken place in prices.

The fact is, that the more the matter is considered and analyzed, the stronger becomes the conviction that the repeal of the corn laws must inevitably have the effect of permanently reducing the value of all agricultural produce in this country; and practical men are by no means satisfied of the prudence of holding stock, even at the present greatly depreciated prices. Notwithstanding the

long period the matter was under discussion before it was finally forced upon the country, the full extent of the measure was not understood until it had been actually brought into operation; and even the trial of twelve months has not settled the point as to what may hereafter be the average value of wheat, with an average crop at home, and no particular deficiency in other corn-growing countries. That many of the free-traders begin to be alarmed at the working of their once darling project is certain; but others still cling tenaciously to their favourite scheme of buying in the cheapest and selling in the dearest market, delighting in theories, and disregarding the warning afforded by the position affairs have been brought to by the practical experiment of the first year of unrestricted importation. We are happy to say, however, that the landed interest has at length been roused to exertion, and we feel satisfied that the session now about to commence will not be allowed to close without the feeling which now animates the country being laid before the legislature in such terms as to force consideration and respect.

We must, however, give up politics, and address ourselves to the more legitimate subject of our article—the Review of the Corn Trade.

We have already stated that the expectations formed on the upward movement in prices about the close of 1849, have met with disappointment; indeed, since the 1st of January the tendency has been steadily downward, and the entire advance previously established on wheat has again been lost; this will be more particularly referred to when we come to consider the transactions at Mark Lane, the decline there having been so closely followed at the provincial markets as to render a notice of the former a fair index for forming a judgment of what has occurred in other parts of the kingdom.

Since the northern parts of Europe became closed by ice (which occurred earlier this year than in ordinary seasons) the arrivals of grain of foreign growth into our ports have been comparatively small; still we have had constant supplies from one quarter or the other, and no inconsiderable proportion of the same has reached us in the shape of flour, principally from France and America. A supply of foreign manufactured flour invariably has a more depressing effect than is produced by a proportionate arrival of wheat, as it to a certain extent deprives

our millers of employment, and causes them to act with more than ordinary caution. The first symptoms of reaction in prices of wheat manifested themselves in the early part of the month, and were undoubtedly caused by an unexpected and rather large arrival of flour at Liverpool and into London. The downward movement which then began has not since received a check, prices being now quite as low as at any former period since the repeal of the corn laws.

At many of the markets in the agricultural districts, red wheat of good quality, weighing 61lbs. to 62lbs., may at present be bought at 35s. to 36s. per quarter; and finer descriptions at corresponding rates: what wonder then that there should be dissatisfaction among farmers? It must be recollected that the crop of 1848 was unusually deficient, and that the last harvest was not over an average. Had the low range of prices been the consequence of a succession of abundant crops at home, our growers would have no right to complain; but the case is widely different: whereas, at present, the value of their produce is beaten down week after week by foreign importations. The slight check to the supply which winter has interposed must, it is well-known, be only temporary: with the spring, foreign corn will again be poured into the country. The certainty of this hangs as an incubus over the trade, and presses with quite as much effect on the buyer as the seller. What prices may ultimately settle down to with free trade it is not easily to determine, but considering the moderate amount of our stocks in granary, and the probability that no great addition can be made to the same by fresh imports for at least a couple of months, we are inclined to think that in the course of a few weeks matters may mend a little, and we should therefore counsel our agricultural friends not to press supplies forward too eagerly. The large millers in all parts of the kingdom have lately been selling more than they have replaced by fresh purchases, and must, ere long, come again into the markets as buyers; hence we may expect a more lively demand before February terminates.

The weather was during the greater half of the month dry and frosty; but the cold, though at times severe, has not been so intense as to threaten injury to the wheat crop in the ground. The keen frosty air has, meanwhile, been favourable for the grain of last year in stack, and most of what has been thrashed has exhibited a decided improvement in condition. The weather has also been propitious for carting manure on the land, and as the frost has now fairly broken up, farmers will soon have sufficient out-door work to occupy their men and horses. Whilst the frost lasted the thrashing machine was kept in full operation, farmers being

anxious to profit by the favourable weather; this may have induced them to thrash out somewhat more freely than a due consideration of what the demand could take off would warrant.

It is somewhat remarkable that Mark Lane has been but moderately supplied with English Wheat, whilst the deliveries have been so free in the provincial markets. This must be attributed either to forethought on the part of the Essex and Kent farmers, or accounted for by the supposition that the quantity remaining in the home counties has already been so much reduced by previous deliveries, as to render producers less anxious to realize. The arrivals of home-grown wheat coastwise into the port of London have scarcely averaged 3,000 qrs. per week since the commencement of the new year, and the quantity brought forward by land-carriage samples from the neighbouring counties has been equally small; the decline with us cannot therefore be attributed to the extent of the supplies. The downward movement commenced on the first Monday in January, and the decline has not since been checked: the fall has been greater on red than on white wheat, the former having receded about 4s. and the latter about 3s. per qr. from the highest point attained in December, bringing quotations back to very near the point from which they advanced last month. The cautious manner in which the large London millers have conducted their operations proves pretty clearly that they are not sanguine in regard to the future; still it is not likely that they will allow their stocks to be much further trenced upon without making purchases; and we are certainly of opinion that they will have to buy more extensively, before the expiration of many weeks, than they have done of late. In the commencement of the month good runs of Kent red wheat were worth 43s. to 44s. per qr., whilst the last sales were at 38s. to 39s. per qr., for 62 to 63 lbs. quality. The decline on Lincoln and Cambridgeshire wheat has been to about the same extent, and the top price of town-made flour having been stationary at 40s. per sack, our flour manufacturers would have done well but for the interference of the foreign.

The arrivals of wheat from abroad have been unimportant, and the few cargoes which have from time to time come forward have been landed, for want of buyers, from on board ship. The operations in foreign wheat have been altogether trifling, hardly any country demand having been experienced, and the local inquiry having been far from active. The satisfactory condition in which a large proportion of the new wheat of home growth has lately come to hand has rendered a mixture of old less necessary, and as speculation has been wholly out of the question, our millers have manifested no

inclination to buy that of which they stood in no immediate need. Importers have, nevertheless, remained tolerably firm, and prices of foreign wheat have not given way so much as the value of English. Good red Baltic cannot at present be bought below 40s. to 42s., and superior Rostock is still held several shillings per qr. above those prices, whilst holders of fine Danzig decline selling below 48s. to 49s. per qr. The entire stock of foreign wheat in granary at this port is estimated in round numbers at 250 to 300,000 qrs., and of this quantity by far the greater proportion consists of inferior and secondary qualities, scarcely suited to the London trade. Within the last week or two there has been some inquiry for low-priced wheat for shipment to Ireland; but the limits of the orders from thence have not been sufficiently high to lead to business. Polish Odessa has been held at 35s. to 38s., and the ordinary sorts of Black sea and Danube wheat at 32s. to 36s. per qr.

We have already referred to the extent of the arrivals of flour from abroad; the first week in January 3,666 sacks, and 12,384 brls., were received, and since then 18,000 sacks and 7,000 brls. have arrived, the former principally from France. These large receipts of foreign have interfered more with the sale of household than with that of the best London marks; and though the nominal top price of the latter has not been reduced, all other sorts have receded, since we last addressed our readers, 1s. to 2s. per sack in value. Norfolk household flour has been sold in the river at 28s., and to be delivered at the terminus of the Eastern Counties railway at 29s. to 30s. per sack, according to quality. The commoner descriptions of foreign have been offered at similar rates, without exciting much attention, whilst the finer kinds of French manufactured have moved off slowly at 32s. to 34s. per sack. The quality of the late arrivals from America is not generally good, and prices range wide, say from 20s. up to 24s. per brl., the latter for fine brands.

Though English barley has come to market in only moderate quantities, the supplies have more than kept pace with the demand; and even the best malting sorts have suffered some reduction since our last; 29s. is now an extreme quotation, excellent quality having recently been sold at 27s. to 28s. per qr. Other descriptions of barley have declined in proportion; and the commoner kinds of foreign have sold very low, say 17s. to 18s.; whilst good Baltic, 52lbs. to 53lbs., samples have realized only 20s. to 21s. per qr.

The transactions in malt have been of little interest, the brewers having refused to take more than needed for immediate use; factors have, however, refrained from pressing business, and prices of the

article have hardly given way in proportion to the all which has occurred in the value of barley.

The arrivals of oats have been decidedly below the quantity required for the consumption of the metropolis; but, having fair stock in granary to fall back upon, the shortness of the supplies has failed to cause any improvement in prices; indeed the tendency has been the other way. The large dealers have kept almost wholly out of the market, and consumers have generally acted with much caution. A larger proportion of the supply than usual has been from Scotland; and some of the cargoes from thence, having been a long while on passage, have come to hand out of condition. This circumstance has added to the general depression of the trade; and inferior or heated qualities have in some cases been forced off at very low terms. Really fresh feed oats have, on the other hand, maintained their previous value with much firmness, notwithstanding the extreme inactivity of the demand, and the determination of buyers to wait for better supplies. Our present quotations are, for fine English and Scotch feed 18s. to 22s., Irish ditto 16s. to 20s., and Foreign 14s. to 18s. per qr. Inferior sorts may be had at all prices down as low as 13s. per qr.

Beans of home growth have come forward rather freely, and have further given way in price 1s. to 2s. per qr. since the close of last month; 28s. being now a top quotation for handsome new pigeon, and 23s. to 24s. for ticks. Egyptian beans have moved off tardily, and may now be had at 21s. to 22s. per qr.

Though the consumption of boiling peas is usually increased materially by such weather as we have experienced during the greater part of the month, neither the demand for, nor the value of, the article has improved; indeed foreign have given way 1s. to 2s. per qr.; and English have scarcely sold so well as before. Hog peas have also been neglected, and have receded about 1s. per qr. in value since the close of December.

In Indian corn on the spot nothing of interest has occurred; but floating cargoes have been enquired for; and Galatz has risen to 29s. per qr., cost, freight, and insurance.

In giving our usual notice of the position of the trade at the leading foreign markets, we may, as a general remark, begin by stating that prices of wheat are relatively higher abroad than in this country; the advance which occurred here in December having been immediately responded to, but not so the subsequent decline. The most recently received advices from Danzig state that holders had remained firm, notwithstanding the dull English reports and increased supplies from the farmers. In the commencement of the new year a good deal of speculation appears to have taken place there, on

the presumption that prices were about to rise in the British markets; and though it has since been ascertained that our advance was not supported, merchants were as firm at Danzig on the 19th inst., as at any previous period. Of really fine high-mixed old there were no stocks worth naming, and its value was therefore regarded as nominal; new-mixed to high-mixed parcels were quoted 38s. to 40s. per qr., according to weight, condition, &c. The lower qualities of red and common-mixed had excited comparatively little attention; but even light 58lbs. to 60lbs. samples had been held at 35s. per qr. free on board in spring. By the annual statement of exports and stocks, issued early in January, it appears that of the total shipments of wheat in 1849 from Danzig, 28,397, about 24,220 lasts had been despatched to British ports, a large proportion of the same on consignment, by which the parties concerned must unquestionably have been losers. The stock in warehouse consisted, on the 1st January, of 10,900 lasts, upwards of half of which was composed of ordinary qualities, scarcely suited for the British markets.

At Konigsburg, on the 1st January, the stock was estimated at 4,600 lasts wheat, 8,000 lasts rye, and between 3,000 and 4,000 lasts other grain and pulse. By the latest accounts from thence we learn that wheat had rather risen in value since the commencement of the month, prices being higher than they were before the close of the navigation, 61lbs. red being then held at equal to 33s. 6d., mixed at 35s. 6d., and high-mixed at 37s. per qr. free on board in spring.

The advices from most of the Lower Baltic ports are likewise of a decidedly firm tone, and at Rostock, Greifswald, Anclam, and Stralsund, considerable purchases appear to have been made by speculators during the first half of the month at very full rates, say 35s. to 37s. per qr. delivered free on board in spring. Subsequently the inquiry slackened, some effect having been produced by the continued decline in the English markets.

The nearer ports have been more immediately under the influence of prices here: at Hamburgh, Rotterdam, and Antwerp, quotations, after having risen early in Jan., have again receded within the last fortnight. At the first-named place good red Upland wheat was, on the 25th inst. quoted 37s. to 38s., and the best Wahren 39s. to 40s. per qr. free on board in spring. In the Dutch markets prices were rather higher, good Rhine wheat being still held at 40s. to 42s. per qr. free on board at Rotterdam on the 21st inst. At Antwerp purchases might be made on easier terms, the last quotations from thence being, for fine 62lbs. Louvain, 39s. per qr. free on board.

From France the advices are of a somewhat similar character; viz., after a short interval of activity and

some advance in prices of grain, the demand had, about the middle of the month, relapsed into inactivity. The value of wheat varied from 34s. to 38s. per qr. in that country, according to quality, the port of shipment, &c. There is, consequently, no apparent margin for profits on consignments to this country; notwithstanding which, shipments were still in progress of being made.

At all the principal ports in the Mediterranean stocks are small, and prices of wheat are relatively much higher there than in this country; and it is therefore more than probable that a portion of what might otherwise have reached us from the Black Sea and Danube ports may remain on the east side of Gibraltar.

By the steam ship Cambria we received advices from most of the principal American markets. The weather had been seasonable both in the United States and Canada; and, as is usual during the winter, but little business had been done. Holders of flour had nevertheless remained firm; the dull accounts from this side of the Atlantic having produced very little effect. At New York, on the 5th inst., good brands of western flour were quoted 5 dol. to 5½ dol. per barrel; and wheat from 106 cents to 124 cents per bushel, according to quality. The demand for Indian corn had slackened, and the article had been freely offered at 60 to 62½ cents per bushel. Freight to Liverpool was 1s. 6d. per barrel for flour.

CURRENCY PER IMPERIAL MEASURE.

	Shillings per Quarter.	
	OLD.	NEW.
WHEAT, Essex and Kent, white	40 to 47	40 to 47
Ditto, fine selected runs	—	46 48
Ditto, red	38 42	37 41
Ditto, extra	39 41	41 42
Norfolk, Lincolnshire and Yorkshire.	38 39	—
Ditto, white	42 44	—
BARLEY, English, malting and distilling.	—	23 25
Ditto, Chevalier.	—	24 28
Ditto, grinding	—	18 21
MALT	53 54	55 56
Kingston, Ware, and town made.	54 56	56 58
OATS, Essex and Suffolk	—	15 17
Lincolnshire and Yorkshire (Polands)	—	17 19
Ditto, feed	—	14 16
Devon & West Country, feed	—	13 15
Northumberland and Scotch, feed	—	18 23
Dundalk, Newry, and Belfast, potato	—	16 18
Limerick, Sligo, and Westport, potato	—	16 18
Ditto, feed	—	14 16
Cork, Waterford, Dublin, Youghal, and Clonmel, black	—	13 15
Ditto, white	—	14 16
Galway	—	12 14
BEANS, Mazagan	23 25	22 25
Tick	27 29	24 26
Harrow	30 31	26 28
Pigeon, Heligland	32 36	28 30
Windsor.	—	25 27
Long pod	—	25 27
PEAS, non-boiler	—	26 27
White, Essex, and Kent, boilers	—	27 28
FLOUR, best marks (per sack of 280 lbs.).	—	35 40
Norfolk and Suffolk, ex-ship.	—	30 33
RYE	—	22 23

FOREIGN GRAIN.

	Shillings per Quarter.
WHEAT, American	39 to 42
Canada	35 42
Dantzic and Konigsberg	42 45
Dantzic, fine white, extra quality	45 49
Stettin and Hamburg	37 42
Danish	35 39
Rostock, Pomeranian and Rhine	41 44
French and Belgian	37 41
Mediterranean, Odessa, and St. Petersburg ..	33 36
Black Sea (nominal) hard to soft	33 36
Buck or Brank	24 26
BARLEY, malting	22 25
Grinding and distilling	19 23
Hamburg, Dantzic, Konigsburgh, and Riga ..	19 22
Danish, Mecklenberg, and Pomeranian	19 22
OATS, Dutch, brew. Poland, Friesland, and Groningen	16 19
Danish and Swedish	14 17
Russian	14 17
BEANS Small	26 28
Egyptian	22 24
PEAS, white boilers	24 27
Yellow ditto	24 27
Non-boilers	22 24
MAIZE, white	28 29
FLOUR, American, sweet	23 24
Ditto, sour	21 23
Canadian, sweet	22 24
Ditto, sour	21 22
French, per sack	30 34
RYE MEAL (per ton)	£6 6s. to £6 10s.
INDIAN CORN MEAL (per bl. of 196 lbs.)	15s. to 16s.

IMPERIAL AVERAGES.

FOR THE LAST SIX WEEKS.

WEEK ENDING:	Wheat		Barley		Oats		Rye		Beans		Peas	
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
Dec. 15, 1849 ..	38	9	26	9	16	0	22	6	27	8	28	11
Dec. 22, 1849 ..	38	9	25	9	15	9	22	9	27	5	28	11
Dec. 29, 1849 ..	39	4	25	9	15	6	24	0	26	11	29	0
Jan. 5, 1850 ..	40	0	25	11	15	10	24	11	26	11	28	5
Jan. 12, 1850 ..	41	1	26	4	15	6	23	4	26	6	28	6
Jan. 19, 1850 ..	41	0	26	3	16	0	23	9	26	6	27	6
Aggregate average of last six weeks	39	10	26	1	15	9	23	6	27	0	28	7
Comparative avege. same time last year	53	3	31	0	21	1	31	1	40	1	45	10
DUTIES	1	0	1	0	1	0	1	0	1	0	1	0

COMPARATIVE PRICES AND QUANTITIES

OF CORN.

Averages from last Friday's Gazette.	Av.		Averages from the correspond- ing Gazette in 1849.	Av.	
	Qrs.	s. d.		Qrs.	s. d.
Wheat	112,603	41 0	Wheat	106,252	53 1
Barley	104,790	26 3	Barley	103,473	30 4
Oats	22,678	16 0	Oats	26,770	21 1
Rye	123	23 9	Rye	132	30 8
Beans	6,592	26 6	Beans	4,896	38 8
Peas	2,432	27 6	Peas	1,532	45 2

DIAGRAMSHOWING THE FLUCTUATIONS IN THE AVERAGE PRICE OF WHEAT DURING THE SIX WEEKS ENDING JAN. 19, 1850.

PRICE.	Dec. 15.	Dec. 22.	Dec. 29.	Jan. 5.	Jan. 12.	Jan. 19.
41s. 1d.
41s. 0d.
40s. 0d.
39s. 4d.
38s. 9d.

ACCOUNT SHEWING THE QUANTITIES OF GRAIN AND FLOUR IMPORTED INTO THE UNITED KINGDOM DURING THE MONTH ENDED 5TH JAN., 1850, THE QUANTITIES ADMITTED 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	1026 7	1026 7	35 6
Barley, do.	—	—	—
Oats, do.	8 0	8 0	—
Peas, do.	150 7	150 7	—
Beans, do.	—	—	—
Maize or Indian Corn, do.	1 3	1 0	—
Wheat, foreign	214326 8	220563 7	30104 5
Barley, do.	118136 5	118288 6	185 6
Oats, do.	75552 3	75884 1	1204 2
Rye	14811 7	6159 0	106 7
Peas, do.	20010 7	30756 3	1839 2
Beans, do.	17624 1	19037 6	4669 2
Maize or Indian Corn, do.	8788 1	67316 1	1435 4
Buckwheat	0 5	0 5	—
Beer or Bigg	—	—	—
FLOUR from British Possessions	45245 2 27	45425 3 23	101 3 6
FLOUR, foreign	201172 1 12	201105 1 7	10624 2 16

PRICES OF SEEDS.

BRITISH SEEDS.

Cloverseed, red 35s. to 40s.; fine, 45s. to 50s.; white, 35s. to 50s.
 Cow Grass (nominal)

FOREIGN SEEDS, &c.

Clover, red (duty 5s. per cwt.) per cwt. (nominally) 33s. to 50s.
 Ditto, white (duty 5s. per cwt.) per cwt. 24s. to 42s.
 Linseed (per qr.) .. Baltic 38s. to 44s.; Odessa, 42s. to 46s.
 Linseed Cake (per ton)

HOP MARKET.

BOROUGH, MONDAY, JAN. 28.

There has been rather more demand since our last report, particularly for fine Weald of Kent samples, and the currency of last week is fully supported.

POTATO MARKET.

SOUTHWARK, WATERSIDE, JAN. 28.

We have had very few arrivals since our last report, which has enabled salesmen to effect a clearance of stored Potatoes to a certain extent. The following are this day's quotations:—

Yorkshire Regents.. 90s. to 130s. per ton.
 Wisbech do

ENGLISH BUTTER MARKET.

JAN. 28.

Our market is without change, and prices are stationary. Nearly the whole of our stock here being of a middling description, is difficult to move.

Dorset, fine 86s. to 90s. per cwt.
 Do., summer-made 56s., 80s. ,,
 Fresh 9s., 13s. per doz. lbs.

BELFAST, (Friday last.)—Butter: Shipping price, 68s. to 76s. per cwt.; firkins and crocks, 6½d. to 8d. per lb.; Pork in good demand at 30s. to 36s. 6d. for lots, and 33s. to 37s. per 120lbs for country pigs. Bacon, 38s. to 40s.; Hams, prime, 65s. to 70s. per cwt.; second quality, 38s. to 40s.; Mess Pork, 60s. to 65s. per brl., refined American Lard, in bladders, 40s. to 44s.; kegs and firkins, 40s.; Irish Lard, in bladders, 40s. to 46s.; kegs or firkins, 41s. to 42s. per cwt.

Jan.	Butter,		Bacon,		Dried Hams,		Mess Pork	
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
24.	84	0	43	0	54	0	60	0
1846	94	0	43	0	54	0	60	0
1847	91	0	56	0	62	0	68	0
1848	88	0	51	0	56	0	50	0
1849	78	0	48	0	50	0	68	0
1850	68	0	38	0	40	0	68	0

BARK.

Per load of 45 cwt.

English Tree.....	£14	0	0	to	£15	10	0
Coppice.....	15	0	0		17	0	0

FLAX.

BELFAST (Friday last.)—Fine, 70s. to 80s.; good, 65s. to 70s.; good middling, 50s. to 65s.; middling, 58s. to 65s.; mid., 46s. to 56s.; coarse, 44s. to 45s. per cwt.

HIDE AND SKIN MARKETS.

Market Hides,	56 to 61lbs.	s. d.	s. d.	per lb
Do.	64 72lbs.	0 11	0 13	"
Do.	72 80lbs.	0 2	0 2	"
Do.	80 88lbs.	0 2	0 2	"
Do.	88 96lbs.	0 3	0 3	"
Do.	96 104lbs.	0 3	0 3	"
Do.	104 112lbs.	0 3	0 4	"
Calf Skins, light		2	0	per cch
Ditto, full		5	6	"
Horse Hides		6	6	"
Polled Sheep		4	10	"
Kents and Half-breeds		3	10	"
Downs		2	4	"

WOOL MARKETS.

BRITISH WOOL.

LEEDS, Jan. 25.—There has not been quite so large an amount of sales of combing Wools this week, but prices are very firm. In clothing sorts there is a fair demand, and prices have an upward tendency.

LIVERPOOL, Jan. 26.

There is only a moderate demand still for laid Highland Wool, but as stocks are light prices are well supported. White Highland is more inquired for. Good crossed and Cheviot are still in good demand; inferior of both descriptions are still neglected.

	s. d.	s. d.
Laid Highland Wool, per 24lbs....	8	0 to 8 6
White Highland do.....	10	0 to 10 6
Laid Crossed do...unwashed	10	0 to 12 0
Laid Cheviot do...unwashed	12	0 to 14 0
Do. do...washed	16	0 to 10 0
White Cheviot do... do.	22	0 to 21 0

FOREIGN.—We continue to have a good demand for all kinds at full prices, and were the selection larger and better we should have more doing. A public sale of 500 bales East India Wool took place on the 22nd inst., which went with spirit at full late rates, and all sold; since which several parcels have been sold at full prices.

TIMBER.

	£ s. d.	£ s. d.
Baltic Timber, per load of 50 cubic feet..	2	15 0 to 3 10 0
Yw. Deals, per standard hundred	10	0 to 15 10 0
Beek Deals, per 40 feet 3 in.	0	16 2 to 1 2 0
Pipe Staves, per mille	100	0 to 125 0 0
Lathwood, per fan of 6 feet	9	0 to 10 0 0
Petersburgh, Riga, and Archangel	12	0 to 14 0 0
Yw. Deals, per stand. hundred	9	10 0 to 10 0 0
White.....	12	0 to 14 0 0
Yw. Battens.....	2	15 6 to 4 0 0
Riga Logs, for 15 feet cube	75	0 to 13 0 0
Stettin staves, per mille of pipe.	2	15 0 to 3 0 0
Swedish Timber, per load	18	0 to 23 0 0
Gothenb. Yw. Deals, per 100 12ft. 3in. 8in.	15	0 to 19 0 0
White ditto	11	0 to 14 0 0
Yw. Battens, per hd. 12ft. 2½ in. 7 in.	24	0 to 25 0 0
Christiania Yw. Deals, per hd. 12ft. 5in. 6in.	21	0 to 22 0 0
White ditto	13	0 to 16 0 0
Quebec and St. John's Spruce Deals, per 100, 12 ft. 3 in. 9 in.	12	0 to 16 0 0
1st qual. yw. Pine Deals, per st. kd.	8	13 0 to 10 0 0
Second do. do.	7	0 to 8 0 0
Third do. do.	17	0 to 22 0 0
Red Pine Deals, per hd. 12ft. 3 in. 9 in.	2	15 0 to 3 10 0
Red Pine Timber, per load	3	10 0 to 4 10 0
Yw. ditto	3	5 0 to 3 12 6
Birch ditto	3	10 0 to 4 10 0
Kim ditto	55	0 to 70 0 0
Oak ditto	14	0 to 18 0 0
Standard Staves per mille standard		
Puncheon Timber, per mille		

MAHOGANY, &c.

Mahogany, St. Domingo	5½d.	to	1s.	9d.	per foot.
Cuba	6		1	6	
Honduras	4½		1	0	
African	5		0	7	
Cedar	5½		0	6½	
Rosewood, Rio	12d.		20l.		per ton.

HAY MARKETS.

THURSDAY, January 24.

At per load of 36 trusses.

	Smithfield.	Cumberland.	Whitechape
Sea-ow Hay	48s to 70s	50s to 70s	48s 68s
Cover Hay	60s 90s	60s 85s	60s 88s
Straw	20s 27s	21s 28s	20s 27s

OILS.

Linseed, 32s. 6d. per cwt.; Rapeseed, English, refined, 42s.; do. brown, 41s.; Gallipoli, per tun, 48l.; Spanish, 48l.; Sperm, 83l.; do. bagged, 83l.; South Sea, 31l. to 33l.; Seal, pale, 39l. 10s.; do. coloured, 33l.; Cod, 29l. to 30l.; Cocoa Nut, per ton, 38l. to 40l.; Paha, 30l.

MANURES.

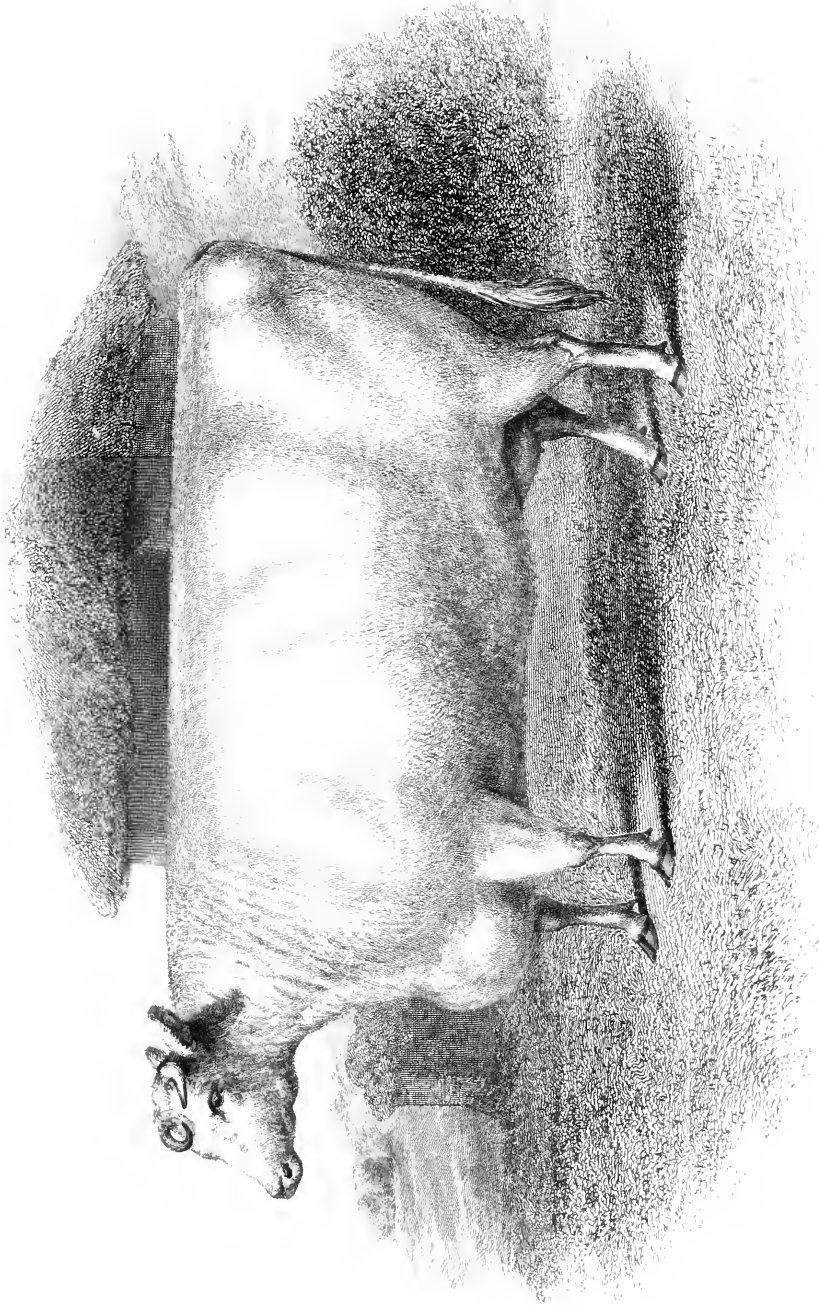
LONDON, JANUARY 28.

GUANO.—1700 tons by public sale. Damaged and sound realized high prices.

NITRATE SODA.—Dull, at our quotations.
 LINSEED CAKES move off slowly, considering the low prices.

PRICES CURRENT OF GUANO, ARTIFICIAL MANURES, OIL CAKES, &c.

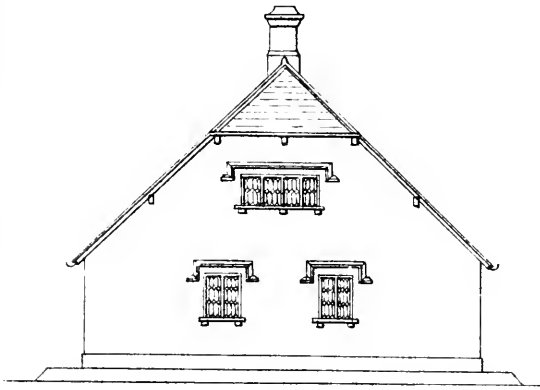
	per ton	£0	0	0 to	£9	5	0
Guano, Peruvian		0	0	0 to	9	10	0
" In quantities under 5 tons		15	0	0 to	0	0	0
Nitrate Soda		28	0	0 to	30	0	0
Nitrate Potash or Saltpetre		6	19	0 to	7	0	0
Superphosphate of Lime		1	0	0 to	10	0	0
Soda, Ash or Alkali		1	10	0 to	1	15	0
Gypsum		2	15	0 to	3	0	0
Coprolite		27	0	0 to	29	0	0
Sulphate of Copper, or Roman Vitriol for Wheat steeping		0	0	0 to	1	1	0
Salt		0	0	0 to	0	11	0
Bones, ½ inch		0	0	0 to	0	15	0
" Dust		0	0	0 to	0	1	0
Oil Vitriol, concentrated		0	0	0 to	0	3	0
" Brown		4	5	0 to	4	10	0
Rape Cakes		7	5	0 to	7	15	0
Linseed Cakes—		6	5	0 to	6	10	0
Thin American in barrels or bags		6	5	0 to	6	10	0
Thick ditto round		6	5	0 to	6	10	0
Marseilles		0	0	0 to	7	0	0
English		0	0	0 to	7	0	0



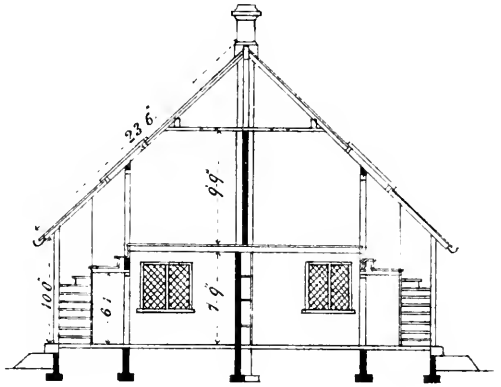


DESIGN FOR A PAIR OF COTTAGES
 SUBMITTED TO THE ROYAL AGRICULTURAL SOCIETY
 IN THE COMPETITION OF 1848-9.

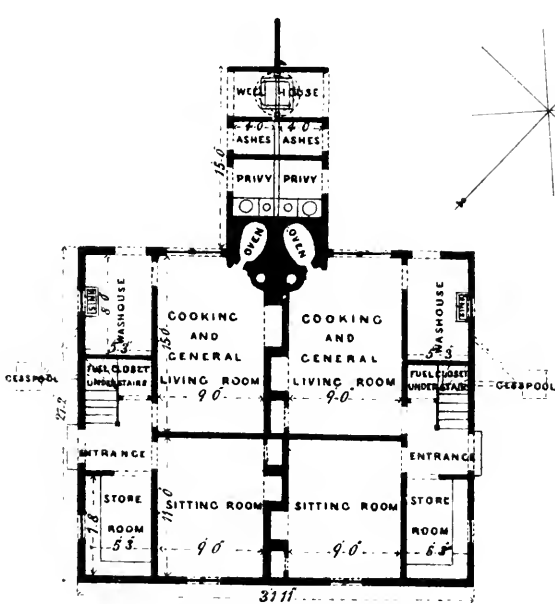
ESTIMATE £ 225.



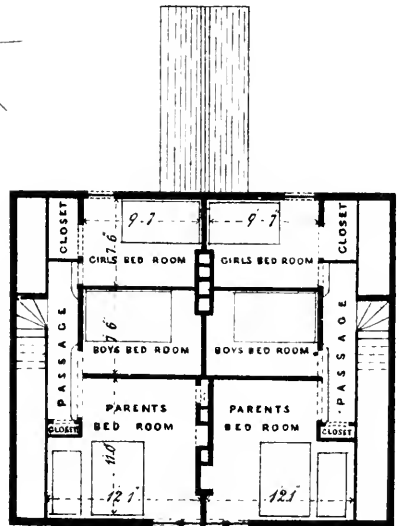
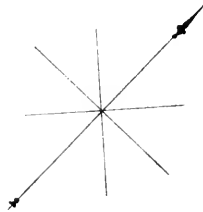
ELEVATION.



SECTION.



GROUND PLAN

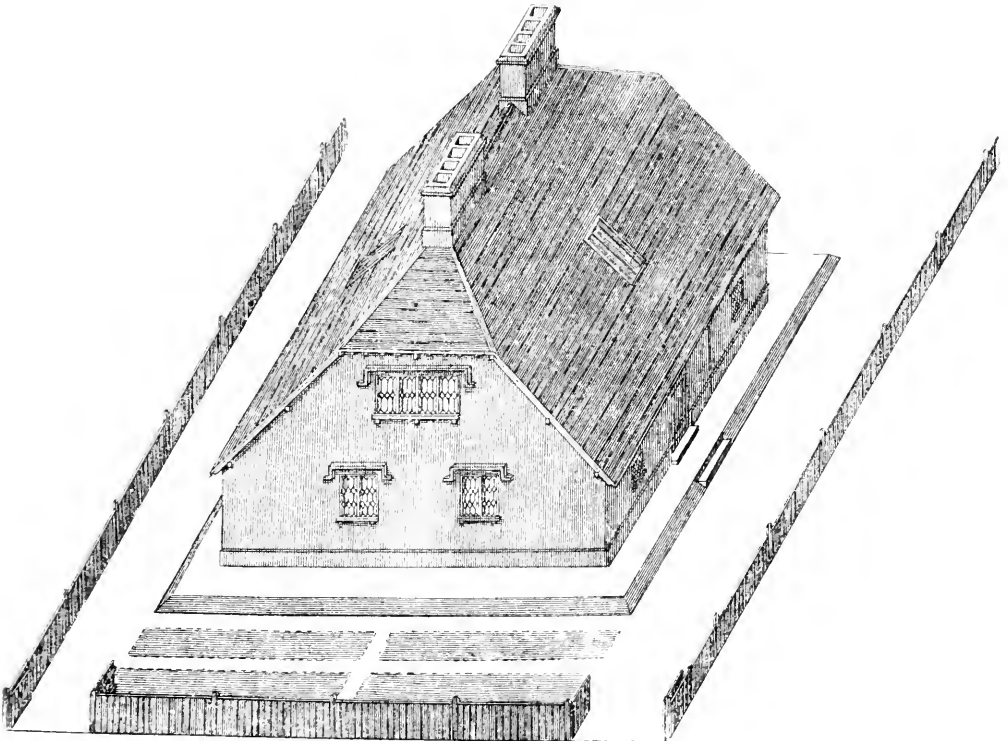
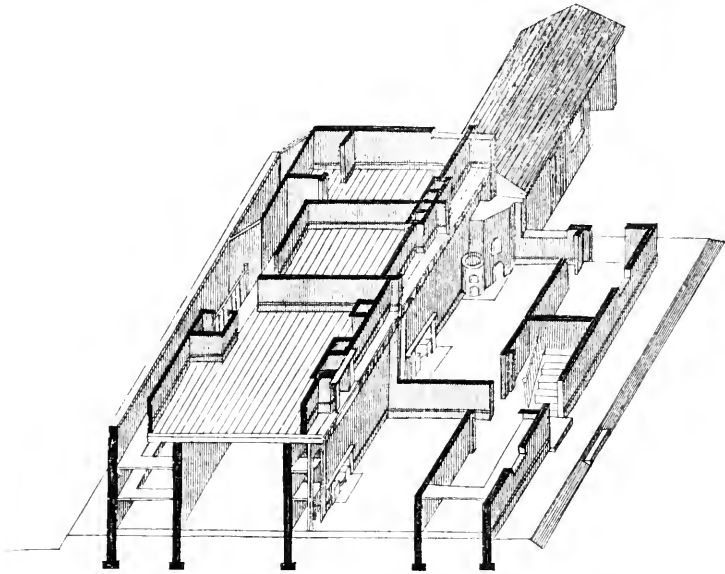


CHAMBER PLAN.

Scale 10 5 0 10 20 of Feet

JOHN ELLIOTT, ARCHITECT,
 SOUTHAMPTON & CHICHESTER.

ISOMETRICAL SECTION.
SHEWING THE FRONT WALL REMOVED AND EXHIBITING THE GROUND
FLOOR OF ONE COTTAGE THE BED ROOM FLOOR OF THE OTHER.



ISOMETRICAL VIEW.

JOHN ELLIOTT, ARCHITECT.
SOUTHAMPTON & CHICHESTER.



THE FARMER'S MAGAZINE.

MARCH, 1850.

No. 3.—VOL. XXI.]

[SECOND SERIES.

PLATE I.

A SHORT-HORNED COW.

The subject of the first plate, bred and fed by John Mann, Esq., of Fenstanton, near St. Ives, Hunts, and exhibited by him at the Smithfield Club Cattle Show in December, 1848, obtained the first Prize of Twenty Sovereigns, in Class 9. The Silver Medal was also awarded to Mr. Mann as the breeder, and the Gold Medal for the best beast in Classes No. 7, 8, and 9. This animal was a splendid specimen of the short-horn breed, taking into account her age; and had a very fine fore-quarter; was got by Mr. Ladd's Bull, Jeremy (2157), purchased of the late Earl Spencer. For pedigree see "Coates' Herd Book."

PLATE II.

DESIGN FOR A PAIR OF COTTAGES.

BY JOHN ELLIOTT, ARCHITECT, SOUTHAMPTON.

ESSAY ON THE CONSTRUCTION OF COTTAGES.

BY JOHN ELLIOTT, ARCHITECT AND CIVIL ENGINEER.

"The earth," says the Psalmist, "is full of cruel habitations;" an expression which may be taken in its literal sense, as a pithy description of what are commonly called the "*homes of the poor.*" The exertions of Howard have freed our prisons from the imputation of being pest-houses, destructive to human life, and disgraceful to a civilized community; but the efforts of a thousand Howards are necessary to raise the habitations of the poor to the position they ought to occupy, as the homes of human beings, of our fellow-countrymen, of those who fight and win our battles, who plough, and dig, and sow for us, and without whom all our own comforts would be at an end, all civilization would cease.

Creatures of circumstances we all are, more or less; every individual, in his habits, thoughts, and conduct, is in some measure influenced by the circumstances surrounding him; it is not then possible to expose the great mass of the labouring

poor to dwell in places where comfort is impossible, and cleanliness and decency all but impracticable, without producing, as the results, discontent and misery, vice and crime; an angel from heaven could scarcely be expected to remain uncontaminated under such circumstances. But the evil does not end here; the human beings so situated must suffer physically as well as morally; health is as much dependent on pure air as on good water, an insufficiency of either renders a man feeble and indisposed to exertion; if he does work, infirmities come on him sooner than on other men, and his children will grow up feeble in body, vitiated in mind; his whole race will eventually be deteriorated. The well meant but injudicious attempts that have, in the great majority of cases, been made to improve the poor man's cottage, have but changed the evil, substituting small close *unventilated* rooms, for the comfortless, but airy, places the older cottages afforded.

OLD SERIES.]

N

[No. 3.—VOL. XXXII.

Shall we call on the poor themselves to remedy these evils? Shall we adopt the *laissez-faire* principle in their case? No, this would be a cruel mockery; for the poor man, if you concede to him the desire to effect the change, must cease to be a poor man ere he could possess the means of remedying these evils, which render his hard lot still harder.

There may be some excuse for making the habitations of the rich, riches being such fleeting things, of perishable materials, of unsubstantial execution; but there can be none for thus erecting a peasant's home, for has not God written that "the poor shall never cease from the land?" Economy then dictates to us that we should make their habitations to endure from generation to generation. Let us therefore eschew all "mud" and "pisé" walls, "wattle and dab," and lath and plaster abominations; let a cottage be built of something that will last; give the poor man a home to take care of, and let it be worthy of his care—let it be "his castle," not his pig-stye.

The problem to be solved in building a cottage may be thus stated:—that it should be economical in construction, durable afterwards, arranged so as to secure to the occupants the greatest practicable amount of health, comfort, and convenience, and at the same time tend by its arrangements to induce habits of order, cleanliness, and decency. To fulfil these conditions, it is essential that the building should be constructed of sound, lasting, and cheap materials, needing in their preparation but little labour, and that of the simplest kind; to insure comfort, and conduce to the health of the occupants, the rooms must be well lighted, free from all damp, draughts, or smell, be easily warmed and easily ventilated; habits of order will be promoted by giving the cottager a separate place for his provisions (and his beer, now the malt tax is coming off), his utensils, his fuel and ashes; to induce him to be cleanly you must give him a plentiful supply of water, easy access to it, and ready means of getting rid of the waste; to insure habits of decency the bedrooms must be private, *never less than three in number*, never on the ground floor, each bedroom having a separate access without the necessity of reaching it by passing through any other room. The common living room, where the ordinary and daily occupation of cooking or baking is carried on, should invariably have adjacent to it a small scullery or wash-house, where the plates and dishes may be washed, and pots and pans cleaned and left. The living room will thus be kept sufficiently tidy for the tired labourer, on his return from his daily toil, to sit down in comfort to his humble repast. In addition to this room for every-day purposes, there should be a small sitting-room, the place of

deposit for the few books, pictures, or ornaments, the cottagers pride themselves on possessing, to be used only on Sundays and holidays, and, in case of sickness, as the sick-room.

It is very important that there should not be more than two doors in any living room; a small room is rendered miserable if full of doors, or even if it have but one badly placed. The relative position of the doors, windows, and fire-place, is of the utmost importance in insuring the greatest amount of comfort, and it ought to be enough to condemn any plan which possessed a door opening direct from a living room into the open air. The fire-place should never be in an outside wall, or loss of heat and liability to smoke will be the result. There is no truer adage than the one which tells us that—

"A smoky chimney and a scolding wife,
Are two of the greatest plagues in life;"

as the latter plague is all but a necessary consequence of the former, we may greatly contribute to a poor man's peace by giving him a chimney that will draw well, and this may with certainty be effected by attending to the relative position of the door and fire-place, the setting of the grate, and the proper construction of the throat; it will also greatly aid the draught, if the flues be constructed as I have frequently had them done, with nine-inch drain pipes. One at least of the upper bed-rooms should possess a fire-place: in case of sickness this is indispensable.

Economy of fuel is of such great importance to a cottager, that the greatest consideration should be bestowed on the form of his cooking apparatus, and of the sitting-room grate; for the latter no better plan exists than that of a simple cast-iron front bar and bottom bar, with the back and sides of fire bricks. For the former the best thing, and the cheapest I have ever met with, was in France—it was a small, low, hot plate and oven, fixed over a small fire placed on the ground; and with this simple apparatus all the cooking was done for a large family, at a cost of about one penny per day. One of the most useful articles in a cottager's kitchen is a Papin's digester, which costs about 6s., and in which nourishing soup may be prepared from materials that would not yield half the same results if prepared in a common pot.

A cottager's spare cash, if he has any, will be much more advantageously invested in pigs, bees, or fowls, than in buying furniture, very little of which he will need if the cottage is properly fitted up, as it ought to be, with good cupboards and shelves; the former answering all the purposes of chests of drawers, and not like them cluttering up the space in small rooms. Even the window shutters to the lower rooms, if hinged to the sill, will

form convenient tables, using the shutter bar as a prop to keep them at the requisite height. It would be advisable that the bedsteads should be provided by the landlord, and if made of iron fastened to the wall, and made to fold up against it, the rooms could thus be more readily and effectually cleaned.

The stair-case should be so placed as to give separate and ready access to every room in the house, and it should never be commenced in a room or end in one. It should be well lighted, and be sufficiently broad and easy of ascent to allow of furniture going up it, and of the coffin of the labourer, whose labour has ceased, coming down it easily, on its way to the last home of all.

In building a double cottage it is important that the entrance to each should be distinct, and as far apart as possible; the doors should not even be seen the one from the other; this will tend to prevent gossiping and quarrelling.

To keep the cottage dry it will be necessary that the walls, immediately under the ground floors, should have a course of slate, through which the wet will not ascend. It will at the same time greatly contribute to the appearance of the place, and add to its comfort, if the ground floor be raised eighteen inches above the surface of the ground, and a terrace be formed of some loose material, either gravel or smith's ashes, round the whole building, which will thus have the appearance of standing on a proper base, and avoid that Jack-in-the-box look all buildings have which spring out of the ground, with nothing to connect them with it.

If shoots be fixed to the eaves, having a stack pipe from them, and small pipe drains to the cesspool, which should also receive the waste from the sink in the wash-house, all pools and slops round the door, looking as untidy as they are unwholesome, may be avoided. No soak or drainage should be permitted to enter the privy tank; that should be made perfectly *water tight*, each cottage privy having its own portion of the tank, the produce of which would half pay the rent of the house.

Having thus drained and warmed the cottage, let us now proceed to ventilate it. If ventilation be necessary in a large house, it is as *indispensable as food* in a small one; but this ventilation must be effected without draught, without carrying off the heat of the room, or the cottager will most assuredly stop up the ventilating openings; these then should invariably be at the top of the room, and open into a separate flue, having an Arnott's ventilator, which costs 5s., to regulate the draught; if there is no brick flue, construct an air tube between the floor-joists over head, connecting this tube either with the open air, or, what will answer better, with a vertical tube opening under the roof. It is of more

consequence that bed-rooms should be lofty than large in their floor area, and they can be readily ventilated by an opening between the ceiling-joists, diminished or increased at pleasure by a square board hung on a pivot, with a line attached. As the bed-rooms will be most economically obtained in the roof, and as slate is the most economical covering, the disadvantage slate has of being very hot in summer and cold in winter, may be entirely obviated by stuffing shavings or straw between the slates and the lathing; this simple precaution will render a slate-covered roof as cool in summer and as warm in winter as a thatched one.

There is one point that should not be overlooked in the arrangements of a cottage, which is, that all the living apartments should occupy the centre of the building, and the offices be arranged at the sides, which will thus greatly contribute to the warmth and dryness of the living rooms. The cottage should always stand in such a position that a diagonal line passing through it would represent the north and south points; sunshine would thus visit every part of the house some time in the day.

The materials of which a cottage should be constructed must vary with the locality; but in the majority of cases it ought to be either of rubble, stone, or brick; where clay exists I should recommend that in place of using ordinary bricks, *hollow tubes of baked clay* should be employed; a saving of at least one-third, and in most districts of one-half, as compared with brick walls, might be thus effected; while the strength would be most ample, the durability equal to bricks, and in the essential qualities of protection from wet and cold, superior to them. Even the roof itself might be formed of these hollow tubes: if a sufficient number of cottages of the same form were erected to divide the expense of centres, without much addition to the cost of a timber roof, while the vaulted one would last for ages, and be perfectly fire-proof, and would need no repairs, the greater part of all cottage repairs occurring in the roof.

Through the kindness of his Grace the Duke of Richmond, I was permitted, two years since, to make the experiment of building a cottage of these brick tubes, constructing wholly with them both roof and walls. These brick tubes were eighteen inches long by seven inches square, rebated into each other, and radiated to the shape of the arch; a short tube of smaller size being used to fit into the others and break joints. The bricks for vertical walls are of nearly the same shape, having a double rebate instead of a single one—they are easily made by ordinary labourers, being simply forced through a mould at the end of a hand-tile machine. One great economical advantage resulting from the use of

these tubes is, that being all forced through the same mould, the insides and outsides can be laid quite true with each other; and being of large size, the mortar joints will be few; the necessity therefore for internal plastering is obviated, as a coat of wash properly compounded will adhere well to the surface of the tubes, and produce a sufficiently pleasing effect. The cottage floors may be also formed of these tubes; or in the living-rooms a more comfortable floor could be produced by using solid pieces of fir about five inches deep, placed edgewise on a bed of concrete. The wash-house must of course be paved with brick or stone.

A chopping-block should always be fixed close to the back door: the people must chop their wood on something; and they will use the floors for this purpose, if the block is omitted.

The roofs, unless the vaulting tubes are preferred, are to be formed of Memel timber, hanging the rafters by iron straps up to a stout ridge piece, supported by upright posts standing on the central wall; this method of construction is the simplest and the cheapest of any, requiring timbers of less scantling, and preventing any tendency of the roof to thrust out the walls.

Cottage windows should be of iron, either hung on pivots, or hinged to open outwards; and they should be fixed as close to the ceiling as possible, for the sake of ventilation in the summer.

A cottage properly constructed ought not to require the use of much lead: all gutters should be carefully avoided, flushings of lead are never necessary. The brick work, where roofing abuts against it, should always be so constructed as to project over, allowing the slates to tuck under this projection, which will form a raking string on the walls, or a base to the chimney shafts.

It is most economical to arrange the various apartments of a cottage so that the containing walls form a square, more space being thus obtained in a given quantity of walling; and it is more economical to construct a roof without breaks, dormers, or valleys—all which cause expense in the first instance, and are fertile sources of subsequent outlay in the shape of repairs.

Comfort, economy, and durability are the first requisites in a cottage; the union of these with beauty must result from the latter being the offspring of form and arrangement of parts; and the effect produced should be appropriate, simple, and unostentations, carefully eschewing all stuck on ornaments, plaster mouldings, and scalloped bits of deal; nothing indeed should be seen outside a cottage that will wear badly, or require the aid of paint to make it look decent. The beauty of expression of purpose is one of the best and cheapest of all beauties; and if to this we give the ap-

pearance of solidity and comfort, however humble the cottage may be, it will be sure to meet the taste of the humble and the refined—of him who judges by his feelings, and of him whose education has carried him beyond rules back to his feelings. A cockneyfied compound of jaunty-finery, a “gent” in brick and mortar, is as much out of place in rural scenery, as it is unsuited to the condition of the humble occupant.

The examination of my design will show how far I have been able to embody the idea and carry out the theories expressed in the foregoing essay. The small entrance lobby gives access to the store room, sitting room, living room, staircase, and fuel closet under it. The position of the doors in the sitting room and living room allows the occupants to sit round the fire without being exposed to draughts, or to the necessity of moving when any one enters or leaves the room. Each room is ventilated by a ventilator fixed in a separate flue. The oven and boiler take up but little room, and are easily got at; a separate flue in the stack is provided for them. The wash-house adjacent to the living room serves at the same time as a sheltered lobby to the back entrance. The arrangement adopted for the fire-places—that of placing them, interlacing with each other—effects a considerable saving in the brick work, and at the same time economises space; the shafts are carried up vertically over the supports below; there is therefore no necessity for gathering over, no balancing on thin walls. The fire-places thus situated and built, may be guaranteed against smoking; and the flues passing through the bed-room will keep them aired. The staircase gives easy access to the bed-rooms, the last step coming into a passage outside the three bed-rooms, to each of which it affords a separate entrance; the ends of this passage give two large cupboards, and a recess obtained out of it affords space for the cot of the little ones by the side of their parents' bed. The position of the doors, in all the bed-rooms, leaves convenient spaces for the beds; and two beds even can be placed there, as the rooms are high and well ventilated. The centre bed-room is lighted by a skylight, made to open and shut like a rimmed box lid, which at the same time serves to light the room, the passage outside of it, and the staircase and entrance lobby below. Each part of the cottage thus receives ample light, without exceeding the tax-limited number of windows. An ash pit and rubbish hole is placed at the back of the oven, and beyond the ash-pit is the privy, standing over a water-tight tank, arched over for the privy floor, but leaving space, by removal of the seat, for emptying the contents: the tank being thus perfectly water-tight, no possible danger can accrue from its close vicinity to the well. The plan shows a

well-house beyond the privies; but it would be preferable, where the water is obtainable at a depth within 30 feet, to have an iron pump fixed, with a double handle, and the nozzle made to turn up either way. A continuation of the roof over these out-houses would afford the most convenient places for piggeries, fowl, and bee-houses. The privies are sufficiently near to the houses for convenience, and all smell from them may be prevented by a very simple plan I have executed, and of which a model is now in the possession of the Sanitary Commissioners. All that is necessary is to have a metal rim to hold water fixed level with the seat, the cover to which moves sideways on joints like those of a parallel ruler, having a projecting rim on the under side, which, when down, fits into the water rim, thus hermetically sealing the only opening into the tank.

It will be observed that the two cottages form nearly a square, there not being a break in the walls, or more than four angles to construct; there is thus but very little walling, and that I propose to build with my tubes, using those of seven inches thick for the outside walls, and those of four inches for the interior divisions, each of which in the

upper rooms stands over a wall below, a point of much importance, as no necessity thus exists for the use of quarter partitions, or vermin holes; where a partition is needed above, matched boarding is employed, and there is thus no place in the whole building where a rat or a mouse could hide itself.

No cottage ought to have a less amount of accommodation than this one affords, and I do not think it possible to obtain that accommodation in a more economical manner.

The offering by the Council of two such handsome premiums for the best design for a cottage, proves the great interest felt in the question, and strongly marks the progress of public opinion in the right direction, encouraging the hope that it will ere long be generally felt that if that man deserves honour who causes a blade of grass to spring up where none grew before, that he will be infinitely more deserving of honour who is instrumental in raising a good cottage where none before existed.

18, *Portland-terrace, Southampton, and North Street, Chichester.*

MANURE—ITS GENERAL AND PARTICULAR APPLICATION.

BY J. TOWERS, MEMBER OF ROYAL SOCIETIES OF AGRICULTURE AND HORTICULTURE.

At page 102, vol. i., allusion was made to two heads under which all those substances termed *meliorators* could be arranged, and particular notice was taken of quick or hot lime, as being an agent, partially soluble in water, and possessing peculiar chemical affinities, by which it produced certain definite effects of very great consequence when fully appreciated. I now beg to re-urge the consideration of those specific affinities, for then a correct insight into the philosophy of manuring will be obtained.

Lime, as we have said, ranks among the soluble manures, a fact which the preparation of lime-water fully establishes; but there are many other chemical salts that are completely soluble in water, and therefore are qualified to act rapidly upon vegetable roots—such are the sulphates so opportunely noticed in Mr. Cuthbert W. Johnson's article commencing page 103 of the last number. To these may be added the potent salt called soda ash, or British alkali, which, according to Dr. Fownes—“contains, when good, from 48 to 52 per cent. of pure soda, partly in the state of mild carbonate, partly as a caustic hydrate, the remainder being chiefly sulphate of soda and common salt.” This chemical compound has of late been highly extolled

as destructive of the wire-worm; but of this I say nothing, as no positive proof of the fact has been communicated to me. The object which now should be urged, is the great necessity of further and more rigid analyses of the staple earths, and of the plants that grow upon them. Advances have been made, and numerous tables formed, by many able chemists; but the results prove so dissimilar that at present we are constrained to hesitate.

Guano, if pure and dry, not developing any odour of ammonia, ranks among the most excellent and comprehensive of partially soluble meliorators. Its soluble ingredients consist chiefly of sulphates, muriates, and phosphates of ammonia, soda, potassa, and magnesia, in varying proportions—uric acid and oxalic acid also in combination are often traceable. The insoluble bulk of the substance consists of bone-earth (sub-phosphate of lime), in a state of very minute division. This fertilizer will be again alluded to in its place. The point which now claims the cultivator's attention is the applicability of each individual saline material so as to meet the requirements of any cultivated plant, and herein consists the discovery and establishment of the *science of agriculture*.

Liquids and solutions are always of doubtful ap-

plication, because, if incautiously or erroneously administered, plants may be at once destroyed or seriously injured, of which we possess proofs in the pot-culture of exotics; but the case is different when we apply farm and fold-yard, and it may be also deodorized fecal substances; these contain all the elements which come under the second head of meliorators, and as not a particle of undecomposed solid substance can pass into the absorbents of the roots, there is little danger to be apprehended, unless they are incorporated with the land in too great abundance. Farm-yard manure has stood the test of ages; if prepared with judgment, according to the principles established by chemical discoveries, it will contain all the elements of vegetable organization; and if by age or improvident management it shall have lost its ammonia, become too much carbonized, and, to a corresponding extent effete, it can be restored by guano, so far as the ammoniacal salts are concerned. And here, by the way, I venture to suggest that in this manner guano can be employed to the utmost advantage, and without any risk or danger to young seedling plants. All land possesses more or less of organic matter; it is indispensably necessary that it should do so, otherwise plants could not be supplied with those hydro-carbonous substances which constitute their bulk. Now farm-yard and other decomposable manures when deposited in the ground (the deeper the better when the straw and other fibrous matter is little reduced) are converted by gradual fermentation into humus—that product of animal and vegetable decay which cannot be imitated by art, but which, by a sovereign law of nature, is inevitably present in all land that is duly cultivated. Hence, and by induction from observed facts, we must insist upon the incorporation of that manure which is supplied by the processes of the farm itself. Fermenting matter must be employed, and the ground is its natural recipient, for thereby heat becomes developed, gases extricated, and retained in a position where they are in close contact with the roots of either vegetables or shrubs, which thus can select and absorb such as suitable to each. I can by no

means admit the theory of Liebig so far as to restrict the nutrition of plants to the absorption of carbonic acid only, whether by the leaves, or by the spongelets of the roots. The decomposition of humus, or of more crude vegetable matter, must evolve other gases, and as every plant will require hydrogen, and many others the compounds of hydrogen and carbon, and of nitrogen, it follows that those gaseous products resulting from fermentation will be duly absorbed and assimilated.

It has been asserted that rotten dung contains more humin (the old name for humus), weight for weight, than fresh dung; and therefore, that if the fertilising power of manure is in proportion to the quantity of humin which it contains, and if it can be proved that the quantity of this is as great in black spit-dung as in the more bulky form of unfermented dung, then the concentrated state would certainly be preferable in point of economy every way. The suggestion was plausible, and so far as mere top dressings were concerned, might be correct; but as the preparation of humus in the heart of the soil at a considerable depth below the surface is the object which ought to be aimed at, we claim the right to believe that every advantage connected with fermentation and its products will be secured by that proper application of manures which retains the fibrous matter of recent compost heaps replete with animal urine.

The subject of manures and composts will demand more space, and therefore I close this article by reminding the reader that as land can be injured and rendered almost barren by a redundant quantity of humus, by which, being glutted, it is made to approach the character of a peat bog; the only certain remedy which chemistry has instructed us to apply will be quick-lime, reduced pretty nearly to powder, and thus incorporated in sufficient quantity with the soil. By the peculiar affinity with which it attracts and fixes the deleterious humous acid, it will, as before stated, correct the existing evil, and convert a poisonous agent into a gradually available manure.

THE NATIVE PHOSPHATE OF LIME.

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

There are few modern discoveries of the geologist and the chemist more generally interesting to the farmer than the native beds of phosphate of lime, which have been lately found, or more clearly traced, dispersed in the green sandstone and crag formations. These are of very considerable impor-

tance, both to the owners of the soil on which they occur and to the farmers of England, as having the certain effect of reducing the charge for crushed bones and super-phosphate of lime. It is true that some desperate attempts have been made to monopolize the use of these minerals by the owners of

some useless patents; but my readers may, I think, rest quite easy on that account—there is no legal restriction to the free use of either coprolites or fossil bones for the purposes of manure. The analysis of a coprolite from the crag formation of the coast of Suffolk, will show the farmer how similar they are in composition to the fresh bones of commerce; in 100 parts of one of these analyzed in the laboratory of the London Manure Company, were found—

Phosphate of lime	56
Phosphate of per-oxide of iron	14
Carbonate of lime	21
Alumina	4
Silex	2
Carbonaceous matter	1
Moisture	2

It is now fourteen years since I first drew the attention of the English farmer to the use of these mineral phosphates. In a work "Upon the use of Crushed Bones as Manure," published by me in 1836, p. 6, I had occasion (after describing the value of crushed recent bones) to remark, "there is another source from whence the phosphate of lime might be obtained for the use of the farmer in large quantities, viz., the fossil bones and native phosphate of lime which is found in various districts of this country in very considerable quantities, and would only require crushing or powdering to render them nearly as useful to the farmer as the recent bones. For that the cartilage or oily matter of the bone does not constitute its chief fertilizing quality, is shown by the fact that the farmers who use bone dust will as readily employ that which has been used by the preparers of cart-grease as they will the fresh unused bones." And then, after referring to the analysis of the phosphorite of the Cornish tin mines, I continued—"The phosphate of lime is also found in many parts of the north of England, in Hungary, and in immense beds in Spanish Estremadura, where it is said to be so common in many places that the peasants make of it their walls and fences."

"In 1846," observes Dr. Buckland (*Jour. R. Agr. Soc.*, vol. x., p. 520), "Professor Henslow laid a paper before the British Association at Cambridge, on the abundant occurrence of the car bones of whales in the crag beds of Felixstow, on the coast of Suffolk, together with large quantities of rolled pebbles of phosphate of lime (which he then supposed to be coprolites) among the miscellaneous gravel and shells that compose the bulk of the crag formation. About this time also, Professor Solly's analysis of these supposed coprolites proved their chemical composition to be nearly identical with that of real coprolites from the has; and the attention of agriculturists was invited to their use as a

manure of nearly equal value with guano or bonedust. Mr. Solly's advice to agriculturists to make use of this newly discovered storehouse of fertility has been duly responded to, and many thousand tons of these pebbles and bones have been collected from the shore near Felixstow; whilst many occupiers of inland farms near that village have been, and are still, collecting similar pebbles from superficial beds of gravel of the crag formation, varying in thickness from one foot to many feet, and extending over areas of variable extent and irregular forms, modified by the sweep of currents, by which the bottom of the tertiary sea was affected during the formation of the crag.

In another portion of England, in the green sand-stone which rests under the lower chalk formation, the phosphate of lime also abounds, although not in such profusion as in the Suffolk crag. The extent of these formations, on a portion of which Mr. Paine, of Farnham, and Professor Way were not long since employed, is hardly known to the general reader. Mr. Morton, in his valuable work on soils, has traced the great southern chalk range pretty accurately: commencing at Bridport, in Dorsetshire, it extends by Salisbury, Hungerford, High Wycombe, Stevenage, Saffron Walden, Newmarket, to Dorking, in Norfolk, under the Wash to Burgh in Lincolnshire, to Barton, across the Humber to Beverley and Foxholes. That portion which forms the southern side of the London basin, extends from Dover to Chatham, Farningham, Merstham, Guildford, Farnham, and Winchester, to Salisbury. It is on the examination of this portion, and of the varieties of strata found in the neighbourhood of Farnham, that Mr. Paine has been recently employed. It may aid us in the better understanding his detail of his discoveries, if we remember the description which Mr. Morton gives (*ibid*, p. 40) of the green sand-stone formation—viz., that it is found under the chalk, and takes the same direction, following it up the valleys between the hills of the lower chalk formation. That it is composed of various beds, the upper beds near the chalk having the truest character, being green or greyish in colour, and having in their composition most of the green earth or chlorite, which is peculiar to this formation (chlorite earth is composed of, per cent.—Silica 50.0, alumina 26.0, lime 1.5, oxide of iron 5.0, potash 17.5). The lower beds, adds Mr. Morton, are frequently of much greater thickness, and are of every variety of colour, from yellow to a deep red. This formation is composed of siliceous sand, intermixed in some places with scales of mica (common mica contains, per cent.—Silica 47.0, alumina 20.0, oxide of iron 15.55, oxide of Manganese 1.70, potash 14.55), and a large proportion of a green earth or chlorite.

These form a soft species of sand-rock, but are so slightly united together that they are easily displaced by the finger or nail. In the upper or true beds of the green sand, beds of schist, passing into coarse chalcedony are sometimes found (chalcedony is a siliceous mineral), and also beds of bluish limestone, as in heat. The colour of these varies from white, light grey, green, yellow, orange, and brown, to dark grey, and even black. The surface of this formation has in general a low and level aspect, but in some places, as in Surrey, Kent, Lincolnshire, and Dorset, it forms a continuous range of hills in front of the chalk. It is a formation that, although not of great extent, may be said to follow the outer line of the lower chalk through all its windings; but in some places is so very narrow as scarcely to be seen, or is covered by the malm, or lower chalk. It is amidst these mixtures of the green sand and the chalk strata that the experiments of Mr. Paine and Professor Way were conducted. The former observes (*Agricultural Gazette*, 1848, p. 122), after detailing his discoveries in the green sand stone—

“The discovery of these phosphate beds in the upper green sand induced me to extend my investigations to other sections of the chalk formation.

“In the first place, from the bottom of my deep drains in the gault, I had collected during the past and present winters several fossil remains, consisting chiefly of a variety of shells, belemnites, broken fragments of ammonites, turrilites, &c., fishes’ teeth, and bones of saurians. These fossils are not sufficiently numerous in my land to be dug out with pecuniary advantage; but they may be found elsewhere in large quantities, and I think I recollect a pit a few miles off in this neighbourhood, where, some years since, I observed them in great profusion. These fossils are extremely hard, like flint; and in this respect differ from those found in the upper green sand, yet they concur in being composed of phosphate instead of carbonate of lime.

“And lastly, I proceed to give the result of my examination of the lower green sand, just below the gault. For some years I had been in the habit of collecting a quantity of greyish coloured nodules, about the size of a walnut, which I considered to be coprolites, but at that time I had no means of ascertaining their chemical composition. Last April, in digging some drains between five and six feet deep, we arrived at a thin, indurated bed of ‘mortar-life stuff, which effectually arrested the downward progress of the water.’ The soil above this indurated band is a hard shingly gravel, which, prior to draining, was utterly worthless. On examining this substance I found some of my old nodules interspersed; and, by way of experiment,

I ordered my man carefully to take out as much as he could by the bottom spit, and to spread it over the land, alongside the drains. The whole field was subsequently sown with swede turnips, having been treated all alike. The crop was altogether a good one; I may say most excellent for the season; but near the drains where the ‘mortar-like stuff’ was spread, the superiority in the size of the swedes was most evident, many of them weighing from 15 to 20 lbs. each.

“When I forwarded to Mr. Way my first box of marl from the upper green sand, I also sent him a parcel of these nodules, and he almost immediately informed me that they contained at least 40 per cent. of bone phosphate. This favourable report caused me to redouble my researches after larger quantities of them, and I soon found that this stratum was likely to prove far more valuable than either of the former ones. When, therefore, Mr. Way was at Farnham, we carefully inspected these beds, and collected a variety of fossils; for in this case also the phosphoric matter is derived from them. The fossils comprize corals, sponges, shells, ammonites, turrilites, and a large number of oblong masses.

“These beds of fossils are deposited in layers in the midst of very coarse green sand, and they possess the property of binding the sand together like mortar. From one of the richest veins we dug out a solid mass, weighing about 60 lbs. This mass Mr. Way broke up, and after sifting and washing, obtained about 35 per cent of fossils. Whilst the fossils remain whole, it is impossible to separate the sand from them, they being in fact intimately mixed up together. Professor Way, however, discovered an easy mechanical method of separation. These mixed fossils, powdered, but not dried, gave on analysis:—

Sand and a little clay	43.87
Water with a little organic matter and fluorine	3.44
Soluble silica	3.25
Oxide of iron and alumina	3.35
Phosphoric acid	20.80
(equal to 42.48 of bone earth phosphate)	
Lime in combination with phosphoric acid..	23.86
Carbonate of lime.....	1.06
Magnesia and loss	0.37
	100.00

“By a process of judicious sieving, the proportion of bone earth phosphate can be raised in the separated mass to 55 or 60 per cent,”

In the preparation of the super-phosphate of lime from these fossil remains, it is only necessary to reduce this native phosphate to powder, and digest it in diluted sulphuric acid; the action is the same as on the phosphate of lime of the recent bones—the effect of the thus prepared super-phosphate as a

fertilizer is similar to that prepared from the bones of a less age. I feel assured that the native phosphorite exists in other English localities, and that the discovery of other beds of phosphate of lime will be made, and other sources of fertility thus rendered available to the farmer. Is not something of this kind to be accomplished in Northamptonshire and other midland counties of England? Have the masses of ammonites and belemnites, which are there found in such abundance, been examined? Have the myriads of fossil remains embedded in the soils of that district, and in the blue lias of Dorsetshire, been analyzed? The question in these times

of low prices, and of forced exertion on the part of the farmer, to increase the productiveness of his land, presents itself in an aspect of more than wonted interest. That the discovery will materially lower the price, and consequently extend the consumption of all those manures, which, like guano, have the phosphate of lime for their base, is pretty certain; and let us not forget, that in hardly any other way can the productiveness of most soils be so generally and so permanently extended, as by the application of fertilizers which supply to the farmers' crops so general and essential an ingredient as the phosphate of lime.

THE CARROT AND THE PARSNIP CONSIDERED AS SUBSTITUTES FOR THE POTATO.

BY MR. HUGH RAYNBIRD, Hengrave, Bury St. Edmunds, Suffolk.

(Premium, Five Sovereigns.)

The carrot and parsnip, more particularly the former, are a very, if not the most, important substitute for the potato. Their nutritious quality, their easy cultivation, and their capability of growing upon inferior soils, render them important auxiliaries to the garden of the labourer, and to the farm of the agriculturist. The former will find them a nutritious winter vegetable for himself and family, while he will find they admit of the same wide application as the potato, in affording the most nutritious vegetable food for pigs and cows. Both carrots and parsnips, when given to cows, produce a milk of a quantity and quality unsurpassed by any other winter food, and the butter is of a fine yellow hue, and wholly free from that disagreeable flavour which renders butter made from the milk of cows fed on turnips so very disagreeable to the epicure.

Cattle fatten as well on carrots as on potatoes. They are as valuable food for horses, particularly for colts, and for those that are not very hard worked, and are required to be brought into selling condition. And when we consider the wide application of this root, we can but wonder why it has not been more generally cultivated upon the wide tracts of light sands and loams that are admirably adapted for its cultivation; and can only find a reason in the fact that carrot and parsnip growing is not generally understood by farmers, or that they are considered (when compared with turnips) to be difficult and expensive crops to grow.

Where broadcast sowing is adopted, and where the carrots or parsnips are sown upon foul land, the cultivation becomes expensive; but when grown upon favourable soil, and under judicious manage-

ment, there is no other root-crop that gives so good a return for the outlay, or that leaves the soil in so good a mechanical state for the growth of the following crop. The long root of the carrot or parsnip penetrates the subsoil, and not only exerts a mechanical influence but derives its food from a greater depth than most other plants, and thus leaves the surface soil to accumulate the fertilising ingredients that are required for other crops.

The following description is derived from observation in a district where carrots are grown more successfully, and to a greater extent than in any other, and where they are deemed of equal importance to the *light land* that beet is to the *heavy land* farmer. The manner of cultivation differs, but I will endeavour to give the details of the preparation of the land, the cultivation and storing the crop, the uses to which it is applied, and also the cost of cultivation, so that my readers may judge of the advantage of growing a few acres of carrots or parsnips in addition to those green crops more generally cultivated. And, independent of the importance of the crop itself, I advocate the more extended cultivation of carrots and parsnips, because the more various the crops upon a farm the more regular is the amount of labour required both from horse and man, and the more independent does the farmer become of failures from an unfavourable season; for the weather which retards one crop may hasten the growth of another; one is attacked by a disease or by the ravages of insects, the other escapes; while, if dependence be placed solely upon one class of plants, the entire growth may be visited with destruction at one and the same time.

The cultivation of the carrot and parsnip is very

similar, and one description will be applicable to both. The parsnip comes up with a broader leaf than the carrot, and makes a more rapid growth during the first few weeks of its vegetation; but it is seldom grown in this district as a field crop; and though the nutritious nature of the root does not admit of a doubt, yet the weight per acre does not equal the weight of carrots grown upon the inferior, light, sandy soils, upon which the latter flourishes so abundantly.

All deep turnip soils, of a mechanically light and sandy texture, are suitable for growing a clean-rooted crop to advantage. Upon thin, light, or heavy soils with a rocky subsoil, the roots have many fangs, and the expense of harvesting is increased. The white Belgium carrot, and in some cases parsnip, may be grown upon stiff loamy land; but though heavy crops may be obtained, yet the difficulty of securing a plant, the additional expense of cultivation, and of taking up on this class of soil, cause the preference to be given to land of a lighter texture when it occurs upon a farm.

In selecting a piece of ground for a carrot or parsnip crop, preference is given to a clean wheat stubble, which may be treated in a similar manner as for the turnip; but it should receive earlier attention both in the autumn and spring, so that a deep and fine tilth is insured by the month of April, which is the usual time of sowing—though this may be deferred till May, if necessary. And in a late spring, late sowing has the advantage, as the carrots are not so likely to be overgrown by the weeds before they can be distinguished by the hoer.

What is good tillage for the turnip may be considered applicable to the carrot. Thus, in Scotland and the north of England, the autumn and spring preparation may be the same, and they may be sown upon drill or ridges in the same way as turnips; but no farmyard manure should be used, as this would occasion the root to divide. However, though this method may give facility for horse-hoeing, yet it is more applicable to the large Belgium than to the common red carrot, and to stiff than to the general run of turnip soils. Upon good and medium turnip land, I would recommend the following system, and reserve the poor siliceous sands and gravels for a few further remarks; my readers will not, therefore, take the following as applicable either to these or to the stiff soils, upon which latter the Belgium carrot can only be grown.

The stubble, if not perfectly clean, is cleaned in the autumn by 3 or 4 times of the scarifier, with harrowings and rollings as required. If farmyard manure is used, from 12 to 15 tons may be ploughed in before Christmas, that it may decompose and mix with the soil; for raw manure, applied immediately before sowing, will injure the quality of the crop.

In February or March the land is ploughed and subsoiled, and left till April, when a harrowing or scarifying will destroy the weeds, and a rolling with a two-horse roller will assist the arrows in giving the required solidity and tilth. Before drilling the seed, the land will require a double tine of the light harrows, and it must be rolled with a one-horse roller before drilling the seed with the common Suffolk corn-drill. The drill-marks are left open.

If artificial manure is employed, and we use it in preference to farmyard manure, it may be distributed broadcast, and ploughed or harrowed in, previous to drilling the seed. We have used animalised carbon, salt, soot, guano, peat, charcoal, and other artificials, with varying success: but it is presumptuous to recommend one manure as a specific, when every one knows that the art of manuring depends upon supplying in a soluble form those ingredients which are found to exist in the plant, or which are essential for its full development.

Some farmers recommend steeping the seed in water in a bag, and then spreading it out 9 or 10 inches thick upon a floor, for a week or more, until it begins to sprout. It is then mixed with sand, and drilled. This forwards the growth, but I doubt the advantage in the event of dry weather following the time of sowing. When dry seed is used, it is rubbed to remove the bushy parts, and it is prepared for the drill by mixing with wood ashes or powdered charcoal; 4 or 5 lbs. of seed are sown per acre in April, or early in May, and two bushels of charcoal or ash are added per acre—the use of the latter being to prevent the seed clogging in the drill.

Charcoal, from its property of absorbing moisture, has been found to be highly favourable for promoting the vegetation of the seed.

The width between the drills may vary from 10 to 15 inches with the kind of carrot or parsnip, and also with the soil; a greater width being, of course, required for the large Belgium, which grows with an abundant top, than for the common red carrot; and more room is required upon a rich than upon an inferior soil.

The Belgium carrot, being of more rapid growth, offers a better chance of securing a plant than the red, as it can be distinguished from the weeds sooner. A small quantity of oats or mustard is often drilled with the seed, to show the rows upon land much infested with weeds; but, upon very foul land, the expense of weeding becomes so enormous that but little advantage attends the cultivation of any variety of carrot.

The carrots will seldom show themselves above ground until 20 days from the time of drilling: they advance very slowly at first. As soon as the plants can be distinguished, a thrust hoe should be

used between the rows, and a few days after the plants will be sufficiently advanced to be singled out to a distance of from 8 to 10 inches apart. This is a tedious operation when the land is foul; the best plants only should be left, even if this is at the expense of the regularity of distance. After a week or two a horse-hoe may be used between the rows; and this may be repeated as often as required, provided the drilling has been done with such regularity as to admit the passage of the hoes without injury to the plants. An implement having the hoes fixed upon levers, united to a bar by universal joints, the lever being guided by boys, is the best tool I have seen for this work.

A second, and perhaps a third, hand-hoeing will be found requisite for making the crop perfectly clean; for it will be useless to attempt growing carrots as a field crop unless the land can be kept as clean as a garden, while the carrots are in a young state; and afterwards the luxuriant growth will repay the attention, by setting the weeds at defiance.

The crop is harvested in November, by being forked up by men and women; the tops are cut off by a gang of boys and girls who follow the forkers; and the roots are stored by being placed in long heaps, about 2½ feet high and 3 feet wide, which, to protect them from the frost, are covered with straw, and then with a layer of moulds.

The produce varies from 500 to 1,300 bushels, or from 10 to 26 tons per acre, exclusive of tops. The latter are fed off upon the land, or ploughed in; when fed off, other food should be given in addition.

With ordinary management, a crop of carrots should never be less than 500 bushels. The great art is the obtaining a plant and the subsequent cleaning from weeds; when these are effectually performed, the battle is won. A thin plant should be ploughed up, for the expenses are nearly as great upon a crop of 5 tons as upon one of 25; and there is always time for turnips. But this must not deter any farmer from attempting their cultivation; for I have only known one instance where we have had occasion to use the plough, and that was from having purchased seed that would not vegetate at all.

Our method of growing carrot-seed is to select well-shaped roots, at the time of storing the crop, and planting them in rows; allowing 18 by 24 inches for each root. The seed-heads are gathered by hand as they ripen; and, after being thoroughly dried in the sun, are stored in a dry place till wanted for use. This we consider the best way of preserving the seed; but, if a want of room is experienced in storing it in this manner, the seed may be separated from the seed-heads immediately it is

dry, either by flail-thrashing, or by rubbing it through a sieve.

The cost of cultivation per acre varies considerably: taking men at 10s., women at 5s., and boys and girls at 3s. and 4s. a-week, it will be as follows:—

	£	s.	d.	£	s.	d.
Cleaning stubble, 3 scarify-						
ings, 4 horses	0	4	6	0	6	0
4 harrowings	0	2	0	0	2	0
2 rollings (2-horse)	0	1	6	0	2	0
Picking and burning weeds	0	2	0	0	2	6
1 ploughing	0	7	0	0	7	6
15 tons of manure, valued at						
3s., or artificial manure to						
the same value	2	5	0	2	5	0
Filling and spreading ditto	0	2	6	0	3	0
Hauling according to distance	0	4	0	0	6	0
Ploughing	0	7	0	0	7	6
Subsoiling (3 horses)	0	10	0	0	11	0
4 harrowings	0	2	0	0	2	0
1 rolling (2-horse)	0	0	9	0	1	0
1 ditto (1-horse)	0	0	4	0	0	6
Drilling	0	1	0	0	1	0
Seed, 4 or 5 lb., at 1s. 6d.	0	6	0	0	7	6
2 bushels of ashes, or peat						
charcoal	0	1	0	0	1	0
Hoeing between drills	0	1	6	0	2	0
Singling out	0	0	8	0	12	0
Second hoeing	0	3	0	0	5	0
Third ditto	0	2	0	0	3	0
2 horse-hoings	0	2	0	0	2	0
Taking-up and storing	0	15	0	1	0	0
Hauling roots	0	2	0	0	3	0
Rent, tithe, and rates	2	0	0	2	10	0

Total expense per acre . £8 10 7 10 2 6

The value of the crop, at £1 per ton, will vary from £10 to £26. The above estimate, taken from prices actually paid during a long series of years, bears out the remark which I previously made, that no profit can be obtained from a bad crop; and it shows that a good crop of carrots is very remunerative, and well worthy the attention of any agriculturist who has spirit enough to undertake their cultivation in a proper manner; and no root or grain crop affords more employment to the labouring classes.

On poor sandy soils, where they are a very valuable crop, I would recommend the carrot or parsnip to follow turnips that have been thoroughly cultivated, and afterwards fed off on the land with fattening sheep to which corn or oilcake is given. The land may be scarified, and then ploughed and subsoiled after the fold; and in a few weeks the natural pulverisation and solidity, resulting from exposure to the elements, will bring the soil into a beautiful state for the reception of the seed. A rolling and two double tines of the harrows will be found necessary to give further solidity and tilth before drilling; the latter to be followed by a light rolling.

It may be alleged that this system throws the carrot in the place of a corn crop, and that consequently a portion of the expenses of the cultivation of the previous crop of turnips must be charged upon the carrots; but, granting this, the chances are in favour of the carrots producing a greater profit per acre than the corn crop, and leaving the soil in far better condition for the following crop. It must be understood that I am alluding to the poor siliceous soils, upon which 3 quarters of wheat, 4 of barley, and 10 tons of turnips, are esteemed abundant crop. The after management will be the same as that already described; the produce will vary from 400 to 800 bushels per acre, whether of the red or white varieties, the produce of either of which will not be very different on this soil. This, at £1 per ton, will amount to from £8 to £16 per acre; and the tops, either fed on the land or ploughed in, are equivalent in value to the fold manure from the previous crop of turnips.

The cost of the crop will be somewhat as follows, taking men's wages at 10s. and women's at 5s. per week, and that the crop is cultivated upon a soil that admits of easy tillage:—

	£	s.	d.	£	s.	d.
Rent of land, rates, tithe, &c...	1	0	0	to 1	10	0
One scarifying	0	1	6	—	0	2
One ploughing	0	6	6	—	0	7
One subsoiling with 3 horses ..	0	9	0	—	0	10
One rolling (2 horses)	0	0	9	—	0	1
Four harrowings at 6d.	0	2	0	—	0	2
Four or five lbs. of seed at } 1s. 6d.....	0	6	0	—	0	7
Two bushels per acre of } wood, ashes, or charcoal, to mix with the seed in drilling, at 6d.	0	1	0	—	0	1
One light rolling (1 horse) ..	0	0	3	—	0	0
Drilling	0	1	0	—	0	1
Dutch hoeing s. d. s.						
between drills ..	1	6	to	2		
setting out	8	0	—	10		
second hoeing ..	3	0	—	4		
third hoeing ..	2	0	—	3		
two horse hoe- ings with } steerage-hoe }	2	0	—	2		
	0	1	6	—	1	0
Manual labour in taking up } and storing.....	0	12	0	—	0	15
Horse labour, do.	0	1	0	—	0	2
	£3	17	6	£5	0	4
Contingencies.....	0	10	0	0	10	0
Total	£4	7	6	£5	10	4

The straw used in covering the roots is still available for litter.

The value of 8 tons at £1 per ton, equalling £8

per acre, and of 15 tons, equal to £15, is the price at which carrots are frequently sold from the field, where no expense or risk of loss from storing is incurred; and if we put the average cost at £8 per acre, and the average value of the crop at only £12 10s. per acre, it leaves such a balance as I will defy any poor land farmer to obtain from a corn crop that follows turnips fed off on the land; and a portion of the balance may safely be set aside to cover the expenses for manure and cultivation, which ought never to be charged upon the turnip crop alone, but should always be spread over the various crops of the rotation.

The above produce is not at all above the average, for upon a farm where carrots were annually grown to the extent of from 5 to 10 acres, on which I resided, during fourteen years there were only two crops that produced less than 500 bushels per acre; the remaining twelve averaging from 500 to 1,400 bushels, or from 10 to 28 tons, and these crops were grown on poor sands and gravels.

Though I have set £1 per ton as the average sale price of carrots, yet I consider the value to the farmer depends upon the produce of the turnip crop: when this is below an average the carrot becomes of far higher value. And taking into account the convenience of having a root which, being stored, is equally nutritive in all kinds of weather, which admits of general application, and is so nutritious for all kinds of cattle, I consider that one bushel of carrots may fairly be valued as equivalent to two of white turnips, and one and a half of swedes or mangold-wurzel.

To the labourer, the value of a carrot or parsnip crop, when compared with the potato, will be found equally great. Carrots may be bought at 6d., and parsnips at 9d. a bushel. Potatoes are now seldom less than 2s. A few pence will purchase seed sufficient for a bed of carrots or parsnips, whilst the cost of the seed potatoes becomes an important item when taken from the labourer's pocket. From the carrot or parsnip, the probability is that he will obtain, with common attention, a root that will furnish him with a good supply of winter vegetable food; while, if he continues to plant the potato, the chances are in favour of their being taken off from year to year by the prevailing distemper, and the crop will barely exceed the value of the seed. But the money value of the crop will not be considered of much importance by the labourer who only cultivates for his own consumption, and chooses that crop that produces the largest amount of available food.

It may be alleged as an objection to the extended cultivation of the carrot or parsnip that the cold and wet climate of Scotland and the north of England

is not suitable for their growth; but I have seen them forming a part of the common management upon farms in an elevated district of one of our western counties, where the altitude and exposure

give the same degree of cold and inclemency of weather as would otherwise be found in districts very much farther north.—From the Journal of Agriculture.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A Monthly Council was held at the Society's House, in Hanover-square, on Wednesday, the 6th of February. The following members of Council and Governors were present:—His Grace the Duke of Richmond, K.G., Trustee, in the Chair; Earl of Chichester; Hon. R. H. Clive, M.P.; Hon. Capt. Dudley Pelham, R.N., M.P.; Hon. H. W. Wilson; Sir Charles Lemon, Bart., M.P.; Mr. Raymond Barker; Mr. Bramston, M.P.; Mr. Brandreth; Colonel Challoner; Mr. Foley, M.P.; Mr. Garrett; Mr. Brandreth Gibbs; Mr. Grantham; Mr. Fisher Hobbs; Mr. Wren Hoskyns; Mr. Milward; Mr. Pendarves, M.P.; Mr. Chandos Pole; Mr. Pusey, M.P.; Professor Sewell; Mr. Shaw (London); Mr. Villiers Shelley; Mr. Simpson; Mr. Slaney, M.P.; Mr. Stansfield, M.P.; Mr. H. S. Thompson; Mr. Hampden Turner; Mr. Thomas Turner; Professor Way, and Mr. Jonas Webb.

Finances.—Colonel Challoner, Chairman of the Finance Committee, presented to the Council the Report of the Committee on the Accounts of the Society to the end of the month of January, from which it appeared that the current cash-balance in the hands of the Bankers at that time was £3,631. He explained to the Council, that this balance included the Exeter Subscription of £1,260, amount received for Life-compositions £1,247, and on account of arrears of Subscription from Members £1,124. The Committee recommended that this sum of £1,247, received as compositions, should be invested as capital by the purchase of Stock in the public funds. Colonel Challoner further reported, on the part of the Committee, that 998 letters had been addressed and sent by post to Members who were more than two years in arrear of their subscriptions, claiming the sum of £5,205 as the amount of such arrears; that 446 of these members had returned answers to the application; 206 had paid their arrears amounting to £808, while 552 persons had sent no answer whatever. He added that the Finance Committee would proceed to enforce the claim of the Society against these parties, in accordance with the instructions and order of the Council. The quarterly statements of income, expenditure, and liabilities, as well as that of the funded property of the Society, were laid on the table for the information of the Council. The Council confirmed this report, and adopted the suggestion it contained for the investment of the balance on the Life-composition account.

Chemical Lectures.—The Report of the Chemical Committee having been read, the Council decided that Professor Way's offer to deliver a course of Elementary Lectures on Chemical Science before the members during

the current year should be accepted with their best thanks. It was arranged that their first Lecture should be delivered in the Council Room of the Society at 12 o'clock, on Wednesday the 27th instant, all Members of the Society having the privilege of being present on the occasion.

Meeting of 1851.—Mr. Pusey, M.P., having laid before the Council a communication from the Royal Commission for the Exhibition of the Products of Industry of all Nations in 1851, it was decided that the President should be requested to direct a Special Meeting of the Council, to be summoned for Wednesday the 20th inst., at 12 o'clock, for the purpose of taking such communication into consideration.

Mr. Shaw, of London, presented a coloured plan of the Islington Cattle Market, and took that opportunity of reporting the renewed outbreak of small-pox among the sheep in Norfolk.

Numerous communications for the Weekly Council, and presents for the Library, were received with the thanks of the Council.

The Council adjourned to Wednesday, February 13th.

A Weekly Council was held at the Society's House in Hanover Square, on the 13th Feb.; present, Mr. Slaney, M.P., in the Chair; Hon. Captain Dudley Pelham, R.N., M.P.; Baron Mertens; Mr. Alcock, M.P.; Mr. Burke; Mr. Dyer; Mr. Fuller, M.P.; Mr. H. J. Hunt; Mr. Majendie; Mr. Pendarves, M.P.; Professor Sewell; and Mr. Reynolds Solly.

Adulteration of Guano.—Mr. H. J. Hunt, of High-street, Lambeth, attended the Council for the purpose of reporting the extensive and systematic plans carried out weekly in the neighbourhood of the Metropolis for the adulteration of Peruvian Guano, and which he thought it of the highest importance to be made known at this season of the year, when purchases of Guano were so largely made by farmers throughout the country. Mr. Hunt laid before the Council samples of the various compounds manufactured for the express purpose of adulteration. The Council thanked Mr. Hunt for the favour of these communications, which they decided to refer to the next Monthly Council, with a recommendation that a Special Committee should be appointed to investigate this important subject, and to place the samples of adulteration in the hands of the Consulting-Chemist of the Society.

Canary Grass.—Mr. Majendie presented to the Council, on the part of Dr. Cazin, Secretary to the Agri-

cultural Society at Boulogne, a specimen of the *Phalaris arundinacea* of Linnaeus (known in this country as the Reed Canary Grass or Riband Grass), along with a supply of the seeds, for distribution among the members present.

Tuberous Roots.—Dr. Lindley transmitted from the Horticultural Society's Gardens at Chiswick a supply of the tubers of Melloca, for distribution and trial as an agricultural plant. In the last number of the Journal of the Horticultural Society, Dr. Lindley has given "Some Memoranda concerning the Melloca."

Australian Flax.—Mr. James Dixon, of Skelton Castle, Launceston, Van Diemen's Land, transmitted specimens of flax grown by him in that colony, during the three previous years.

Culture of Fruit Trees.—Mr. Robertson transmitted from Paris his mode of improving the culture of fruit trees, which the Council referred to the Journal Committee.

Wheat Sowing.—Mr. Birch Wolfe favoured the Council with a continuation of his experiments on the sowing of wheat, which was also referred to the Journal Committee.

Miscellaneous Communications.—Baron Merten presented a copy of his work entitled "Faits et Observations sur l'utilité du Drainage perfectionné." Mr. Bullen, secretary to the Royal Agri. Imp. Soc. of Ireland, also personally presented a copy of the volume of the "Quarterly Journal of Agriculture and Industry of Ireland for 1849." Mr. Fuller, M.P., presented a plan of his portable saw-mill, with a statement of its advantages; Mr. Willacy, a plan and statement of his portable hand-railway for farms; Mr. C. Steward, a communication of his experience in the use of Crosskill's one-horse carts; Captain Waterton, a statement of the value of his alkaline feeding powder, given to cattle attacked by the prevailing epidemic; and Messrs. Dodd and Peeling, a copy of their "Farm Account Book."

The best thanks of the Council were ordered for these various presents and communications.

It was announced that a lecture by Professor Way would be delivered to the Members at twelve o'clock on Wednesday, February 27th.

A SPECIAL COUNCIL was held at the Society's House in Hanover-square, on Wednesday, the 20th of February, for the adjourned consideration of a communication from the Royal Commissioner for the Exhibition of the Works of Industry of all Nations in 1851, as connected with the general question of the most proper and convenient place for holding the Country Meeting of the Society in the same year—present: His Grace the Duke of Richmond, K.G., Trustee, in the Chair; Lord Hatherton; Hon. Robert Henry Clive, M.P.; Hon. Capt. Dudley Pelham, R.N., M.P.; Hon. H. W. Wilson; Baron Mertens; Sir Thos. Dyke Acland Bart., M.P.; Sir Charles Lemon, Bart., M.P.; Sir

John V. B. Johnstone, Bart., M.P.; Mr. Raymond Barker; Mr. Branston, M.P.; Mr. Brandreth; Mr. French Burke; Colonel Challoner; Mr. Walbanke Childers, M.P.; Mr. Evelyn Denison, M.P.; Mr. Druce; Mr. Foley, M.P.; Mr. Brandreth Gibbs; Mr. Grantham; Mr. Fisher Hobbs; Mr. Hudson, of Castleacre; Mr. Jonas; Mr. Miles, M.P.; Mr. Parkins; Mr. Pendarves, M.P.; Mr. Pusey, M.P.; Prof. Sewell; Mr. Shaw, of London; Mr. Villiers Shelley; Mr. W. Simpson; Mr. Stansfield, M.P.; Mr. C. Hampden Turner; Prof. Way; and Mr. Wilson, of Stowlangtoft.

The Secretary having laid before the Council the Summons for the Meeting, and the President's Letter authorising its issue, as well as the Communication from the Royal Commissioner laid before the Council by Mr. Pusey, M.P., at their previous Meeting, the Council received from Mr. Pusey a further communication from the Commissioner, in reply to inquiries for information he was requested, as a member of the Commission, to make on the part of the Council, and then proceeded to the mature consideration of the special business for which they had been summoned.

On the motion of Colonel Challoner, seconded by Mr. Evelyn Denison, M.P., it was resolved—"That the Royal Agricultural Society of England shall hold their Show of Cattle, under their own rules and regulations, in Kensington, in 1851; but that the Society will not hold a Show of Implements in that year."

On the motion of the Hon. Capt. Pelham, M.P., seconded by Mr. Childers, M.P., it was resolved—"That a Copy of the Resolution of the Council be communicated to the Royal Commission by Mr. Pusey, with the expression of the Council's willingness to confer further with the Commission, should they at any time desire it."

The Council then appointed a Committee—consisting of the Duke of Richmond, Mr. Raymond Barker, Mr. Shelley, Colonel Challoner, Mr. Hudson, of Castleacre, Mr. Jonas, Mr. Brandreth, and Mr. Shaw, of London—to look over the Charter and Bye-laws of the Society, and take the necessary steps that may be required in consequence of the Resolutions then agreed to by the Council.

Mr. Raymond Barker and Mr. Miles, M.P., gave notice that they should move, at the Monthly Council in April next, "That the order in Council of May 3rd, 1847, be rescinded, with a view to substitute for the counties therein named the county of Middlesex; and that the successive years of the Exhibition be carried forward so as to maintain the rotation of districts as now constituted, namely—

"1851. *Metropolitan District*, comprising the County of Middlesex.

1852. *South-Eastern District*, comprising the Counties of Kent, Surrey, and Sussex.

1853. *South Wales District*, comprising the whole of South Wales, with the addition of

the Counties of Monmouth, Gloucester, Hereford, and Worcester.

1854. *East-Midland District*, comprising the counties of Leicester, Lincoln, Nottingham, and Rutland."

Thibetian Sheep.—His Royal Highness Prince Albert communicated to the Council through the Hon. Colonel Phipps, a Report on Her Majesty's Flock of Thibetian Sheep on the Farm at Osborne, for which the Council directed their best thanks to be conveyed to his Royal Highness for the interesting details which it furnished, and for the assurance it implied of his Royal Highness's participation in the national objects of the Society. The Council directed this communication to be submitted for the consideration and discussion of their next Weekly Meeting, on the 13th of March.

Belgian Fire-places.—The Secretary having informed the Council that the Belgian Fire-place presented to the Society by their life-member the Baron Mertens, of Ostin in Belgium, and accepted by the House Committee, had been put up in one of the official rooms of the Society, the Council offered their thanks to Baron Mertens, then present at the meeting, for this instance of his liberality and great attention to the Society. Baron Mertens then laid before the Council a work by M. Jules Noirsain, on the construction and advantages of the new plan by which apartments could be aired and ventilated in the most economical and agreeable manner by means of this fire-place, which he hoped would prove, as he intended it should do, a great advantage to persons of every rank in England, but especially to the poorer classes. The Council directed this work to be received with their best thanks, and to be laid before the Weekly Council on the 13th of March, for the information of the members of the Society.

Guano Adulteration.—Professor Way expressed his intention of making "Guano and its Adulteration" the subject of his Lecture to be delivered before the members in the Council Room of the Society, on Wednesday the 27th inst., at 12 o'clock, previously to his commencing the Course of Lectures, of which the arrangement was left to the Council at their next Monthly Meeting.

NEW MEMBERS.

Charles Towneley, Esq., of Towneley, near Burnley, Lancashire, and Charles-street, Berkeley-square, London; and the Marquis of Westminster, were elected Governors of the Society.

The following new Members were elected :—

Arnold, Thomas Owen, The Park, Hatherleigh, Devon
 Arnold, William, jun., Nethercott, Iddesleigh, Hatherleigh, Devon
 Bayley, Robert Riddell, 4, Basinghall-street, London
 Bentley, Robert John, Eastwood House, Rotherham, Yorks.
 Bradshaw, William, Slade House, Levenshume, Manchester

Branwell, Christopher, Hendon House, Sunderland
 Bryant, James, Prospect, near Plymouth, Devon
 Burkhill, Edward, Winteringham, Barton-on-Umber, Lanc.
 Cail, J., 8, Pavilion-place, Battersen-fields, Surrey
 Caldwell, Capt. Fr. Ed. (73th Highlanders), Langford Lodge, Brandon, Norfolk
 Carew, Thomas, Colepriest House, Tiverton, Devon
 Christy, James, jun., Boynton Hall, Chelmsford, Essex
 Clarke, Richard Hall, Bridwell, Colnampton, Devon
 Cole, Rev. N., South Brent, Ivybridge, Devon
 Colthurst, Joseph, 35, Jernyn-street, London
 Comins, Rev. William, Rackenford, Tiverton, Devon
 Daniel, Thomas Daniel, Stuckeridge, Bampton, Devon
 Dickin, Thomas, jun., St. Stephen's Hill, Rugeley, Staffs
 Dnitzze, Sir John, Bart., Exleigh, Starcross, Devon
 Edge, James Thomas, Stedly Hall, Nottingham
 Fellowes, Robert, jun., Billeswall Hill, Lutterworth, Leicester
 Galpine, W. L., Lynington, Haunts
 Harrison, James, Buckingham
 Hayne, J., 24, Gloucester-square, Hyde-park, London
 Hellyer, G. W. Maine, Bashly, Lynington, Haunts
 Henry, James, Blackdown House, Petworth, Sussex
 Hoare, Richard, Hauptstead, Middlesex
 Howard, J. P., 59, Mark-lane, London
 Lewis, Capt. T. E. Locke, R.E., Exeter
 Lubley, John, The Parsonage, Wiveliscombe, Somerset
 MacConnell, Frederick, Newby-bridge, Milnthorpe, Westmoreland
 Maw, George, Burrough Farm, Northam, Bideford
 Milner, John, Hordle Farm, Lynington, Haunts
 More, R. B., Linley, near Shrewsbury
 Packard, E., Saxmundham, Suffolk
 Percival, Stanley, Bridgefoot, Barnet, Herts
 Phillips, John R. Spencer, Ribbams Lodge, Chelmsford, Essex
 Reed, Howard, Long Sutton, Linc.
 Riley, Edmond, South Dalton Grange, Beverley, Yorks
 Roberts, William, 197, High-street, Exeter
 Robinson, Mrs., Wilson House, Milnthorpe, Westmoreland
 Rome, Joseph, Mayor of Carlisle
 Samuelson, B., Britannia Iron-works, Banbury, Oxon
 Smith, Sir Charles Cunliffe, Bart., Suttons, Romford, Essex
 Sparkes, John, North Bemfleet, Wickford, Essex
 Staniland, Meaburn, Mayor of Boston
 Stephens, Edward, Trewornan, Wadebridge, Cornwall
 Steward, Charles, Henley, Ipswich, Suffolk
 Stratton, Richard, Salthrop, Swindon, Wilts
 Tatton, Thomas, Wittenshawe Hall, Northenden, Manchester
 Thompson, Robert, 22, Victoria-road, Kensington
 Treby, Paul Ourry, Goodamoor, Plympton, Devon
 Veitch, James, Exeter, Devon
 Veitch, James, jun., Exeter, Devon
 Wilkinson, Rev. John, Broughton Gifford, Melksham, Wilts
 Wills, Thomas, jun., Eastury, Bovey-Tracey, Chudleigh, Devon
 Wyatt, Thomas, 359, Strand, London

BOCHARA CLOVER.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

SIR,—I have this moment read, in the February number of your magazine, the remarks of your correspondent, Mr. Moor, upon the growth of Bochara clover, the cultivation of which he recom-

mends as green food for cattle in this country, "the more especially as he understands it contains much saccharine matter." The immense produce which Mr. Moor obtained would fully justify this recommendation, could it be proved that the quality of the plant, in feeding properties, was at all commensurate with the bulk of its growth. This point Mr. Moor does not seem to have proved; and as I never heard of its having been employed with success as an article of green food, I shall, by your permission, tell you what is the experience that I had of it in only one experiment, which proved so unsuccessful that I never tried another.

A friend made me a present of some of the Bochara clover-seed, a few years ago, with the expectation that it was to turn out an article of beneficial growth in British husbandry. I, like Mr. Moor, tried it upon a patch of good garden soil, and with, though not equal, still quite sufficient success, as to quantity of its produce, to have induced me to prosecute its cultivation. The stem, however, and branches are so much stronger and more woody, in proportion to the leaf, than in anything which we recognize by the name of clover, that it does not impress one with a favourable idea of its nutritious and profitable qualities. When it had attained the stage of growth at which clover is cut for green food, I had some of it taken to the cows; but they only smelt it, turned it over, and rejected it. It was then offered to pigs, and received the same treatment. It happens that we have one of those privileged domestic pets in the shape of an old pony, which has been the companion and plaything of a lot of children in succession, and which has been their tutor in the art of horsemanship. "O!" said they, "try Dapple—she will eat anything. She follows us about for bread, apples, potatoes, pie-crust: she will eat anything but meat." Well, a little of it was presented to Dapple, which, however, is now misnamed, having not one hair that is not white; and she, with the confidence arising from uniform kind treatment, took some of it into her mouth and began to eat, but presently let it fall and tossed her head to get quit of it, looking as much offended as if a dose of aloes or some nauseous physic which she has never required or swallowed in the 23 years of her vigorous life, had been imposed upon her. This result deterred me from making further experiments on Bochara clover. Whether there was anything particular in the kind of seed which was sent to me, in the manner of its cultivation, or the period at which it was cut, to account for its being so dis-

tasteful to our domestic animals, I cannot tell; but if any of your readers should have met with better success than myself, it might be useful to the public to be informed of it; for I agree with Mr. Moor in thinking it might form an advantageous article of growth, if the quality were at all equal to the quantity which it might be made to produce.

Your obedient servant,

JOHN GREY.

Dilston, Feb. 21, 1850.

COUNTY EXPENDITURE.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

SIR,—I am anxious to direct your especial attention and that of your numerous readers to the bill now before Parliament, for the establishment of county financial boards.

The time is come when every possible effort must be made to economize the expenditure of the farmers; and there is every reason for believing that if the rate-payers in rural districts are permitted to exercise the right of electing a board to manage the county expenditure, the enormous sums now spent by the magistrates in salaries, &c., without the least controul, may be greatly reduced.

By the present law, the rate-payers in rural districts are under a disability and suffer a degradation which have long since been removed from those residing in cities, towns, and boroughs. The Municipal Reform Act gave to the latter the constitutional power of electing persons to manage their local expenditure; but the former are still left to the mercy of a body neither elected by them at first nor subject to be removed, however expensively the local management may be conducted. Thus the law, while it compels the rural rate-payer to procure the necessary funds, commits their disposal to others.

Now, therefore, the farmer's real friends in parliament may effectively serve him by supporting this measure for his local enfranchisement, while his enemies will have to show the Parliament and the country why *he* should continue to be deprived of rights and privileges which have long since been conceded to other subjects of the realm.

I remain, sir, yours respectfully,

G. S. BARBER.

Sutton, Feb. 22, 1850.

ON THE MANAGEMENT OF BARLEY.

BY HALL W. KEARY.

[Prize Essay.]

Barley, unlike the more valuable grain, wheat, can only be grown successfully upon certain soils, and under certain circumstances adapted to its culture; for while the latter may be sown with advantage upon almost every variety of land, and under apparently disadvantageous circumstances, the former, that is to say, the finest malting samples, cannot be produced in perfection without great care and management in the preparation of its seed-bed. The time of sowing and variety of seed are also important considerations; I propose therefore to treat this subject under the following three heads, those pointed out by the society, viz. :—

- 1st. The preparation of the land.
- 2nd. Advantages and risks of early sowing.
- 3rd. Different varieties of seed as suited to various situations.

Upon the proper preparation of the land depends most materially the *quality*, even more perhaps than the quantity of the future crop; and although the finest samples of barley are only produced on soils generally known as decidedly barley lands, yet even on these the greatest difference is often seen in the same season, and with other circumstances alike, when different systems of tillage have been adopted: I shall now endeavour to describe the different modes of growing barley which have come under my observation in various districts of the kingdom. In several of the Midland counties there are fine deep loams upon gravel, and also upon clay, which produce very bold heavy barley, although it cannot be said to hold for malting purposes the first place in the London market. The usual system followed in those districts, upon what are termed turnip and barley soils, is to sow barley after turnips, which have previously been wholly or partially fed off by sheep. The firm and beaten state produced by the continual treading of the sheep is generally broken up during the autumn and winter months by the plough, and in this state the ground remains until the time of seed. Scarifying and harrowing is the only additional preparation given before the seed is sown or drilled; which latter plan is now very general, although there are some farmers in those districts who still contend for the broadcast system. Unquestionably the more the seed can be dispersed over the ground the better; but the difficulty of depositing it at an equal depth is the great objec-

tion; for hence two or three growths are the result, entirely spoiling the quality of the grain and involving much trouble and difficulty at the time of harvesting. The drill, on the other hand, sows exactly the same quantity throughout at an equal depth, and thus all grows together and is ready for the scythe the same day. The sowing season varies according to circumstances from the middle of March to the end of April. The chief varieties of seeds are the old common barley, the Chevalier, and the Nottingham long-ear. Chevalier is now more generally grown than it was, although some contend that it does not produce so much per acre as other varieties; it is also more sought after by maltsters, and commands the highest price. On some of the rather strong clay lands of the Midland counties it is not unusual to grow barley after fallow. The land being left rather rough and cloddy in the autumn, the seed is sown broadcast as early after February as the weather will permit, upon the stale furrow, and dragged or scuffled in without any further preparation. Very good crops too of barley are frequently grown upon this plan; and for such soils I very much doubt whether a better one could be adopted. In some of the southern counties the turnip land is ploughed up as soon as it is dry, and then well worked twice with the scarifier or drag-harrow, upon which the seed is drilled, at the rate of about three bushels per acre.

On all warm genial soils the sowing commences as early after February as possible; but on the colder lands it is thought preferable to leave it until April, unless indeed they are very rich, in which case the earlier the seed is sown the less will it be laid.

Generally speaking the common sort of barley is more usually grown in the south; the Nottingham long-ear is occasionally sown, and so is the Chevalier, but the latter is somewhat out of favour in some districts, as it is said not to produce sufficient quantity on those soils.

Hertfordshire is much celebrated for the quality of its barley, and I believe the London brewers consider the malt made in some parts of that county the best in the market. The finest samples are grown in the light districts, which have generally a chalk subsoil. The land is, for the most part, ploughed only once, and the seed sown in March

or April. On the stronger lands, on which some years ago a fine malting sample could not be produced (when the old common barley was sown), very good crops of superior quality are now obtained, since the introduction of Chevalier, which has very much superseded the other varieties.

The Yorkshire and Lincolnshire wolds have of late years become large barley-growing districts, and although their northern climate is somewhat unfavourable for producing in perfection that grain which delights in warmth; still the system of high-farming so extensively carried on in those counties has enabled them to rival, if not excel, some of their more favoured southern neighbours.

In those districts the white turnip is chiefly grown, and the whole or greater part of the produce is fed off with sheep; when swedes are grown, they are seldom or ever stored, but are left standing where they grow, until they are wanted in spring. It is a prevailing opinion amongst the Wold farmers that they obtain a much better crop of barley after white turnips than after swedes; whereas a completely contrary opinion exists in Norfolk, so celebrated as a barley-growing county. It may not be amiss to compare the different systems, and endeavour if possible to arrive at a correct conclusion. As the feeding properties of the swede are decidedly more nutritive than those of the white or common turnips, it is fair to presume that the manure from sheep fed upon the former will prove a richer fertilizer than that from sheep fed upon the latter. In Norfolk the Swede turnips are generally speaking stored in November and December, and the land is thus relieved from the exhausting effects of a root crop, drawing for so long a period nutriment from it. May not this circumstance explain in some degree why a difference of opinion exists in two districts alike celebrated for good farming and for intelligent agriculturists? After close observation of the difference in crops of barley after swedes, as compared with barley after white turnips, I must decide in favour of the former; and I cannot but think that if more attention were given to this subject by those eminently practical men, the farmers of the Wolds of Yorkshire and Lincolnshire, and if the Norfolk plan were fairly tried and tested, opinions, which I am bound to think erroneous, would gradually give way. Then I believe we should see that most valuable of roots, the Swedish turnip, growing on the best Wold lands, producing infinitely more sheep-feed, and consequently more mutton; and, from the increased fertility imparted to the soil, producing more barley also. Nor would the advantages end here, although it may, perhaps, be foreign to the subject to trace it further; but if the soil be fertilized for barley, it will also tell upon the clover, and this again on the wheat crop.

The plough is mostly used in the Wold districts for breaking up the turnip land after feeding sheep. The land thus remains till seed-time approaches, when it is dragged and harrowed, and the seed occasionally drilled. In many instances the seed is sown broadcast, and then well dragged in with the scarifier. The objections to this plan, which I have previously alluded to, are, however, becoming apparent, and the drill is more frequently seen than formerly. From 10 to 12 pecks per acre are usually sown. The general seed-time varies from the first week in March to the end of April.

The Norfolk system of storing Swede turnips has been already alluded to, and I will now endeavour to describe the different plans of growing barley generally adopted in that county. In addition to the growth of a large breadth of swedes, the most spirited farmers consume a large quantity of linseed cake, crushed barley, or peas, with their feeding sheep; and it may here be right to notice one circumstance connected with this practice, which I think must be admitted to be true, viz., that although the produce per acre of the barley crop may be increased, it is yet thought that the quality is somewhat deteriorated; perhaps, however, not to such an extent, but that the increase in produce more than makes up for any deficiency in price. To this system, perhaps more than any other, is to be ascribed the fertility and corn-producing capabilities of some of the worst lands of West Norfolk. I believe also it is universally allowed that the above is by far the best and cheapest mode of bringing a poor farm into a high state of cultivation. The cake passing through the animal, an increase of mutton is added to the increase of corn, and the cost of artificial manure is thus doubly paid for.

It is usual to draw off a larger proportion of the root-crop for consumption in the yards by oxen, from those fields where the fattening and cake-consuming sheep are intended to be fed.

The system of ploughing twice for barley very generally prevails in Norfolk. Experience has invariably shown that more barley can be grown from twice ploughing than from once. By the former system, the manure of the feeding sheep is more equally and intimately mixed with the soil than when it is merely turned over once; and, of course, the greater part of it left at the bottom of the furrow. As the last ploughing generally takes place immediately before sowing, a lighter, kinder, and more genial seed-bed is also obtained than when sowing takes place on the dead surface of land ploughed up many weeks previously. It is, however, frequently found that in all soils, except those of the lightest and most sandy character, the use of the plough in the first instance, for breaking up, is not altogether the best: the land is left too close and

impervious to the action of frost, and frequently does not work so well in the spring as when some of the following modes are adopted. A strong searifier, with the teeth closely set, and drawn by four horses, is frequently used to break up the turnip-land; in which state it remains, rough and uneven, until the proper time for the second ploughing arrives, which invariably is performed immediately before it is thought proper to sow barley. Another plan occasionally followed is to remove the iron breast or mould-board, substituting a piece of rough wood in its place, or anything, in fact, to keep the furrow open, without turning it completely over, which thus presents a rough and accessible face to the action of frost, or other numerous atmospheric changes, which invariably mark our English winters. If this operation be well performed in dry weather, and a small and sufficiently deep furrow taken, I believe the land is left in the most favourable state for producing a good and genial seed-bed for the future crop. This surface is of course well harrowed before the second ploughing takes place, which as before observed, is not done until immediately before barley sowing; upon the large light land fields of West Norfolk it is usual to plough the whole field, and then drill across the furrows. If the drill follows the plough, it does so upon a less level and even surface, and the seed is not deposited so equally at one depth; nor can the drill-man perform his work so straight or well, from the impossibility of preventing the drill coulter running into the furrows made by the ploughs. Harrows follow the drill, and, in some instances, the roll; and the small seed-machine, followed by light harrows, complete the operation.

Upon stronger land, and especially in a wet season, it is usual for the drill to follow the plough; so that all the work may be harrowed and finished close up at night. Upon these soils the rolling does not take place generally until the barley has made its appearance above the ground and become strong in the blade; when the passing of a light roll across it breaks the mouldering clods, and gives a little fresh soil and firmness to the roots.

It used to be a very common practice in Norfolk, some years ago, to sow the barley broadcast, and then plough it in with a one-horse plough. In some parts of the county, on light tender land, this system still prevails, though it cannot be said to be at all generally practised.

On strong soils, which are apt to work unkindly in the spring, the plan of two-furrowing or ridging is frequently adopted. The ploughman takes rather a shallow furrow to start with, and returns with a deeper, leaving a small balk, and turning it over so as to leave a complete ridge; when this has been exposed to the atmospheric changes for some weeks,

an opportunity of dry weather is taken to reverse these ridges and expose the inside to the weather. It thus remains till seed-time, when a skeleton plough is used to split open the ridges; it is then well harrowed, and levelled as much as possible. The drill follows immediately; and if the above operations are performed properly in dry weather, an admirable seed-bed will generally be the result.

There are, however, objections to the above mode, which ought to be stated. It is most difficult to make the land completely level: and hence, particularly in a dry season, the furrows show themselves in the growing crop, which always looks much stronger and healthier in alternate rows all through the field. This is more seen in the early part of the season, but it cannot be doubted that it must operate unfavourably upon the yield when the time of cutting arrives.

The usual time of sowing may be said to extend from the middle of March to the end of April, although the two first weeks of the latter month are generally considered, in average seasons, the most favourable. Upon some of the stronger and more backward soils, barley is sometimes sown early in March, and, provided the land works well, undoubtedly the quality is improved by early sowing; but it is generally thought that the quantity is somewhat diminished. The old common barley is now but little sown in Norfolk. Within the last few years Chevalier has become very general. "The Brewers' Delight" is almost, if not quite, equal to Chevalier for malting purposes, grows stiffer in the straw, and is gradually coming into use. The Nottingham long-ear is a great favourite with some, while others prefer American barley. Another variety, obtained from Leghorn, has lately been introduced, and it is favourably spoken of by the maltsters, but experience has not yet tested its productive qualities. Chevalier, however, is still grown by many; and when care is observed to change the seed, by taking it from a different locality, I believe few kinds will be found to equal it.

Having now described the different systems pursued in some of the most important barley-growing districts, I shall, in conclusion, make a few observations, founded on experience and personal observation.

It has before been noticed how much depends upon the way in which the land is treated in the first instance, not only as to the mode of performing the work, but also as to the weather in which that work is performed. It is no uncommon occurrence to see ploughing going forward upon land intended for barley when the water stands in puddles on the surface, and the whole ground is, perhaps, saturated with moisture, the idea being to get the ploughing

den in or about the middle of the spring work. The ploughing is then done, it is true; but it is not sufficiently considered that numerous harrowings, rollings, and perhaps clod-crushing, must be gone through before barley can be sown amongst clods, which are the sure results of working in wet weather. Nor is the labour and loss of time of those operations the only evil; soils forced into tillage by harrows and rolls rarely, if ever, become kind and genial for the reception of the seed; and it must be strong in the recollection of all who have sown barley under the above circumstances, that an inferior crop has generally been the result. Upon very light sandy soils liberties may be taken in wet weather, with little or no bad effect; but upon land with any degree of staple in it, I am inclined to think that too much importance cannot be attached to working it at every stage in dry weather. There are, however, peculiar seasons when the weather is so constantly wet, that it is almost impossible to carry out the above practice strictly. As a modification of the bad effects of ploughing turnip land for barley, when the soil is too wet, I last year saw tried, and with remarkably beneficial effects, a most simple plan, which, although from its very simplicity some may be tempted to despise, I am convinced is most efficacious. A piece of cord was tied round the fore-part of the breast or mould-board of the plough, which prevented that smooth shiny surface left by it in wet weather, and entirely removed the necessity for rolling: whereas in the same field where the cords were taken from the ploughs, large clods prevailed, and the greatest possible difference was perceptible to the most casual observer. For those soils generally denominated turnip and barley soils, I think there can be little doubt that the system previously described of breaking up in the first instance by a scarifier, or skeleton plough, and then ploughing immediately before sowing, is preferable to the more common mode which prevails in some districts, of merely ploughing once and then putting in the seed. In the first place the manure is thoroughly mixed and ready for the young roots of barley as soon as they begin to shoot, and in the generality of seasons, moreover, a better tilth will be obtained. For these lands, also, the drill system must, I think, be considered the best and safest. There may be districts, circumstances, and seasons, which would point out another mode of sowing to be more advantageous; but these may be deemed exceptions to a practice, which, I cannot but think, will be still more universal. After drilling, very much harrowing and rolling are by no means desirable: the land may with advantage be left somewhat cloddy, provided the clods are small, until it is time to sow the small seeds, when the light roll makes it sufficiently fine

and gives a little fresh soil in which to sow the young clover.

Advantages and risks of early sowing.—Although very early sowing is strongly advocated, I hold it to be quite impossible to fix any period which will suit all circumstances and seasons. If the weather be perfectly dry and the land works well in February, the quality of the barley will unquestionably be improved by early sowing; but that a corresponding increase takes place in quantity may however, I think, be doubted. There is a great difference in seasons, and a practice which would prove highly suitable to one year might, if persevered in under different circumstances and with different weather, be productive of very injurious results in the next. It can never be judicious to meddle with the land in the spring until it is dry and works well. On strong cold land also, barley should be sown much earlier, generally speaking, than upon light sandy lands with a warm dry subsoil. In the former there is no danger of a too rapid growth in the first stages, and the land having sufficient staple to carry it out, the quality of the grain will be decidedly improved and the period of cutting will be accelerated. On the other hand, if sown before the land is in proper tilth and fit to receive the seed, a rough coarse sample will be produced. The invariable result of very late sowing, there can be no doubt, is an inferior quality of corn. From the 20th of March to the same date in April will, I think, in average seasons be found a safe and judicious period for barley sowing.

There is at the present day a great difference of opinion as to the question of thick and thin sowing; after several careful experiments, I am inclined to favour a middle course. From 8 to 10 pecks per acre on kind and genial soils will generally suffice; but on unkind land in imperfect tilth it may occasionally be necessary to sow a larger quantity.

The different varieties of barley comprise the old common barley, Chevalier, Brewers' Delight, Oakley, American, Nottingham Long-ear, Berkshire, &c. The Chevalier decidedly ranks first for malting purposes, and is most eagerly sought after by the brewers in every district. The objections urged against it are, that it does not produce so much per acre as some of the other varieties. I am, however, inclined to think that, under proper cultivation and with occasional change of seed, there are few sorts that can be compared with it. I will give the result of some experiments carefully tried between 1836 and 1845:—

	In 1836.		CORN.		STRAW.	
	Bush.	pecks.	Tons.	cwt.	lbs.	lbs.
Chevalier	42	0	0	14	1	
Common barley . .	42	0	0	15	6	
American	40	0	0	14	4	

	CORN.		STRAW.	
	Bush.	pecks.	Tons.	cwt. lbs.
In 1841.				
Brewers' Delight..	57	1	1	6 6
Berkshire	56	2	1	6 2
Chevalier.....	60	1	1	7 6
Nottingham.....	56	3	1	8 0
In 1845.				
Brewers' Delight..	52	0		
Chevalier.....	48	3		

The foregoing experiments are strong proofs in favour of Chevalier—in every year it was the best quality. “Brewers’ Delight” is, I believe, quite equal to Chevalier for malting purposes; and in appearance, there is in fact little or no difference. I am a very strong advocate for a constant and judicious change of seed; and although it may sometimes be expensive to obtain it from a great distance, I believe it will generally repay the cost by an increase of produce and an improvement of quality.

A few years ago a very strong instance confirming my opinion in this respect came under my observation. On two adjoining farms, in a barley-growing district, both much alike as to quality of soil, the occupier of No. 1 being in the habit of constantly changing his seed and sowing tolerably early, and the occupier of No. 2 systematically never changing his seed and sowing rather late, the quality of the barley grown upon No. 1 in the year referred to was remarkably good; and upon No. 2 it was so very inferior as to be quite unsaleable for any but the most common purposes; and 2s. per bushel, or 16s. per qr. was the difference in the price these barleys fetched at several times during

that season, on the same day and at the same market. The produce per acre also was, as nearly as could be ascertained, very much greater than on farm No. 1.

I have never heard that Chevalier, or any of its varieties, were not hardy, or incapable of being produced in cold and bleak situations; but rather the contrary, and on the whole it appears that the charge brought against it, of yielding badly in some districts, is not borne out by universal opinion. Before it be condemned, I should strongly recommend all to test it accurately by careful experiments.

There may be, and probably are, descriptions of land quite incapable of producing the best quality of barley, and upon such soils a greater produce of the common barley may, perhaps, be grown. It would, however, be going too far to recommend this or that variety as being the best or most productive for every locality; but my own opinion is decidedly in favour of Chevalier and Brewers’ Delight; bearing always in mind the necessity for a change of seed, and care being taken to sow the boldest and best that can be obtained. There can, I think be, no doubt that the same laws prevail in the vegetable as in the animal world. Few will dispute the fact, that strong and healthy animals propagate a like progeny, and *vice versa*. So we may fairly infer, and it is moreover borne out by the results of practice, that from the largest and best kernels of grain of every description the best crops will be produced.—Journal of the Royal Agr. Society.

THE LONDON FARMERS' CLUB.—MONTHLY DISCUSSION.

The monthly meeting of this Club took place at the Club-rooms, New Bridge-street, Blackfriars, on Monday evening, Feb. 11, when the chair was taken by Mr. Payne, of Felmersham.

The subject for discussion was “The evils resulting from the present unsuccessful mode of taking the corn averages, with a view to an amendment of the present system.” The duty of introducing the subject devolved upon Mr. Bennett, of Cambridge, but from what follows it will be seen that that gentleman was unable to attend, and in his absence it was introduced by Mr. Shaw.

The CHAIRMAN, in opening the business of the evening, stated that this being not only the first discussion of the year, but also his first appearance officially in the character of chairman, he wished to make two or three observations in reference to the manner in which the subject of the evening might be discussed by any gentleman who might speak upon it. In the first place he would impress upon them the necessity of strictly confining themselves to the subject placed on the card (Hear, hear); while he might repeat that no one except the gentleman by whom the question was opened would

be allowed to extend his observations over more than twenty minutes. The question which came before them that evening was of the greatest importance to agriculturists, and he regretted to find that his friend Mr. Bennett was not present according to promise, to introduce it (Hear, hear). Mr. Shaw, however, had kindly undertaken to supply Mr. Bennett’s place, and he was sure that gentleman would treat the subject with his usual ability. He (the chairman) thought that at least some kind of apology or excuse should have been forwarded to the Club by Mr. Bennett; he was of opinion that it was his duty as chairman to make that remark, if not indeed to suggest that some inquiry should take place into the cause of Mr. Bennett’s absence.

Mr. SHAW, of the Strand, on rising to introduce the question, commenced by stating that when the choice of subjects which appeared on the card was made by the committee, there was one proposed by him, and which was fixed upon by the committee for him (Mr. Shaw) to introduce on the 1st of April next. On that occasion Mr. Bennett observed that it would have been better had the subject been taken up by some one possessing more practical knowledge. Mr. Shaw expressed

his concurrence in Mr. Bennett's remark, but added that in however crude a manner he might treat the subject, he had the satisfaction of knowing that it would be taken up by Mr. Bennett, and that full justice would be done to it by the practical men who would follow them. If, then, he had expressed himself in such a spirit with reference to the subject with which his name was associated as the introducer at the April meeting, how much more was he in need of their indulgence on the present occasion! because he felt not only the want of that practical experience alluded to, but also a fair opportunity of dealing with it, as the letter positively requesting him to act for Mr. Bennett was dated as late as the 29th of January. If their Chairman had thought it requisite to ask for indulgence in his capacity, he (Mr. Shaw) had far more need to ask for similar indulgence on the present occasion (cheers). It was well known that for a very considerable period there had been certain restrictions on the sale of corn, relating to its export and import at certain prices. The first Act of Parliament on the subject, however, to which he would refer them, was the 10th Geo. III., chap. 39, passed in 1770, the preamble of which explains the object, and is as follows:—"Whereas a Register of the Prices at which corn is sold in the several counties of Great Britain will be of public and general advantage, be it enacted." By this Act the Justices at Quarter Sessions are requested once in every year to direct returns to be made weekly of the prices of corn in such and so many market towns in their respective counties, ridings, divisions, and stewardies, not less than two or more than six in each, as they may think requisite, in England and Scotland, and to appoint a person to make such returns. A general receiver of corn returns was to be appointed by the Treasury to enter the district returns in a book, and to publish the same in the *Gazette* at least eight times in the year. This appeared to be the foundation of taking the averages. A subsequent Act, the 31st Geo. III., chap. 30, was passed in 1790, entitled "An Act for regulating the Importation and Exportation of Corn, and the Payment of the Duty on Foreign Corn imported, and of the Bounty on British Corn exported." That Act went more into detail on the subject of the returns. Instead of the selection of places from which returns were to be made being left entirely to the discretion of the justices of the peace, it was enacted that the country should be divided into districts, distinguished as *Inland* and *Maritime*, and the names of the places in each county whence returns were to be made were enumerated; additional regulations respecting the inspectors were made, and the form of oath which they were compelled to take prescribed; that these returns should be sent up to the Receiver of Corn Returns in London, and that, when made up, the average prices should be transmitted to the officers of Customs and other parties in the different ports and places where they would be required to regulate the imports and exports. The system, in fact, was much the same as it now is. Still, this Act differed from other Acts which had followed on the same subject, inasmuch as certain places from which the returns were made, which were mentioned therein, were now altogether omitted; and,

for some of the omissions, he (Mr. Shaw) was unable to discover a satisfactory reason. The places from which returns are made did not appear to be selected at this day in accordance with their respective merits. In the amended Act of 1842, amongst the places which were added, he looked in vain for two towns of considerable importance as corn-markets: he alluded to Marlborough, in Wiltshire, and Ross, in Herefordshire. He could not see on what principle those towns inserted in the Act of 1790 should be omitted in the enlarged list of places enumerated in the Act of 1842. While seaport towns, in which grain resold, and having superadded to its original price the extra expense of carriage, warehousing, &c., were included, inland places, or places which should regulate what we would call the natural price, were in many cases altogether omitted. He would further direct especial attention to the expression used in the Act of 1790 in reference to wheat, the prices required to be returned being those of "*middling* British wheat," thereby showing the intention to have been the obtaining the average *price* of the average *quality*. Before he referred to the manner in which the averages, or fiars as they were termed, were taken in Scotland, which seemed, by the way, to give general satisfaction in that country, he would particularly mention the case of the East Lothians, where the question of taking the fiars had been recently complained of and discussed. He believed that the cause of complaint arose from the fact that the East Lothians were an exception to the rest of Scotland. The great point, as he thought all would admit, was to ascertain the natural price of corn (Hear, hear). It might be seen, from the early acts, that the original intention not only had reference to the price and quantity sold, but also to *quality*. Now he would impress upon them the importance of the fact that when the best grain was returned over and over again with additional expenses, and most probably an additional profit every time it was sold, such must be anything but the average price of an average quality of corn from the grower. It was well known that only the best corn was sent to market; and for which there are many reasons. In the first place, men liked to obtain a high price for what they offered, and hence dressed their corn highly; secondly, as farmers, they coveted the reputation of producing a good article, which might induce them to send only their best to market; and thirdly, there was a great deal of refuse corn, and corn of inferior descriptions, which, being consumed at home, never had a chance of being included in the averages at all (Hear, hear). He was afraid they were nearly all alike—farmers and merchants, buyers and sellers—liable to blame for the great deficiency in the amount of the returns. In the absence of accurate statistical knowledge, all was, of course, guess-work. They knew not the number of acres annually under wheat in this country; they knew not what the land of England was capable of growing; they had to guess what amount was produced, and for how much it was sold. Looking at the opinions published for the last fifty years, and comparing population with production, he had come to the conclusion that 20,000,000 quarters of wheat were grown annually in Great Britain and Ireland. Some time since, the av-

rage produce had been set down at 15,000,000 qrs.; but he thought that he might state, with truth, that it was much greater now than it was twenty-five years back, and, taking the medium, he might at any rate estimate the average produce now at 17,000,000 qrs. without including what was sold two or three times over. The amount returned, as shown by the *Gazette* for the last three years, is as follows:—1847, 4,643,006 qrs.; 1848, 5,309,649 qrs.; 1849, 4,487,264 qrs.; from which it would appear that not one-fourth of the wheat grown was brought into the averages, while the price being taken from this return—a superior quality—of course gave the average many shillings beyond what the middling quality should be, and what it ought to be. They managed these things better in Scotland; they seem to have a more canny mode there—(laughter)—of putting the averages on a much sounder footing. He would read the following extract in reference to Scotland from the Act to which he had already alluded:—

“And be it further enacted by the authority aforesaid, That the importation of foreign corn, meal, and flour, and the payment of the duties thereon, and the exportation of British corn, and of the other articles herein-before mentioned, and the payment of the bounty thereon, shall be governed and regulated in each of the districts in that part of Great Britain called Scotland, by the prices of each sort of corn or oatmeal, taken in the manner hereinafter mentioned; that is to say, the sheriff depute of each of the counties, and the steward depute of the stewardry in Scotland herein-before mentioned, or his substitute, respectively, shall, on the fifteenth day of the month of September One Thousand Seven Hundred and Ninety-one, and on the fifteenth day of every succeeding month, or within three days thereafter, convene in open court, at the usual court place, at twelve of the clock mid-day, before him, a jury of not more than seven, or less than five, good and lawful men of his county or stewardry, not being buyers of corn or oatmeal for sale, of whom two shall be chosen from among the freeholders or commissioners of supply, and two from among the farmers of land, and the remaining number from among the reputable inhabitants carrying on trade or business in some town in that county or stewardry, to fix and determine, upon oath, the weekly market prices of the several sorts of middling British corn and oatmeal, as the same were commonly bought and sold in that county or stewardry in each of the four weeks then last preceding, according to the evidence to be adduced of the said prices in manner herein-after directed; and the said sheriff or steward depute or substitute shall, in the presence of the jury so convened, proceed forthwith to take proof of the weekly market prices of middling British wheat, rye, peas, beans, barley, beer or bigg, oats, and oatmeal, as the same were commonly bought and sold within that county or stewardry in each of the said four weeks, by examining, upon oath, as many persons resident therein, and skilful in the prices of corn and oatmeal, who are, by the said sheriff or steward depute, or substitute, to be convened before him for that purpose, as shall be necessary for complete evidence of the weekly prices aforesaid, and thereupon the said jury shall, by an instrument in writing, under the hands of the major part of them, fix and determine the weekly market prices of wheat, rye, peas, beans, barley, beer or bigg, oats and oatmeal, as the same were commonly bought and sold within that county or stewardry in each of the said four weeks, distinguishing therein all the prices of each of the said several sorts of corn, and of oatmeal, in each of the said four weeks; of which weekly prices so fixed and determined

the said sheriff or steward depute, or substitute, shall forthwith return an exact and distinct account.”

Now he thought that in this extract there was enough to show a very marvellous difference between the Scotch system and their own. In Scotland, however, at present, the fiars were struck annually instead of monthly; and on the previous Saturday he had seen in a Scotch paper an advertisement calling a meeting in February, for taking the fiars for the county of Fife. The attention of all is thus directed to the subject. It becomes similar to a trial in court; and there could be no room for attributing negligence or interested motives in making an improper return. The question of averages was of the highest importance to farmers, because it greatly affected two very vital questions. In the first place, in many parts of the country the rent was regulated partly by a corn-rent and partly by a money-rent; it therefore became highly necessary that the returns should be fairly and fully taken. Again, the tithe commutation was calculated on the same basis. He was aware that the question of tithes was a delicate one to touch; but on that occasion it should be restricted to the one point—How far the returns were properly made, and whether or not they were such as were calculated to do justice to all parties? If the quality of the grain from which the averages were taken were above that of the general produce; if the averages were taken from grain, which, passing through many hands, was sold at prices embracing accumulated expense; and if, after all, the tithe commutation, based on such averages, were taken at fifty-six shillings instead of forty shillings, the present price, it would be considerably higher than what it ought to be. It must be recollected that the tithe re-charge amounted to nearly £4,000,000, and must, under existing circumstances, unfairly take a heavy percentage out of the pockets of those who could ill afford and never ought to pay it. It was not necessary for him to offer any additional remarks as to the causes which made such averages unfair. Those whom he was addressing would be better able to describe the working of the system. He would only repeat that the corn returns did not embrace one-fourth of the quantity actually sold, and that the present averages were not of a middling quality of grain, and did not, in fact, give the real or natural price of corn (Hear, hear). The extra expenscs from re-sales might, with additional expense, be estimated in many cases at 5s. per qr., and he thought that in all places where returns were made such re-sale or accumulated price should be excluded from the list. For instance, there is the London market. How many hands did corn pass through before it reached that market? Properly the return should be made by the grower, or at least should be authenticated by him. But here he was aware there was a great difficulty to be contended with, as a considerable number of farmers had a decided disinclination to state what their corn was sold for. If it was damp, or in any way out of condition, and was therefore sold at an inferior price, a man would not in that case wish to proclaim it in public, as the price denotes the quality of the corn. Still this concealment would in the end tell against the farmer him-

self: and if every man would but consider himself bound to make an honest return of all he sold they would get much nearer the truth, and the truer the statement of facts the greater would be the advantage to themselves. He had now communicated all that he had to offer on this subject, which would he trusted at all events prove sufficient to induce others to enter more fully into the question (cheers).

Mr. GRAINGER said it appeared to him that great hardships were inflicted upon parties by the present mode of taking the averages. He could state from his own knowledge that the transit from Ely to the large market of Wakefield, in Yorkshire, amounted to about 3s. 6d. per qr.; and the merchant's profit, and other items of expence amounted to 1s. 6d. per quarter in addition. With rent-charges at a fixed sum, 56s. a quarter would represent 8 bushels of wheat. According to the average in the *Gazette*, 56s. would represent 10 bushels of wheat; and if they took the grower's price, 56s. would represent 12½ bushels of wheat. (Hear, hear.) That appeared to him a very strong case for inquiry into the present system. He mentioned rent-charges because he was interested in them. Other gentlemen had to pay corn-rents on the same averages; and it behoved all who had to pay on this average system to endeavour to get the matter placed on a better footing. (Hear, hear.)

Mr. MECHI said he would confirm the statement of Mr. Shaw, that a portion of inferior corn was generally retained for grinding at a low price in the neighbourhood, from which returns were made. He was accustomed to retain his second quality of wheat, and to sell it to his men, when ground, at a reasonable price; and he believed that many other persons pursued the same course. No return was made for it. That was the only remark which he had to make on the subject.

Mr. WILLIAMS begged to offer a few remarks on the improper manner of taking the averages throughout the kingdom; considering that the British farmer's position was such that he could not afford to pay more for corn or tithe than he received for his own commodities. The last season would illustrate their position as farmers much better than the present one. It was a well-known fact that during the last season the corn grown in the southern counties of England was of a very inferior quality, and the consequence was that the price given in the returns made from those counties exceeded the amount paid by the millers by many shillings per quarter. He had no wish to bring any accusation against the millers; but he had heard it remarked, and he repeated the opinion just as he had heard it, that the millers were probably interested in making the returns less than the price at which they had purchased during the week. There were cases in which people had acted from interested motives—(laughter)—but of course it was possible that in this instance the imputation of doing so was unfounded. He could prove that in many cases; rices were altogether omitted from the returns, and the reason might be that the wheat was of so low a quality that it was not considered worth while to include it. That might be right or it might be wrong; but if there were any force in the accusation of which he had

spoken, they would be justified in acting upon it. They had a right to demand that, if one class of individuals alone made returns, security should be taken for their accuracy; and if they had been proved to be inaccurate, they had a right to call for a change in the system. He had heard it observed that, in omitting to return the low-priced wheats, the millers might be actuated by the consideration that, by returning them, they would reduce the average prices of the kingdom, and that, by selling so many sacks of flour to retailers at a reduced price, they might sustain considerable loss. The retailers might point to the averages, and say: "You are charging us too much;" and they would point to averages in localities which did not give a fair representation. At all events, something should be done to prevent the recurrence of such practices. Now this question affected the farmer in three different ways. First, in regard to his tithes. He entered into an agreement to pay tithe according to the average price of corn throughout the kingdom. The average prices exceeded by 5s. what would be the real average if returns were made of all that the farmer received. If he sold his wheat at 40s., the average upon which he would have to pay was 45s. Under the septennial clause of the Tithe Commutation Act, which existed the six previous years to the present one, having sold his wheat at 40s. to 42s., he was compelled to pay tithes on 54s. 10d. How did that clause operate with regard to corn in the present year, when prices had tumbled down very much more than during many previous years? For every quarter of wheat which he had sold this year at 35s. to 40s., he would have to pay tithe on 53s.

The CHAIRMAN thought the speaker was a little wandering from the question. He did not wish to restrict him unnecessarily to any particular line of argument, but he should endeavour to keep a little closer to the matter in hand.

Mr. WILLIAMS begged pardon if he had deviated from the question, but he thought that what he was saying had an important bearing on the condition of the farmer. Now take the case of a man who had taken his farm at a corn rent, and see how the present mode of taking the averages would operate with regard to him. He would have to pay his landlord more for rent than was proportionate to what he received for his corn, owing to the increase in the averages, which had been so lucidly explained by Mr. Shaw. (Hear, hear). There was another mode in which the system operated. If he asked his landlord for the slightest reduction of rent, his landlord might reply, "Why, things are not quite so bad as you represent: you are getting so much per quarter for corn." Whence did the landlord get his information? Why, from the *Gazette*, from which he appeared to be receiving much more for his wheat than he obtained in reality. (Hear, hear). This question had been argued in a club to which he belonged at Swindon. They had considered the operation of the Septennial provision in connection with free trade. They had gone into details which showed clearly that the averages affected them prejudicially. After he (Mr. Williams) had made certain observations at the meeting, a miller who was

present came up to him, and said—"I concur in every word that you have uttered. Only last week I purchased, at 26s. per qr., a carriage of wheat, of which I made no return." Let them consider the position of the individual who sold that wheat. He would assume that he had a farm of five acres, producing seven sacks per acre. He would thus have seventeen quarters and four bushels of wheat, which he might well take to market in a waggon (Hear, hear). This wheat was sold at 26s. per quarter, producing £21 9s. That man would have to pay tithe upon 54s. 10d. per quarter. This would amount to £4 15s. 11½d. The rent—allowing one fourth under that head, which was, he thought, a very fair test—would be four quarters and three bushels, of the kingdom in the week. This quantity would amount of course to £9 8s. 1½d. Thus, £14 4s. 1d. would be required to pay the tithe and the rent; the difference between that amount and 26s. being all the farmer would receive for labour, taxes, and capital. Two-thirds of the whole amount would be required to pay those two items alone. If, on the other hand, the averages were taken as they ought to be, the tithe would be only £2 5s. 6d., and the rent only £5 13s. 9d., making a total of £7 19s. 3d., and the seller would have, with the same price, £14 15s. 9d. Such would be the different results from the same five acres of land under different modes of taking the averages. Now he thought the reason why the averages were higher than they ought to be, was that they were made by the purchaser; and he had arrived at the conclusion that so long as the returns were made by the purchaser alone the averages would never be correct (Hear, hear). But would the averages be correct if the returns were made by the sellers? The highest orders were much too indolent to make the returns (laughter). He was of opinion that they ought to be made by the buyer and the seller conjointly; and if the meeting would allow him, he would briefly state in what way he thought this object might be secured. In the first place he would not have the returns made in different measures—in the load, the quarter, the sack, and what not (Hear, hear). So long as there was this variation, there would, of necessity, be the greatest difficulty in obtaining correct returns. He proposed that, not only should the returns be taken in every one of the 290 towns in which they were at present taken, but that it should also be shewn in what part of England every quarter of corn sold in the market had been given; considering, as he did, that accurate statistical details regarding the produce of the soil in different parts must be of the greatest value. To ascertain the entire growth of the country within a thousand quarters was a point of the greatest importance, and he believed that that might be done if they set about the matter as men of business. At present there were no statistical documents from which it could be seen how much wheat was produced, and how much was sold, in any one year. If a buyer had bought a quantity of wheat in any county where a market was held, the proper time for making the return would be that at which he paid the purchase money; and,

even though the corn might be sold at the barn-door instead of at the market, the same rule would apply. Of course no alteration could be made without an act of parliament; but he would suggest that the following schedule might be adopted as an improvement upon the present returns:—

Name of Seller.		Wheat.		Price.		Value.		Barley.		Price.		Value.		Oats.		Price.		Value.		Rye.		Price.		Value.		Beans.		Price.		Value.		Peas.		Price.		Value.	
		qr. b.	s. d.	£ s.	qr. b.	s. d.	£ s.	qr. b.	s. d.	£ s.	qr. b.	s. d.	£ s.	qr. b.	s. d.	£ s.	qr. b.	s. d.	£ s.	qr. b.	s. d.	£ s.	qr. b.	s. d.	£ s.	qr. b.	s. d.	£ s.	qr. b.	s. d.	£ s.	qr. b.	s. d.	£ s.			
Total.....																																					

A Schedule, showing the quantity of English corn bought by Mr. _____, during the week ending _____ 185____, of the following persons: the entries to be made by the Vendors, and the whole certified by the Purchaser, agreeably to Act of Parliament passed, &c. &c.

COUNTY OF _____

When the farmer went to receive his money the purchaser might hand this blank schedule to the seller, and while the buyer was signing his cheque the farmer might be occupied in filling up the blank or blanks: the entry having been once made need never be made again. If the purchaser went into another county he might be required to make the following declaration:—

I hereby declare that the above is a true account of the quantity of English corn, purchased by me in the county of _____ in the week ending _____

Signed

185

Name

Residence.

This return the corn merchant should be required to make every week. It struck him that this was a very simple plan, and as some alteration was evidently required, he had felt it his duty to submit it to the meeting. It would certainly have the advantage of embracing both buyers and sellers; and in his judgment it would be a good system of returns (cheers).

Mr. OWEN wished to state a fact which had come within his own knowledge, as illustrating the practice which had been referred to in the discussion. On the previous Thursday, at Newbury market, he had heard a very large dealer state in a public company that he had bought a considerable quantity of wheat of a large farmer under these circumstances: Some time before the dealer had offered the same party a certain price, which was then refused. The owner now came to the dealer offering to sell. The latter said—"Why, I offered you so much before, and you would not take it." They did not deal at once, but in the course of the forenoon the farmer came to the dealer again, and said, "If you will have my wheat, I will give you three or four loads in." Upon that condition the bargain was struck. He (Mr. Owen) asked the buyer how he had made his return; to which he replied, "I shall return for the fifteen or twenty loads which I bought, but not for the three or four loads given to me." There could be no security for the farmer so long as that irregularity prevailed. He had no wish to cast an imputation on any one; his simple object was to show how farmers were prejudiced by the present system (Hear, hear).

Mr. GRAINGER said he believed that in many parts of the country it was the practice to sell by weight and not by measure. When wheat was offered to the corn-merchant, he asked not "How much do you want per quarter?" but "What weight do you put upon this wheat?" They were all aware that the more weight was put on a parcel of wheat the more money it would fetch. A farmer would make more of 61lbs. than of 60 lbs.; and he would rather put in a given quantity—say a pint or a pint-and-a-half per qr.—than have one or two pounds taken off the weight. At least such are the feelings of the grower in the north of England. There wheat was not sold by measure but by weight.

Mr. SHELTON said he would not attempt to take up the time of the meeting did he not in his own person represent not only a farmer but also a corn merchant. He rose to confirm some previous remarks by stating what was done in the market with which he was himself connected. As that market was the largest wheat-producing market in the country, perhaps he might be allowed to state what system was followed there. Some remarks had been made that evening with regard to the irregularity of the returns. Now he could assure the meeting that in the market with which he was connected fully nine-tenths of the wheat sold was fairly returned. A remark had been made by Mr. Shaw with reference to

middlings. He did not know upon what Mr. Shaw grounded his opinion, but he believed that every dealer was compelled by law to return every single purchase which he made. The return had no reference to qualities. The dealer was bound by oath to return every purchase which he made, whether of middlings or any other quality of wheat (Hear, hear). With regard to an observation of the last speaker as to the selling of corn in the market, he must confess his belief that nineteen out of twenty of the farmers who came to the market with which he was connected sold their wheat by weight. The object of recommending the farmer to sell by weight was to steady the business done. He himself, in his capacity of a corn merchant, had recommended the farmer to sell his wheat by measure, stating at the same time its natural weight. They never allowed a man to make up his corn; it was supposed that he offered and others purchased at so much per qr.; but at the same time, rather than there should be a dispute as to the measure—for there might be great difference as to the mode of measuring—he recommended that the party selling should state the weight at 17 stones instead of 18 stones. In Gainsborough, and in many other towns, wheat was sold at 18 stones if it weighed only 16 stones. That was a very improper state of things. In the largest market of the kingdom a healthy and proper system had been established—that of buying at so much per qr., which secured a return of the real value. In Gainsborough and other places wheat was sold at 63lbs. per bushel, in Leeds and Wakefield at 60lbs., and in Glasgow at 60lbs. There were fifty different modes of selling in different parts of the kingdom, and such a state of things required alteration.

Mr. WILLIAMS said that in the town of which he had spoken numbers of persons came to the market week after week, and made no return. In fact, there were many who did not know how to make a return, and it had fallen to his own lot to set some parties right upon the subject.

After a short pause,

The CHAIRMAN said that as there seemed to be rather a dearth of speakers on the question, and as he happened to have a friend in the room who happened to know something of the subject, although he did not happen to be a member of the Club, he hoped that that gentleman would be allowed to throw a little light upon the matter (cheers).

Mr. BIGGS, of Beds (the gentleman referred to by the chairman), expressed his sense of the favour conferred upon him in being allowed to address the meeting. The question under consideration was one to which he, as an individual, attached very great importance, and he was glad to have had the opportunity of listening to the remarks of the previous speakers. He perfectly agreed with the opinion which had been expressed, that the mode of taking the averages at present adopted was anything but perfect or just. He had been a buyer in the Bedford market for thirty years. He could not say that he had experienced any difficulty in filling up the returns. A man could easily write "barley" under "wheat," and "beans" under "barley." He had filled

up the returns for 20 years conscientiously, and indeed he would have incurred a penalty of £50 for any discovered breach of the law in that respect. The question was one on which great interests hinged (Hear, hear). The tithe question was one interest; corn rents were another; and future legislation with respect to the present anomalous state of agriculture was a third. The legislature must go into this last question very shortly, in one shape or another; they would be driven to it (Hear, hear); and it was desirable that they should have correct data to proceed upon. He much lamented, not only as a member of the agricultural community, but as a Briton, that there were no correct statistics or data as to the actual amount of corn which was produced annually in this country; and if any movement on that subject should arise from this meeting, the discussion would have been of far greater importance than might be inferred from the number of gentlemen present (Hear, hear). Though he made returns constantly himself, yet since ye first began business many men had risen up who made no returns; or if they made returns at all, it was in a casual and unofficial manner. He had heard larger buyers than himself in the Bedford market repeatedly declare that they made no returns whatever. He believed they had no object in the omission, much less had they, however, an unworthy one. The explanation was to be found in that indolence, and desire to avoid trouble as far as practicable, which were so characteristic of human nature. For his own part he considered it most important that proper official returns should be made by buyers, but at the same time he did not think that much more correct returns than were made at present could be obtained, without adopting some plan similar to that which had been suggested by Mr. Williams. The schedule proposed by that gentleman was, on the whole, a very good one. A few objections might be raised against it. The practice of throwing in two or three quarters of wheat appeared to him very irregular; and he must say he had never heard of such a practice before. There were great difficulties in the way of establishing a sound system, but none which might not be overcome; and he thought that discussion would in the issue prove important, because the members of the club appeared to look at this subject in a business-like point of view, looking fairly at the difficulties which had hitherto presented themselves, and aiming at their removal. It must at all times be an object to the legislature to get correct returns for the purposes of legislation; and the object was one of increased importance, considering the critical position in which agriculturists were then placed. He saw nothing impracticable in the proposal that a few of them should meet together and work up a schedule for presentation to those who would have to legislate in relation to their interests, and he hoped that something important would accrue from the discussion of that evening.

Mr. ARCHESON said, that having been a practical farmer for some years, he wished to make one or two observations on the question under consideration. With regard to the objection which had been introduced, that it was not desirable that a farmer should have an opportunity of seeing the price at which the wheat of his bro-

ther farmers had been sold, admitting as he did that there was great force in that objection, he would submit that it might be obviated by having a cheque-book, with separate places for the entries, so as to prevent A from knowing at what rate B had sold his wheat. He had chiefly risen, however, to notice the effect of the omission to make returns. He would assume that wheat-flour was sold to the labourer at 10d. per gallon. Could they, however, do justice to the labouring classes while the matter was so ill-defined as it often was at present? (Hear, hear). It appeared to him to be of vital importance to the labouring classes, and consumers generally throughout the kingdom, that a system should be devised by which the averages would be fairly struck, so that every man might get his bread at a fair price.

Mr. LEE said, that though he was not a practical man in the same sense as most of the gentlemen by whom he was surrounded, yet his attention had been frequently directed to this subject by the position which he occupied, and he must say that on many occasions he had had great difficulty in arriving at a just conclusion as to the real amount of corn grown in this country, important as that question really was (Hear, hear). Some time since, a gentleman of Norfolk wrote a long letter to one of the papers, in which he endeavoured to prove that the whole amount of wheat grown in this country did not exceed 7,000,000 quarters, basing his calculations on the statements made in the *Gazette*. If those official statements were to be relied upon, it would appear, from what they had heard that evening, that that gentleman's calculations were possibly correct; for they had heard that evening that the amount stated to have been sold in 1847 was less than 5,000,000 quarters, while in 1848 the amount sold was 5,390,000, and in 1849, 4,500,000. The letter of which he spoke was followed the next week by one in which it was stated that the growth of wheat in this country could not be less than 18,000,000 quarters. Shortly afterwards, a gentleman named Bouker stated at a public meeting, in Wales, that the growth of wheat in this country averaged 24,000,000 quarters. There was a vast range between 7,000,000 and 24,000,000 (Hear, hear). As a member of the public he felt interested in having more distinct information. Here were gentlemen professing to have a perfect knowledge of the matter, one of whom stated that England grew annually only 7,000,000 quarters of wheat, and the other that she grew 24,000,000 quarters. If they took the population at 26,000,000, and the average consumption at one quarter per head, it was only necessary, according to the last statement, that there should be 2,000,000 quarters imported in order to make up the consumption of the country; whereas, if the former view were to be relied upon, England did not grow anything like a sufficient quantity for her own use, and it was necessary that a much larger importation should take place. It appeared to him absolutely necessary that some schedule should be brought into general use, by means of which the legislature of the country and the community at large would learn what quantity of wheat the land really produced at the present time (Hear, hear.)

Mr. SHAW then replied. He said: I will not occupy

your time with more than a few sentences in closing this discussion. I am exceedingly happy to find that an important subject which I had the pleasure of bringing before this Club four years ago has not lost any of its interest. I am glad to see practical men coming forward this evening to express their sense of the importance of accurately ascertaining the quantity of grain produced in this country. I have always considered the obtaining a good system of agricultural statistics a matter of vital importance; and circumstances which have recently occurred have proved such to be the fact. I believe that those whose duty it was long since to adopt measures for acquiring such knowledge are quite unaware of the capabilities of this country as regards production, as well as ignorant of the amount of food which is actually produced for the consumption of the people. The observations of the gentleman who spoke last with regard to that point are very important. That gentleman remarked that if this country grew 26,000,000 qrs. of wheat it could only be necessary to import 2,000,000. Now I think that remark must have come home to the mind of every gentleman present. If we look back upon the ten or twelve years immediately anterior to 1847, we should find that this country did not, on the average, import more than 2,000,000 qrs. per annum during that period (Hear, hear). Hence I hold, as I always have done, that the growth of wheat in this country has very nearly kept pace with the growth of the population; nor have I the slightest doubt that if we were treated fairly in the averages and in other respects, we should be able to grow not only as much wheat as the population of the country required, but even an excess of its requirements. I repeat that, in my opinion, the capabilities of the country are amply sufficient for that purpose (cheers). An observation has been made in reference to my use of the term "middling"; and from the statement made, that corn merchants are compelled to return all sorts, I am afraid that I was misunderstood. I employed the word "middling" as a term used in the early acts of parliament, merely for the purpose of pointing out what the returns originally made were required to show, that it was not intended that the average price should be taken from the superior quality. At present, I contend, the average is taken from the best—the inferior qualities of corn are not returned. I say that so far from the averages being based on the average prices, they are based upon the high prices and the low are omitted; and it was only in that view that I used the term "middling." Our friend has told us that in his well-conducted market 9-10ths of the whole quantity of grain sold are properly returned. I have not the slightest doubt of it; but, then, if one-tenth be omitted, the omission is, I maintain, mischievous (Hear, hear). I should like to know, too, whether it be not the fact that corn often passes from hand to hand, and that the same corn is returned more than once, with accumulated profits and expenses. I quite concur with Mr. Williams as to the desirableness and practicability of having the prices returned correctly. We are, I think, very much indebted to that gentleman for the schedule which he has prepared; but at the same time I beg to suggest one or two dif-

ficulties which might attend the adoption of his plan; for I need not say that the best way to obviate difficulties is first of all to look them in the face, with the view of providing a remedy. I am very much afraid that there would practically be a frequent recurrence of that difficulty which is stated to have arisen in a town in Wiltshire, and that the dealers would find great obstacles to the filling up of the returns with facility. A great deal of corn is sold which never goes into a market town at all (Hear, hear), passing from hand to hand and being bought by millers and various other parties; and I fear that until Cirencester College has been more frequented (laughter) there would, on several accounts, be some difficulty, in making out these returns. That is a difficulty which may be surmounted; but still it is a difficulty, and must not be lost sight of. Another difficulty is this: It is necessary that we should consult the farmer's feelings, and with that view some means must be devised by which we shall prevent the last man in a list of sellers from having the opportunity of casting his eye over the list, and thus ascertaining at what price his neighbours have sold their corn. (Hear, hear.) I feel sure that that would be a great objection, and something should be done to prevent it. Again, with regard to throwing in an additional quantity, I am afraid the practice of such a custom would not be prevented by his plan. These are little points which have struck me as demanding consideration before Mr. Williams's schedule can be generally adopted. But there is another, and a very important difficulty, in respect to weights and measures. You are aware that under the present system weights and measures vary all over the kingdom. Nothing could be more absurd than the course adopted by the legislature (though I am sorry to say that such absurdity is too often seen in legislation) in not making the use of uniform weights and measures compulsory when the last measure relating to them was passed. To pass a measure on such a subject, and leave its adoption optional, was altogether absurd. The result is, that we have wheat sold by the 70lbs. in Liverpool and in Herefordshire, and in some places in the north by what is called a windle; in one place a load of wheat is what a man can carry on his back, while in another it is forty bushels. Thus we have various measures in different parts of the kingdom. The return is made to the inspectors in the weights or measures of each particular place, and he is bound to reduce them to the imperial standard, and make his return under that head. I feel certain that until the legislature has passed an act to establish uniformity in weights and measures, it will be impossible to carry out any extensive improvement of this description. As Mr. Williams's schedule will appear in the report of our proceedings, there will be an opportunity of considering all these difficulties, and I do hope that the consideration given to the subject on this occasion will not be in vain. The discussion of this evening must of course have a tendency to direct public attention to the subject, and we may have to date from this period the consideration of it, not only by the agricultural public at large, but more especially by those whose duty it is to entertain the question more seriously—I mean the mem-

bers of the legislature—with the view of finding a remedy for what we all feel to be a grievance. I say "we," because on this occasion I put myself into the same boat with the farmers, and I complain equally with them of a system of making up the averages which is most incorrect and unfair.

Mr. WILLIAMS wished to observe, in reply to an observation of Mr. Shaw, with regard to the difficulty which some persons might find in filling up the returns, that all that was requisite to make the return was that the farmer should be able to put down the quantity sold, the price at which it was sold, and the sum which it amounted to. With respect to the remark that many persons would object to let others know at what price they sold their corn, he begged to tell Mr. Shaw that the number of those who were inclined to withhold information with regard to their sales was now much fewer than it used to be. Many an individual who was formerly very close on this subject now made no mystery of the matter; in his own neighbourhood but little difficulty was experienced in procuring information. However, to meet the objection he would suggest that the initials might be used; the initials would fully answer the purpose so long as the returns were correctly made. If a schedule like that which he had suggested were unopposedly adopted the certain quantity of wheat sold throughout the kingdom within the year would be ascer-

tained, and statistics would exist to prove, at least in that respect, the growth of the nation.

The CHAIRMAN said there was one point which appeared to him to have been rather overlooked. He happened to be one of those gentlemen who were called land valuers and corn valuers, and he had observed that like great injustice, which pervaded his district in respect to unfair returns, attached to the party who took the corn at the average market price. It was customary to take the average of Christmas, Michaelmas, and Lady Day; but if the best corn only were returned it would be clearly seen that the person who was subject to this so-called average price of the market was unfairly dealt with. Under such a system a person might have to pay for the average of the three market days very considerably more than he ought to pay. This was another important feature of the case which ought not to be overlooked.

Mr. SHAW then proposed the following resolution: "That by the present system of taking the averages the price of corn is represented to be higher than actually is the case, and hence operates unjustly upon all contracts based upon it, and demands the immediate attention of the legislature."

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

A vote of thanks was given to the Chairman.

USHER'S PATENT STEAM PLOUGH.

[Patent dated July 18, 1849. Patentee, James Usher, Edinburgh. Specification enrolled, Jan. 10, 1850.]

This invention consists, firstly, in mounting a series of ploughs in the same plane around an axis, so that the ploughs shall successively come into action; and secondly, in applying power to give rotary motion to a series of ploughs or other instruments for tilling the earth, so that the resistance of the earth to the ploughs or instruments, as they enter and travel through the earth, shall cause the machine to be propelled.

Fig. 1 shows a side elevation of steam machinery arranged suitably for carrying out this invention; fig. 2 is a plan thereof, the steam boiler and engine being removed. Fig. 3 is a plan of a plough when two mould-boards are used, in cases where it is desired to turn the land on either side; and fig. 4 shows a side view of one of the ploughs on its axis, by which and by fig. 1 it will be seen that the under edge of the mould-board and share is formed to a curve struck from the centre of the shaft or axis on which the ploughs are affixed; *a a* indicate the bed-frame or carriage of the machine. The fore carriage wheels *b b* are mounted on an axle, which turns in bearings *c* attached to the swivel frame *D*, which moves on the bolts *d* for the purpose of causing the machine to turn round in a

small space. A portion of the swivel frame *D* is toothed, and acted upon by the pinion and winch *e*; the hind-part of the carriage is here shown supported upon the hollow cylinder or roller *f*, composed of two extreme parts *f¹* and *f²*, which are wheels similar to *b b*, the intermediate part *f* being by preference removable at pleasure, so as to render these bearing parts suitable to the different stages of cultivation to which the machine may be applied. This compound cylinder has its axle supported in the bearings *g* attached to the lower, or to the under side of the carriage frame. The axle of this cylinder carries also at one end the wheel *h* to be afterwards noticed.

A moveable lever frame *i, i, i, i*, is supported on an axle or shaft *k*, as a fulcrum. The free ends *i i* are formed into the toothed segments *c*, and are concentric to *k*, these segments being acted upon upon by the two toothed pinions and spindles *m*, which elevates or depresses the hind part *i i* of the lever frame, and all that it carries, at the pleasure of the conductor.

On the carriage thus constructed is placed the locomotive boiler, with its engines of any ordinary construction, as *n n*, the power of which is applied

through the medium of connecting rods *o*, to the crank shaft *p*, the two arms of which stand at right angles to each other, in the usual way. The crank shaft *p* is supported on two standards *q*, securely fixed to the carriage. On the shaft *p*, there is also fixed the spur pinion, indicated by the dotted circle *p' p'* in fig. 1; and this pinion, by taking into the wheel *r*, mounted on the shaft *k*, gives motion at the same time to the pinion *t*, which is carried round on the same shaft *k*. The pinion *t*, thus actuated, takes into the wheel *h*, before referred to, on the bearing cylinder *f*; and it is preferred that

the pinion *t* should be applied so as readily to be put into and out of gear with its wheel, though not so shown in the engraving. By this arrangement of parts, a slow progressive motion is obtained for the whole machine, on the one hand through the cylinder *f*, and on the other hand a separate rotary motion, at a certain increase of speed, is communicated through the wheel *r* to the pinion *w*, fixed upon the pinion *u*, which last-named shaft has its bearings *v v* attached to the moveable frame *i i*.

FIG. 1.

FIG. 4.

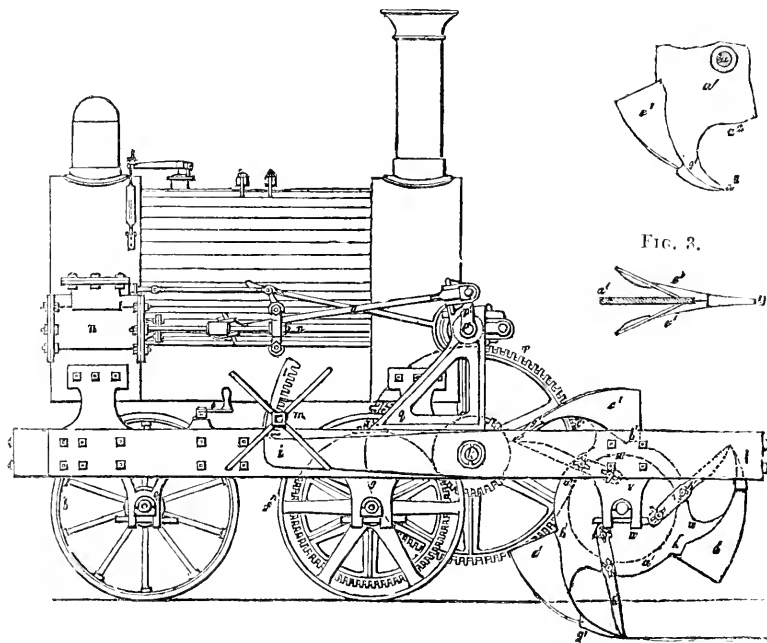
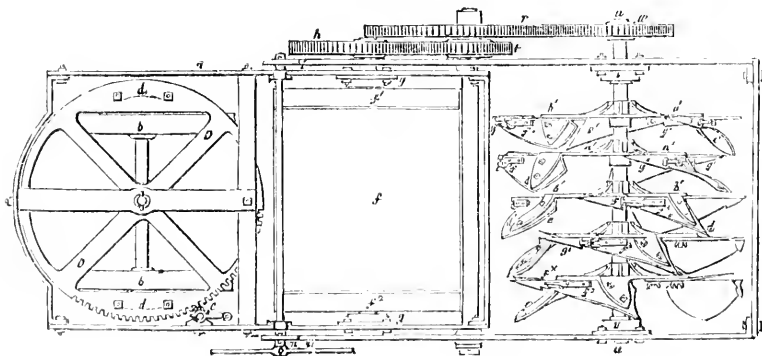


FIG. 2.



On the shaft *u u* are placed a series of plates or projections, fixed at regular distances. Or such plates or projections, with their ploughs afterwards described, may be placed upon separate shafts, each with its own proper gearing; but it is preferred to place them on one shaft. These plates or projections on the axis are shaped in such manner as to receive and have affixed to each of them several ploughs, adapted by their revolving motion to penetrate the soil, and by their mould-boards to elevate and turn over portions thereof; *u u* are the plates or projections fixed upon the shaft *v*; they are each formed with a strong boss at the centre, by which it may be securely fixed to the shaft. Each plate *u* has three arms or prolongations *b*, *b*, *b*, which terminate in the radial direction shown; a further prolongation *d' d'* is carried obliquely upon each of these arms. Upon the plate and projections thus constructed is affixed the tilling apparatus, which consists, firstly, of the part *e*, which acts the part of the mould-board or turn-furrow in the common plough; and it is to be fixed by screw bolts or otherwise to the prolongations *d' d'*. To the fore part of this mould-board *e e* is affixed a bar *f* of wrought iron, which is also furnished with a lug *f'*, by which it is attached to the plate, by means of screw bolts or otherwise; the bar *f*, thus secured, forms a head or share bearer, as in many common ploughs. To the fore part of the bar *f* the share *g* is adapted, and fixed by its socket. The mould-board, and also the share, may be varied in form. A fore-cutter or coulter *h'* is affixed in front of each share, by screw bolts or otherwise, and is provided with the means of adjustment through the counter slits, in itself, and in the plate; but, in order to meet the different qualities of soils and the various stages of tillage, the further provi-

sions shown in figs. 3 and 4 are employed. Fig. 4 shows a variation in the form of the plate *a* of figs. 1 and 2; *u* is the shaft, as before, carrying the plates or projections; *a*¹ shows a detached portion of one of these plates, in which the curved part *a*² to *a*³ is brought forward and armed with a steel blade, answering the purpose of the separate coulter *h'* in fig. 1; *e* is the mould-board, and *g'* the share, as before. Fig. 3 is a form of plough suitable to the tillage of green crops; *a* is a portion of the plate or projection, seen edgewise; *e* and *e'* are right and left mould-boards, and *g'* a plain spear-shaped share. The number of plates or projections, and also the number of ploughs in each, may be varied.

It will be seen, that not only the ploughs which are set in the same plane around the axis follow each other into action, but that the ploughs of the other sets (which are affixed around the axis in parallel planes) are arranged and come into action, so that two ploughshares will not strike the earth at the same instant. In the arrangement of the apparatus before described, it will be seen that the propelling of the machine along the land is by reason of the resistance of the land to the ploughs as they enter and travel through the earth, and the motion communicated to the wheels or rollers. This part of the invention is applicable where teeth or tines suitable for tilling the earth are applied about an axis, and will be found to act better than machines in which tines or teeth, set around an axis, have had motion communicated to them from the wheels which run on the land. In thus using this part of the invention, the only change necessary will be to employ a rotary axis *u*, having tines or teeth of any suitable shape, in place of the ploughs shown in the engravings.—*Mechanic's Magazine*.

AN APOLOGY FOR FARMERS, BY ONE OF THEMSELVES.

The last year has indeed been an eventful one for the entire agricultural interest. After having been for centuries alternately fostered by bounties on the exportation of corn, and protection duties on its importation, the agriculture of Great Britain is, with scarce a moment's warning, thrown overboard by the legislature, and left to its own resources. One landed proprietor has assured his tenants that they are never more to expect legislative interference in their behalf. I am at a loss to understand by what line of reasoning this gentleman has undertaken to speak so positively on the course to be pursued by the wisdom of our future legislators. To me there is only one point in the question which admits of certainty, and that is, *that farmers there*

always will be; but whether the descendents of our present landed proprietors, or the children of our present farmers, will, after a few years' struggle of *present prices*, be best able to cultivate the soil, is a question I leave to the above-named gentleman to decide. There is, however, another view of the subject, which is admitted by all parties, namely, that with present prices, and the crops we have usually grown, farmers cannot live and continue to pay their present rents.

But, besides this change of views on the part of the legislature, another striking characteristic of the past year is the tone in which farmers are now addressed. As an example (anything but a solitary one), a correspondent of a leading agricultural

journal recently styled them "*the mole-eyed tillers of the soil.*" A writer in *Blackwood's Magazine* has said that they were little more thoughtful than the iron with which they tilled the soil; and in the *Edinburgh Review* we are assured that, "if the United States of America are now beating us out of any of our old markets, it is not that they possess more energy, more industry, or more intelligence than we do, or have cheaper labour, *but because, in their earnest competition, they have been more attentive to avail themselves of the daily discoveries of science, and have accordingly so far succeeded in producing better or cheaper articles.*"

These are hard accusations, and it is rather difficult to restrain our criticism into a tone of reply; nor should we have done so, had we not been surprised beyond measure to observe that the above is now the usual style of language bestowed on the tillers of the soil; and even if we should venture a reply, the reviewer last quoted will perhaps include us amongst "those half read-men, who," he says, "at farmers' clubs and agricultural meetings, are prone to exaggerate the importance of some trifling practical difficulty, and to lessen the value and usefulness of science, *because, so far as they know, it either has not solved or cannot solve that difficulty.*" Should we be included amongst these half-read men, we will still do our best to describe the course of events in 1849.

The past year has not been deficient in the production of books on agriculture. A new edition of "Stephens' Book of the Farm" has been successfully brought out, and, as a practical work, we scarcely expect to see it exceeded. Several agricultural cyclopædias, with their immense mass of information, have also been issued: the *Farmers' Magazine*, the *Journal of Agriculture*, and *Transactions of the Highland and Agricultural Society*, with the *Journal of the Royal Agricultural Society*, have each contributed towards the spread of sound practical and scientific knowledge. Nor must we omit to mention with respect the various agricultural newspapers, which have all done their utmost to diffuse amongst us a knowledge of the proceedings of the farmers of every other part of the globe.

There was a time when sanguine men held out hopes to public meetings that chemistry was to regenerate the agriculture of these islands. We were assured that, "without any great risk of being able to bring the crop home in our coat pocket, we might carry the manure for a large field out in our waistcoat pocket." Farmers have actually been assured that if the seed was only *steeped* in a chemical solution no other manure was required. This failed, as might have been expected, and in the minds of many has thrown a doubt over any further

help to be derived from this quarter. It is in consequence of this doubt that farmers are, as above quoted, considered as stupid as the iron they work with; and it is further in consequence of the non-existence of one single practical suggestion which has, during the past year, been the result of scientific investigation, that we throw back the accusation of ignorance and stupidity to the reviewers.

Besides the above-named agricultural publications, the past year has also brought out another work, with the name of Professor Johnston attached to it. A writer in an agricultural paper commences his criticism on this work by saying that "*it is, or ought to be, the first book of the day.*" That it is neither the one nor the other, and anything but what it ought to be, is the reason why we think the "Experimental Agriculture" worthy of a more extended notice. In the introduction to the work we are assured "*that scarcely any of the results it contains are to be relied on.*" This is modest enough, and quite agrees with our own opinion, not of the experiments, but of the professor's summary of them. The writer in the *Edinburgh Review*, in reviewing the very work we have now under consideration, assures us that the Americans are, as we have already quoted, underselling us, because they have paid more attention to science than we have. Now, how, when, and where have the American farmers done so? Why does not this "Experimental Agriculture," which was the means of introducing the above remark, bring the instances before us, in which such improved practice is followed, and of which we are yet ignorant. If the results of the application of science has been so important in America, why does not this summary of "Experimental Agriculture," as the latest publication on the subject, tell us what they are? The conclusion is evident; the reviewer of the "Experimental Agriculture" knew more of the subject than the author himself did, or no such superior practice is in existence as the introduction informs us; the results contained in both the review and the original work are equally unworthy of reliance.

We were sadly puzzled for some time to reconcile this apparent contradiction, until our attention was directed to a most astonishing discovery announced in the *Athenæum*. It appears that some one of profound mechanical genius has been stimulated to enlarge the application of Babbage's celebrated calculating machine, and has actually invented a machine for the composition of books; of the existence of this machine the book before us on "Experimental Agriculture," as well as others quoted by the *Athenæum*, is a positive proof. We have not seen this book-making machine, and can only form some idea of the way in which it works by the results lying before us. It appears there is

a compartment containing alphabets and stops, to be used in the formation of small words and sentences of little moment. But this part is evidently of little consequence; for into another compartment are thrown, not alphabets, nor sentences, but books, and of these the best that can be found. It is but little credit we can claim for adding our mite of collateral evidence on the existence of such a wonderful machine; but, as farmers, we feel flattered that the second clearly established application of the book-making machine should have been in the service of agriculture.

We cannot expect that the existence of this machine will be admitted without proofs. The first is, the whole of the book before us has been before printed; and the second is, there is not a single conclusion drawn from any of the experiments quoted. This could not be otherwise; for, however perfect and beautiful the book-making machine may be, of course it cannot reason and draw conclusions from what is passing through it. But the most convincing proof of the existence of this wonderful machine is, that when the "Experimental Agriculture" was passing through, *it must have been out of order*. In the instances quoted in the *Athenæum* the results were turned out in the most admired manner; but in the "Experimental Agriculture" it is the very reverse—we never before met with such a *hash*. We are actually sorry for the authors, whose works have gone to make up the compound, as they will never be able to recognize their own share of the work, any more than the individual ingredients of Meg Merrilies' celebrated stew could be distinguished.

But we also think a word of defence necessary for the experimenters, who were mostly practical farmers; and if they have failed to elucidate any portion of the science of agriculture, as the "Experimental Agriculture" assures us they have done, the fault is in the difficulty of the subject, and not in themselves.

In the way of experiment and research, some credit is due to the Agricultural Chemistry Associations of both England and Scotland. I am not aware of the exact arrangement of the former with Professor Way (whose analyses and researches deserve great credit), but the Scotch Association have placed Professor Anderson in communication with practical men, and he is now trying experiments *in conjunction with them*. The modest address with which the latter gentleman commenced his labour we have read with great pleasure; and if he only, in answering questions connected with agriculture, has the courage to confess his ignorance where science is yet in the dark, he will soon raise chemical science to the estimation in which it was held at the first formation of the society with which

he is connected. Should he, however, have the moral courage to make such a confession, he will be the very reverse of his predecessor Professor Johnston, who constantly thought that he had a solution in his laboratory to every question proposed to him. One instance will suffice. When in Holland, Professor Johnston received a letter from the agricultural inspector of Dutch Guiana, with a sample of dry Banana meal, for investigation as to its capabilities as human food. He is informed, in this characteristic letter, "that the negro slaves in Dutch Guiana, who are principally fed on the Banana, *have enormously swollen stomachs*. The slave population is also decreasing at the rate of nearly 2 per cent. per annum; the births being 1 to 36, and the deaths 1 to 22 of the population. It is well known that the slave population of these countries could never be kept up without supplies from Africa, and it has been supposed that this was easily explained by the *horrors of slavery*. Now this," says this inimitable letter, "is all very well for *le culyaire*; but those who understand the matter are satisfied that there must be some other reason assignable for the present mortality amongst slaves." Amongst other causes, the writer suggests that the Banana, a sample of which accompanied the letter, may, for some unknown reason, be unfit for food, and requests the Professor's opinion. "There is not much," says the Professor, "in the observation that *the stomachs of the Negroes attain a large size*. A *bulky* food must necessarily swell the stomach, but it is not on that account deficient in nutritive properties." If the bulk of the food which it is necessary to take in order to support life be not a satisfactory way of ascertaining whether or not it be deficient in nutritive properties, I am at a loss to know how the comparative feeding properties of different substances are to be ascertained. But the Professor thinks differently, and puts the Banana meal through such a course of analysis as would have equally proved that a mixture of sawdust and guano was little short of roast beef, in feeding properties. His conclusions are, "that as potatoes can *raise* strong men, as in Ireland, so can the Banana, and that we have no reason to conclude that the latter will not fully supply all the ordinary wants of the living *animal*." The Professor's present visit to America offers an excellent opportunity for him to study the Banana as an article of food; and, by-the bye, he better not omit the opportunity of more fully investigating the value of dry cod fish, which he also says is worth twice its weight of fresh beef or mutton.

In concluding this part of our apology, it is necessary to remark that our object is not to depreciate the value of chemistry as a science, but rather, in defence of the farmers as a body, it is necessary

to point out that it is scarcely justice to accuse them of neglecting the suggestions of a science which is, as yet, so much in its infancy as to pronounce one pound of cod fish to be equal to two pounds of beef in feeding properties, and which, in spite of the evidence offered by the frightful mortality and swollen stomachs of the unfortunate wretches who are compelled to live upon it, can still pronounce the Banana to be capable of supplying the wants of the living animal.

The writer in the *Edinburgh Review* has, as we have already quoted, also accused us of being behind the American farmer in the application of science to agriculture. There is only one instance in which this can possibly have happened. Professor Johnston has recommended a mixture of oil! glue!! and crushed bones!!! as a substitute for oil-cake, in feeding cattle. It appears, according to the *Edinburgh Review*, that this important suggestion has been carried out so far as to lead to the erection of several mills for the manufacture of this mixture. As no such mills are in existence in England, they must surely be the instances of improved agriculture, which the reviewer states have taken place in America; for if, as the Professor says, *the animals* (meaning the negro slaves) are *so herbivorous* as to be able to live on Banana meal, I have little doubt but that the American cattle are also *so carnivorous* as to be able to live on crushed bones.

One other characteristic of the year 1849 we must now notice. It appears that English agriculturists were not only ignorant of the wonders science had done for them, but they were also ignorant of the common principles of their business. In this dilemma, a new light appears in the shape of high farming, of which the most notable apostle is Mr. Caird, who has published a pamphlet to prove to us benighted farmers, that high farming can place us, with wheat at 36s., upon an equality with our previous farming, and wheat at 56s.: in other words, where 28 bushels of wheat have been the utmost the farmer was able to raise, it is only his ignorance of this new light which prevents him making it 47 bushels. The farmers, poor honest souls, were not a little astonished at this; and the more so, as the high farming cry was re-echoed from one end of the country to the other, in terms, if not complimentary, at least loud enough to have roused the farmers, if even their own interest had no charms for their ears. They were naturally not little astonished to hear of the mine of wealth which had been all along within their grasp, and felt some regret that Mr. Caird had so long withheld this valuable information; because, if such increased crops are useful with low prices, they would have been proportionably more valuable when prices

were higher. In this respect, Mr. Caird's greatest friends must admit he is to blame.

The pamphlet, in which this wonderful discovery is given to the world, has been several times discussed by more able writers than myself, so that little more need be said, except that the farm on which this high farming discovery has been made is a most unfair subject for comparison, for many reasons:

It is an unfair subject for comparison, First, *in its local advantages*—

1. Mr. Caird, himself, states that "*the mode of management adopted on the farm described is applicable, in all its details, only to land suitable for turnip husbandry.*" This at once shuts off all the poor clay lands from all hope of benefit from this high farming.

2. The farm consists (out of 260 acres) of 30 acres of reclaimed land, and "65 acres of superior red turnip soil," or nearly one-half of the land of the very best description.

3. I should think there is hardly one acre out of a million in Great Britain on which, as on this farm, the potato can be grown free from disease; and that not merely one year in four, as farmers ordinarily are able to do, "*but year after year;*" and even with this impoverishing system, "*portions of the land are becoming too rich, which makes it necessary to adopt some plan to reduce its fertility. With this view, a few inches of the surface have been removed; the tenant being induced to adopt such means as will not interfere with the continued cultivation of this root.*" Any comment of mine could only spoil the effect of this last quotation. Perhaps Mr. Caird will be kind enough to inform us, what nine-tenths of the tillage land of Great Britain would grow, if a few, aye, a very few inches of the surface were removed.

4. Perhaps Mr. Caird will also be kind enough to inform us whether it is usual for all farms to be so near the seaside as to enable the farmer to collect annually 500 loads of sea-ware; or so near a peat moss, where, like the Auchness farm, 2,000 loads of peat can be procured in one season.

Secondly: But the Auchness farm is not only an unfair subject for comparison with regard to its local advantages; but it is inferior to the general run of farms in one important point of management. Mr. Caird himself admits this; for he says, that "*no fixed rotation has yet been laid down on this farm.*" Surely this apostle of this new light cannot recommend such a system for general adoption. If he does, perhaps he will be kind enough to inform us what would be the consequence of such a proceeding, if generally adopted. Would our crops be improved or not?

Thirdly, As a proof of the advantage of the high

farming system, the following detailed account of the produce is given :—

	£	s.	d.
30 acres of oats, 1350 bush. at 2s. 6d.	168	15	0
55 acres of wheat, 1980 bush at 6s. ..	594	0	0
About 60 acres of potatoes, 378 tons at 40s.	756	0	0
Profit on 130 head of cattle	845	0	0
Produce of 5 cows	50	9	0
150 sheep	90	0	0
3 young horses	15	0	0
	<hr/>		
	£2518	15	0

I admit this is a very handsome produce from 260 acres; but as the great object of the matter is profit, we will endeavour, as far as possible, to make out a balance-sheet for Mr. Caird, in the means for which he has left us strangely deficient. The first item is rent. It appears that the Auchness farm on this head only pays £262, or one-tenth of the value of the year's crop. We congratulate the tenant most sincerely on his luck on this head, and as the most of tillage land pays one-third of the yearly produce instead of one-tenth, we will make a change in the sum under the head of rent, in our estimate of profit, in order to compare the Auchness farm with general farming. Nor is this to be complained of; for there is Mr. Caird calling attention to his wonderful proceedings, and inviting us all to admire the wonderful profits he is making, at least £500 of which, under the way in which farms are usually let, belong and is paid to the landlord.

The following is the estimate we would make of of a year's outlay upon the Auchness farm :—

AUCHNESS FARM.—1849.

Dr.

	£	s.	d.
To rent—say	800	0	0
„ labour account	417	3	8
„ guano, &c.	256	0	0
„ linseed, &c.	270	0	0
„ 1,000 bushels of oats, for horses	100	0	0
„ 120 bushels of seed oats	15	0	0
„ 110 bushels of seed wheat	33	0	0
„ seed potatoes for 60 acres	150	0	0
„ poor rates, &c.—say	15	0	0
„ tithes—say	60	0	0
„ property tax (exempt, as the rent is under £300	0	0	0
	<hr/>		
	£2116	3	8

Upon this estimate leaving Mr. Caird a profit when wheat is 12s., of about £400. But as the title of the pamphlet is “*High Farming as a Substitute for Protection*,” meaning the low prices consequent upon a withdrawal of protection. We will therefore calculate the value of his year's crop at present prices, and see what profit is left :—

AUCHNESS FARM.—1849.

	Cr.	£	s.	d.
By 1350 bushels of oats at 1s. 9d.		118	2	3
„ 1980 bushels of wheat at 4s. 6d.		115	10	0
„ 60 acres potatoes		600	0	0
„ Profit upon 130 head of cattle..		600	0	0
„ do. upon cows		50	0	0
„ do. upon sheep		90	0	0
„ do. upon horses		15	0	0
		<hr/>		
		£1918	12	2

If, therefore, the Auchness farmer had to pay an ordinary rent, there would be a loss of £200 upon the year's transaction. We are informed by Mr. Caird that the farmer at Auchness is also agent for the estate, so that his salary for his services in this respect, and the £500 per annum less rent which is paid for the farm than is usually the case, relieves us from the anxiety that we felt for the moment that the tenant of Auchness would shortly be compelled to apply to his landlord for a reduction.

In the preceding estimate of outlay I have made no deduction for interest of capital. I have given credit for £600, as profit upon the cattle; and yet I am sure there are few farmers in 1849 (the year for which the estimate is made) were not obliged, in consequence of falling markets, to sell their cattle at little if anything above cost price. Nor is this all. Mr. Caird principally plumes himself upon the increase of produce as compared with that obtained by the previous tenant. But he surely does not mean to compare all the tenantry of Great Britain to his predecessor. No, our situation is that of Mr. Caird's successors, not of Mr. Caird himself. Mr. Caird's successors will, in all probability, have to pay a different rent from what the present tenant does; and suppose, when that individual has had possession of the Auchness farm for a few years, and after undertaking to pay a rent bearing the usual proportion to the produce—suppose, I say, that a reduction again takes place in the value of farming produce to the extent of some 30 per cent., the tenant would certainly be astonished if his landlord, instead of reducing his rent, were to hand him a copy of his predecessor's pamphlet. This is just the situation of hundreds of farms in Great Britain. The writer himself, in common with hundreds of others, has no sea-shore or peat bog near his farm, or he would not have needed Mr. Caird's hint to use them.

It is with some difficulty that my criticism has been retained within moderate bounds. I think that the insinuation contained in Mr. Caird's pamphlet—that his neighbours and his fellow-farmers between Land's End and John o'Groat's have been to a man so stupidly asleep and blind to the resources of their farms, that they may, under his new light, at once increase their produce by 30 per cent.—would have

been a sufficient excuse, if even I had slightly stepped the bounds of propriety.

There is, however, one point in Mr. Caird's pamphlet well worthy of consideration; and as many landed proprietors have greedily swallowed the high farming part of it, and strangely overlooked the other, we will try to draw their attention to it.

"In what manner," asks Mr. Caird, "has this high farming been produced in the illustration we have given? Not by the common plan of putting up the farm to *private* auction, and choosing for a tenant the offerer who promises the highest rent and accepts the lowest sum for outlay in improvements, but by the landlord frankly offering to perform what he knows to be his rightful share of the expense of putting his land, and the buildings upon it, in a fit state for an improved course of farming, and then selecting a tenant possessed of the requisite capital and skill, who is encouraged to exert these to the utmost by liberal arrangements and a moderate rent."

I have already remarked that the high farming cry was echoed from one end of the country to the other, and greedily accepted by the landed proprietors as an answer to the application of their tenants for a reduction of rent, forgetting, most strangely, the commentary on the state of their property they were thus offering to the world. If the produce of any farm can be at once increased by 30 per cent. (to meet a corresponding reduction in value), it must have been in the state in which Mr. Caird's predecessor had his farm, and before the capabilities of the land can be developed. Mr. Caird's words, as above quoted, must also be adopted as the practice of the estate.

One landed proprietor, whose name in pity for him we withhold, sent his tenants a bundle of Mr. Caird's pamphlet, in answer to an application for a reduction of rent, assuring them that they had no difficulty in adopting the high farming system—thus at once confessing the miserable plight in which his estate had previously been allowed to remain; and also telling them, that if one of his tenants DARED to discharge a single hand they should at once leave his estate. What a dreadful threat! What liberal covenants! The resources of this gentleman's estate must have been previously beautifully developed.

This gentleman's case is certainly not a solitary one; and is, we are sorry to say, only an exaggerated example of the way in which the landed proprietors are disposed to meet the times. It only shows either that their estates have been previously neglected or mismanaged, or that they are ignorant of the altered state of the times, or that, in consequence of previous extravagance and consequent

embarrassment, they see no other way of maintaining their position.

Sir Robert Peel having also publicly addressed his tenantry, and offered to them conditions which show him to be in one of the three positions above described, we will for a few moments consider this celebrated document. As Sir Robert has especially countenanced Mr. Caird's high farming views, we will see how far he proposes to adopt the liberal covenants advocated by that gentleman.

1st. There is one part of his letter which cannot be too carefully born in mind by farmers, namely, that Sir Robert Peel thinks that the recent change in the corn laws *will maintain a range of low prices*; this is a most important admission, and will be the key to our future remarks.

2nd. "It is hardly necessary" (we quote Sir Robert's own words) "to refer to leases of longer duration than one year, they are so few in number." What an admission for a landowner! What an admission of ignorance of what has worked such wonders in Norfolk! Leases so few in number as not to need reference! Of course this is the very estate to which Mr. Caird's recommendation of liberal covenants *followed* by high farming must be applied.

3rd. "In cases in which leases do, however, exist," continues Sir Robert, "I will consent to release the tenant from his engagement." A most liberal offer, costing the landowner nothing; as the farms on lease are sure to be in the best possible order for letting.

4th. As the average of the last few years have been about 56s., the most of Sir Robert Peel's tenantry must have entered upon his estate at these prices; the following offer he makes will also be appreciable, when prices are 36s., and, by his own showing, likely to continue so: "I purpose," says Sir Robert, "to defer for a time the general review of the relation in which we stand to each other." I have no doubt whatever but that he would be equally glad to defer it altogether. But in the mean time he offers, *on condition* that *all* the arrears be paid up, to expend 20 per cent. of his rent in improvements. Mark the liberality of this. Suppose the occupant of a house were to complain of it to his landlord, and request a reduction; he would be rather surprised to be told that if he paid his rent as usual, he, the landlord, would lay out 20 per cent. of the rent in repairing spouts, building walls, and such like. Such a reply would be considered an insult, and yet it is hardly a parallel to Sir Robert's answer to his tenants. Suppose one of these happy individuals pays £100 per annum, and in answer to his complaint that his produce is reduced in value 30 per cent., his landlord offers to expend £20 on his farm in draining and such-like perma-

ment improvements, the tenant also contributing the cartage. This £20 expended upon the estate is worth to the tenant not more than 5 per cent., but say even 7 per cent. to the tenant, or equivalent to a reduction of about $2\frac{1}{2}$ per cent. upon the rent. The extreme liberality of this munificent offer would only be spoiled by comment, and may well be doubted to be an example of the way in which Sir Robert hopes to manage his estate. The offer is a perfectly safe one, for not one of his tenants will accept it, as it happens, by a strange oversight, to be coupled with an assurance that we are to have a run of low prices, and that the prudent landlord defers the consideration of the altered position of his tenantry, caused by these low prices, to an indefinite period. Sir Robert Peel's tenantry may well thank him for nothing. And with regard to this liberal offer being accompanied by the condition of paying up the arrears, it can only be paralleled by a merchant offering to return $2\frac{1}{2}$ per cent. upon his bad debts, with the hope that such an offer will be followed by their payment.

There is one other portion of Sir Robert's letter to his tenantry, to which, as bearing upon our remarks upon the style of address now bestowed upon farmers, we will direct attention. The *liberality* of Sir Robert Peel's offers, the strange acknowledgment which he makes that leases are the exception to the rule in his system of management, scarcely prepared us for the insinuation that all hopes of future legislative protection from foreign competition was about as reasonable as the farmer who grows only 18 or 20 bushels per acre expecting to be protected from his neighbour, "who, in not more favoured positions, and on land of equal quality, produces 40." This argument is two-edged; it is just as wise for the indolent farmer to expect to be protected from his enterprising neighbour, as it is for landlords who are so deficient in the improved practices of the day, in draining, farm buildings, and such like, as to be under the necessity of still setting apart 20 per cent. of their income for the purpose of improvements which should have been effected long

ago—I say their conduct is just upon a par with the indolent farmer, if they expect, under such circumstances, to be able to defer until the time they may think convenient, the consideration of the altered relation between themselves and their tenants.

The only reason which I can assign for having occupied so much space in noticing this celebrated letter is, that it is but another example of the tone in which farmers are now unceremoniously addressed; had it not been for this, I should have classed it along with the farming addresses which a certain gentleman uses as an advertisement for an article of the toilet table, and suspected that the motive which could induce a landowner to make known to the public the miserable mismanagement of his estate must have been a more powerful one than the most consummate self-satisfied egotism could have otherwise supplied.

I am aware that I am advocating the cause of the weaker party. The constant increase of the population, whilst it adds to the number of farmers, adds nothing to the extent to be cultivated; and as that extent cannot, like manufactories, be extended without limit, the competition for farms will always give the landowner the highest possible rent for his land. And where tenants are from year to year, we may still occasionally hear of a landowner holding over them the *dreadful* threat of being driven from his estate. Such things will happen; and the only satisfaction we have is that such a threat, implying that the tenant has so farmed his land as to be ready for such an emergency, must consequently be as much a greater punishment to the owner than it is to the tenant, as the former has a perpetual interest where the latter has a yearly one.

In concluding this "apology for farmers," I may be allowed to say, that thinking no weight could be added to my arguments by the name of an unknown individual, and notwithstanding the estimate in which we are at present held, I am not ashamed to own myself, ONE OF THEMSELVES.

ON THE COST OF PRODUCING CORN.

The question which is forcing itself upon the notice of cultivators of the soil in all directions, and which, quite independently of all extraneous political questions, will continue to do so, is the *economising of the cost of production*. This is forced upon them of necessity. Some, we are sorry to say, are doing it by stopping all outlay; reducing the wages and number of labourers; neglecting their hedging, ditching, and draining; curtailing their cake and artificial manure bills; and drawing their

present resources from the stamina of the soil. Others are studying the most economical plans consistent with keeping the soil in good condition, and are not afraid of a little outlay, if they have a moral certainty that the results will be more favourable to the eventual reduction of the cost of producing food.

We need not say that the latter is eminently the only proper and safe plan; and as there is now a 'war of statistics' raging, as a contemporary has

called it, it is by no means improper to thoroughly sift and investigate the elements of the art of producing our crops. We give from a pamphlet, mentioned in another part of this day's *Journal* ("Observations on the Elements of Taxation, and the Productive Cost of Corn, &c. By S. Sandars) by a correspondent of this paper, an outline of the cost of producing corn, in labour, or the representatives of labour. Here it is, at p. 52:—

	Per acre.
1. Tithes are wages paid to the clergy for their personal services.....	£0 6 6
2. Poor-rates are wages paid to decayed and sick labourers; and county rates are wages paid to the police, to the members of the legal profession, &c.	0 4 9
3. Wages of agricultural labourer.....	1 5 0
1. Wages to tradesmen, and those employed in making articles sold, and profits thereon	0 5 1
5. The maintenance of horses is the wages paid for animal labour	0 18 9
6. The wages of the farmer for superintendence	0 13 4
7. The payment for seed-corn is for wages, taxation, &c., embodied in its production	0 9 0
8. Rent is interest paid for the capital embarked in land, and the improvements on land; and as all capital is accumulated labour, rent is the wages of accumulated labour	1 0 0
9. The interest paid for the farmer's capital, which is equally accumulated labour ...	0 7 0
10. Casualties.....	0 0 10
	£5 10 3

In the above analysis, tithes and poor-rates being rent-charges, say

£0 11 3	
The landlord's rent	1 0 0
The interest of capital	0 7 0
Total of non-taxable expenditure	£1 18 3

"Thus 38s. in 110s. gives 30 per cent., or 60 millions of the farmer's expenditure of the 200 millions, that are not subjected to taxation charges, which deduction leaves 140 millions to pay 40 per cent. of taxation, or 56 millions sterling above the natural cost.

"The productive cost of wheat is the condensed wages of labour, and as such labour is taxed 33 per cent. in this country, the price of wheat is enhanced from its natural or money price of 33s. 4d. per quarter (with wages at 12½d. per day) to 48s. per quarter, which price is equivalent to the existing rate of wages, at 1s. 6d. per day. The wages of labour in Germany being 10d. per day, such wages are equivalent to wheat at 26s. 8d. per qr."

He then gives the elements of the production of wheat in Germany, the above table being the cost of producing an average of ten kinds of agricultural produce.

Taking 100 acres of arable land in Denmark and the Northern States of Germany, he thus gives the cost of producing wheat—

1. The church is supported by the government	£0 0 0
2. No poor-rates, but we add for the general indirect taxation that may affect the productive cost of corn	0 4 0
3. Labour, 9d. to 10d. per day, or one half of the cost of British.....	0 12 6
4. Tradesmen's bills, one-half of the cost of British	0 2 0
5. Maintenance of horses, corn, and rent, being allowed as three-fourths of British, say	0 11 1
6. Farmers' maintenance of family, servants, &c.	0 6 6
7. Seed-corn	0 6 9
8. Casualties	0 0 6
9. Interest of capital	0 3 6
10. Rent.....	0 15 0
	£3 4 10

The cost of British cultivation of 100 acres is

£5 15 0	0 0
Ditto, German.....	324 3 4

Less cost of German corn £220 16 8 or 40 per cent.
 And English barley costs 30s.; German, 18s.
 " oats 20s.; " 12s.

The above statements seem carefully made, and the writer of the pamphlet is evidently no superficial political economist and statistician; and they point out the necessity of economy, or of sinking. Now what can the British farmer economise, or how can he reduce the cost of production? We will take his sources of expenditure *seriatim*—

The tithe rent-charges, for instance, will gradually decrease with any steady and permanent reduction of price; and though the comparatively high average of the year 1847-8 will affect these for four years to come, and as every sort of land must have this upon it as a fixed and permanent impost, we shall always have so far an element of difference between this country and most foreign producers of corn.

The poor-rates, we are afraid, cannot in any way be reduced by low prices, but the reverse, and their removal is utterly impossible: hence another element of difference.

The labour may and must and will be reduced, because it can be sustained at a cheaper rate, and so much will be thrown on the market as to render this inevitable.

Tradesmen's bills will be somewhat reduced, simply by the action of less demand, and hence more competition, but not to any very great extent.

Horses may be maintained more cheaply, both by food, which costs less, and possibly by scientific treatment, in a less expensive manner.

The farmers' own expenses will be reduced in one or two articles of home consumption, as meat, bread, &c.

Seed corn will cost less, say 33 per cent.

Casualties will be the same.

The interest of capital cannot be less, for the reduced prices will not enable the farmer to withdraw any portion of it from his farm; indeed, it is itself

reduced in the reduction of the value of its representatives.

Rents must be reduced.

But all these being reduced, another material element must not be forgotten: the farmers' profits will be reduced, and we fear on small farms to a degree so infinitesimal as to merge them into greater holdings.

But with all that can be done, there will be a great struggle, and the question in practice will be, whether the sum paid for freight, &c., will compensate for the difference in permanent charges, after the reductions are made? *Time alone can answer.*—Gardeners' and Farmers' Journal.

GLEANINGS IN AGRICULTURE.

(Continued.)

38. *Lolium perenne* (Pasture or common rye-grass).—This much-esteemed favourite with some farmers appears to have been the first grass cultivated in England, and is, like all other cultivated subjects, found wandering into several varieties, a few of which we shall notice. It is an early and substantial grass, suitable to a variety of soils, yet it thrives best in rather damp soils: for instance, when grown with clover, as it commonly is, the broad foliage of that plant, by keeping the earth moist, enables this grass to acquire such a luxuriance that as an individual unaided plant it will not attain. It produces its seeds in abundance, by which means it is easily propagated, and the fibrous structure of its roots fit it in an eminent degree for alternate husbandry. The usual luxuriance of this grass is often considerably diminished by cultivation, as we frequently find it in old rich pasturage with seven or eight florets on each spicula, but the dryness or poverty of the soil in which it is sometimes sown reduces it to a dwarfish stature, consequently reducing in a great measure its valuable qualities. Yet, with all the good properties attached to this grass, we are of an opinion that in many counties in *England*, and particularly *Scotland and Ireland*, its cultivation has been carried to a greater extent than necessary, *i. e.* to the exclusion of many other more permanent grasses, which would yield, under the same cultivation this grass experiences, a greater return—such, for example, as Nos. 2, 3, 4, and 5, already described. When intended for hay it should be cut as soon as it is in flower, and not when the seed is ripe, which is too generally the practice; for if left longer the increase in bulk will not compensate for the loss occasioned in quality. When well made, the hay of this grass is considered preferable for hunters and race-horses, as it is said not to affect their wind, nor blow them as other hay does. There is, however, much difference of opinion with respect to the merits, good and bad, of the rye-grass, that little need be here added. The following are the most esteemed varieties of *Lolium perenne* with

which we are acquainted. True, there are many others, of minor importance, and which will be found to differ or agree with each other, according to soil, situation, and cultivation; but as prominent distinction there is none:—

I. Pacey's Rye-grass.—This variety is common in rich meadows, and old gardens, and neglected rich lands. It produces a considerable amount of nutritious foliage. The quantity sown, when required for hay, should be one bushel per imperial acre. Some may say that one bushel is too much; but, in our opinion, it is a much more rational procedure than to have only half a crop for the sake of a few bushels of seed.

II. Whitworth's Rye-grass.—This variety possesses the valuable properties of early and late growth, but it is so tenacious of life that it requires two and even three ploughings to eradicate its roots. The foliage is remarkably fine, and is well adapted for sowing in field or pleasure ground mixtures. This grass is named in honour of Mr. G. Whitworth, who thus speaks of it in a letter to Mr. Sinclair—"About eighty acres of rather thin poor *wold* land, incumbent on chalk, was sown with the Whitworth variety and clover; the former predominated. In 1819, the first year of grass, the land kept some *ewes* and *lambs* until the 1st of May, when it was shut up for mowing. The produce of hay was fifty-four good waggon-loads; but thirty acres were allowed to stand for seed; the produce of seed was from two to three quarters per acre. The pasture was laid in for about four weeks, then stocked with five hundred lambs, which it kept for seven weeks, and afterwards kept one hundred and sixty lambs, with the help of a little hay given occasionally through the winter, and until the beginning of April, when three hundred ewes and lambs were put in and did well through the spring months."

III. Russell's Rye Grass.—The value of this grass is considered by some to be somewhat superior to "Pacey's" (No. I.) It is an early grass, vegetating nearly

the whole year. It is named in compliment to the late Duke of Bedford, who first pointed out the original plant to Mr. Holdich, the late editor of the *Farmers' Journal*, and from which the stock has been raised. According to the experiments of Sinclair, the produce on the 16th of April, from a brown rich loam, was 5,415 lbs. per acre, of nutritive matter 212 lbs. At the time of flowering the produce was 15,654 lbs., of nutritive matter 733 lbs.

IV. Stickney's Rye Grass.—This grass resembles the above a great deal too much to require any minute description.

V. Scotch Perennial, or Common Rye Grass.—This grass is more generally cultivated in Scotland and the north of England; it is, however, giving way, like many others of the *Lolium* varieties, to more permanent sorts.

VI. Annual Rye Grass.—This grass differs slightly from those of a more perennial character by having fewer root-leaves and a great number of culms. By some it is supposed to yield a greater bulk of crop, for which it is better adapted for "single crop" than the perennial sorts. It is the only true annual of *Lolium perenne*.

Of other varieties, we have *Moles*, which is said by some writers to yield a considerable crop; but the mode of cultivation is not given; we have never met with it in general cultivation. *Polex feris*.—This variety is of Scotch origin. The Thick-stalked, a French sort, under the name of *L. grossum*. The Spreading Rye Grass, which is said to be of early growth, with prostrate shoots, and an abundance of foliage, growing in sort of tufts extending a foot or two in diameter, the seeds of which variety were, according to Sinclair, procured from Germany, under the name of *L. stoloniferum*. The Devonshire Evergreen, more commonly known as Devon Evers, and a variety of others, whose good qualities have only a fine name to recommend them. In fact, every county, and almost every point in Great Britain and Ireland, has its own peculiar and esteemed rye grass, as it has of wheat, oats, &c. That it would require one year's volume of the *Gardeners' and Farmers' Journal* to describe their history and migration, I think few who know anything on this subject will deny. That the *Lolium perenne*, and some of its more prominent varieties, are excellent grasses, any farmer who cultivates them is well aware. While on the subject of *Lolium*, I will here describe *L. temulentum* and *L. arvense*, as being strictly grasses; otherwise their proper place would have been under the "Weeds of Agriculture."

29. *Lolium temulentum* (true awned rye-grass).—This grass is a native, but a detested and noxious plant; neither bird nor beast chooses it as food. It is not very common, yet at times it appears in abundance; but whole counties may be searched in vain without procuring a single specimen. It is said not to be uncommon at times in Pembrokeshire, and frequently leazed out of the corn, and burnt. When the Welsh farmers have weeded their corn, and sown English grain, it is rare to find a specimen; but when native corn has been sown this grass makes its appearance; and we are told that the "soil naturally will produce it." The effects of the seed, when its flour has been mixed with that of wheat in bread, we are told, occasions to the consumer violent vomitings,

and at times death; and when malted with barley intoxicates to delirium. It would appear from the numerous samples brought to this country from the continent amongst wheat to be pretty common. It is a difficult matter to separate them from the wheat, being about the same size; and its early growth in the field so much resembles that of the young plant of wheat that there is no distinguishing the one from the other, otherwise this would be a good opportunity of clearing the wheat crop.

40. *Lolium arvense* (awnless rye-grass).—This grass resembles the preceding, and both are found in the same situation, viz., wheat fields. It is, however, considered in England a scarce plant, being at times found in South Wales. The deleterious effects of *Lolium* appears to have been known at a very early period, and mankind dreaded its malignancy; and, as if a derivative from *dolum, dolosum* (deceit, baseness), condemned in all cases as pernicious. Ovid mentions it as being injurious to the eye; and hence it was said of blind people that they were subdued by *Lolium*. Martial alludes to its injurious effects in corn. Virgil calls it cursed *Lolium*, as one of the certain attendants upon bad husbandry. The Italians perpetuate the evil report by saying, of those whose depression of spirits approach a melancholy insanity—

"He has eaten bread with *lolium* in it."

Happy for England that it knows nothing of its baneful effects! Knapp, in his "British grasses," says "he cannot help suggesting an idea that the 'tares' mentioned in St. Matthew's gospel as being sown by an enemy among the corn, were allusive to these *darnell*. The supposition that has been advanced, that the tares were of the genus *Vicia* or *Ervum*, will not bear a scrutiny, as is evident from the very expressions—'Let both grow together until the harvest, and in the time of harvest I will say unto the reapers, Gather ye together first the tares, and bind them in bundles to burn them; but gather ye the wheat into my barn.' But neither of the genera above-mentioned could be parted from the corn, as they would twist round and be inseparable; and they might be weeded from the wheat, when young, by the obvious difference of the rising plants; but the similitude of the young *lolium* to the blades of corn would render it undistinguishable; and the very method recommended by the Lord of the Harvest is adopted where *Darnell* is abundant, as previous to the introduction of the sickle the 'hever' is gathered into bundles and burnt. Our Saviour, in all his discourses with his disciples, illustrates his doctrines by beautiful and apposite allegories, all drawn from common occurrences or transactions of life; and although his parable was only allegorizing the influence of Satan, yet the circumstance of corn being injured by tares must have been a common and lamented fact universally familiar to the dwellers in Judea."

41. *Lolium italicum* (Italian rye-grass).—The agricultural world is indebted to Mr. Lawson, of Edinburgh, for the introduction of this grass—a gentleman who has paid the greatest of attention to the cultivation and purity of grass seeds. We will here introduce Mr. Lawson's report, published in the Quarterly Journal of Agriculture, January, 1832:—

"This plant is said to be distinguished from the common rye-grass (*Lolium perenne*) by its larger leaves, by its being of a deeper green, and by the greater height to which it grows. It is usually sown in autumn, as is the general practice with grass seeds in the south of Europe. After the field is harrowed, it is sown at the rate of from 16 to 18 lbs. per acre, and the seed rolled in. In the following autumn the turf is covered like an old meadow, and the crop of the following year is more than double. It may be also sown in spring. If it be sown with clover or lucerne, its growth is so rapid that it will quickly choke them. It is eaten greedily by cattle, whether green or dry, and yields fifty per cent. of hay.

"Mr. Thomson, of Banchory, having procured a few seeds of it at the agricultural exhibition at Munich, had the goodness to communicate them to me. About the same time I obtained a small quantity of what was called a new kind of rye-grass, from Hamburg. These two were sown last spring, and at the same time, for the purpose of comparison, was sown along with them a small quantity of Stickney's rye-grass, which is held to be one of the most valuable varieties of perennial rye-grass under cultivation. The progress of these plants was carefully observed. There was no difference in the period of their germination or of appearing above ground; but, in a short period afterwards, the seeds obtained from Italy and Hamburg both exhibited a decided superiority in their growth over that of Stickney's rye-grass, and this superiority was afterwards maintained during the whole of the season.

"The general appearance of these two foreign grasses was the same, they being broader in the leaf and much more luxuriant in growth than Stickney's, and when examined after they came into flower they were both found to be of the same variety of grass. It is not known whether this Italian rye-grass is a native of Italy or of Germany; neither is it known in which of these countries it was first cultivated. Although the small scale upon which the experiment was here made did not afford an opportunity of ascertaining how it was relished by pasturing animals, the account obtained from Hamburg precisely confirms that above stated, for it is represented as being softer, more juicy, and of a richer foliage, and more relished by cattle, than the common rye-grass.

"This grass, too, is found to be more hardy than the common rye-grass, for in the vicinity of Hamburg the common rye-grass will not stand the winter when very severe; whereas the Italian rye-grass withstands the severities of winter, even when sown in September, and consequently the plants are young and tender when the frosts prevail.

"That it is a perennial grass, too, has been ascertained by the cultivation at Hamburg. A few plants in their second year have been sent here from that place, which, though completely checked in their growth by the effect of the sea voyage, were planted about the middle of November, and have now put forth fresh leaves."

Such is Mr. Lawson's report in the Quarterly Journal of Agriculture for 1832. Since then this grass has been extensively cultivated by the Scotch farmers, with whom it has taken the place of the older sorts. It is a perennial, and suited to almost any soil and situation, producing an abundance of seeds. Its hay is excellent for horses and cattle, possessing considerable nutritive qualities. By some this grass has been considered only a variety of *L. perenne*. This may be so with botanists, but in an agricultural point it possesses characters of considerable importance, compared with any other *Lolium*.

42. *Festuca ovina nordeiformis* (long-awned sheep's

fescue).—This grass is a variety of *Festuca ovina* (No. 9), but in some instances it is highly superior, as it produces an early herbage, consisting almost entirely of leaves similar to the latter-math produce. And it also, from its early growth, flowers sooner than the other Fescue species. It certainly possesses sufficient merits to entitle it to a place in the mixture for the best permanent pasture. According to Sinclair's experiments, at the time of flowering the produce from a sandy soil with manure was 13,612 lbs. per acre. The produce of latter-math was 5,445 lbs. per acre.

43. *Bromus arvensis* (branched broom-grass).—This grass often attains the height of three or four feet; leaves broad, and woolly on both sides. Straw, when young, woolly; but it becomes smooth as the plant advances in age. It is confined to rich pastures and meadows, and a very early grass, not being affected by frost. It is an annual, and of course its existence yearly depends on its being suffered to ripen its seeds; but by allowing it to ripen its seeds it is of very little value. It, however, should be mown when in flower, when it affords a considerable weight of good hay. It is generally in flower from June till August, and a native. According to Sinclair's experiments, at the time of flowering the produce from a sandy loam was 23,821 lbs. per acre.

44. *Bromus multiflorus* (many-flowered broom-grass).—This grass is also an annual and a native, and even preferable to *B. arvensis* (No. 43). It is natural to soils of less rich nature than No. 43, and is certainly deserving a place in the mixture of pasture grass. Although the whole genus *Bromus* are considered bad grasses by the farmer, Sinclair says, "On comparing the quantity of nutritive matter afforded by the produce of one acre of this grass at the time of flowering with that afforded under the like circumstances by the *Bromus arvensis*, it manifests a superiority of 266 lbs. per acre." The leaves of this grass are small in comparison to *B. arvensis*; and the spring produce of foliage is proportionably less, owing to its not vegetating so early. Cattle and sheep are particularly fond of it. According to Sinclair's experiments, at the time of flowering the produce from a sandy loam was 22,466 lbs. per acre.

45. *Triticum caninum* (bearded wheat grass).—To a common observer this grass is taken for *T. repens*, hereafter to be described, but they are perfectly distinct. Our present subject is rarely if ever found in corn fields in a wild state. The appellation of *caninum*, or dog's-grass, is far from conveying the pertinent distinction which many of the terms of Linnæus so happily express, as from such an epithet one might be led to believe that this grass was in peculiar request by that animal; but when the stomach of the dog is oppressed with acid or bile, he resorts promiscuously to any rough-leaved grass, nor does a particular selection seem necessary, the aim perhaps required being only to stimulate or slightly irritate the coats of the stomach, and the discharge which nature requires is consequently effected. This and many other singular faculties which the brute creation are endowed with, to remedy occasional necessities, or produce effects, are surely in many instances simple instinct, and only below reason. The foliage of this grass is readily

eaten by cattle, and is one of considerable value, as it affords an early food in spring; in fact, being nearly equal to that of the meadow fox-tail (No. 3), and on soils of an inferior quality might be cultivated with considerable advantage. It is a perennial, and producing a sufficiency of seeds, which quickly vegetate, and the plants soon arrive at perfection. One drawback to its more general cultivation is the curve of the spike. It flowers in July, and the seed ripens in August. According to Sinclair's experiments, at the time of flowering the produce from a sandy loam was 12,251 lbs. per acre. The crop at the time of flowering is of greater proportional value than at the time the seed is ripe, nearly as 6 to 5. The produce of the lattermath was 3,662 lbs. per acre.

16. *Triticum repens* (common couch grass, &c.)—This well known grass has several vulgar names, by which it is known by every plough-boy, and against which a general anathema seems to have been pronounced; yet it has its merits. Sir H. Davy found the roots to contain nearly three times as much nourishment as the stalks; and we are of an opinion that the roots, after being carefully gathered and washed, will repay all the trouble as food for horses and swine. At Naples they are much esteemed, and are collected in large quantities for feeding horses; and lambs are particularly fond of the young grass. It does not thrive well, mixed with other grasses, being more attached to cultivated lands, where it becomes a very troublesome weed; yet however injurious or plentiful it may be, it is bad management alone that encourages its growth, or even permits its existence in corn fields. Under the name of couch or quitch is included every creeping grassy root that intrudes in our fields, and, of whatever genus, equally condemned. Yet *Triticum repens* is the true couch grass of cultivated land; and the only means of extirpating it is by frequent ploughings, harrowing, and forking out the roots and burning them, when not employed in feeding cattle, for if a particle of its creeping root of half an inch in length only remains behind, it will during the season cover nearly a yard square, as the land so pulverized gives double encouragement for this rapid growth. From the formation of its root it is easily eradicated, at least more so than many other plants: it propagates out by its seeds; therefore, as already said, any joint of the root is the founder of a baneful progeny, and point out the sluggish farmer.

17. *Agrostis stolonifera* (*A. alba*, of some authors).—(Small clustered bent or florin).—Of this grass there are, by some writers, five or six varieties, to several of which distinct specific names have been given; yet, in our opinion, they all more or less agree. It is one of the latest flowering of the *Agrostis*, and generally inhabiting moist places of a peaty nature, where it forms an herbage that is locally valuable, sometimes constituting the chief part of the crop, affording by its late growth a good pasture for the autumnal months. It perfects a sufficiency of seeds, which readily vegetate, and should form part of the mixture for irrigated meadows. It flowers in July, and the seed is ripe in August. There is much prejudice existing against the different species of *Agros-*

tis, without any just reason. It remains in a degree inactive till the other grasses have attained almost perfection, when this florin and its varieties begin; and on close inspection it will be found that the latest mouthful, and sometimes the earliest, in the pasture in which it is found, is principally of this grass. It has been recommended to cut down the stoloniferous shoots in small pieces, and strew them on the ground, rolling them in; moist weather is preferred for this operation; but it is a tedious and useless operation, as it not only seeds freely in this country, but is yearly imported from Germany and France. The ground should be well pulverized before sowing, as the seeds are small, and might be carried too deep. A blight occasionally infects this plant; the whole of the branches then become perfectly crowded with florets, and the corolla will be found infertile, and filled with a black powder.

48. *Agrostis spica-venti* (long-awned bent).—This grass differs from all the genus *Agrostis*, and can never be confounded with any other. It seems invariably to preserve its individual habits, as it is never, as far as we are aware, been degenerating into varieties. It at times becomes very luxuriant, attaining the height of three and four feet in moist soils, with a panicle a foot in length, clustered with florets; and did each produce a seed, the prolificacy of this grass would be prodigious, yet from its annual habits it is of little importance to the agriculturist. It is, in many parts of England, a rather rare grass.

49. *Aira Aquatica* (water hair-grass), or *Catambrosa aquatica* (water whorl-grass).—This grass has been by some writers described as an useless agricultural plant, but as a meadow grass it has considerable claims on the farmer's attention. The luxuriance, sweetness, and succulency of the whole plant, are indications of utility not to be overlooked. From the idea that has been promulgated that it will only grow in water or mud, it has, in some measure, been discarded as unfit for cultivation. Even Sinclair was of this opinion, yet with due deference we are of a different opinion—having seen its luxuriance in irrigated meadows, and the fondness of cattle for it, that we recommend it to form a goodly portion of the mixture for meadow. And we also recommend it to be sown in water-fowl preserves, as aquatic birds are particularly fond of it. Sinclair gives the following as his experiment:—At the time of flowering, the produce from mud covered permanently with running water, was 10,890 lbs. per acre.

50. *Aira cristata* (crested hair-grass).—This plant is of apparently little use in an agricultural point of view. It inhabits dry and sometimes elevated places. Not generally found, but locally abundant, and, in such places, affords a mouthful for the mountain sheep. The leaves are flat and hairy, when young, and of a glaucous hue; one or two only are found upon the straw, but several small tufts arise from the roots. The general habits of this grass warrants it being classed with *Aira*; yet, it is with some authors arranged with the *Poa*, such being the confused state of our botanical knowledge.

51. *Melica carulea* (purple melic-grass).—This grass delights in deep, spongy soils, but is not peculiar to such places, and varies much. It is one of our latest

grasses; and for the purpose of hay, it is comparatively of no value. It is found in perfection till the end of September. Its strong and long straw, with only one joint, furnishes not a bad substitute for the Indian rush. In Somersetshire, the country people make of the straws a neat kind of besom, which they sell in the towns and villages. In Somersetshire it grows in great abundance; also in Anglesea, in the neighbourhood of the copper works of Pary's mountain. This grass is also occasionally twisted into a line, from which netting is formed, and is said to be prized by the continental fishermen, as lasting longer, and being less injured by water, than those made of hempen twine. In an agricultural point of view it is of little importance; but with *Aira cœspitosa*, No. 37, it can with advantage be employed in forming a cover for wild-fowl. This grass, like the preceding, has more than one name, by different writers: first, we find it was arranged with *Aira*; next, *Arundo*; and lastly, with *Agrostis*.

52. *Melica uniflora* (long-branched or one-flowered melic-grass).—This truly pretty sylvan grass delights in the shaded coppice, seldom advancing to the full glare of day. It is not an agricultural grass, but a pleasure-ground grass for growing under the shade and drip of trees: it flourishes particularly under beech trees. It is a very early grass, if not one of the very earliest—in favourable seasons it may be found peeping from the dry leaves of the coppice in the warm days of April. The leaves are of a yellow green hue, a little woolly on the inner side, and minutely serrated on their edges. Root fibrous: a perennial. We recommend its cultivation with advantage under the shade of trees, &c. Cattle are particularly fond of it; it also forms a good cover in plantations for game.

53. *Melica nutans* (short-branched melic).—This is another sylvan grass, somewhat resembling the last (52). It seems, however, of a more tender habit, and is a much rarer plant than the preceding, appearing to prefer the mountainous districts of the northern counties, where it is pretty generally diffused. It does not succeed so well as the last, under cultivation.

54. *Triodia decumbens* (decumbent heath-grass). It is also known under the names of *Festuca decumbens*, *Poa*, and *Melica decumbens*.—This plant delights in high, wet, and barren pastures. It never appears to be touched by cattle, and produces its herbage late in spring. In an agricultural point it can claim no rank, and though it may frequently associate with the herbage of the pasture, it is in such places as are but scanty of produce, it never intruding where the soil is rich, or occupied by more valuable grasses. It is a native and a perennial. According to Sinclair's experiments, at the time of flowering the produce from a clayey loam was 5,445 lbs. per acre.

55. *Festuca calamaria* (Reed fescue-grass).—This rather rare grass is also known under the following names by different authors: *Festuca sylvatica*, *Poa sylvatica*, and *Poa trinervata*, as also *Festuca decidua*. The root is fibrous, tufted with several stems, two and three feet high, and leafy. It delights in shadowy stations. It possesses qualities sufficient to entitle it to a share in the

mixture for pastures, particularly shaded ones. There is, however, one serious drawback to its general cultivation as an agricultural grass, which is, that it does not produce seed enough for its general cultivation. It is found in the mountainous woods of Scotland, Ireland, and the north-west parts of England. A perennial; flowers in July.

56. *Festuca pinnata* (Heath fescue-grass).—This grass is an inhabitant of chalky soils, abounding wherever found, but otherwise it is quite local, but uncommon in Yorkshire, Oxfordshire, and Kent, as also Dorsetshire. It is a perennial, flowering in July, and the seed is generally ripe in August. It is a coarse, harsh grass, applicable to no agricultural purpose, but is a sure indication of a lean and hungry soil; it quite retires from cultivation. Sinclair says—"At the time of flowering, the produce from a siliceous sandy soil with manure was 20,418lbs. per acre. Although the weight is considerable, it is neither early, nutritive, nor relished by cattle."

57. *Bromus racemosus* (Slender broom-grass).—This broom-grass is perfectly distinct from *Bromus mollis*, No. 22; it is also compounded with *B. pratensis*, *B. arvensis*, No. 43; and has been described as *Festuca avenacea*. It is slender in habit, appearing early in May, and is conspicuous above its meadow companions when in its infant state. As an agricultural plant, it should form one of the mixture of early grasses for pastures, hereafter to be spoken of. It is an annual, found in meadows and pastures in flower in June. After ripening its seeds, it dies and withers away as the other pasture grasses increase.

58. *Bromus giganteus* (*Festuca gigantea* of some authors).—Tall, smooth-stalked Broom, or tall Fescue grass.—This grass attains almost an unlimited height. In very dry places it is met with a foot high, and in more rich and moist it acquires an altitude of six or seven feet, yielding an immense bulk of foliage, which is not very readily eaten by cattle in a dry state, but when mixed with other hay it is eaten readily. This grass should be cultivated with other coarse grassy kinds, for being cut up into chaff for steaming with turnips, &c., as it contains a considerable amount of nutritious matter. It should be cut when in flower, so that it may retain its juices when dry, and enrich the steamed food for the fattening cattle. We have some more to offer on this subject when our list of Gramineæ is finished. This grass thrives well under cultivation, and appears to continue in the soil. It is a perennial, and a native, found in its natural state in woods; flowering in June, and ripening its seeds in July. Small birds are particularly fond of its seeds, which are produced plentifully. According to Sinclair's experiments, at the time of flowering, the produce from a rich siliceous sandy soil was 27,255 lbs. per acre. We have observed in the woods here that the roe-deer (*Cervus capreolus* Lin.) are fond of this grass, cropping it to the ground. It should be extensively sown in game preserves, as it affords excellent shelter.

59. *Avena pratensis* (many-flowered oat-grass).—With the exception of *A. florescens* (No. 10), the genus *Avena*, like the genus *Bromus*, from some reason not at

all satisfactory, have, and are by many agriculturists considered nothing better than weeds, and who use every means in their power to eradicate them from their land. Our present subject is found more frequently on chalky soils, dry heaths, and Highland mountains, where it affords the Highland sheep a grateful mouthful; and to the Highland farmer this grass is of considerable importance, although with the lowland farmer it is considered a weed. We cannot but admire the singular and beautiful manner in which the great Creator has clothed this earth, suiting

its vegetable production to the wants and comforts of the animal race. Wonderful in all His works; to one race, to one age, He unveils not His inexhaustible stores, but metes them out to employ the mind, reward the industry of man, excite the gratitude of generations until time is no more. According to Sinclair's experiments, at the time of flowering the produce from a sandy loam was 6,806lbs. per acre. It is a native and a perennial, flowering in July and August.

Millon Abbey.

J. M'INTOSH.

(To be continued.)

PRESENT PRICES.

THE PRESENT PRICES, BY THE REV. A. HUXTABLE, M.A., RECTOR OF SUTTON WALDRON, DORSET. Third edition: Ridgway, Piccadilly: 1850: pp. 36.

There is a feeling of gratitude universally prevalent in the human mind towards those who raise to us a helping hand when difficulty, or affliction, or distress assails us. A person who at no other time will exercise the feeling will generally be thankful to the hand extended to him in his troubles: and though the impression may be soon effaced, yet at the time it is so generally in exercise as to be considered universal.

The degree of this feeling depends on the intensity of the suffering and the amount of relief. When the evils are of a slight or insignificant character—when they produce little pain or privation, there is less of the feeling; and when the help, however well-intentioned soever it may be, is of little avail, there is at once a blunting of the finest sensibilities, and the emotion of gratitude is almost forgotten.

We believe the circumstances of the present times, as regards the whole farming community, are those of a very painful and distressing character. The rents and outgoings are being paid out of the hard earnings of years of previous toil, or from patrimonial funds which ought to make provision for a family: and many an anxious parent looks upon an innocent and unconscious family with many an anxious throb; and thankful would he be to that kind messenger who would bring to his mind the welcome news of hope, however faint and distant.

In seasons of distress, national or domestic, the clergy of our land are a body of men who are looked up to, at least, for advice and guidance; and though mainly for the purpose of attending to the spiritual wants and moral condition of their flocks, they are often also extremely useful in bringing unbiased and unfettered judgments to bear on the cases brought before them of a temporal character; and hence, though clergymen do not always come forward as writers of agricultural pamphlets—nor if they did, would they always on these subjects be

the best guides—yet in seasons of distress their pen may be as usefully employed as their tongue, and they may in a temporal matter be able to speak the words of cheering hope as well as in a spiritual.

The duties of the clergyman often prevent his being so qualified, as a practical man, as those are who consult nature more in her hiding place, and who have more to do with the material body and less with the immaterial soul; and we cannot but be reminded of a gentleman, who leaving home in hay-time, left the practical management of his crop to a clergyman who had published a treatise on hay-making. The good gentleman had the misfortune to have his hay spoiled by the unfortunate theorist; and there is always a danger in bringing in theoretical cooks, lest they should not succeed in their plans, and should, after all, "spoil the broth."

We merely state these general matters in the outset, and it may be that they may be verified or not in the case of the reverend gentleman whose name is just now making such a stir in the agricultural world by his pamphlet on "Present Prices." He may be an exception to the rule after all, and he may have stepped out as a pole-star to the half-shipwrecked cultivator, to guide him safely through his toil-worn and weary passage. He has good right, farming himself in the celebrated Dorsetshire, where labour is perhaps cheaper than in any other English county, with a fine genial climate—a speaker and writer on agricultural matters, and a teacher at farmers' clubs—a promoter and prime mover of the Agricultural Chemistry Society, and an active member of the Royal Agricultural Society—enjoying a large private fortune as well as being a rector, we may each imagine he has the means of trying all that heart could wish—no fear of losing a trifle which he would never feel. And now, when he stretches out his long arm to beckon the farmers to a refuge of safety, it becomes a question with us

and with them whether they are to believe and to follow, or whether they are to doubt and to avoid.

It shall be our object, as far as our humble ability will afford us the means, to sift and analyze his statements to the very bottom, and to endeavour to ascertain the precise basis upon which his recommendations are based; for upon these he stakes and hazards the opinion, that if they do all his bidding "it will no longer be considered ruin to themselves, though wheat should remain at five shillings per bushel, and meat at five pence per lb."

The getting up of the pamphlet does no great credit to the accuracy of its author, for in the "third edition," which now lies on our table, there are four sets of errata in figures, which seem altogether inexcusable, and some not noticed at all; and either the reverend pamphleteer is very inaccurate and careless, or he is ingenious as a book maker. That there are grounds for the latter supposition we may fairly conceive, for the title-page and preface are on two separate leaves stitched to the body of the pamphlet; and we are much mistaken if the reverend gentleman has not divided one impression into several editions, we know not how large; and thus in a third edition, instead of correcting the erroneous figures in the body of the work, we find him stitching in a fly-leaf of errata. We merely mention this to show that there may be more foresight and cunning in the getting up of the pamphlet than its careless omissions, errors, and inaccuracies would warrant the belief in.

Having disposed of this part of the subject we come to the pamphlet itself; and we may say it divides itself into a disquisition on the causes of agricultural distress and their remedy. As the latter subject, however, is the most practical, we will address ourselves to it in the first instance; and having examined it, we may, if space will allow, advert to his opinions on the cause which has produced it.

The remedy, however, is summed up in a few, a very few words—nay, in one word: it is that "spirit-like essence of the farm, ever longing (and no wonder,) to fly off to boundless air, and with it, alas! flies the truth of all my calculations and your hopes of profitable returns—AMMONIA." Alas! indeed, for if it once gets afloat in boundless air, it may perpetually fly and leave the calculations of the sanguine clergyman "lurking in that gloomy cavern," with the unrealized profit of the unfortunate cultivator.

And here we may remark that the calculations are not deducible from Mr. Huxtable's own practice. He has been farming, and advising, and lecturing for years; and instead of finding the universal sol-

vent, or philosopher's stone of agriculture, he goes to another's experiments, and deduces from them what the author did not, and, we believe, would not venture to do. But all this before he has tried it! It has been well said of farming practice that it is necessary not only to try an experiment to satisfy ourselves of its accuracy before we propound it for general adoption; but we must repeat it at least twice before we can safely recommend it. And yet, instead of Mr. Huxtable doing this, giving us two real, veritable, tangible balance-sheets, showing profit and loss, he merely gives us a few shreds of theory and fewer still films of practice, attaches them together, and Almaschen-like, presents the aerial castle to the wondering farmers; and we wish before he has done he does not get that unhappy kick which will dispel his "spirit of the farm" into "boundless air; nay, we wish he does not work his own doings, disperse his own bundle of brittle hypotheses.

Mr. Huxtable, "deriving his consolation," he says, "from another quarter" than agricultural protection—that is, not the spiritual, but the "secular occupation" of "the better management of his own farm"—jumps at Mr. Lawes's experiments detailed in vol. viii. of the *Journal of the Royal Agricultural Society*, and from these deduces his principles of corn growing, and manure making, and cattle feeding, which will enable the farmer to live and thrive with corn at five shillings per bushel and meat at five pence per pound! Nay, further, he hints in his preface that five shillings is not taken arbitrarily, for prices are now below five shillings; and as his system, we infer, renders the growing of any given quantity of wheat per acre a certainty, he has only to jump to 40 bushels per acre instead of 32, and the deed is done at once, at four shillings per bushel. Might he not have gone on to say, "and so on *ad infinitum*?"

And first, as to wheat growing, he lays down his principles A. and B., which he says are, with their general rider, established by Mr. Lawes's experiments at Rothamstead farm. We wish this to be specially borne in mind, for it is evident this is the keystone to the whole hypothesis, and we shall presently see how even his premises are borne out, without reference to his deductions.

He says, p. 10—"It is presupposed that the land is under the conditions of good husbandry, properly drained, free from couch, adapted by its texture (being either loam or clay) for the growth of wheat, and valued for rent at 20s. per acre, subject to tithes, &c., in addition.

"A.—Land of this quality will grow wheat year after year successively (the drills being hoed clean

of annual weeds), and the produce in the average of seasons will be 16 or 17 bushels per acre, the straw as well as the corn being removed.

“B.—If the straw be returned to the field, and so the minerals are restored, each bushel of wheat beyond the natural produce of 16 bushels will require 5lbs. of ammonia.”

Now Mr. Lawes's article, to which Mr. Huxtable refers, appeared in the Royal Agricultural Society's *Journal* in 1847; since that period the latter gentleman has had abundant opportunities of putting the theory in practice on his own farm; but he has not told us that he has done this, and therefore all his facts are calculations upon paper, which his field practice has not exemplified. Let us see, however, whether Mr. Lawes bears out the sweeping principles he here lays down. That gentleman, wishing to test the effects of mineral and ammoniacal manures, exhausts a certain field by a very scourging process; for a period of seven years he grows, after manuring, the following crops without any manure whatever. The produce of the first four years are not given, but that of the three experimental years are, and we give them opposite the crop in order to show distinctly the process.

	PRODUCE.		
	Bush.	pkts.	qrs.
1840, Barley	—	—	—
1841, Peas	—	—	—
1842, Wheat	—	—	—
1843, Oats	—	—	—
1844, Wheat	16	0	0
1845, Wheat	23	0	0
1846, Wheat	17	3	3

Now we ask how can Mr. Huxtable at all infer from this that wheat at 17, or at least 16 bushels per acre can be grown year after year successively? Can he say that because after seven years' corn crops that quantity was produced it would always produce that? Does Mr. Lawes say so? Not at all. But if this is not so, it will not help Mr. Huxtable, for to be of any use whatever it must grow this for ever; and if it had grown this for seven or nine years it would not have been sufficient to sustain the theory which he, as we shall see presently, thinks proper to found upon it.

We would also ask (for we cannot find where Mr. Lawes states the fact), how is it proved that by returning the straw to the field the minerals are restored? That it restores some minerals we are ready to admit; but we ask for the proof that it restores such as will enable the wheat to be sold off year after year. According to Professor Johnston, the wheat, corn, and straw carry off the following proportions of minerals, or at least of ash.

	WHEAT CORN. STRAW.	
	lbs.	lbs.
Potash	7'15	.. 22'44
Soda	2'73	.. 0'29
Lime	0'85	.. 12'09
Magnesia	3'63	.. 6'89
Oxide of Iron ..	0'20	.. 2'35
Phosphoric acid	15'02	.. 5'52
Sulphuric acid..	0'07	.. 10'49
Chlorine .....	..	.. 1'97
Silica	0'35	.. 117'94
	33'0	+ 180 = 213lbs.

This is calculated on 25 bushels of wheat and 3,000lbs. of straw per acre.

Now if we take a single element for the sake of illustration, phosphoric acid, we shall see that though the ash of the straw is three times more than that of the corn as to its entire weight, of this it will soon be exhausted by Mr. Huxtable's plan.

	lbs.
First year takes off, of phosphoric acid...	25 ³ / ₄
Straw restores	5

Therefore the first year's loss is	20 ³ / ₄
second	20 ³ / ₄
third	20 ³ / ₄
fourth	20 ³ / ₄
fifth	20 ³ / ₄
sixth	20 ³ / ₄
seventh	20 ³ / ₄

Thus in seven years there is taken off 145³/₄ lbs. of phosphoric acid alone, though all the straw is returned. Unless some conjuring process is adopted it must be quite clear that the soil must soon become exhausted of this element; and yet Mr. Huxtable assumes that the minerals will be restored. Having shown that Mr. Lawes' experiments by no means bear out the conclusions of Mr. Huxtable, it would seem almost useless to carry out his deductions; but we think they contain within themselves so many of the elements of self-destruction that they may be allowed to take their chance. He thus solves the problem, as he says, how corn can be grown at 5s. per bushel, and so teaches us to grow a cheap crop of 32 bushels per acre:

	bush.
“Natural produce of the soil	16
The straw containing $\frac{1}{2}$ per cent. of nitrogen of previous crop of 32 bushels per acre, weighing 3,200 lbs., will furnish, by decomposition in the soil, 19 $\frac{1}{2}$ lbs. of ammonia, or	3 $\frac{1}{2}$
12 $\frac{1}{2}$ + 5 = 63 lbs. of ammonia, will produce..	12 $\frac{1}{2}$

“The present price of ammonia, whether in guano

or sulphate of ammonia, is sixpence per lb. The field being free from couch will require only one ploughing. The threshing is supposed to be performed by steam, at a cost of 1½d. per bushel. The horse labour has been charged at the cost for which it can be done by hired horses in this neighbourhood.

With these data the cost of an acre of wheat will be as follows :—

	£	s.	d.
Rent, £1; tithes, 5s.; rates, 2s. 6d.; way-rate, 10d.	1	8	4
Ploughing, harrowing, drilling, crushing	1	0	0
Tradesmen's bills	0	5	0
Bird-keeping and hoeing	0	5	0
Reaping 10s., harvesting, 3s. 1d.	0	13	1
Taking in rick for threshing, and marketing	0	4	10
Threshing 32 bushels, at 1½d. per bushel	0	4	0
Seed, two bushels	0	10	0
62½ lbs. of ammonia, at 6d.	1	11	3
	<hr/>		
	6	1	6

The produce, 32 bushels at 5s.	8	0	0
Expense of crop	6	1	6
	<hr/>		

For the interest on capital and profit, per acre	£1	18	6
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He admits, however, that he foresees that "among the calculations which have just been given, there is one which will probably be vehemently opposed: that which attributes to land rented at £1 per acre the power of producing from its own resources 16 bushels annually; nor is it in my power to support the assumption which I have employed in the estimate, by adducing other cases precisely similar." It is, therefore, evident that he feels afraid of this leading proposition, and well he may; but we will gratify him for once, and for argument's sake admit it in all its force.

Taking this inherent power in the soil to produce 16 bushels naturally, for ever, and using Mr. Huxtable's own figures, returning the straw only, and no ammonia whatever, we shall see the conclusion we arrive at; and, as it will test his principles by themselves, we shall have the means of judging them from his own data.

We propose, therefore, to cultivate on his scale of expenses, and use no ammonia whatever, but merely return the straw. Our calculation, adopting Mr. Huxtable's own figures, will be—

	£	s.	d.
Rent, £1; tithes, 5s.; rates, 2s. 6d.; way-rate, 10d.	1	-	-
Ploughing, harrowing, rolling, crushing, &c.	1	0	0
Tradesmen's bills	0	5	0
Bird-keeping, hoeing, &c.	0	5	0
Reaping (as the crop will be 19½ bushels instead of 32 it will cost only) 6s., and harvesting, for the same reason, can be done for 2s. 6d.	0	8	6
Taking in rick, for threshing and marketing (as the quantity will be so much reduced) will only cost	0	2	5
Threshing 19½ bushels, at 1½d. per bushel	0	2	5
Seed.....	0	10	0
	<hr/>		
	£4	1	8

The produce of the crop, 19½ bushels at 5s.	4	17	6
Expenses of crop	4	1	8
	<hr/>		

	0	15	10
Then, as £5 per acre will be abundant capital for this low farming, put the interest at 10 per cent.	0	5	0
	<hr/>		

Leaving a profit per acre of £0 10 10

or on a 600 acre farm an annual profit of £325 per annum!

And as this is a safe return, depending on the natural produce of the soil, as it requires little skill, little expense, we think, assuming Mr. Huxtable's principles correct, he will see there is so little risk in it that it is far preferable not to purchase nor apply any ammonia whatever!

It would seem that it were unnecessary to examine the pamphlet further; absurdity, we can easily imagine our practical friends will say, can go no further. But we must say a word or two on Mr. Huxtable's principles. They contain an "if" we had rather see cleared up before we go further. "The land being free from couch" is a *sine qua non* which he strongly contends for. Now we well know that incessant wheat-growing has been tried by some of the ablest scientific men in the kingdom. We need only mention one, as his name is known both as a scientific and practical man, and a sound thinker; and that is more than can be said of all pretenders: we mean Mr. Briggs, of Overton, the secretary of the Wakefield Farmers' Club, who found that the real impossibility of growing wheat year after year was, that the weeds could not be kept down; and if this be so, if it is a practical

difficulty at the very threshold of the state of facts necessary to Mr Huxtable's hypothesis, we would ask why does he propound it, since he cannot himself say it is practicable? of this he never seems to have a doubt; nay, he goes further. We had naturally wondered why he stopped at the low farming of 32 bushels per acre, and did not at once add *double*, at least, the quantity of ammonia, and so add 25 bushels at once to the 19½, and make it in all *forty-four*! Certainly he might appear to think that this was the limit of increase; and if he had, though we might have longed to see a reason assigned for a state of things so remarkable, we could have believed it possible; but no, a class of men once set on horseback never fail to ride to the same destination; and he completes the climax of absurdity by stating at the very outset, on the two *appended leaves* of his third edition, that "it is sufficiently plain that the *charges on the crop being the same*, a return of 40 bushels sold 4s. each would be as remunerative to the farmer as 32 bushels at 5s." After trying to dive into the meaning of this somewhat obscure passage, we cannot help thinking that he wishes us to understand that he only provided an addition of ammonia, enough to produce 32 bushels; but if we will add a little more, we can get 40. If he does not mean this, we do not see how he can apply the observation; but we never, till now, knew that the charges on a *heavy* crop remain the same as on a *light* one. We think this is a "calculation" as new as his new theory of wheat growing.

We had forgot, however, at the proper place to make another allowance which escaped our calculation, as it had seemed to do his. Mr. Lawes grew, it will be remembered, five grain and pulse crops, and took them all off before he exhausted the condition of the soil to its natural state; and hence Mr. Huxtable, and we following him closely, should have taken credit for this, and then the proposition A. would be thus stated correctly.

A. Land of this quality will produce five grain and pulse crops before its artificial and added fertility is exhausted, and afterwards 16 or 17 bushels per acre, the straw as well as the corn being removed (for this was the case with Mr. Lawes's land); and hence all tenants, before they have any necessity for adding any ammonia whatever, may take off all their crops with impunity. We fear the landlord will neither thank Mr. Huxtable, nor Mr. Lawes his teacher, if such applications are to be made of their principles.

But Mr. Huxtable having first taken a forced view of Mr. Lawes's experiments, and twisted them to his own purposes, does not take the corresponding drawbacks. Mr. Lawes's theory will *not* bear the conclusion that crops may go on for ever by merely

adding the straw and ammonia; nor that you can increase the crop by the latter to any extent at pleasure, for he says, p. 245:—"In some experiments where no minerals have been applied, the salts of ammonia are not producing their accustomed effect: an excess of the azotised condition is commencing, and mineral *manures* will have now to be employed to increase the natural produce of the soil." Such would be the state after a few doses of Mr. Huxtable's ammonia—the corn would be sold off, the straw only returned, and so the mineral condition would be enfeebled, for it was after three years only of Mr. Lawes's experiments that this deficiency presented itself.

Leaving principle C, which is neither disputed nor new, we come to D, which we will thus give, because he again appeals to Mr. Lawes. It is—"D. That when animals are being fattened on highly nutritious food, it is found that 1lb. of nitrogen in the food produces from 5lbs. to 7lbs. of live weight, which live weight contains about 3 per cent. only of nitrogen; consequently when the increase of live weight, and the amount of nitrogen in the food, are known (which is now the case with most of the 'feeding stuffs' in use), we can estimate the quantity of nitrogen and of ammonia, and therefore the value of the manure.

"E. Consequently, if the prices of lean and fat stock are in a fair proportion to each other (*i.e.*, lean stock weight, for weight, being cheaper than fat) it will be found (when stall-feeding is thoroughly understood) to be far more profitable to produce ammonia by feeding cattle, than by purchasing manure."—p. 11.

And this he proves, not by feeding cattle, but by fattening pigs. But now we beg to ask—where? chapter and verse, if you please, do we obtain the fact, that *per se* 1lb. of nitrogen in the food produces from 5 to 7 lbs. of live weight? Reference is given, it is true, to the article of Mr. Lawes, in vol. x. of the *Journal of the Royal Agricultural Society*. How far we find these statements, or "great principles," as Mr. Huxtable calls them, are established by Mr. Lawes, let that gentleman state himself, rather than refer to the vast number of tabular statements he has given. At page 306, he says—"It was found that although the amount of highly nutritive *nitrogenous* compounds consumed by the animal was *very large*, yet the increase produced was far inferior to that obtained from a *less amount* of them, in the case of the former series; and the results now to be detailed will still further show that the value of the food depends materially upon *other circumstances* than the per-centage of these substances in them." Take this again—"All the animals *lost weight*, notwithstanding that the weekly consumption of *nitrogenous* compounds was con-

siderably greater than in any of the other cases" (p. 314). Here again we join issue with the reverend pamphleteer, and beg to call his attention to the fact that as his case is unsupported by evidence, he is quite out of court.

We cannot help noticing, moreover, the "if" which forms so prominent a part of his principle E. It seems all his data resolve themselves into the fact that lean beef, pork, or mutton, in the animals to be grazed, must be less per pound than fat. If it is not so in fact, we come at once to the inevitable and irresistible conclusion that he cannot do what he professes—make a profit of meat at five pence per pound, and hence cannot meet "present prices." Now this he does not tell us how to accomplish; and until he does, another link will be wanting in his chain of reasoning—and bad as it is in its first premises, it seems to be also bad in its deductions.

Maugre all these, however, he makes a grand isolated Quixotic attack on all graziers, and mounts, not the Rosinante of cattle or of sheep, when he had data, but he attacks the windmill of prices mounted on the backs of 70 to 90 squeaking pigs. These were fed, sold off, and replaced by others, from June 9 to December 17—their food one-half barley, the other half lentils, tares, and beans, ground together with meal, with a certain proportion of pollard and bran. "The whole amount of food consumed was—

	£	s.	d.
Meal, 42,047 lbs., cost	135	0	0
Bran, 9,979 lbs. ,,	19	6	0
Pollard, 2,178 lbs. ,,	5	9	0
	<hr/>		
	159	15	0
Attendance	4	12	0
	<hr/>		
Total cost	£164	7	0
Whole increase of live weight.	14,467	lbs.	
Dead weight, being forty fifty-sevenths	10,152	lbs.	
	£	s.	
Meat, 10,152 lbs. at 4½d.	190	7	
Cost of food, &c.	164	7	
	<hr/>		
Profit.....	£26	0	
	£	s.	
Meat, 10,152 lbs. at 5d.	211	10	
Cost of food, &c.	164	7	
	<hr/>		
Profit.....	£47	3	

We may well say, happy Mr. Huxtable that you live in Dorsetshire! Here are 70 to 90 pigs, say 80, which must at least employ one very able-bodied man his entire time. They were kept, it appears, 23 weeks, and yet they cost in attendance only £4 12s., or just *four shillings per week*. Now it matters little to us whether, in other places, this attendance (at a season when wages are high) would

have cost at least three times as much, because it is clear that he judges himself, and that the principle of the whole calculation is so far wrong that it is quite unworthy to enter into details: nor will we question the fact by urging that possibly some erratum has occurred here which has escaped Mr. Huxtable's notice. But he has shown *profit* without either telling us the cost price of the animals, or the capital employed in feeding them; and yet he makes it a necessary part of his principle, that the *lean stock must bear a fair proportion to fat*, and complains they do not. Now if this be so, if his purchased pigs did not, then it is quite clear that his deduction of profit is a mere delusion; and yet leave this out, and the whole calculation goes for nothing!

But this only leads the rev. gentleman into conclusions which are still more fatal and untenable. One false step, especially in a principle, always involves still more fatally erroneous principles; and therefore, *assuming* that his pigs really left a profit for risk, outlay, marketing, and interest for the capital employed; assuming also his calculations as to wheat-growing, which we have shown to be fallacious, to be right; taking for granted all this, he can make the crops pay. In other words, corn may be raised at five shillings per bushel, and meat at five pence per pound.

But as wheat, only, is put as the least favourable point of view; and as pigs, and pigs, and nothing but pigs, however "grateful," will not go down with Englishmen, the rev. pamphleteer goes on to show that if we please, we may grow beef and mutton on the same terms; and hence builds up a green crop hypothesis—how correct we shall presently see. To estimate this, he takes the cost of the cultivation of 60 acres of land, a part of 300, which he makes out in the gross to be £4 9s. 4d., but charges nothing for hay for his horses, for artificial manure, or for interest of capital; and reckons the value of his green crops, not again, as the basis, of his own experience, but gives the calculations of several other persons.

First, there is Mr. Curwen, "who gives some 'remarkable' instances of increase of live weight from the consumption of clover 'to which he assigns as green food the value of £13 4s. per ton, when beef was 7d. per lb. (ought it not to be 13s. 4d.? a slight error), that is 9s. 6d. per ton, when it is only 5d.; which upon *his estimate* of 16 tons per acre, gives a return of £7 12s. apart for the manure."

Now either Mr. Huxtable believes that this "remarkable instance, given so long ago, was one generally applicable and generally true, or he did not. If he did, he is under a sad delusion; if he did not, he ought not to have printed it. But as a test, we will engage that his neighbours will sell

him all their clover crop, at half the money; and what a mine of riches he will have! Here, however; we may supply one of his omissions, that is, each of his pair of horses will consume at least two acres of clover, we must therefore add this value to the cost of production given above.

	£ s. d.
2 horses, 2 acres each of clover, = 4 acres, at £7 12	30 8 0
or 10s. per acre.	0 10 0
Interest of capital omitting when high farming prevails	0 10 0
Manure, or its equivalent, purchased at the very least per acre, <i>all being carted off</i>	1 0 0
Risk, say per acre	0 4 0
Seed	0 3 0
	2 7 0
Add to this his previous statement. . . .	4 9 4
Which gives	£6 16 4

And we refer to any practical man whether this is not vastly nearer the cost of production than the items of the rev. gentleman.

Now he next applies the turnip crop, and again quotes other authorities.

	£ s. d.
Mr. Browell estimates yellow turnips at	0 5 0
Mr. Stephenson	0 6 8
Mr. Howden.	0 7 1

Here, again, the special pleader begins his work, more worthy of the bar than the pulpit; and, taking the *highest* value, makes out a margin of £1 7s. 8d. per acre, at a crop of 20 tons. But if we add the charges particularized above, we shall find that even with doing this the green crop will be a loss to the farmer, not to mention the risk of crop, and the uncertainty of always producing—nay, the *certainty* of not always producing—20 tons per acre.

	£ s. d.
He thus calculates 20 tons at 7s. per ton	7 0 0
Expenses as given by us	6 16 4
	0 3 8

But if we take the lowest calculation of value, or 5s per ton: it will stand thus:—

	£ s. d.
Cost of production	6 16 4
Value of crops	5 0 0
	£1 16 4

Loss by the crop per acre

We need not pursue the balance sheet he gives on bases, so unsatisfactory. But we apprehend it will stand thus:—

Dr.		£ s. d.
Cultivation for wheat (see <i>ante</i>)	6 16 4	
Seed wheat 10s., less 3s.	0 7 0	
Cost of swede cultivation	6 16 4	
	£13 19 8	
Cr.		£ s. d.
Wheat 32 bushels at 5s.	8 0 0	
Swedes 20 tons at 5s	5 0 0	
	£13 0 0	

This, without any insurance or risk, leaves a loss of 19s. 8d. per acre on the entire rent, and more, on Mr. Huxtable's own assumption.

Of all the writers who have written on the present alarming state of things, we do not know one who, on all points, has so thoroughly failed as Mr. Huxtable. His premises are unsound, overstated, and baseless: his calculations are full of errors, mistakes, and omissions; and need it be said his conclusions are as unsound, as deceptive, as fallacious, as it is possible to conceive.

He has spoiled his fair fame, he has damaged himself as an agricultural teacher, he has destroyed all confidence of practical men in his gossamer-spun theories, and his pamphlet will be hurled away with the disdain of those who are mocked in their affliction and insulted in their distress. We hope he will in future attend more to his bible, and less to bucolics, will break up the spiritual fallow, will sow the good seed, will feed the flock—in short, will confine his duties to the care of a spiritual husbandman; and painful will it be if he is not more successful in that department, than in the one he likes to speak on.

We remember a late archbishop once directed one of his clergy to confine his attention to his flock, or his cattle, which was most congenial to his feelings. We advise Mr. Huxtable to attend to his people rather than his pigs, and hope he will find the former, eventually at least, more profitable than the latter.—M.

LABOUR AND THE POOR.—THE RURAL DISTRICT.

DEVON, SOMERSET, CORNWALL, AND DORSET.

PHYSICAL CONDITION OF THE LABOURER IN DEVON AND SOMERSET.

(From the Morning Chronicle.)

LETTER V.*

Before entering into a consideration of the moral and religious condition of the labouring classes in the agricultural districts, it is advisable that I should extend over a large surface my observations as to their physical and intellectual state. The group of counties of which I now propose to treat, in reference to these branches of the general inquiry, comprises Devon, Somerset, Cornwall, and Dorset. As regards the house accommodation, and the wages and diet of the labourer, I shall deal with them separately; after which I shall take a general survey of the state of education in all; and then it will be time to deal with the moral aspect of the subject—in doing which, I shall comprehend with this the other group of counties already partly disposed of. In prosecution of this plan, the present communication will be devoted to an inquiry into the physical condition of the labouring classes in the counties of Devon and Somerset.

These counties have an aggregate area of 2,797,200 acres. It would be difficult to select another district in England presenting a greater variety of surface, both as regards its general aspect and its capabilities in an agricultural point of view. Portions of it are as wild and impracticable as is the Black Mount—once a royal forest—which extends in such waste and monotonous succession from Glenorchy to Glencoe. The sterility of these parts is most conspicuous in the districts comprehended under the names Dartmoor and Exmoor. The chief value of these districts is in the pasture which they afford to sheep, and in the treasures contained in some of the spurs and ridges which shoot off from them in the direction of the estuary of the Severn. For the most part, too, they are intersected by valleys, which are cultivated generally by small farmers, some to a greater, and some to a less extent, according to their circumstances and capabilities. In other directions, we find marshy tracts, composed of the debris washed down into the sea, during the lapse of ages, from the higher grounds of the interior. These marshes are more commonly met with along the northern than along

the southern coast of the counties, and are more prevalent on some portions of the coast of Somerset than anywhere else. They constitute, however, but a small portion of the whole area, by far the greater part of which exposes to the sun a charming succession of gentle but rich alluvial undulations. In Somerset the richer tracts are chiefly appropriated to the purposes of grazing, that county having been famous for its dairy farming ever since the time when tillage was so largely superseded in England by pasturage. Somerset has, indeed, long ceased to raise sufficient grain for its own consumption. Dairy farming is also very prevalent in Devon, particularly in that part of it which abuts upon the southern boundary of Somerset, and in the neighbourhood of Totnes. But a large proportion of the land of Devon is arable, tillage being the rule, and pasture the exception, especially along the line extending from Torquay to Honiton and Axminster.

The combined population of the two counties was, in 1841, 963,000 souls. This gave one person to every 2 4-5th acres—the average throughout all England being, as frequently observed, one to every 2 1-7th acres. The great pressure of population upon surface in this district, as compared with that in the district formerly considered, is accounted for by the presence of numerous and large towns in the counties now under consideration. The number of people employed in them in commerce, trade, and manufactures, in 1841, was 120,000; the number employed in agriculture, 99,009. Of those employed in agriculture 75,392 were agricultural labourers. Of this number no less than 58,596 were adult males, upwards of 20 years of age. This, making the same calculation as in the former case, would give 226,336 as the whole number in the two counties dependent upon agricultural labour for support; in other words, about one-fourth of the whole population is thus dependent. In the four counties already treated of, the proportion was much greater, the disparity being accounted for by the employment of various kinds afforded to immense numbers of people by the seaport and manufacturing towns (the latter on rather a small scale) with which the two counties abound. In addition to this, the greater proportion of their surface which is under pasture leads to the

* Letter No. IV. appeared in the January number, page 33.

employment of a smaller number of people upon the land than would be thus employed were more of their acres devoted to the plough.

Devon and Somerset have long been classed in the unenviable category of counties presenting the agricultural labourer in his most deplorable circumstances. With Dorset and Wilts they are generally regarded as exhibiting the unfavourable—whilst Lincolnshire exhibits the favourable—extreme in the labourer's condition. Well aware of this, and of the difficulty of conquering a prepossession which may have been received on insufficient grounds, I divested myself, as much as possible, of preconceived notions, determined to judge, so far as I could, not from hearsay, but from personal observation. With this view I have been over the greater part of the two counties, and I have found the state of the labouring class to be such, in every respect, as to justify the prevailing impression.

In traversing both counties, more especially Devonshire, I was particularly struck with the utter absence of new cottages. Along the highways and byways their absence is observable; and not only this—but in many places there are abundant evidences that cottages, which a few years ago were tenanted, are now, if not altogether untenanted, going rapidly into decay. Many are so rickety and ruined, that to inhabit them any longer is impossible; whilst, as regards others, the process of demolition or decomposition has only commenced—confining the wretched tenants, who had formerly two rooms, to the only apartment which remains, and which they can with difficulty keep together. In search of these, one has not to go into remote and sequestered parts, where things are done which would not be exposed in the neighbourhood of the highways. I have seen specimens of cottages in this state along the line from Exeter to Honiton, and in the district traversed by the high road to London. One in particular struck my attention, from its dilapidated appearance, and the discomforts to which it obviously subjected its inmates. The upper part of one of the end walls was entirely away, exposing the crazy anatomy of the roof, and laying the whole of what used to form the sleeping apartment of the family bare to every tempest that swept around their miserable house. I entered this fragment of a cottage, and found the family to consist of seven. The dilapidated wall had, for some years, shown signs of weakness; but no effort was made to repair it. At length it became so shaken that the only resource left appeared to be to pull down its upper part, and leave the lower and sounder portion standing. This was done, but nothing—not even a boarding—was put to supply its place, so that the family were driven to occupy the lower

apartment only, unless they could contrive to sleep in a room exposed on one whole side to the elements. The lower room, which was about 16 feet square, with a mouldering brick floor, served as kitchen, sitting-room, and bed-room for seven people. The ceiling, which was rickety, bulged downwards, as if oppressed with its own weight—whilst through the gaping beams, with which it was replete, trickled the rain, whenever it was driven by the wind into the dismantled room above. The approaching winter will be the second spent by them in this wretched ruin. Back from the highways, and in the more secluded parishes, much of this state of things may be observed. Not only are no new cottages being erected to meet the exigencies of an increasing population, but old ones, instead of being kept in repair, are suffered to crumble to pieces—if, indeed, decay is not aided by more active means. In a parish between Honiton and the coast, a great part of which is owned by Sir Edward Elton, this process of cottage clearing seems to be a marked feature in proprietary policy. On Sir Edward Elton's property I am told that the average rate of decay or demolition is about six cottages per annum.* As each cottage would contain a family of seven on the average, the proprietor thus clears his estate of about 42 poor persons each year, unless they can find room in their neighbours' hovels, which can, in most cases, be but ill spared. By this means this estate, and others similarly dealt with, will, by-and-by, become eased of one incumbrance at least which presses upon them—a large and unemployed population. But it may be said that this process of clearing has a tendency to

* The following is the reply of Sir Edward Elton to the statement in this letter, in reference to that gentleman:—

TO THE EDITOR OF THE MORNING CHRONICLE.

Sir,—In your Journal of Saturday last, your correspondent, upon the subject of “Labour and the Poor” in the rural districts, asserts that I annually remove, upon my estate in Devonshire, six cottages, thus decreasing the population to the number of 42 persons in each year, and having for my object the diminution of the parochial burdens. I have found it necessary, during a period of many years, to take down four cottages immediately adjoining my family residence, but I have invariably afforded the occupiers more suitable dwellings. With this exception, upon my property, extending over some thousands of acres, I have never removed a single cottage. Your sense of justice will doubtless induce you to correct an error you have unintentionally been led into.

I am, sir, your obedient servant,

EDW. MARWOOD ELTON.

Brooks's, St. James's, Nov. 5.

raise wages, if its result should be to lessen the permanent charges upon the property. Into this subject I shall have occasion to inquire more at large in a subsequent communication.

Whilst, in many parts of Devon and Somerset, the process of the demolition of cottages has been going on far more rapidly than that of building new ones, the population of the two counties has been fast increasing. "We don't find room for them," said a farmer, with whom I conversed on this subject, "and they are drafted off to other places." But they are not thus drafted off in all cases; and the real effect of the demolition of cottages is to reduce, if possible, to a still lower point of wretchedness, the physical condition of the labourer. The clergyman of one of the parishes of Devon pointed out to me an addition which had recently been made to the parish church. As it stood, the church was but a small one; but the addition made to it was larger than the original edifice. "Why was the addition made?" I asked. "Because the population of the parish has increased," was the reply. This answer was obvious, and I had anticipated it, but I wished to obtain it in order to base upon it another question. "How comes it," I inquired, "that, if the population has increased so as to require so large an addition to be made to the church, there is not a single new cottage to be found in your parish?" "That is difficult to say," he answered. "It does not appear to me," I added, "that there is a cottage in your whole parish which has been built within the last fifty years." "They all seem to be of that age at least," he replied "and many much older." "And when was the addition made to the church?" I inquired. "Within the last twenty years," said he. This simple story speaks for itself. The population of the parish in question has largely increased, but the house accommodation has not increased in the slightest degree to meet the exigencies of a growing population. It is evident that the new comers were not drafted off elsewhere as fast as they came, otherwise the church might have remained of its original dimensions. The truth of course is, that most of them stayed in the parish—every cottage in it becoming more and more crowded with inmates every year. The consequences of this, both in a moral and physical point of view, are shocking to contemplate. And this is the process which is going on in more parishes than one in the counties of Devon and Somerset. Whilst population is increasing within them, not only is house accommodation not increasing, but it is actually diminishing.

The points in Devon at which I more particularly inspected the dwellings of the poor, were—in the south, in the neighbourhood of Exeter, along the line between that city and Exmouth, in the direction of Totnes, and throughout a great part of the union of Kingsbridge; in the vicinity of Axminster, between that town and Honiton, and between Honiton and Sidmouth; and in the north, around Barnstaple, and along the more northerly part of the vale of Torridge. In Somerset I examined them with some care in the neighbourhood of Minehead and Dunster in the north-west, near Bridgewater in the centre, and about Wells, Chewton, Mendip, &c., in the north-eastern part of the country. In the great majority of instances I found the condition of the cottages to be deplorably bad. It is not to be denied that I encountered some, and even many exceptions. At many points there were cottages to be found well situated and commodious, but they were exceptions to the general character of the peasant's dwellings. My present object being to state the points at which accommodation is deficient, it would be unnecessary for me to dwell upon those instances in which I found it good, even were they more numerous than they are; and if, in what follows, I pass them without notice, it is because of their being merely exceptional.

It is impossible fully to estimate the wretchedness to which the inmates of the hovels which meet the eye at all points are exposed without a close personal inspection of them. We are accustomed to associate with the idea of a country village, or with a cottage situated in a winding vale, or hanging upon the side of a rich and fertile slope, nothing but health, contentment, and happiness. A rural dwelling of this class, with its heavy thatch and embowering trees, makes such a nice pencil sketch, that we are naturally inclined to think it as neat and comfortable as it appears. But to know it aright it must be turned inside out, and its realities exposed to the gaze of the observer. Could the internal be always given with the external view it would moderate our enthusiasm for the little sketches which work so early and so powerfully upon our fancies, and which are suggestive of nothing but contentment and happiness. How often does the cot which looks so attractive and romantic on paper conceal an amount of wretchedness, filth, squalor, disease, privation, and frequently of immorality, which, when exposed in their reality, are perfectly appalling! And as to health—nowhere, perhaps, is the pure air of heaven more tainted than in the neighbourhood of these rustic dwellings. You will encounter odours in a country village which it would be difficult to match in Westminster or St. Giles'. Indeed, the most sickening and offen-

sive that I ever came in contact with had nestled themselves on the summit of Beacon-hill, in the neighbourhood of Bath. It is high time that people divested themselves of the false impressions too generally entertained of the character of our rural cottages. They are chiefly drawn from descriptions which at one time may have suited the reality, when the condition of the agricultural labourer was much better than it is now. For that it was much better than at present is evident from the information derived from a variety of valuable sources. To go a considerable way back, we find Fortescue alluding to their condition in his day as one of great comfort and happiness, inasmuch as they lived chiefly on butcher's meat, of which they had plenty, and had abundance of good ale with which to accompany it at their meals. In regard to their diet at least, their condition now seems the very reverse of what it was then; and as it is impossible that they could have fallen back so much in this important element of their physical condition without having all the others deteriorated in proportion, it is fair to infer that their house accommodation was better formerly than now. It was better in this, if in no other respect: that fewer people were to be found under one and the same roof—a state of things much more favourable to health, cleanliness, and good morals, than that which now prevails. We must, therefore, judge of the labourer's condition, not from past descriptions of it, but from the sad realities of the present hour.

Between Exeter and Exmouth I found several cottages of a very low order, although not exactly of the worst description. East of Exmouth, and in the direction of Sidmouth, they were, in many instances, of an inferior description to those in the locality just named, being, in many cases, so overcrowded as to render almost impossible the preservation of health. In many instances I was deceived by the exterior of their hovels; for here, as elsewhere, they have recently been cleansed and white-washed in anticipation of a visit of the cholera. They therefore look at present, when only examined from the outside, much more attractive than they did two or three months ago; requiring an inspection of their interior to dispel the illusion which many of them, with their sparkling white walls, no matter how low and ricketty they may seem, are calculated to produce. The cleaning which they so extensively underwent was not confined to the outside, but in the great majority of cases it would already be difficult to tell that the inside had been touched at all. I was scarcely prepared for the extent to which dung heaps were to be found close to the dwellings. When the drainage is bad, which is too often the case, and when there are a pig-stye and a dung-heap attached to a cottage, the

character of the atmosphere inhaled by the inmates may be easily conceived. The practice of keeping a pig is, in some counties, much more prevalent than in others. It is a boon, in one sense, to the labourer where he can keep one: but, in another, it is a nuisance of the first order. When he has a patch of ground attached to his house it is almost invariably so small that the pig-stye, if not directly under his window, is not removed to the distance of thirty feet from it. The system of giving field allotments, too, has to some extent affected injuriously the sanitary state of some of the villages. These allotments are not universally granted; but where they are so, the land is generally well manured, the garbage used for this purpose having been collected for months at the very doors of the allottees. I have been told of several instances in which a decided change for the worse has thus been wrought in the sanitary state of village communities. Previously to their procuring allotments they had but little or no inducement to collect manure: but since they have been granted to them it is one of the conditions on which they hold them that they shall be well manured. Besides being compelled to manure them well, they are themselves anxious to do so, inasmuch as they pay tolerably high rents for them, and are therefore anxious to get as good a return as possible. It thus happens that either from the want of accommodation or from the absence of inclination to keep the neighbourhood of their dwellings clean and healthy, they collect the filthy heaps at the ends of their houses, and sometimes close to their very doors—so close, indeed, that you occasionally step upon them in entering the cottages. This is certainly no argument against the system of allotments, which is an admirable one in many points of view; but it shows how much has to be done to improve the condition of the class in question. It is not enough that a movement is made in their behalf, in this or that particular direction. Their condition is so wretched and low that unless several movements are made in different directions for its improvement, the very measures which are designed to ameliorate it are accompanied with evils almost as great as those which they mitigate.

In some of the small valleys in the undulating district around Totnes I found several specimens of the worst description of cottages. Indeed it was a matter of surprise to me that some of them were inhabited at all, notwithstanding the miserable accommodation with which a labouring family will put up. The same may be said of the district, both in Dorset and Devon, lying around Axminster. Here the population is very dense, both on account of the clearing system having been carried to only a trifling extent, since few of the parishes around

are close parishes, and of the demand for labour which at one time existed in Axminster, when it had some pretensions to being a place of manufacturing importance. But it is no longer so. Who hears of Axminster carpets now? The population which formerly collapsed upon the town has recently been thrown back again upon the adjoining parishes, in such numbers as to have a sensible effect both upon wages and rates, and to raise the value of cottages, whilst they have trenched upon their accommodation. I have been told of more than one instance in which this has taken place. As new cottages were not at first built to meet the increasing demand for them by those returning to their parishes in search of employment, many persons were obliged to lodge with those occupying such dwellings as existed. For this accommodation they of course paid so much per week; the result of which was, that the price of cottages was raised in some cases to the tenants. If a small family could accommodate two or three lodgers, which they frequently did, a considerable addition was made to their weekly receipts; and as this addition came from the cottage, the landlord compelled them to share its enhanced value with him. In some cases in which this was mentioned to me, the tenants looked upon this increase of rent as the work of stewards or agents alone; in others they were of opinion that the proprietors not only sanctioned, but enjoined it, with a view, if possible, of driving the poor people away, so as to get rid of the cottages. I inquired of several of them if they felt very generally the inconvenience of overcrowding, and if it had recently increased. They replied that it was the greatest inconvenience suffered by them, and that of late its increase had been very great, both from the natural growth of population and from the large addition which had been made to their numbers within the last few years, from the decay of manufactures in Axminster. In one hovel with two rooms I found no fewer than eleven people. The sleeping apartment was upstairs as usual, directly under the thatch. There were three beds, two of which were on the floor. In that having a bedstead slept the father and mother, and two children—a not uncommon arrangement—the remaining seven occupying the beds on the floor. The eldest of the family was a girl 16 years of age, the next a girl about 15, and the third a boy of 14. They sometimes had a large tattered shawl hanging between the bed occupied by the parents and those on the floor, but in winter they generally had it down to serve as an additional covering for the children. The family was scarcely ever free from disease, the younger children being pale and emaciated, and diarrhoea being a very common ailment with them all. Their diet was

scanty, and the situation of the cottage bad. There was no drainage, and in wet weather a strong infusion of manure from a neighbouring dung heap would trickle in at the cottage door. They were dirty in their habits; but to have kept their house anything like clean would have required so constant and energetic a warfare with filth that they shrunk from engaging in it. In addition to this, the greater portion of the time of the elder members of the family, including the parents, was occupied in the fields; and when they came home at night from their toil they were too fatigued to address themselves to the task of keeping their house in decent order. It will very often be found that the filthy state in which cottages are kept arises more from the habits of the inmates than from the character or situation of their domicile; but habits, if not exactly formed, are greatly influenced by circumstances. The circumstances of the agricultural labourer are such as frequently to call away from his home to work in the fields those whose proper duty it is to stay at home and keep the house neat and cleanly. But this necessity of his lot should only stimulate landlords to do all in their power to surround him with facilities for, and incentives to cleanliness. This some landlords are doing on an extensive scale, and in a judicious manner. I have been given to understand that the Duke of Bedford has ordered no less than £16,000 to be expended in the erection of new cottages on his property in the vicinity of Tavistock, and in the mining district within the Cornish border. The plan on which these cottages will be built will be very commodious, and in this respect many believe that his Grace is going somewhat too far. Unless the labourers inhabiting them be placed in a position to live comfortably without taking in lodgers, they are certain to do this; and to accommodate them they will, in a cottage having three bed-rooms, crowd the family into one room, so as to leave the others vacant for such a purpose. I have known numerous instances of this throughout the counties which I have traversed; families of eight or nine, and sometimes more, being packed close together in one room in a cottage with two bed-rooms, the other room being occupied by lodgers. I have also, as already mentioned, found a lodger occupying the same apartment with the family in cottages having but one bed-room. So long as the necessity exists for making their house a source of profit to them, so long will spare room, if they have much of it at their disposal, be unavailingly bestowed on the labourers and their families.

LETTER VI.

In continuation of the subject of my last letter, I now proceed to furnish the reader with a detailed

account of what I witnessed in the house accommodation of the labourers in portions of the district of country now under consideration.

Of all the cottages which I inspected, it was in the neighbourhood of Honiton perhaps that I encountered the most wretched specimens. Between that town and the sea stretches a rugged and sequestered district, varying in width from eight to ten miles, which I was advised to traverse, as it might discover to me phases in agricultural life not very generally exhibited along the high roads. Between Exeter and Honiton the country is divided into long and broad valleys, hemmed in by ridges of hills well cultivated to their very summits; but the district in question has a broken appearance, resembling that of a tumultuous sea. The deep valleys are narrow and irregular—the uplands, which are high, sometimes assuming the form of crooked ridges, and at others rising in isolated and conical hills. The land is light and stony, and is cultivated far more extensively than thoroughly. The summits of the hills and ridges are, to a great extent, covered with copsewood, which sometimes stretches down their sides in broad belts into the valleys beneath. The roads are exceedingly uneven, and in some cases almost impracticable. The streams are no longer lazy and turgid, but rush merrily along to the sound of their own music over pebbly channels, clear and pellucid in their waters, as are the more impetuous torrents of the north. They frequently intersect the roads—when they have to be forded, bridges being but rare conveniences in the district. Sometimes, after heavy rains, they render the roads impassable for hours. You are scarcely a mile from Honiton, ere you enter this lonely and sequestered region. Your road leads you now to the hill top, now to the bottom of the valley, and then to the hill top again. The rough and stony track which you pursue is generally flanked by high and crumbling banks, overspread with the ivy, the young oak, the holly, the fern, and the bramble. In short, it is difficult to believe yourself any longer in busy and enterprising England—so sudden and so complete is the transition from one of its main thoroughfares to this lonely and secluded district.

Almost throughout its whole extent the condition of the labourer is one of extreme privation. In parish after parish which I traversed, the evidences of this accumulated upon me. But there was one spot in which the complicated misery which I witnessed seemed to culminate. It was the village and parish of Southleigh.

The parish is one of considerable area, but of very limited population. Indeed, it was difficult to understand where or how the 350 souls inhabiting it were housed; for, with the exception of the small

village which it contains, but few cottages of any kind were to be seen in the parish. To the village I directed my footsteps without delay, approaching it from the brow of one of the high hills which encircled it on all sides. The deep glen at the bottom of which it lay was well wooded, and it was not until I was close upon the village that I discovered any traces of its vicinity. First came the grey square tower of the parish church, which peered over the tree tops—then the thin subtle smoke of wood fires mingling with the foliage—and lastly the cottages themselves, with their mud walls and heavily thatched roofs. On descending to the road which leads through the village, I found a woman of about 50 years of age, engaged with a pitchfork collecting some straw at the corner of one of the houses. I remarked that the day had been fine—an observation which she seemed to think so commonplace that she scarcely deigned to reply to it. But there was more than this; for both her tone and manner betrayed that she entertained towards me a mingled feeling of suspicion and dislike. I stood looking at her; but she turned her back upon me, and worked all the harder, as if she wished me to understand that the brief interview was over.

“You seem to work very hard,” I observed, determined, if possible, to draw her out—“What are you doing that you are so earnest about?”

“Gathering straw,” was her categorical reply.

“What are you gathering it for?” I asked her.

“For the pig,” said she.

“Do you keep a pig?” was my next query.

“Yes,” was all that I got by way of answer.

“What are you going to do with it?” I demanded—“are you going to sell it?”

“We are going to salt it,” said she.

I thought her phraseology rather expressive, and ventured upon a smile, at which she did not seem altogether pleased. Resuming my queries, I asked her when she would kill the pig, but to this I received no answer—it apparently occurred to her that she had been altogether too bland and communicative, and so she withdrew once more within herself.

“Whose tenant are you?” I asked; on which she turned hurriedly around, and looked at me with a deep scowl, accompanied by a flourish of the pitchfork, which reminded me what vulnerable creatures we are. I shrank back a little, so as to be out of arm's reach of her.

“I meant not to offend you by the question,” I added. “I merely wished to know if you were one of Mr. Gordon's tenants.”

“I be,” said she, in a tone and with a hastiness of manner which showed that I had failed to pacify her. She resumed her work; but, after a short

pause, turned round to me and said, "Are you the gen'lman that called on me some time ago?"

"Not I, my good woman," said I; "this is the first time that I have ever seen you."

"Didn't you call on me for the key?" she continued.

"I was never here in my life before," I rejoined, somewhat puzzled at the direction taken by her inquiries.

"Didn't you come for the key, when I refused to yield it up?" she asked, still endeavouring to identify me with a transaction of which I was profoundly ignorant. I reiterated my former denial, which seemed at last to satisfy her; for, leaning on her pitchfork, she exclaimed, with a loud laugh, and a total change of manner, "Good luck, I took you for the attorney's clerk, who was sent here by the squire to get the key."

This explained to me at once the unwelcome nature of my reception. It appeared that, some time ago, a summary process of ejection had been attempted against her, in which the clerk of a neighbouring attorney played a rather conspicuous part, and which she stoutly resisted, treating the clerk at the same time, according to her own account, to sundry epithets not very flattering to his vanity. From a similar infliction I was only saved by the timely discovery that I was not the identical individual, or another visiting her under similar circumstances. "Excuse me, sir," said she; "it's some time since he has been here, and we so seldom see strange people here that I thought you might be he."

Once established in her confidence, I proceeded to question her about her domestic circumstances, and found her as garrulous and communicative as she had been taciturn and reserved before. Having scraped together an enormous fork-full of straw, she threw it over her shoulder, and informed me that if I wished to learn any more from her, I must follow her to the pig-stye. I had no objection, and did so, ascending for a few steps one of the roads leading up the hill, at the side of which was the residence of the family pig. Having deposited the straw in the stye, and spread it into a comfortable litter for the pig, which she scratched for some time on the back—addressing it, at the same time, in a language which it seemed to understand, but which I didn't—she turned round, leant again upon the fork, and waited to be interrogated.

"Why was the key demanded of you?" I asked her.

"Because we didn't pay no rent," said she. "We didn't pay for a twal'month."

"And why did you not pay?"

"Because the house isn't fit for a pig to live in,

let alone a Christian," she replied, with great indignation.

"Can I see the house?" I inquired.

"I'll show you every bit of it, if you just step down," she rejoined; "and if you think it's a place for Christian people to pay rent for, you ought to be a squire yourself."

"But do you think all the squires bad?" I asked her.

"I can tell you who isn't good," she observed; "and I suppose they are all like him."

"Do you intend to pay no rent?" I inquired.

"I have paid it before, and must pay it again, I suppose," she answered.

"How long have you resided here?"

"Twenty years."

"In the same house?"

"Yes," said she, "in this piggery for twenty years."

We had by this time gained the house, but before entering I thought it as well to examine its exterior. It was a cottage, containing, like too many others, but two rooms; the walls were of mud, or rather of what is called "cob"—a kind of mixture of mud and small stones. The roof was of thatch, and had been recently repaired in parts. Each room had but one window; that in the upper room, which was in the gable end of the cottage, being extremely small. On three sides of the house there were great cracks or fissures in the walls, all of which added to its discomforts, and one of which positively endangered its stability: it was in the front of the cottage, near one of the corners, and ran from the thatch to the ground, occasioned by the end wall having fallen considerably from the perpendicular. I asked her if she was not afraid that the house would come down about her ears. She replied to the effect that her apprehensions had been blunted, as they had been excited by the same cause for the last ten years. I then entered the hovel.

Bad and unprepossessing as was its exterior, it did not half prepare me for what I witnessed inside. The chimney stalk was at the side of the door, and its side formed with the wall a small passage, about five feet long, at the end of which was another door, suspended upon one hinge, which opened into the lower apartment. In the recess formed by the other side of the chimney stalk and the opposite wall was the window, so small and so situated that it threw but a shabby twilight into about one-half of the room. The other half was equally lighted when the door was open; but when it was shut it was in such a gloom that it was scarcely possible to discern the objects which it contained. I requested her to leave the door open, that I might see to more advantage, but chiefly—although I did not tell her so—that I

might have the benefit of the fresh air, to counteract the sour and sickening smells which were rife within. The ceiling, which was blackened with smoke, was so low that it was only between the small rafters that I could stand erect with my hat on. The fire-place was of an enormous size; but although the day was cold and raw, there was not at the time a spark of fire upon the hearth. There were a few chairs and some tripods, in the shape of stools; about and within the ample fire-place was a bit of log, supported on four rude legs, which formed a kind of bench, on which about three could sit at a time, sheltered by the chimney-stalk, in which they sat, from the drafts which pervaded the room in every direction. At one corner was an empty barrel, which answered the purposes of a table, and close to it an old deal chest, over which were two or three shelves full of crockery of all shapes, colours, and devices, and in all stages of fracture. Hard by was a large black-looking tub, in which there was a quantity of flour which had recently been sifted from the bran. In the centre of the room was the moiety of an old round table, at which the family partook of their meals. What these were will be afterwards mentioned. In the deep recess occupied by the window sat the eldest daughter of my guide, working hard at the lace-cushion, taking that position as the one which afforded her most light in the room. A good deal of the fabric known as Honiton lace is manufactured here. Some time ago it was understood that the Queen had given an order for some, and a portion of that prepared for her Majesty was wrought in the parish of Southleigh. The poor creatures (women exclusively being thus employed) were quite proud of their commission. "They tell me that the Queen is to have it as curtains for her bed," was the information which they frequently conveyed to those inquiring in reference to the subject. The floor of the hovel was of mud. It had never known the covering of quicklime and sand, which frequently forms the flooring of the cottages, and which is to be seen in some of those in the village. Towards the fire-place it descended so as to form a tolerably deep hole, in which water not unfrequently collects, and which has been prevented from deepening still further by a species of rough causeway work with which it is lined. With this exception, you trod nothing, whilst in the lower room, but the cold clay which formed the uneven flooring. I hesitated ere I ventured up stairs. The family was not large, as most of the children were grown up, and were aloft on the world for themselves. But there were still five at home—the father and mother, a young man of 21 years of age, a girl of about 18, and another girl of about 13. The five slept in the room above. In this

instance it was more the chamber itself than its furniture that was at fault. It was wretchedly lighted, and the room seemed, in places, to be falling in. To ventilation it was an utter stranger. The crazy floor shook and creaked under me as I paced it. The bedroom was approached by a few broken steps, which rose to it out of a dark recess opposite the door, and in which were stowed away a few pots and pans, some small bundles of faggots, pieces of broken furniture, and a few implements of labour.

"What do you think of it now?" asked my guide, after I had emerged into the light and fresh air; "is it fit for a pig to live in?" With its cracked walls, its clay floor, its imperfect light, and unwholesome atmosphere, I certainly could not say that it was fit to be the abode of a human being. "What rent do you pay?" I asked. "A shilling a week," she replied—a rent for which, in many places, the labourer has a very comfortable home.

The next cottage which I inspected was situated directly opposite the one described. As in that case, the walls were of cob-work, and the roof of thatch. It was one of two cottages which were attached together. The door was in the gable end, which faced the main road. Like that just visited, it had but two apartments, one above and the other below. What struck me before entering was the condition of the window designed to admit light into the lower room. The aperture in the wall was about two feet high and about fifteen inches wide. This was occupied by a leaden window-frame, with small diamond-shaped panes. Some of them were filled with glass, some with brown paper, and others with rags—whilst a large piece of rusty sheet-iron occupied the place of several of them which had been broken. It was difficult to recognize it as a window. Small as it was, only about one-half of it was serviceable for the admission of light, the only purpose to which the other half was applied being the exclusion of fresh air. I entered the cottage, and on my eyes becoming accustomed to the twilight within, I found myself in the presence of five small children and a woman who appeared to be their mother. The floor, as in the other case, was of clay, and the ceiling so low that I had to stoop to walk about. The cottage was, in every way, as wretched in its appearance and accommodation as that which I had just quitted—whilst the general condition of its inmates was much worse than in the other case, seeing that the family was comparatively large, and all the children of so tender an age that they could not work. I asked to be shown up stairs, and groped my way to where I supposed the staircase to be. But instead of a flight of steps, no matter how rude or unsteady, I came in contact with what seemed to

be a perpendicular ladder, which led through a hole in the ceiling. On inquiring if this was the only means of communication with the upper apartment, I was informed that it was. It was up and down this that children of two and three years of age had to climb up daily, to get to and from their miserable dormitory. The poor woman observed that she was in daily dread of some accident happening, especially to the younger children, in their ascents and descents. It was not an uncommon thing for them to tumble, especially on endeavouring to descend; but hitherto such mishaps had not been attended with any serious consequences, for the clay floor on which they fell was generally moist and soft. As for herself she did not much care about it, having become accustomed to it; but it was rather a difficult job to go up and down when she had a child at the breast. She had not the means herself of improving her staircase or repairing her window, nor was her landlord disposed to aid her in so doing.

The cottage attached to this had rather a sad story connected with it. It was built of precisely the same materials as its neighbour, and was of about the same dimensions. The end looking upon the hill behind the village had been overgrown with ivy, which had been cut down, as it was supposed that it rendered the cottage damp. The dead wood of the mutilated parasite was still thickly imbedded in the wall, as it could not be pulled out without endangering the stability of the edifice. On scanning the wall closely, one could see near the angle of the roof a square hole, in which there was a casement with four panes of glass. The whole window did not look more than fifteen inches square, yet it was all the means by which light was admitted into the upper chamber of the hovel. There was no tenant occupying it at the time, the door being locked—nor is it likely that it will ever be opened again for the admission of another occupant. In the course of a few more years, it will be another cottage blotted from the face of England. Its last occupant had died about a month before. She had been long an invalid, and was removed, shortly before her last struggles, to a cot not far distant, that she might not die alone. About the close of last year, as I was informed by some of the villagers, she was frequently visited by the lady of the vicar of the parish, of both of whom they all spoke in terms of the greatest kindness and affection. Her malady was increasing, and she was then confined to her bed in the upper room of the cottage. On the occasion of her first visit to the invalid, this lady is reported to have said to her, "Betty, do you not feel this room too cold for you?" "Yes," she replied, "I do; but you see there is no glass in the window, and it has been so

for a long time." It was as she represented. There was not a single pane in the casement. The temperature without was consequently that within. The wind rushed in whenever there was any stirring; the rain, when it fell, encroached upon the floor, and sometimes upon the very bed; and on stormy winter days, when the snow was driven before the blast, it would enter at the open casement, and form tiny wreaths upon the floor. "And was it allowed to remain open?" I asked my informant. "It would have been, sir, but that the vicar had it glazed at his own expense," was the answer. And who was she whose last sickness was thus aggravated by the cruel discomforts of her home? One who for five-and-twenty years of her life had been a faithful servant to the squire! Her reward, on becoming superannuated in the service, was the liberty to occupy this doomed cottage rent free. We hear of horses which have served their owners long and faithfully been pensioned off upon the best pastures for life. During my peregrinations through Oxfordshire I was told of the case of one horse which had served its master so long and well that, after he could no longer eat grass, he had it fed on slops, and finally on sugar, to prolong its existence. It died at last in a comfortable stall. But there was no such sympathy in store for poor "Betty" in the day of her extremity. I was anxious to see the room in which this forlorn invalid had lain bed-ridden for so many months; but I could not do so, as the door was locked, and all entrance prevented. I could, however, see into the lower apartment through the window—it was like the rest, "not fit for a pig, let alone a Christian, to live in."

The next cottage which I entered had a more promising look about it. In the extent of its accommodation it was no better than the other, but it had a hard dry flooring of lime and sand, and was kept clean by a tidy little woman, who was nursing a child on my entering. I found, however, that her means were superior to those of most of her neighbours—her husband being a carpenter, and earning the wages, not of the labourer, but of the artisan.

I crossed the road, and entered another hut, which overlooked the churchyard. It had two apartments below, and but one, I believe, above. The outer of the two lower apartments seemed to be abandoned by the inmates, and looked as if it would have been applied to the purposes of a storehouse, had there been anything to store away in it. I passed through it to get to the inner apartment. Everything was grim and black, the ceiling being low, and the floor composed of earth. The water was trickling in different directions about it: and no wonder. The aperture which contained the

window was divided into three parts, something like a Venetian window, by two perpendicular pieces of wood, which formed the staple of the casement. There was neither glass nor sash in the middle portion, nor had there been since it was tenanted by its present occupants, which it had been for many years. It was open winter and summer, except when they chose to close it up with some opaque substance, which they seldom did, as they would be thereby deprived of light. One winter it was intensely cold, and they had it boarded up. It remained so, however, but for a very short time, for the board was soon taken down to be burnt as firewood. Immediately below the open window was a cradle, in which an infant was being rocked. It was nothing but a black greasy box, shattered a little on one side, and placed upon a couple of rough rockers. The child was covered by what appeared to be a tattered horsecloth. Only a few days before, I had inspected a workhouse, where I was shown the apartment which served as a nursery for the children. What a contrast did their comfortable circumstances present to the wretched accommodation of this child of honest and industrious parents! I remained below whilst one of the family went up stairs to show me the state of the ceiling. There was scarcely a plank but seemed to yield under her feet, whilst the seams which extended along the floor at one corner were so broad as to expose to those above everything going on below. The first thing which meets the squire's eye on coming from church is this ruinous hovel with its ever open window. He certainly cannot plead ignorance of the condition of his tenants.

I next visited the house of the blacksmith of the village and clerk of the parish. He was a fine sturdy old man, who had brought up a family of thirteen without ever coming upon the parish. His youngest son, a strapping lad, was working in the smithy along with him. He had got almost all of them well settled in the world, although his difficulty in bringing up so large a family had been greatly increased by the liability of one of his daughters to epileptic fits. His wife was a hale and respectable-looking old dame, who kept his home clean and in order; a circumstance to which alone it owed all the comforts of which it could boast, for in its style and general character, although somewhat larger, it was little better than any of the rest.

My next visit was to a small tenement divided into two dwellings. At one end was a small excrescence, which had the semblance of a shed or wood-house. It had evidently been taken for such by peripatetic bill-stickers, for the door leading into it was plastered over with "posters" of all sizes and characters. It nevertheless formed the ante-chamber to the dwelling of one of the families oc-

cupying the house. On entering I found the floor paved with small stones, after the fashion of a rough and irregular causeway, with a kind of gutter in the centre to let the water run off, for the house lay low and was very damp. Passing through this, which seemed to serve the purposes of a lumber-room, I entered the "day-room" of the family. It was more comfortably furnished than I expected to find it, especially as I had been informed that the tenant had been disabled for some time by rheumatism from working. How a rheumatic patient could expect ever to recover in such a place was to me a mystery, for the earthen floor was quite damp and cold after the rains which had recently fallen. His wife was seated at the lace-cushion by the window, working very industriously, but complaining of her head. Beside her sat a young girl, also with a lace-cushion before her, engaged in making large sprigs, which were to form part of a bridal scarf and veil for some fair lady who was about to be led to the altar. There was still another in the room—an old man, who sat in a corner by the window, sewing a piece of flannel. He was about sixty, but looked older. A few grey hairs still clung to the sides of his head, just above his ears, but all the rest was bald. He had on the top of his head a scar, which was partly hidden by a piece of dirty sticking plaster. He continued his work, but in a most unworkmanlike manner, apparently taking no heed of anything passing around him. I stepped up to him, and asked what he was about, to which he replied that, having nothing to do out of doors, he was employing himself by "doing a bit of tailoring." The whole picture was a curious one: the rheumatic invalid seated by the feeble fire, his wife and daughter working busily over their lace-cushions at the window, and the old man making a waistcoat for himself in a way which plainly showed that "tailoring" was not his vocation. Had the accommodation been better, it would not have been, on the whole, an unpleasing one—but the cottage was one of the worst description, although everything in it in the shape of furniture was neat and clean. The dwelling adjoining it had a better entrance, but the accommodation which it afforded was not a whit better. Here, also, the lace-cushion was in requisition, and the inmates were subject to rheumatism, from the dampness of the floor, which, like that of most of the other houses, was of earth. A part of it looked as if it had been recently under water. On inquiry, I found that it had been so—as it was more or less, indeed, after every heavy rain. In these cases the water was removed by soaking cloths in it, and wringing them dry out of doors. These last-mentioned cottages, with one or two others, occupied the lowest ground covered by the village. Until recently their unwholesomeness and other

discomforts were greatly aggravated by a broad stagnant open ditch, which exposed its putrescent contents on the other side of the road. The offensive smells which used to emanate from this hot-bed of pestilence were spoken of by the inmates as something incapable of description. "You should have tried them, sir," said a woman who had waxed eloquent on the subject. I told her that I could fancy what they were, and would content myself therewith. Yet, bad and pestiferous as was the malaria engendered by this reeking abomination, it was never removed until the vicar took the matter up. The reader will at once see that in this respect the case of South Leigh is parallel to that of Sutton Courtney. He had the ditch covered over, the filthy volume which used to stagnate in it being now carried off by means of an iron tube sunk a foot or two below the surface. In addition to the gain which this has been in point of health, it has been attended with this other advantage, that it has added materially to the width of the road, at a point where more room was wanted, owing to a sharp turn which had to be taken round the end of one of the houses.

After visiting a hovel situated in the midst of some copsewood, a little distance up the slope of the opposite bank, and in which the inmates were obliged, whilst working at the lace-cushion, to place boards under their feet to protect them from the cold wet floor, I betook myself to the residence of one of the farmers of the neighbourhood. In this part of Devonshire the number of "small farmers" is very large. This gives rise to many evils, some of which will be alluded to in a subsequent communication. How far they retard the progress of the agricultural labourer may be inferred from the simple fact, that in many cases they are contented with house accommodation little if at all better than that of the labourer who is so badly housed. The person in question was one of this class. He was an elderly man, of rough exterior and stern character. During the war, an endeavour was made to force him into the militia; but having no taste for military glory, he put a stop to all the persuasions of the authorities, and to the suggestions of patriotism, by chopping off a part of the forefinger of his right hand. This disabled him from manipulating a musket, but it did not prevent him from handling the plough. He has ever since farmed in the neighbourhood on a small scale, in doing which he has amassed a little money. His house was some distance up the hill; but although it might have been well and easily drained, it was scarcely drained at all; for at one end, and partly in front of it, filthy solutions had accumulated to a disgusting extent. They were powerfully impregnated with an infusion of a rotten dung-heap, which

supported itself against the gable end of the house. His wife was ill of a mortal disease. She was able to sit up, and was accompanied by her sister, who had come from some distance to see her. They were both seated within the huge chimney stalk, at the back of which burnt a more ample fire than I had seen in any of the other houses. Behind them, and as it were on one side of the stalk, was a window, which lighted up the huge fire-place. On my suggesting that such was hardly the place for an invalid, I was told that it was selected as the most comfortable part of the room. Every now and then a puff of wind would come suddenly down the chimney, and envelope the invalid and her companion in smoke. The house was in no respect better than that of many an agricultural labourer of the class not the most comfortably housed; but it was in some respects superior to most of those in the village below. The lower room had, for instance, two windows, instead of one; its floor was of lime and clay, which kept it hard and dry, and there was a little more room between it and the floor of the upper chamber. It also contained more furniture; that which it had being cleaner and less mutilated than the furniture in the other houses, but in all other respects—in size, in general appearance, and in style and design, and in its external accompaniments—it would have been difficult to distinguish it from the rest. It was anything but what one would picture to oneself as an English farmer's home. A little lower down the hill was the residence of another farmer, who cultivated on a somewhat larger scale. It also contained an invalid, a young man, who was just recovering from an acute rheumatic fever. When I entered he was expecting a visit from the clergyman, who also acted the part of physician to his flock. The house was a degree better than that last alluded to. There was a spacious yard in front, surrounded by a number of out-houses. In the midst of it was a filthy pond, surrounded with manure and garbage of every kind, from which proceeded an atmosphere which it weakened one in every joint to inhale. When farmers themselves are contented with such hovels, it is no wonder that they think the agricultural labourer sufficiently well off in his den, or that the landlord—perhaps taking the farmer's notions of comfort as his standard—does nothing towards ameliorating the condition of his humbler tenantry.

For all the hovels described—as well as for others of which they may serve as specimens—rents are paid. In amount the rents vary but little from each other, and they are in general far too high. For the same rent that is paid for these cottages, accommodations on a much better scale are enjoyed by the labourer even in Wiltshire. But few of the cottagers at Southleigh have gardens at-

tached to their houses. Most of them have small field allotments, which are supplied to them by the vicar, at a reasonable rent. In these they raise cabbages and turnips, and, but to a small extent now, potatoes. The failure of the potatoes for several successive years has occasioned the people to lose their former faith in them. They regret, however, not having planted more this year, seeing that the crop has been, generally speaking, both abundant and good, and that they find it difficult to make up for the want of them, turnips being but a poor substitute. The average rent of the cottages is about 50s. a year.

The name of the landlord whose tenantry are so deplorably circumstanced is, as I have already stated, Gordon. It is now many years since he came into possession of the property, which he did by purchase. I was given to understand that there was not a cottage in the parish then which was not in a far better state than it is now. They have been gradually going to wreck and ruin—but little, if any effort having been made to save them; and all this time, as already stated, the population has been increasing—so much so, indeed, as to require a large addition to be made to the parish church. The cottages have been getting more and more crowded every year, and the whole condition of their inmates more and more wretched. The mansion of the proprietor is about a mile from the village, and is known as Wiscombe Park. For several years after he took possession he resided at the Park—a course which had a very sensible effect upon the employment and comforts of the villagers. But for many years past he has chiefly lived in the neighbourhood of Exeter. His son, however, has recently been residing for some months at the Park, and his presence was of considerable advantage to the poor people. Mr. Gordon has lately revisited Wiscombe; but, should he leave, and his son not re-occupy the house, the condition of the poor will be one of extreme privation during the winter. For some time past, in their hour of difficulty and sickness, they have had none to whom to look for advice and relief but the resident clergyman and his family. The living is but a small one, and it is very hard that the incumbent should be called upon to bear unaided so grave a responsibility and so heavy a burden.

I mention this case in all its circumstances, because it is one of the most striking that has presented itself to me, and because it illustrates, though perhaps to an extreme degree, much that is going on in many parts of the country, to alienate the affections of the poor from their social superiors. In Southleigh and its neighbourhood I could trace but too clearly the extent to which this alienation was going on. Mr. Gordon is not the only pro-

prietor in the parish, though he is the principal one, and the village belongs to him. Of none of the parish squires—nor, indeed, of any of the surrounding proprietors—did the villagers speak either with respect or affection. On inquiring into the origin of this hostile feeling, I invariably found that it was traceable to a belief that the proprietors cared not what became of the labourers. Even apart from those considerations of duty and benevolence which should prompt a landlord to bind himself with his people in the strong bonds of a mutual sympathy, the calculations of prudence should suggest the adoption of a humane and considerate line of conduct. I have been astonished at the extent to which I have found Socialist doctrines prevailing amongst the rural poor. They know nothing of Socialism as a distinct political theory; but its principles have made their way amongst them to a considerable extent—their progress being promoted, if it was not originated, by the daily contemplation of their own wretched lot. They contend that they have “a right to live, and to live comfortably, as well as the best of them”—and they begin to reason with themselves that they cannot do this until land is treated, not as a property, but as a trust. They have at present no organization or mutual understanding by which they might attempt to carry such doctrines into practice; but they are becoming more and more imbued with these sentiments, and many of them will tell you so.

I cannot say that I witnessed anything in Southleigh absolutely worse than what I have met with elsewhere. But nowhere else have I seen a whole community, although it is but small, in so deplorable a plight. Such instances are most likely to be found in close parishes, where the work of cottage clearance is going on, and in districts which at one time contained a focus of manufacturing activity, but the industry of which has since been paralyzed. This is the case in the neighbourhood of Axminster, as already stated; and in the north of Devon, near the lead mines, which have recently become extinct. They are also occasioned by the sudden growth of a manufacturing or mining interest in the midst of what was formerly a purely agricultural district, causing the sudden concentration of a large population in a spot where the house accommodation for them is limited, and where, from the policy of the proprietors, it is not increased. An extraordinary instance of this I shall have occasion to refer to, when I come to speak of the accommodation afforded to the labourer in some parts of Cornwall. On the other side of Honiton is the parish of Gettisham. Its condition, as regards the state of the labourers resident in it, is quite a contrast to that of Southleigh. Their houses are better, the situations are more healthy,

more is done for drainage and ventilation, and in many cases the rents are more reasonable. In this neighbourhood reside, amongst other proprietors, Mr. Justice Patteson and Mr. Justice Coleridge. The contrast between Gettisham and Southleigh does not stop here. In the one, the people are badly off—in the other they are comparatively well off. In the one they are indebted for the few comforts which they possess to the care and zeal of the clergyman—in the other, they owe their happier lot almost entirely to the sympathy and solicitude of the squires.

But bad as are the tenements usually occupied by the poor, they are not, except in rare cases, quite so revolting in their character, and in the scenes to which they give rise, as are some tenements which have a claim to be regarded in the light of public buildings. These are the parish houses, which are scattered in considerable numbers over the southern and western districts. They are the houses in which the poor were accommodated previously to the erection of the union workhouses. In many cases, since the workhouses came into use, these parish houses have been sold, and the proceeds applied to defraying *pro tanto* the expense of building the workhouses. But in others, the overseers will not part with them, keeping them for the purpose of letting, and thus deriving a profit from them. They are generally let at a lower rent than ordinary cottages, and thus become the resort of those in the most wretched circumstances, who crowd into them by dozens, and fill up almost every crevice of them with lodgers. One of these I saw on the borders of Devonshire and Cornwall, and not far from Launceston. It consisted of two houses, containing between them four rooms. In each room was a family, who used it both night and day; the lower rooms

were about twelve feet square: in one of them were a man and his wife and five children; in the other were a man and his wife and eight children; in this latter there were but two beds—the father and mother and two children occupying one, and the other six being huddled together into the remaining bed. They lay “head and foot,” as they termed it—that is to say, three with their heads at the top, and three with them at the foot of the bed. The eldest girl was between fifteen and sixteen, and the eldest boy between fourteen and fifteen. The closeness of this room was overpowering. The beds were necessarily large, and occupied most of the floor; indeed, when the whole family was assembled, several of the children were placed upon the beds to keep them out of the way. In this way the beds may be said to have never been cold. How can health be retained or morals preserved under such circumstances as these?

But my space warns me that I must have done. If, in what I have here depicted, I have selected what may be called extreme cases, let it be borne in mind that between the cases so selected and the line of mere comfort there are very many grades of wretchedness and privation. Blame is not solely to attach to such cases as exhibit the extreme of destitution. A labourer's condition may be many degrees above this extreme, and yet be well calculated to justify animadversion and to inspire alarm. I have here said enough to show that the labourers, both in Somerset and Devon, are, taking them as a class, deplorably housed. And so long as they continue to be so, it will be vain for us to expect to raise them in the scale of virtue or intelligence. If we would improve the peasant's morals, we must begin by improving his home.

(To be continued.)

REPORT OF THE HALESWORTH FARMERS' CLUB, NOVEMBER 2ND, 1849.

It has been well observed of late, that farming, to be worth pursuit in these days, must be made a business—a business, too, conducted on sound principles, and with the strictest regard to economy in all its departments.

An occupier of land must consider himself to be a manufacturer; and his great aim must be to raise the largest possible quantity of produce at the smallest possible cost.

To effect this, a thorough knowledge of the details of practical farming is unquestionably of immense importance; nor is the application of scientific

principles to agricultural operations a matter which forms a distinguishing characteristic of the age, to be censured or undervalued. Indeed, every invention or improvement, whether the result of private intelligence or public enterprize, which tends to lessen manual labour, economize time, and introduce a better system of culture, should be hailed as a boon, first to the farmer himself, and through him to the community at large.

These sentiments appear to the committee of the Halesworth Farmers' Club so entirely to accord with the views of the members who have shared in

the various discussions of the past year, that further introductory observations would, it is deemed, be superfluous.

The committee, therefore, according to past usage, now proceed to embody, in the form of a report, the substance of the different subjects which have been canvassed, with some general remarks on the society's position, for the use and behoof of its members.

The first subject entertained at the monthly meeting of the Society, held on the 10th of November, was, "The best method of restoring the fertility of land when exhausted by mismanagement or over-cropping."

In touching upon this question, the introducer first pointed out some of the principal evils by which he considered the productive qualities of the land were affected: *viz.*—

1. Uncertainty of tenure and a corresponding want of security to capital.

2. A too limited expenditure in cultivating and properly under-draining the soil.

3. The want of a sufficiency of stock, and a too penurious system of feeding them, to the detriment of one of our most powerful and reproducing stimulants—farm-yard manure.

4. The fallacious system of growing too large a proportion of tares and other spring crops, and otherwise violating the rules of good husbandry, by what is usually termed "running the land."

Having dilated upon each of these points at considerable length, he proceeded to address himself to the main question: namely, how the fertility of the soil under such circumstances can be most expeditiously and effectually restored?

In applying his observations to the description of lands within this particular district (which he conceived to be the preferable course), the following were suggested as some of the leading remedies:—

1. The necessity of well and thoroughly draining and cleaning the land, assisted by such mechanical aids as experience has proved to be the most desirable.

2. The keeping such a quantity and description of stock as may be best adapted to the occupation, and a judicious outlay in the purchase of a limited quantity of food for the same.

3. A liberal application of artificial manures, especially for the root crops.

4. The exercise of a sound discretion in the employment of labour, and a vigilant attention to the general routine of farming operations.

After a lengthened conversation, the views of the members were condensed in the following resolution:—

RESOLUTION.—"That in the opinion of this meeting, the best method of restoring productive-

ness to exhausted land is by thoroughly draining and cleaning the same; by well feeding thereon as much stock as is practicable; and by a liberal application of artificial manures, particularly for roots."

At the meeting held on the 8th of December, an analytical statement of the previous year's distribution of Cottage Allotment rewards was kindly submitted by one of the members. The meeting was also gratified with the announcement that Edward S. Gooch, Esq., was desirous to become a member of the society, and also with the liberal donation of £2 from that gentleman in support of the Cottage Allotment Funds for the ensuing year, accompanied with a request to be enrolled as an annual contributor to that amount—a compliment which was ordered to be acknowledged by the secretary.

The subject which came under the consideration of the meeting was, "The best systems of draining to be adopted on the different soils in this neighbourhood."

In admitting the importance which this question has assumed in the scale of farming pursuits, and the strong desire which has of late years been manifested to arrive at a correct determination between the merits of deep and shallow draining, the introducer remarked, that it nevertheless remained difficult, indeed he had almost said it was impossible to define any precise rules by which parties could be governed, so completely was the entire operation dependent on circumstances.

To favour this view of the question, some copious extracts, from an excellent paper on this subject in the 9th vol. of the *Royal Agricultural Society's Journal*, were read, in which the author (Mr. W. Bullock Webster) after recording a variety of systems which have been pursued in different parts of the kingdom, thus writes:—"Almost every system that has in turn been introduced has been attended in some cases with success, and thus has found advocates, and had a fictitious importance for a time attached to it; each one has, on the other hand, in some cases failed; nor is it reasonable to expect like results where conditions are totally different."

The members were then favoured with the details of an experiment carried out under the immediate superintendence of the introducer upon his own occupation, which extended to a depth of 32, 38, and 50 inches respectively, upon the same inclosure. In this instance the surface water had not been carried off with any perceptible degree of rapidity from any particular portion of the field. It might be, perhaps, fairly argued, that the deepest drains were most remote from accident, and might probably stand longest; but these advantages were more than counterbalanced by the great inconvenience of deepening the ditches accordingly. After some

general remarks, the substance of a well-written letter, addressed by a highly scientific and practical gentleman, John Donaldson, Esq., an Assistant Drainage Commissioner, to the editor of the *Mark Lane Express*, was submitted, in which the arguments advanced by the advocates of universal deep draining were completely refuted. In this communication, the use of tiles was strongly advised, and the practice of covering the same with from six to twelve inches of broken stones or clean gravel was highly commended. The modes of operation pursued by different members, and their various results, having been recorded, the following resolution was subsequently agreed to :

RESOLUTION.—“That owing to the various substances of which the subsoils of this neighbourhood are composed, the members present consider that in performing the operation of underdraining no particular rules can, with propriety, be laid down. Experience, however, induces the belief, that on a considerable portion of the lands of the district, which rest upon a strong retentive clayey subsoil, an interval of from sixteen to twenty-four feet from drain to drain, and a depth of from twenty-eight to thirty inches, may be successfully adopted, such widths and depths to be varied upon gaulty and porous subsoils, according to circumstances.”

At the meeting held on the 5th of January, “The comparative value and properties of different artificial grasses, and their adaptation to particular soils,” formed the subject of inquiry.

The introducer commenced his remarks by referring to the mixture of grasses which principally constitute the herbage of our natural upland pasture and low meadow lands. He had long entertained the idea, that in the cultivation of such lands in this locality we have advanced by comparatively slow degrees. The want of more frequent dressings, and the practice of allowing grass seeds to be collected, were, he considered, highly injurious to permanent pastures. He then remarked, that in treating upon this subject generally, the meeting would unanimously coincide in the opinion laid down by Baxter, in his *Library of Agricultural and Horticultural Knowledge*, that the properties which give value to grass are—1st, early growth ; 2nd, superior weight of produce ; 3rd, permanency ; 4th, reproductive powers ; 5th, late growth ; 6th, nutritive powers.

To define the properties and comparative values of each distinct species, as well as the proportions in which they could be most judiciously combined, to suit the varied soils of this district, would be neither easy nor practicable, as so much depends upon concurrent circumstances.

The speaker then (assisted by the work before

mentioned), gave an outline of the natural habits and properties of some of the more valuable descriptions of grasses which prevail in this immediate neighbourhood.

He also quoted the various species most highly recommended for general purposes on lands of the best quality, and also on light sandy soils of an inferior nature, and the respective proportions of each, which were classed as follows :—

No.	On good lands.	Quantity per acre.
1	Cocksfoot grass	21 pts.
2	Meadow fescue	”
3	Meadow foxtail	”
4	Rough-stalked mead-grass ..	”
5	Tall oatlike soft grass	3 pts.
6	Meadow catstail	2½ lbs.
7	Hard or smooth fescue grass ..	10 pts.
8	Crested dogstail grass	”
9	Nerved meadow grass	5 pts.
10	Wood meadow grass	10 pts.
11	Narrow-leaved meadow grass ..	2½ pts.
12	Broad-leaved creeping-bent, or florin	5 pts.
13	Ryegrass	10 pts.
14	White or Dutch clover	2½ lbs.
15	Bush vetch	5 pts.
16	Sweet-scented vernal grass ..	2½ pts.
17	Perennial red clover	2 lbs.
18	Yarrow	1 lb.

No.	On light or inferior soils.	Quantity per acre.
1	Cocksfoot grass	3½ pks.
2	Improved Pacey's or Russel's rye- grass	”
3	Hard or smooth fescue	2½ pks.
4	Smooth meadow grass	”
5	Catstail grass	½ pk.
6	Sweet-scented vernal grass ..	¼ pk.
7	Broad-leaved creeping bent ..	”
8	Golden oat grass	½ pk.
9	Crested dogstail	”
10	White clover	”
11	Trefoil	¼ pk.
12	Red suckling	”

It was remarked, that in laying down lands for a permanent pasture, no admixture of annual seeds, or the taking a grain crop with the same, was consistent with the rules of good husbandry.

A lengthened conversation followed on the qualities of clover, trefoil, and other artificial grasses, peculiarly adapted to arable culture, in the course of which a more extended growth of Italian ryegrass was strongly recommended.

It must be mentioned with regret, that the members present were disappointed in the unavoidable absence of a zealous and intelligent friend, whose remarks on this subject would have imparted considerable interest. It is, however, gratifying to state, that in a communication to the secretary, in which—after alluding to the importance of the ques-

tion, and the limited amount of information which prevails in this particular department of the vegetable class—he adds, “Out of three hundred specimens, I have been able to collect about one hundred and thirty-five, in various parts of the counties of Norfolk and Suffolk. Attentive observation has led me to the conclusion, that many of the permanent grass lands in this neighbourhood, especially the upland pastures, are very deficient in some of the best varieties; amongst which may be particularly mentioned, *Agrostis caninum*, *Alopecurus pratensis*, *Briza media*, *Festuca bambroica*, *Festuca rubra*, *Poa nervata*, and *Panicum pratensis*.”

He concludes: “Should any of the members feel sufficient interest in the different descriptions of grass seeds indigenous to this particular district, as to desire to inspect the same, it will afford me great pleasure, at any time, to place the small collection which I possess at their disposal.”

At the meetings held respectively on the 9th of February, and the 9th of March, the question entertained was, “On the Application of Steam Power to Agricultural Purposes.”

The member who undertook to introduce this subject first noticed that, in order with any degree of success to meet that competition with the foreigner to which we are now exposed, the means of advancing our agriculture by every possible scientific improvement must necessarily be a matter of considerable moment. As an evidence of the great impetus afforded to the foreigner by our altered position, he stated, that a gentleman from Poland, who was travelling through this country expressly for the purpose of availing himself of the productions of English intelligence, industry, and skill, and of acquiring enlarged information on agricultural matters in general, had recently visited his establishment, and ordered a large consignment of the most approved farming implements of the present day. The liabilities to which the lands of foreign countries are subject, as compared with our own, were stated to be next to nominal; whilst the facilities offered for the transmission of continental produce, by means of railway communication, had now become almost incredible.

With regard to the application of steam power to agricultural operations, it was considered that upon large and well-regulated farms it might be beneficially employed, for the following reasons:—

1st.—As tending to diminish the labour of, and economize the outlay with respect to, cart horses.

2nd.—That the work so performed can be executed more effectually and at a cheaper rate.

3rd.—That it conduces to a better and more judicious equalization of manual labour.

In corroboration of these points, the following

statements, which display the actual expenses incurred by a member of the club, who had used a portable steam-power thrashing machine for the purpose of thrashing a stack of mown wheat, as compared with the estimated expense of having the same operation performed by a four-horse power thrashing machine, were submitted to the members:

By Steam Power.

	£	s.	d.
Manual labour	1	2	3
Carting water	0	5	0
Eight cwt. of coals	0	8	0
Use of steam engine and thrashing machine.....	1	0	0
	<hr/>		
	2	15	3

By Horse Power.

Manual labour	1	7	4½
Horse labour.....	1	10	0
Use of machine.....	0	15	0
	<hr/>		
	3	12	4½
Deduct	2	15	3
	<hr/>		
Balance in favour of steam	£0	17	1½

The introducer, who, from his extensive practical experience and highly scientific knowledge, was well qualified for such an explanation, then entered upon an elaborate description of the various steam engines now in general use—pointing out with great clearness their principles of construction, capabilities, &c. The meeting was also favoured with some particulars as to the working of a six-horse power fixed steam engine upon his own occupation—and also with an outline of the nature, extent, and situation of the premises connected therewith.

After a long and animated discussion, the members agreed to the following resolution.

RESOLUTION.—“That it is the unanimous opinion of this meeting, that the attention of the English farmer to all scientific improvements in agricultural machinery is *now* of paramount importance. And further, that it has been satisfactorily proved to the members present, that the application of *steam power* to farming purposes is attended with great advantages, particularly on extensive and well-arranged occupations, owing to the cheapness and efficiency with which the work is performed, and the beneficial employment of manual labour produced by that agent.”

The above resolution having been passed, it was suggested by a gentleman present—who, although not immediately identified with agricultural pursuits, nevertheless feels a deep and lively interest in the welfare of the farmer—that a joint stock company should at once be formed, to consist of twenty members, each of whom should take a £10 share,

for the purpose of purchasing a steam-power portable thrashing machine for the use of the neighbourhood. This proposition was cordially responded to, and arrangements were speedily made to carry the same into practical effect.

On Friday, the 2nd of March, a special meeting of the club was convened, for the purpose of aiding the popular movement of endeavouring to secure the repeal of the malt tax.

This subject having been before entertained and fully recorded in a former report, it will be undesirable to add more than that the sentiments of the members had undergone no change, if we except the fact that an intensity of feeling pervaded this discussion in some degree proportionate with the altered and aggravated position in which the British farmer is now placed by the principles of free trade legislation.

The opinions of the members as to the pressure of this obnoxious and indefensible impost, as well as to the necessity of a more just equalization of such other peculiar burdens as now press most severely upon the general industry of the kingdom, may be gathered from the following petition:—

“To the Honourable the Commons of Great Britain and Ireland, in Parliament assembled—

“The Humble Petition of the undersigned Occupiers of Land, and others, Members of the Farmers' Club, meeting at Halesworth, in the county of Suffolk—

“SHEWETH,

“That owing to the depreciation which has taken place in the value of corn, cattle, and almost all agricultural produce, the cultivation of the soil has become so unprofitable that if some remission of the burdens now pressing upon the British farmer be not promptly made, the ruin of many, at no distant day, will inevitably ensue.

“That the admission of foreign barley into this country, *duty free*, has essentially affected the price of that of our own growth; whilst the heavy duty payable on malt (which, at the present time is equal to about 70 per cent. upon the raw material,) tends to limit its consumption, and forbids the English agriculturist from entertaining a hope of receiving a more remunerating price for his native produce.

“That whilst the duty on malt operates most rigorously in curtailing the comforts and necessities of a large and annually increasing population, it presses with more than ordinary injustice upon the poorer classes, who, at the present moment, are almost entirely deprived of that wholesome and natural beverage—*home-brewed beer*—which is so essential to their domestic comfort, as well as the more easy performance of their arduous employments.

“That the pressure of the malt tax is partial and unjust towards the landowner, affecting (as it does) those counties especially in which barley forms one

of the principal articles of production; whereas, in certain districts, the cultivation of that grain, owing to the character of the soil and other contingent circumstances, is almost totally impracticable.

“That it has been proved by practical authorities that malt is a highly nutritious and valuable food for cattle; and but for the operation of this tax your petitioners would gladly substitute the same for the large quantities of linseed and oilcake now purchased of the foreigner; an expenditure which, in some instances, tends to lessen the employment of labour, thereby causing a proportionate increase in the poor's rates.

“That for the above and other reasons, your petitioners, deeply feeling that the operation of this tax is excessively vexatious and unjust, are resolved not to relax in their exertions to obtain by every legitimate means its total and unconditional repeal.

“That the profuse and extravagant expenditure in almost every department of the government of this country, which is daily becoming more universally acknowledged, fully satisfies your petitioners that this obnoxious impost *can be spared* without impairing the dignity of the crown or causing any diminution in the efficiency of our necessary establishments.

“Your petitioners therefore humbly but firmly entreat your honourable house immediately to repeal this objectionable tax; and in the exercise of a sound and well-ordered economy to effect such constitutional retrenchments and reforms as will lead to an equitable adjustment and distribution of those local and national burdens which now press with undue severity upon the general industry of the kingdom.

“And your petitioners, as in duty bound, will ever pray.”

The members met on the 13th of April to take into consideration “The effects arising from the frequent letting of farms *off-hand*.”

The member who brought this subject forward remarked, that it was rather with a view of eliciting the opinions of those gentlemen who might differ from him than from his ability to do that justice to the question which it really deserved, that he should venture to make a few observations, which would be principally directed to the *disadvantages* incident to such occupations.

He purposed therefore very briefly to consider these effects, as applicable to the landowner, the occupier, and the community at large.

As to the first class, the meeting, he thought, would concur in the opinion that a great and rapid depreciation was, in most instances, sustained by the owners of such farms, from the frequent practice of converting the comfortable farm houses thereupon into cottage dwellings. Where this is the case, the dilapidation and neglect consequent upon such a system soon become apparent; and it is not less easy to trace the same sources of de-

preciation to the outbuildings, yards, gardens, and fences pertaining thereto.

He was aware that the opinions of owners of property themselves were divided on this point.

There are those, and liberal and enlightened landlords withal, who are so averse to the system, that they will by no means allow a tenant to hold two farms; indeed, in some of the leases of this district there are prohibitory clauses to that effect.

On the other side, it is contended by some, that the repairs necessary to small occupations are of too burdensome a nature when compared with the amount of the income derived.

There were probably other and manifold considerations which might conduce to the difference of opinion to which he had alluded; but of one thing he thought the meeting might be fully assured, (and he wished distinctly to qualify the objections he might take to the system by plainly recording the opinion,) that landowners generally, or their representatives, will undoubtedly be very much influenced in entering upon contracts for such occupations by the *recognized skill and ability of the applicant*.

The disadvantages accruing to the tenant from the system in question appeared to be—

1. The frequent unfavourable situation of the occupiers of such holdings, occasioning great inconvenience and loss from a want of personal attention and supervision, as regards the various arrangements thereof.

2. The tendency afforded by such a system to displace the small and industrious occupier. And

3. The increased liability to impositions and losses upon off-farms, from the facilities which they offer for the commission of petty depredations.

Having confirmed each of these positions by some passing remarks, the evils resulting to the community from the practice under consideration were next adverted to.

On this branch of the subject the speaker observed that he had long entertained the idea that the *diminished expenditure* with the *local trading interests*, occasioned by a combination of farming occupation, was highly objectionable and injurious.

The respective positions of the miller, general shopkeeper, butcher, maltster, wheelwright, and blacksmith, under such circumstances, were severally instanced in confirmation of this opinion.

The social and political influence incident to small holdings, which was characterised as a question of deep and vital importance, was also reviewed.

In conclusion, the introducer hoped to be understood, that although not favourable to the aggrandizement of a large extent of land for occupation,

he equally deprecated too great a sub-division of the same, particularly with the limited breadth which this kingdom affords, as he could but regard the results of such a system to be fraught with great and incalculable evils. The cultivation of our wastes would, indeed, by furnishing increased employment, be partially beneficial to the labouring population, and might, in that light, be regarded as a great national advantage; but he looked forward to a comprehensive and well-considered scheme of emigration as the best and almost only means of effecting that great social amelioration in the condition of the poor so earnestly desired by every well-wisher of mankind.

The chairman having expressed his entire concurrence in the foregoing remarks, called the attention of the meeting to the injurious effects occasioned to tenant farmers generally, by the *enhancement of rent*, and the undue amount of parochial offices saddled upon the resident occupiers by the practice of farming off lands. He instanced the case of a parish where he had resided, in which 4,000 out of 6,000 acres were farmed off-hand, and experience had led him to entertain the firmest conviction, that apart from all pecuniary considerations, the working of such a system was by no means calculated to promote that good feeling and identity of interest which ought to exist between employers and employed.

Several interesting remarks having fallen from various members, the following resolution was at length unanimously adopted:—

RESOLUTION.—“That the members present consider the following disadvantages usually result from the frequent letting farms off-hand: *viz*:—

1. A more than ordinary depreciation and comparative loss to the *owner* in the fee simple of such farms, arising from the almost invariable practice of converting comfortable farm-houses into cottage dwellings.

2. The frequent unfavourable situation of such occupations, rendering them less beneficial to the *tenant* from the limited means of devoting that degree of attention to the same which circumstances require. And

“3. The *tendency* of such a system to annihilate the small and industrious occupier, to cause a prejudicial interference with the employment of labour and trade, and to prevent the exercise of a prudent economy in general and parochial expenditure.”

At the meeting held on the 4th of May, the subject for discussion was, “Are the burdens upon land equally proportioned between the fixed and floating capital?”

Having alluded to the importance of this question and the magnitude of the interests which it

involves, the introducer remarked, that although favourable to the principles of discussing all matters brought under the notice of the club, upon the broadest possible basis, he nevertheless wished that the terms of the subject to which the committee had affixed his name had been more definitely expressed.

Any examination into the burdens on real property would, he apprehended, be wholly incomplete and unsatisfactory unless accompanied by an inquiry into the nature and extent of the property on which these burdens are by law imposed. The *burden*—and the *ability to bear it*—the proportion which exists between one and the other must be impartially considered, to give an inquiry like the present any useful or practical operation. This is indispensably necessary for the purpose of ascertaining whether a tax is excessive as compared with the property on which it falls, and for the purpose of further considering the justice of transferring the whole or any portion of this tax to the *public*, or any other description of property. When the burdens affecting fixed capital were referred to, the speaker intended to convey, that by fixed capital is meant what relates *exclusively to landowners and real property*; whilst by the burdens affecting floating capital may be implied such as bear entirely upon the interest of occupiers and tenant farmers.

For the purpose of practically elucidating the question, the separate charges were arranged under the following heads, *viz.*—

<i>Landlord's direct burdens</i>	<i>Tenant's direct burdens.</i>
Repairs of buildings	Income tax
Property tax	Insurance.
Insurance.	
<i>Landlord's indirect liabilities.</i>	<i>Tenant's indirect liabilities.</i>
Land tax	Fluctuation of rates
Tithe rent charge	Assessed taxes, &c., and
Free and quit rents	Probate and legacy duty,
Poor, county, church, highway, and other rates	or letters of administration.
Stamps, &c., in conveyance, and fees and fines in copyholds.	

By calculations then adduced, it was shown that the tenant's direct burdens upon his income are only one-half those of the landlord; but upon the actual capital of each party the proportions would stand at about one-third per cent. as regards the former (or tenant's) and about one-eighth per cent. as regards the latter.

To illustrate by the foregoing example the *indirect burdens*, in respect to which each description of capital (namely the fixed and floating) is liable, a greater and more objectionable disparity exists.

The speaker would confine his observations on this part of the subject solely to the transfer of either property by reason of death.

Upon referring to the stamp act it will be found, that in the event of a sale and realization of the sum of £15,000 in landed property, the stamp on conveyance would amount to £170—or rather more than 1½th per cent., with a total exemption from probate duty; whereas the probate duty alone, on the personal property required to carry on such an occupation, would be from 2 to 3 per cent.; in addition to which, the legacy duty invariably attaches to the latter.

A lengthened and somewhat animated discussion ensued, in which some members contended that tithes or rent charge, land tax, and rates respectively, are burdens upon land, and tend as such, to increase the cost of production, and to affect, in a certain degree, the price of agricultural produce.

In replying to such observations generally, the introducer remarked, that it would be expedient to consider a question common to all such charges—namely, *on whom they fall*; and further to examine whether they actually operate as a deduction from rent, or as a tax upon the tenant occupier.

In order to exemplify this, he continued, in ascertaining the annual rental value of an estate, my first business is to arrive at the yearly or permanent outgoings; then, having looked to the productive quality of the land, and estimated the produce at a given price, I return to the expenses, and take the one from the other, which leaves a clear balance for rent, after allowing the tenant a profit for his capital employed. The fee-simple value of a farm may also be arrived at by adopting similar means of procedure.

It may, therefore, be concluded, that in a general sense, neither the landlord, occupier, or labourer, are prejudicially affected by these burdens, because they should be, and undoubtedly are, made the subject of previous estimate, either in effecting a purchase, or before entering upon the occupation of a farm.

After a long conversation, the following resolution was moved and agreed to:—

RESOLUTION.—“That in the opinion of this meeting, the greatest disparity, with regard to the burdens on land, between *fixed and floating capital*, consists in the latter description of property being liable to the probate and legacy duties, from which the former is almost entirely exempt.”

At the monthly meeting held in June, no discussion took place.

The question proposed for inquiry on the *5th of July* was, “What means can be adopted, legislative

or otherwise, to enable the British farmer successfully to compete with the foreign corn grower, under the repeal of the corn laws?"

The introducer commenced by remarking, that he deemed a fair and impartial consideration of the various points involved in this question to be highly important—not only to farmers, but to all classes of the community. The difficulties under which the agricultural interest are now labouring (which he ascribed in some measure to the operation of free trade) are of so obvious a character, that any lengthened observations on this branch of the question would be both tedious and unwarrantable. He begged, however, to be allowed very briefly to refer to the prices of wheat for the last six weeks, compared with those on which the tithes commutation was based, as exhibited in either year by the published returns; and also to the estimated reduction in the capital of the tenant farmers of this country at the present moment, as supported by various authorities.

In looking at the question before him upon its broadest possible basis, the speaker acknowledged that he was quite incompetent to furnish the meeting with any satisfactory solution of the same.

He freely admitted, that to indulge the hope of having rent, rates, labour, tradesmen's bills, and other expenses, incident to farming pursuits, reduced to a comparative level with agricultural produce, would be alike unwise and fallacious. According to the terms of the subject, what then remains to be suggested? After some reflection, he had arrived at this conclusion: that amongst the remedial measures of a legislative character, which would be calculated in some degree to mitigate existing evils, and to improve the unfavourable position in which the farmers of this country are now placed, the following deserve especial consideration, namely, the abolition of the law of settlement, a national poor rate, the repeal of the malt tax, and the adoption of elective district boards, for the superintendence and management of the county expenditure. The claims of these propositions, respectively, both upon private and public attention, were clearly and powerfully urged.

Amongst the more prominent ameliorations of a social character, the more general adoption of corn rents, based upon sound and equitable principles, and the granting long leases with liberal covenants, appeared to the judgment of the introducer to be of the greatest practical utility.

The following member, having expressed his concurrence in most of the foregoing statements, proceeded to argue, at some length, upon the unfair position of the farmer as compared with the manufacturer, the latter being, in some instances, protected by a duty varying from 10 to 25 per cent.

The monied interest, he contended, was benefited in the same ratio in which by free trade legislation farmers are injured; and in despite of that popular theory, which favours cheapness of labour no less than cheapness of provisions, he affirmed, that the real wealth of a nation consists alone in the *profitable employment* of its industrial population—a state of things which, in his opinion, neither had been nor could be successfully promoted by unrestricted competition.

The following member remarked, that although he perfectly agreed in many of the introducer's suggestions, he did not coincide in the view he had taken with regard to the present low prices of corn; which, he thought, could be more justly attributed to the artificially high prices of 1847, than to the operations of free trade, the latter having in reality but just commenced.

He instanced the fact of twenty firms engaged in the corn trade having failed, in the summer of the year alluded to, for upwards of four millions and a half; and he considered that the total loss might be fairly computed at about ten millions sterling.

He then entered upon a lengthened examination of British imports and exports for a series of years; attaching particular importance to the extraordinary amount of wheat and flour taken for home consumption in the first four months of the present, as compared with the corresponding period of the preceding year, the declared quantities of which, respectively, were as follows:—

<i>From the 1st of Jan. to the 5th</i>		<i>of May, 1847.</i>		<i>Ditto, 1848.</i>	
Qrs. of wheat ..	2,059,823 ..	against	380,176		
Cwts. of flour ..	1,608,232 ..		„	242,295	

The above figures, he considered, furnished a convincing proof that with the deficient wheat harvest in England last year, had the old corn law remained in existence, consequences of the most serious nature must inevitably have ensued.

Having briefly alluded to the system of farming pursued in Germany and other continental countries, he concluded by moving the following resolution.

RESOLUTION.—“That the corn laws, originally imposed as a protection to the agricultural and other interests, having been removed—probably for ever—the members of this club regard it as the bounden duty of the legislature, in consequence of the deteriorated value of agricultural produce, to reduce the burdens pressing on British farmers; and would urge the following measures for the serious and immediate consideration of government:

- “1. An alteration of the law of settlement.
- “2. A repeal of the malt and hop duties.

“3. A relaxation of the stringency of the game laws.

“4. A reduction of the extravagant national expenditure.

“5. A legalized tenant right.

“6. An elective board for the management of the county funds.”

The above resolution having been seconded, a member of the club subsequently proposed the following amendment :

AMENDMENT.—“That the expenses incident to the raising of corn in this country, which have been to a certain extent nurtured by a system of protection, are so onerous and unequal, as compared with those of the continental producer, that nothing short of an entire and sweeping revision in every department of the British farmer's expenditure, combined with an increased amount of intelligence, perseverance, and skill, in forming and carrying out his various arrangements and operations, can enable him in the least degree successfully to meet that competition which he has now to encounter by reason of recent legislative enactments.”

After a few observations in support of the above, the amendment and resolution were respectively put to the meeting, when the former was declared to be carried.

“The description and value of agricultural implements best adapted to the efficient cultivation of a farm of 200 acres,” formed the subject of inquiry at the meeting held on the 7th of September.

The introducer, after some passing remarks, alluded to the observations of James Allen Ransome, in the preface to his work on “Farming Implements,” to shew how proportionate the progress of mechanical improvement has been with the advancement of the science of agriculture. It was, he considered, a matter of no slight gratification to an Englishman to have descended from forefathers whose attention had been so successfully directed to an occupation, which, as Doctor Johnson remarks, “not only gives riches to a nation, but the only riches she can call her own.” We have, it is true, been called a land of “workshops,” but surely there is no just reason to regret that cognomen, since in no country, perhaps, could a more general application of available principles to different branches of practical usefulness be found than in our own.

In all progressionary improvements, continued the speaker, the implement maker finds in *prejudice* one of his greatest enemies, and he would therefore hail its suppression as a great boon to mechanical advancement. Having alluded to the great principles which should characterize all mechanical operations, viz.—simplicity of construction, economy

of outlay, and ability to accomplish a given quantity of work with the least possible expense—he proceeded to submit a catalogue of implements, the merits and demerits of which were severally discussed, and the following were eventually resolved upon as best adapted to a mixed soil land farm of 200 acres :

ARTICLES.	Estimated cost price.	
	£	s. d.
Three swing plough, with wood beams and handles, and fitted with pondle-trees and whippletrees, complete . . .	8	0 0
One double-handled iron ditto and appendages	4	8 0
Furrow or Northumberland plough, fitted with hoes	3	10 0
One cultivator, for general purposes . .	10	0 0
Fine Scotch carts	67	10 0
One waggon	28	0 0
Fifteen-coulter corn and seed drill, with additional box, &c., for artificial manure	45	0 0
Three-horse, jointed, and light rolls . .	17	5 0
Three gangs of harrows and pullingtrees	13	0 0
Garrett's patent horse hoe	17	10 0
One lever horse rake	6	6 0
A chaff engine, with horse works complete	20	0 0
A dressing machine	5	5 0
Sack barrow	0	10 6
Weighing machine and weights	4	10 0
One cake crusher	4	4 0
One wheel turnip-cutting machine . . .	4	0 0
A sheep fold, in four divisions, each containing four iron hurdles of twenty-one feet each	16	16 0
Six various iron pigs' troughs	3	12 6

It is deemed to be worthy of remark, that the members unanimously agreed in the opinion that good machinery, although most expensive in the first instance, would invariably, with proper care and attention, be found the cheapest and most economical in the end.

On Friday, 5th of October, “The best mode of managing Kitchen and Fruit Gardens and Orchards, so far as the same is applicable to the interest of the Farmer,” formed the question for consideration.

In commencing his remarks, the introducer said that he feared the subject allotted to him would be devoid of general interest, inasmuch as he considered that but few farmers in this district gave that attention to this branch of husbandry which it really requires and deserves. Long and attentive observation, combined with some practical experience, had led to this conclusion; and it was rather, therefore, with a view of stimulating his friends to the acquirement of enlarged information on this subject, than from his own ability to do it

justice, that he undertook to submit his views on this most pleasing of all rural employments. He begged permission, in the first place, to notice some of the more objectionable features presented in many of the gardens and orchards of this district, particularly directing attention to the tall box edgings, high fences, and thick and mossy trees which surround them—than which nothing can more strongly indicate unprofitableness and neglect.

Having largely dilated upon these and similar obstructions, and pointed out some general remedies, it was remarked that the principal considerations in the choice of a spot of ground for a kitchen and fruit garden are—first, situation—second, soil—third, extent—and fourth, the manner of enclosing and laying it out. In selecting the soil and situation for a garden, the former should be rich, rather stiff than light, and considerably deep. The situation should be level, or on a moderate declivity only, and the conveniency of supplying a sufficiency of water was a point of some importance. The extent of a garden should be adapted to the requirements of the family; and two most essential rules with regard to its general management are—first, to avoid crowding the ground with more fruit trees and plants than it is able to nourish properly; and second, never to let any part of it remain unoccupied for want of a due succession of crops.

In all cases, the selecting fruit trees of the best and most approved descriptions was strongly advised, preference being given to the upright or pyramidal kinds.

These, if grafted on quince stocks, and root-pruned as often as necessary, will quickly produce an abundance of fruit in almost any description of soil. As a general rule, fruit trees may be planted about six feet apart, which will be found amply sufficient for garden culture, and the observation holds good whether they are arranged as a square or in rows. The speaker then proceeded to enumerate the twelve best descriptions of pears to be grown on quince stocks; and also a collection of the most esteemed varieties to be grown by walls or cultivated as espaliers. To these were added a list of the most eligible kinds of orchard pears, coupled with some passing remarks as to the best means of promoting their cultivation.

Twenty of the most approved descriptions of table and kitchen apples were next enumerated, and the most esteemed varieties of apricots, peaches, nectarines, plums, raspberries, strawberries, gooseberries, and currants, were also severally instanced.

The best specimens of vegetables, including potatoes, cabbages, carrots, parsnips, onions, peas, lettuces, &c., were lastly particularized, the names

of which (as well as of the preceding) must, of necessity, be precluded from this brief notice.

It is but justice to add, that the introducer's remarks throughout were highly interesting and instructive, and that he fully deserved the unanimous thanks of they members, which were spontaneously accorded at the close of the meeting.

This is a digest of the proceedings in which the society has been engaged for the past year, in the preparation of which your committee have, as a guide to future improvement, very briefly embodied with the resolutions arrived at, some of the evidence and arguments by which those results were obtained. How far their undertaking may meet with general approval, it is not the province of your committee to inquire; but acting upon the precedent successfully adopted at the establishment of the society in 1839, they venture to hope that the information thus conveyed may prove, in some degree at least, beneficial to the members.

Your committee advert, with great satisfaction, to the numerical increase of its supporters, and especially to the countenance afforded to the society by those noblemen and gentlemen who are not immediately connected with agricultural pursuits, regarding, as they do, such a combination of interests to be well calculated to ensure the future prosperity of the club. The gradual increase of donations to the society's funds for promoting the cottage allotment rewards, amounting in the present year to £17 17s., is also deserving especial remark.

Your committee have also pleasure in noticing, that during the past year a valuable acquisition has been made to the society's library, consisting of Stephens' "Book of the Farm," the pecuniary resources for which were entirely raised by voluntary contributions.

At the annual meeting held on the 2nd of November, the treasurer's accounts were exhibited and approved. The present officers were also re-elected for the ensuing year, with the exception of the secretary, who involuntarily resigned in consequence of the pressure of other engagements. At the express desire of the members it was requested to be placed on the minutes of this report, that their special thanks were due to that officer for his zealous attention to the society's interests.

In thus recognizing the performance of these duties, your committee feel, however, that they would indeed be wanting in gratitude if they allowed the far more valuable services of your president to remain unnoticed.

He has exercised the most unwearied diligence in pursuit of the best interests of this institution and of agriculture generally; he has evinced his anxiety in its welfare by the most assiduous attention and

unremitting punctuality, at the same time fulfilling the duties of his office with that impartiality which in such a situation it is indispensably requisite to observe.

Your committee consider themselves happy, therefore, in the opportunity thus afforded them of recording their grateful sense of his past services ;

and they sincerely indulge the hope that those services may long be continued in promoting the harmony and well-being of the Halesworth Farmers' Club.

On behalf of the committee,

CHARLES LENNY, Secretary.

Wisset, near Halesworth, Suffolk, November, 1849.

THE AGRICULTURAL DISTRICTS OF ENGLAND.

FROM THE TIMES COMMISSIONERS.

WE have always been of opinion that if the landowner and the public were better informed as to the real position of the tenant farmer, he would be found entitled to more consideration than he has hitherto experienced. There never was a period when sound and truthful information upon this subject would be of such importance as at this peculiar juncture. We therefore hailed with much satisfaction the announcement that *The Times* newspaper was about to send out commissioners on a tour of investigation through the agricultural districts, and to communicate their observations and enquiries through the columns of that journal. The talent always displayed by *The Times* afforded ample guarantee that the duty would be performed with ability ; and the only misgiving we felt was, lest a leaning might be given to the reports favourable to the opinions advocated by that journal. This misgiving was, however, in a great measure dispelled by the following paragraph contained in the introductory letter of *The Times* commissioners ; they observe :—

“ Our business is with the actual condition of English agriculture, and not with the political views of opposing parties. We shall be silent about Protection on the one side or Free Trade on the other, giving our deepest and most anxious attention to those districts where the cry of agricultural distress has been most loudly raised.”

Whatever opinions may be entertained as to how far *The Times'* commissioners have hitherto acted in accordance with the principle laid down in the extract above quoted, it is perfectly manifest that the amount of deviation from it has not been to an extent such as to render their reports objectionable to men of any party : and it must be admitted, a very considerable amount of useful information is imparted in them. Entertaining these views, and not holding ourselves in the slightest degree responsible for any opinions promulgated in the reports in question, we have determined to submit them to our readers, in the full conviction that useful information will be derived from their perusal.—[ED. FAR. MAG.]

LETTER I.

AYLESBURY, BUCKS, JAN. 19.

SIR,—Having been commissioned by you to proceed on a tour of investigation through the agricultural districts of England, and to communicate to the public, through your columns, the results of our observations and inquiries, it is necessary that at the outset we should explain fully and clearly the origin and nature of the mission with which you have honoured us, and the spirit in which we propose to discharge it.

Within the last few months the price of corn has fallen so low that great alarm has been excited throughout that large portion of the community who live by the practice of agriculture. This alarm has been evinced in a number of ways ; and whatever opinion may be entertained as to the wisdom shown in the different modes of expressing it, about the main fact there is no doubt. On the other hand, while so many connected with the land are anxious, fearful, and discontented, the public

at large, as consumers of corn, are not disposed to feel otherwise than satisfied at its cheapness. Thus it happens that a conflict of interests, real or apparent, arises, which it concerns the welfare of the state to decide equitably. How is that to be done ? You have thought that the only unerring light to be guided by upon a question so momentous must be that furnished by a personal inspection of the agricultural districts of England, by a careful and impartial examination of their present condition, by ascertaining how far the practice of agriculture has followed the progress which it has made of late years has a science, and to what extent those large economies have been effected in the cultivation of the soil which a judicious application of capital has never failed to accomplish in every other department of human industry. Such is the origin of our commission. It is founded on the old saying “ that one fact is worth a thousand arguments.” It has originated in an earnest desire to draw from the actual condition of agriculture in England materials whereon to rest a decision which, if possi-

ble, may reconcile the permanent prosperity of the agricultural interest with the adequate provisioning of the nation.

As to the nature of the inquiries we are about to institute, they will embrace the whole scope of English agriculture, and extend, if necessary, to every operation connected with the cultivation of the soil. The details of management, whether they relate to the landlord who lets, the farmer who occupies, or the peasant who labours, will all be carefully investigated; and where we think injudicious practices have arisen, where the resources of the earth appear to us to be wasted or neglected, it will be our duty to place these things fairly before the public. Besides the development of those facts which seem to us important in their direct bearing upon the condition of practical agriculture, we are also instructed to give our attention to the burdens on land, the relations existing between the different classes engaged in its culture, and every other matter which affects the cost of its produce. In pursuing an inquiry so extensive, not only in the space of country which we have to cover, but in the multiplicity of subjects with which we have to deal, it would be almost impossible, and perhaps useless, to attempt to chalk out any plan which we ought or intended to follow. The geographical divisions of the kingdom naturally suggest that each county should be separately examined; but that, we fear, would extend the term of our commission beyond those limits which public interest and the general character of contributions for the press prescribe. Moreover, it is very desirable that the facts we adduce should, as far as practicable, be classified in such a manner that when read consecutively they may present a methodical arrangement of topics, instead of being jumbled together without reference to those rules of system and order which should regulate agriculture as they do every other department of industry to which the energies of man are successfully directed. Keeping this object in view, we propose to visit successively those districts of the country where kindred branches of agriculture preponderate—for instance to take tillage, the breeding and fattening of stock, and the raising of dairy produce, as much as possible in their order during the course of our investigations. It is well known that by a natural subdivision of labour different districts of the country yield different kinds of produce—that white crops form the chief wealth of one section, live stock that of another, and dairy produce that of a third. These subdivisions of course are not always exclusively followed, nor in marking them do we indicate any opinion that they ought to exist; we merely point them out as convenient heads under which to classify the series of facts which we are desirous of collecting.

Other limitations will arise in the course of our inquiries; but in the meantime we are anxious that it should be distinctly understood that we seek, within such bounds as public interest and the pressure on your columns permit, to furnish a clear and consecutive description of the present state of agriculture in England.

The benefits which science may yet confer on the economical development of the products of the soil will unquestionably be very important. Results dependent upon the future acquisition of knowledge must necessarily, however, be of a speculative character; and we therefore purpose to limit our inquiry to a personal investigation as to how far the main principles which are now recognized by all intelligent agriculturists as indispensably necessary for the successful prosecution of their business, are carried into practice in the different agricultural districts of England. A brief outline of these principles will therefore be appropriate in this place.

Thorough drainage may be regarded as the first and most necessary improvement. Wherever the soil or subsoil is of a retentive character, it is necessary to provide artificially for the escape of the superfluous moisture, which would otherwise remain in a stagnant state beneath the roots of the cultivated plants, stunting their growth, preventing the due action of manures by maintaining a continued low temperature, and obstructing the access of air. When the land is thoroughly drained, the rain, as it falls, diffuses itself equally through the whole mass of cultivated soil, conveying its fertilizing powers to every part of it, and passing off by the natural fissures to the conduits prepared for its reception. As the rain descends, the air follows and completes the process by which the soil, and the manure added to it, are best fitted to nourish and mature the crop.

As an accessory to thorough drainage, the deep cultivation and disintegration of the soil are indispensable. Various methods have been adopted for this purpose. Subsoil and trench ploughs are most frequently used on large farms where a sufficient command of horse power can be obtained, while, on smaller farms, deep digging with the fork or spade is found the most convenient, and certainly the most perfect mode of effecting the same object.

When these preliminary steps are accomplished the land is placed in a fit condition for the subsequent processes of culture, the farmer being now satisfied that the results of his expenditure in manure and tillage are comparatively brought under his control.

To facilitate the operations of tillage all unnecessary obstructions must be removed. Fields must be laid out of such a size as to be compatible with the economical execution of horse labour. Con-

venient roads must be constructed for carrying off the produce of the fields with the least waste of power, and for carrying back to them the manure which is requisite to maintain or increase their fertility.

In fixing the system of culture for any particular farm, regard must of course be had to its climate and local position. If the climate admits of the growth of any of our usually cultivated crops, the main consideration should be to supply the articles which are most in demand and which yield the largest returns. The intelligent farmer will take care to avail himself of every increased means of communication which brings him within the circle of the daily requirements of a dense population.

Beyond that circle he will have to provide for the economical and profitable consumption of his green crops and grass by stock, the accumulation of manure, the culture of corn crops, and will avail himself of the aid of machinery in preparing these for the market.

Next to thorough drainage, the great secret of good farming is the accumulation of manure. In the best agricultural districts the quality of farm manure is justly regarded as of great importance, and as that depends mainly on the description of food from which it arises, it follows that the more enriching the character of the food which is given to live stock the better is the quality of the manure which they produce. It is also ascertained that a mixture of food, such as oilcake or bruised grain, given in certain proportions alternately with green food, contributes at once to hasten the fattening of the animals, to economise the consumption of food, and to enrich the quality of the manure.

It is further ascertained that warmth and shelter tend greatly to economise the consumption of food. And it is therefore necessary to the successful conversion of green crops into butchers' meat that the farmer should have at his command sufficient house accommodation for his live stock, that should be so constructed as to economise labour in attendance on the stock, and to provide receptacles for the manure, so that not a particle, solid or liquid, may be wasted.

The discovery of portable manures, such as bones and guano, have much enlarged the limits of green crop cultivation, and coupled with the introduction of cheap feeding stuffs for live stock, have enabled the farmer greatly to extend the quantity of stock which his land could previously maintain. This naturally leads to a more elaborate system of farming, involving a larger expenditure of capital on the part of the tenant, and requiring a greater degree of scientific skill in its profitable application.

Each succeeding number of the *Journal of the*

Royal Agricultural Society lays new proofs before the public of the necessity imposed on every farmer for the employment by him of increased capital and skill, if he hopes to compete on equal terms with the practice of the best farmers therein described. While this necessity is laid upon the farmer, it is equally clear that the landlord must do his part in providing those permanent outlays which do not fall within the province of the tenant; and that the labourer, whose field of employment is thereby enlarged, should perform with diligence and assiduity the share allotted to him in this progressive improvement.

We propose to direct our inquiries, then, to ascertain how far these acknowledged principles are carried into practice, and in what degree the reciprocal duties of landlord, tenant, and labourer are fulfilled. Many other points of practical interest will no doubt arise in the course of our investigation; but the brief exposition we have now given of the progress of agricultural knowledge will serve to indicate to the public the nature of the inquiries we are entering upon.

Having thus briefly explained the origin of this inquiry, and the nature of the duties which it imposes on us, it is necessary that we state candidly and fully the spirit in which we hope to discharge those duties. Having come to record facts, we shall consider ourselves debarred from giving opinions until the data for forming them have been collected. *Our business is with the actual condition of English agriculture, and not with the political views of opposing parties.* We shall be silent about protection on the one side or free trade on the other, giving our deepest and most anxious attention to those districts where the cry of agricultural distress has been most loudly raised. When a medical man examines his patient, he attends carefully to general symptoms, but gives his principal consideration to the locality chiefly affected. We propose, as best we are able, to follow the same course. The proprietors and farmers who have complained most we shall address ourselves to most studiously; and we trust that while the nature of our duties involves an inspection of the management of individual farms, that inspection will be conducted by us with a due regard for that sensitive delicacy of feeling which we all experience when public attention is directed to what immediately concerns ourselves. How far the right exists to inquire into the mode in which any body of men conduct their occupations is, under ordinary circumstances, a question of some difficulty; but with reference to the districts whence the cry of agricultural distress has issued, all doubt upon that point has been removed. Having challenged public attention, they cannot complain that they have

received it, and we therefore confidently expect in those districts that every facility will be afforded to us in prosecuting our inquiries. Indeed, we trust, that generally throughout the different classes of the agricultural community, we shall meet with hearty co-operation, encouragement, and candour. Whatever success may attend the performance of them, our labours have been undertaken not only for the instruction of the public, but for the benefit of the farming interest itself; and, for ourselves, we are sincerely anxious to disclaim the taint of political bias, and to prosecute our inquiries in a free, courteous, and conciliatory spirit.

It now only remains for us, in concluding this letter, to explain the reasons why we have selected the district around Aylesbury for the commencement of our investigations. We have been guided in making that selection principally by the fact that Buckinghamshire has taken a very prominent position in the agitation which has arisen out of the low price of corn. Whether its character as a corn-growing county be sufficiently high to entitle it to figure prominently in such an agitation is a question which we shall have to discuss hereafter. In the meantime we are well pleased to commence our humble labours where the champions of Free Trade and Protection have both put forth their strength, without however occupying that wide field of patient inquiry and observation on which we are about to enter.

LETTER II.

AYLESBURY, JAN. 21.

As the agricultural reputation of Buckinghamshire is said chiefly to rest with the grass and dairy farmers of the Vale of Aylesbury, we paid our first visit to that district, and we now proceed to detail as succinctly as possible the results of our observations and inquiries. The soil in this part of the country is a strong clay loam, varying in depth from two feet of rich staple to only a few inches incumbent on stiff clay. We found the farmers very ready to admit the excellence of the land for grazing purposes, but strongly impressed with the idea that it is very ill adapted for tillage; and their practice quite corresponds with their opinions, for of three parishes which we visited, one 2,000 acres in extent, had not more than $7\frac{1}{2}$ or 8 acres under the plough; another, 900 acres in extent, had only 90; and the third had none at all. The country, therefore, is laid out principally in rich pastures, the fields being large and separated from each other in the usual manner, by hedgerows. The feeding of stock and dairy farming are, of course, the chief uses to which the land is put, and as the nature of

these branches of agriculture, when pursued separately, does not call into play any considerable amount of human labour, there is a very scanty population. Clay soils reveal as quickly as any other the want of drainage, or any deficiency in the manner in which it is carried out. We had, therefore, very little difficulty in perceiving that a great deal yet remains to be done with regard to this primary requisite of good farming in the Vale of Aylesbury. We were informed that tile-drains are used for the tillage lands, and turf wedge drains and wood drains for the pasture lands. The two latter, though not so durable as the former, are stated to be found sufficiently good in practice, and being cheaper to construct, are preferred in a district where all the permanent improvements of the soil are to a great extent left to be effected by the farmer. It appears to be the custom here that the landlord should take little or no part in the agricultural process. In letting his land he seldom does anything to raise the character of the raw material which he thus supplies to the farmer. Sometimes he finds the tiles for drainage, the tenant agreeing to pay all other expenses; but that is the limit of his liberality or his enterprize in this important matter. In the course of our enquiries we did not find one instance where drainage was undertaken by the proprietor as a permanent improvement, and the interest on the money expended charged on the tenant, according to the method pursued in the best agricultural districts. As with drainage so also it is with farm buildings. The management of grass farms does not involve nearly so large an outlay in this respect as where a higher system of culture is adopted; but, nevertheless, nothing can be imagined more inadequate, or worse arranged, than the accommodation of this kind provided in the Vale of Aylesbury. In two of the farms we inspected the buildings were of brick-work, and had been partially, if not altogether, constructed at the expense of the landlord; but in one of these we observed that the yard where the manure was collected sloped towards a large watering pond, into which, of course, all the liquid portions of the manure were drained. The other farm buildings we saw were constructed of rough timber, with roofs of thatch. They had evidently been raised without much regard to shape or situation, or economy of space, and being mixed up confusedly with stacks of hay and beans, presented to the eye a spectacle much more picturesque than convenient. The condition of one farm particularly in respect to outhouses struck us very forcibly. The occupying tenant told us that he had 660 acres all under grass, for which he paid £1,500 a-year of rent and tithe, besides poor rates; that he had expended £200 in making his house habitable on taking possession; and that his landlord would

do nothing in the way of providing needful accommodation for his stock. The appearance more than justified this statement.

In the district about which we are now speaking, the tenures are principally from year to year. We met with two instances in which leases existed; but they were near their close, and one of the lessees, at least, appeared to look forward to that event with no small satisfaction. As far as we could learn, a yearly holding seemed to be looked upon with favour by most of the tenants. With no more secure title the land has been occupied for a long series of years by the same individuals; and one farmer told us that he and his father had rented the same soil for a space of 70 years. He added, that during that time, with a considerable capital invested in stock, a productive soil, an indulgent landlord, large improvements in drainage, and a rent not increased for 30 years, nothing had been made of it. The rent per acre of the land in this locality varies considerably according to its quality, and ranges from 10s. to 50s. an acre; the average, however, being from 25s. to 35s. The amount of poor-rates was not complained of, though certainly the rates mentioned as charged in the different parishes struck us as high considering the small population in them. Tithes were in some instances paid by the landlord, but this appeared to be the exception. One fact collected by us during our inquiries is worth recording, though it does not bear directly upon the main objects of this investigation. It is that the landlord of one tenant whom we visited pays to an ecclesiastical corporation £600 a-year as tithes, though no one discharges the spiritual duties of the parish, and the parish church is roofless, having been so for several generations. The farmers in Aylesbury Vale appear, without exception, to regard both tithes and poor rates as burdens paid by them in deduction of rent. The farms we visited were of considerable extent, and it does not appear the fault of the district to err in this respect. They average from 300 to 600 acres. It may, however, be doubted how far the capital of the tenant is commensurate with the requirements, in that respect, of his holding. We were informed on respectable authority that in some instances the farmers of the district have hardly any capital at all, and that their stock has been purchased with borrowed money, for which, as they have no good security to offer, they pay exorbitant interest.

In the management of the different farms we visited in the Vale of Aylesbury, tillage forms a very inconsiderable matter. We shall first, therefore, describe the system of grass farming. As nearly as we could ascertain the farms are stocked one-third with ewes, and two-thirds with dairy and fattening cattle. The quality of the soil on each farm

determines the precise apportionment of stock; the best land being chiefly devoted to fattening cattle and sheep, the secondary and the worst to dairy purposes. On all the grass farms here the practice with regard to sheep is to purchase ewes early in autumn, which drop their lambs in January, and, after the lambs are disposed of in the London market, are fattened and sold during the nummer. The stock is thus changed every year. The ewes are fed on the pastures summer and winter, getting, occasionally, corn in troughs in severe winter weather, and about the time of lambing. They receive no turnips during the winter; but the practice of farmers differs in regard to the summer food of the sheep, being regulated by the extent of their tillage land. Where fallow is made the land is previously sown with winter vetches, on which the sheep are folded in the early part of summer, thus securing an excellent bite for the sheep, and at the same time giving a dressing of manure to the land. The lambs are sent to the London market as soon as they are ready. The prices which one of the most intelligent farmers with whom we conversed to-day considered remunerative were as follow:—32s. for lambs; 2s. advance in the difference between the selling and buying price of the ewes; and 4s. each ewe for wool. Below these rates he thinks the farmer will not be paid. It must be remarked that most of the ewes had twin lambs. The present rates for ewes and lambs are about 25 per cent. under the above. Wool maintains its price. The ewes kept are principally of the Southdown breed.

Dairy farming is the most important branch of rural industry in this neighbourhood. The farmers do not breed the stock, but buy young cows, and sell them as soon as the begin to fail as milkers. The entire produce is converted into butter, which is sent up to the London market throughout the season, an agent in London being commissioned to sell it. The cows are fed on the fine pastures of this district during the summer, and tied up in sheds for five or six months during the winter, where they are regularly supplied with hay. No green food, wurtzel, carrots, or turnips are grown on the farms, or given to the stock, but some good feeders supply them with a portion of oil-cake in addition to the hay. The hay is of the finest quality. In some farms the cows go loose during the winter in open yards, with sheds to retire under. They are in all cases attended to by men, who feed, clean, and milk them. One farmer employs 12 men to tend a herd of 100 cows, during a winter season.

The milk, when carried to the dairy, is poured into large oblong shallow wooden vessels, lined with lead. Twelve hours afterwards the cream is skimmed off; in 12 hours more it is again

skimmed; and the same process is repeated a third time. In the warm weather of summer this suffices; but during winter a fourth, and sometimes a fifth, skimming is necessary before the careful dairymaid is satisfied that she has succeeded in extracting the whole of the cream. The milk is then drawn off into a pipe by which it is conducted to a tank out of doors, close to the feeding-troughs of the pigs. The butter is churned by horse-power. We did not meet with an instance in which the temperature of the dairy was regulated by the use of a stove.

The price of butter in this district for the last ten years was read to us from the book of one of the gentlemen he visited. From 1839 to 1847, in the month of January in each year, there appeared scarcely any variation, beginning at 15d. to 16d., and ending with 16d. per pound. In 1847 it fell as low as 13d., in 1848 it rose to 17d., and now it has fallen to 14d. per pound. Dairy farming is said by all parties to be the only department of their business which leaves them a profit at present.

A farmer holding 300 acres of grass land mows about 100 acres annually. Part of this receives a top-dressing of dung during the previous winter. The produce varies from ten cwt. to two tons per acre, and the cost of making and stacking the crop is about 15s. an acre. The good farmers consume the whole of their hay on their own farms. But a very small portion is sent from this quarter to the London market, and that said to be hay of inferior quality, produced on the poorest land, and parted with by the neediest farmers. There was a good deal said with reference to the quality of London hay, most of our informants stating to us that no really good hay ever was sent up to London, and that it was almost impossible to tell the difference betwixt good and inferior hay, without being informed of the quality of the land on which it had been grown. This of course had reference to natural upland hay, not the hay of artificial grasses or clover.

Where cattle are fattened they are purchased during the autumn, receive hay, and in some cases oilcake, in yards during the winter, and are fed fat on the best grazing land during summer. It will thus be seen that the farmer of grass lands in this quarter changes his stock of sheep and fattening cattle every year, and his dairy cows when they cease to yield a profitable return. The fall in the price of butcher's meat has therefore very seriously affected him for the season, as it has, in some cases, nearly extinguished his usual profits on fattening cattle, and greatly reduced them on sheep. Next year, should prices continue as low as they are at present, he will still be a sufferer, though not to the same degree, as the prices of the stock he has

lately purchased are reduced nearly in the same proportion as those he obtained in selling. The produce of three acres of good grass land, summer and winter, is reckoned necessary for the keep of one cow. A milch cow consumes much more than the produce of one acre of hay during the winter.

The management of the tillage land on these farms forms quite a subordinate branch of their system. The crops usually grown are wheat and beans alternately, one field being set aside for the purpose of tillage and kept constantly under the plough. The very small proportion under crop enables the farmer to manure it heavily, and accordingly the crops he produces are good, five quarters of wheat and as many of beans being the common yield. One gentleman told us that he had profited by a lesson he got from witnessing the effects of deep tillage on one of the labourer's allotments in his neighbourhood. In consequence of this he instructed his ploughman to go eight inches deep, instead of five, which is the usual depth turned up here in preparing for beans; and though, to the dismay of the ploughman, one or two inches of fresh clay were turned up to the surface, the bean crop, notwithstanding a dry summer, proved excellent, whilst most of those on the surrounding farms were a failure.

The construction of the farm buildings is everywhere defective in arrangements for accumulating or saving manure. To this most important point no attention is paid, the solid manure lying about the yards and the liquid draining itself off to the watering pond or nearest open ditch. The use of bones or guano seems scarcely known, and their value as a manure for the grass lands appears not to have been ascertained. One farmer said it might pay a man with a lease to use such purchased manures, but not otherwise. We cannot help thinking that great benefit would arise from the application of bones and guano to the lands intended for hay, the produce of which might by such means be greatly increased. If to this were added the consumption of cheap feeding stuffs by the ewes, they could be kept from roaming over the whole of the pastures in the months of spring, by which the growth of the grass is often so much retarded as not to afford a full bite to the dairy stock before the beginning of June.

The number of labourers employed on these grazing farms exceeded what we should have anticipated—from 10 to 14 people being engaged on farms of from 300 to 400 acres, with not more than 50 acres of tillage. In all the parishes in which we were to-day there were no labourers out of employment, if we except a few under-drainers, whose work has been, for the present, put a stop to

by frost. The rate of wages is from 9s. to 10s. a-week, with breakfast and ale on Sundays to the men employed with the dairy cattle. Wages have not fallen more than 1s. a-week from the average, though they are 2s. to 3s. a-week lower than they were during the high prices of 1847.

Having thus rapidly surveyed the present condition and practice of the grass farming system for which Buckinghamshire is said chiefly to be famous, it is proper that we should now give some account of the method of husbandry pursued in the districts devoted to tillage. On the clay soils arable culture is not carried on to the same extent as where gravel and chalk exist. The land, too, we are informed, is very difficult to work, and very unprofitable. The worst clays are said to be principally occupied by a smaller and less intelligent class of farmers. Being anxious to ascertain the condition of agriculture in some districts of the county where cropping is resorted to instead of pasturage, and where the character of the soil affords facilities for the carrying it on successfully, we examined carefully the lands extending from Aylesbury to Wendover and the Chiltern Hills. The chalk formation there meets one of green sand, which separates it from the great bed of clay crossing the northern half of the county. There is, therefore, combined within a short distance, a considerable variety of the soils, and the land altogether, to the eye of a stranger, looks of very fair quality for the purposes of cultivation. It, however, obviously wants draining, the first requisite of good farming. A system of drainage is in operation to which we shall shortly allude in describing the management pursued. As on the grass lands, that primary agent in the improvement of the soil is almost entirely neglected by the landlords, who in this district act very much as if they believed that the whole business of a proprietor was confined to drawing his rents. Not only with respect to drainage, but in farm buildings also, the state of agriculture here is lamentably deficient. The feeding sheds, cow-houses, barns, manure yards, are all of the most primitive construction, both in materials and design. The side walls are of rough wood, rapidly decaying from exposure to the weather. The roofs are generally of thatch, and nothing short of a powder magazine can be conceived more ignitable than the whole premises. As to the manner in which they are fitted up internally, to one accustomed only to the modern practice of agriculture it appears like a remnant of Anglo-Saxon times. We saw one cow-house, the stalls and feeding troughs of which were quite a curiosity in the shape of woodwork.

The tenure by which the land is held is generally from year to year, the landlord sometimes prescribing certain limitations as to the mode of culti-

vation to be pursued, and sometimes leaving the farmer to do exactly as he likes. The rent varies of course with the quality of the land, but generally averages about 30s. an acre. Poor rates we found heavy in Wendover parish, but light in others adjoining it. This appears to arise from the fact that agricultural labourers being seldom housed on the lands, all congregate together at some convenient point for the work of a whole district, and thus mulct the ratepayers of one parish heavily while the others go almost free. We inquired particularly how far farms which had fallen into the landlord's hands within the last few months in this neighbourhood had been taken, and whether the old rents were still given for them. We were told that "somehow or other" farms were still readily taken and the former rents maintained. The proprietors and tenants seem to be on comfortable terms with each other; and the latter have invariably expressed themselves to us about the former in kindly and respectful language.

With reference to the subject of drainage, tiles or pipes are seldom used; the material most in demand for filling the drains being "rag" or lumps of hard chalk, about the size of paving stones, which are carted three or four miles for this purpose. Where the operation is performed in the best manner a drain is opened between each "land," the distance apart being from 24 to 30 feet, and the depth of the drain about two feet. The blocks of "rag" are then laid to the depth of a foot fully, a little straw is strewed over, and as much as possible of the noxious substratum which had been thrown out in digging the drain is packed carefully over the straw, the surface soil being then replaced in its former position. The more general plan is, however, to put in, where they appear to be required, a few drains, which are cut to a depth of 15 or 18 inches, and filled up to the bottom of the plough furrow with wood or hedge trimmings. These are said to last for many years. Wet spots here and there throughout a field are so treated, but it is not thought necessary to go regularly over the whole field in the same way. As nothing is believed to be more injurious than any admixture of the substratum with the surface staple of the soil, of course subsoil ploughing or trenching are carefully abstained from, and the benefit of deep disintegration as accessory to drainage is accordingly lost.

The course of cropping followed does not seem to be very definite. Some landlords do not interfere with their tenants, but allow them to pursue whatever system they find most advantageous. Others prescribe a certain course, which is termed "three crops and a fallow." It begins with bare fallow, then wheat, then beans, pease, and clover, and last wheat or barley. This may be considered

the standard, from which there are little deviations. The fallow is found the best and surest preparation for wheat, for which it is usually dunged. After the wheat is removed the land is ploughed and planted with winter beans. The beans are put in in rows with a dibble, at the rate of three to three and a-half bushels an acre, for which the workman is paid 1s. 6d. a bushel, or 4s. 6d. to 5s. 6d. an acre. In spring and summer the beans are hand-hoed with a broad hoe twice or three times, the price paid for each hoeing varying from 3s. 6d. to 4s. 6d. per acre, according to the clean or foul state of the land. After the beans are removed the land is sown with wheat, which, if it escape the ravages of the slug, generally proves a good crop. To destroy the slugs quick lime is used by the best farmers, and is scattered thinly over the surface, at the rate of from one to two quarters an acre. Where it is not thought advisable to sow wheat after beans the land lies during the winter, and is ploughed and sown with barley in spring. Part of the division allotted to beans, an acre or two on a farm of 200 acres, is sown with turnips, which are evidently not considered of much value on this kind of soil. No mangold or other root crop is cultivated, and scarcely a rood of potatoes. On one farm this crop is proscribed by conditions of tenure, the tenant being only allowed to grow half an acre on his farm; a privilege which he does not make use of. No artificial manure, bones or guano are used, and scarcely any purchased feeding stuffs. The farms are laid out in fine open fields, varying from 8 or 10 up to 30 acres in extent. They are enclosed with good thorn fences, and suffer very little injury from excess of wood.

The crop of wheat of the present year is very deficient in yield, turning out little more than 16 or 20 bushels an acre on land of excellent quality. Barley is also a short crop, but beans a very full one. The low price and the deficient yield are the cause of the present complaints: 28 bushels of wheat, 32 of barley, and the same of beans, are reckoned fair average crops.

In working the land it is found necessary to use two different descriptions of plough; one an old-fashioned wooden plough for winter, and the other a more modern iron-wheel plough for summer. The wheel-plough comes into use "with the cuckoo," the ground being in winter so soft that the wheels will not then work. The depth of furrow turned up is from 4½ to 5 inches; the latter depth not being exceeded for fear of bringing up the

noxious subsoil. The surface did not appear of a peculiarly stiff nature; in fact, rather the contrary, having in many cases a large admixture of flints. Yet in winter there are seldom less than four horses in a plough, and three roods are reckoned a fair day's work. In summer three horses are used, and an acre is turned over in a day. The number of labourers employed varies a little. On one farm, with 120 acres under tillage, there are eight men and a boy, two ploughs, and seven work horses, in regular employment throughout the year, and these may be reckoned as nearly the proportions for the arable land round Wendover.

The quantity of stock kept on these arable farms is quite inconsiderable. Three or four cows, and their produce, and a few scores of sheep in summer, comprise the whole for a farm of 150 acres. The farm buildings enclose a large court, into which the straw as it is thrashed is thrown out of the barn, and the cattle, aided by 10 or 12 excellent pigs, eat and tread it into manure. The watering pond usually forms the lowest part of the yard, and of course receives all the drainings of the dung. The crops are thrashed out with the flail.

Many of the farms are intersected by public roads, and are thereby well supplied with means of access to the different fields. But where they are not on the line of road the farmers suffer great inconvenience from the want of proper farm roads. The consequence is that in harvest they are obliged to stack their crops in the corner of the field where they are grown, waiting for dry frosty winter weather to carry them home. On one farm which we examined the roads had become impassable, and the carters had therefore been obliged to turn into an adjoining wheat field, along the headland of which the heavy waggons had done much injury to the young wheat plant. If a different system of husbandry, involving a greater extent of root crops were adopted, the want of good roads of access would be found still more injurious than at present.

Before closing this communication it is only right that we should acknowledge the courtesy and frankness with which the farmers generally have received us at the outset of our investigations. They have communicated freely the modes of cultivation adopted by them, and the condition of farm management in their part of the country. We met with only one exception to this, but we were not surprised at it when we found that the same person holds himself aloof from the other members of his own class around him.

(To be continued.)

CALENDAR OF HORTICULTURE.—MARCH.

RETROSPECT.

The weather during the ten last days of January suffered no material alteration; cold, but not severe, generally gloomy, but with some sun, and an increase of mid-day temperature on and after the 25th. Some rain fell on the 26th, 29th, and 31st. The wind settled in the south-west on the 1st inst., and brought with it a tendency to rain and much more genial temperature. We already find eight occasions wherein rain fell in sufficient quantities to verify the usual character of February. There has also been a fair average of sunshine. Frost has seldom occurred; but the wind has been occasionally tremendous. Vegetation begins to advance; primroses are in bloom; narcissus are forward, and the buds of trees in general swell.

Analysis.—The *Brassica* is a very extensive family, and almost all the members of it may be advantageously sown in the month of March. It is generally supposed that the varieties which rank under the head *oleracea* (potherbs), or the *capitula sperica* of De Candolle, are rank feeders, and as such require a strong enriched loam. We offer to the reader's notice a table extracted from Professor J. Johnstone's lectures of the results obtained by Dr. Framberg from the *ashes* left by burning the dry leaves of the cabbage.

	PER CENT.
Potash	11·70
Soda	20·42
Lime	20·97
Magnesia	5·94
Oxide of Iron	0·60
Phosphoric acid	12·37
Sulphuric acid	21·48
Chlorine	5·77
Silica	0·75
	100·00

It is to be regretted that we have not the relative quantity of ashes from given weights of the moist and dried herb; but judging from the great quantity of soda, lime, and sulphuric acid in the above list, compared with the high luxuriance produced by a very small quantity of excellent guano during the growth of the garden-hearting cabbage, I presume that the aforesaid elements indicate the application of sulphate of soda, common salt, gypsum, and also of a fair dose of very fine bone earth. We cannot judge from the processes of combustion how far ammonia may be useful, but a trustworthy *organic analysis* of the green parts would, I little doubt, determine the presence of much *nitrogen*, a

fact to which we are led by the nauseous odour emitted during their putrescent fermentation.

OPERATIONS IN THE KITCHEN GARDEN.

In the first and second weeks.—Sow the seeds of *cabbage*, *borecole*, *Scotch kale*, *savoy*, *Brussels sprouts* in very rich soil, but prefer a new or maiden loam. Prepare open plots of ground on the principles above adopted, *i.e.*, by deeply trenching a fine and unctuous loam, and depositing at the bottom of every trench a strong layer of recent manure, saturated with urine, as a foundation for *cabbage plants*, *cauliflowers*, and the earliest *brocoli plants*. The earth to be turned on this manure is to receive a liberal supply of short reduced manure from the dung-hill or composts, to which a little of the best *guano* has been added. In a bed so prepared plants of the brassica family are almost certain to succeed: they should stand from 18 to 30 inches asunder, according to the habits of each. The spaces to be kept free from weeds, and as growth advances, liquid manure or guano-water (one oz. to two gallons) may be now and then applied in dry weather: the effect of this latter ammoniacal fertilizer has been found astonishing.

Transplant and sow *lettuces* of any approved kinds. In attempting to produce *white cos*, similar to those sold in London, the means of irrigation must be at command, and the soil made rich with black manure; the nearer its transition state to that of *humus* the better. Sow *spinach*, *onions*, *London leeks*, for transplanting, *radish*, of sorts, *carrots*, *parsneps*, and *beet*.

In the third and fourth weeks.—Repeat the sowing of *peas* and that of *broad beans* for the last time. From this time forward sow the better and later sort of peas, as the *imperials*, *Prussians*, and *marrowfats*, using no fresh dung. Earth up and stick the plants of early crops. A strong sowing of *stone* and *Dutch turnips* will come in early. Proceed with *small sabading*, *purslane*, *chevil*, *curl parsley*, *nasturtium*, for picking, *capsicum*, and *love-apples* in frames, *asparagus seed* preparatory of plants for forcing. *Celery* and *celeriac* ought to be raised over a gentle warm bed of tree leaves, the earth above to be guarded by a hand-glass. *Sweet basil*, in pans, is thus raised.

Asparagus beds and single rows ought to be very carefully forked to ease the advance of the shoots. Fear not to try a strong application of salt *early in the month*; the surface may appear as if snowed over, and thus the beds will be made *free of weeds*

—a great advantage—but by all means avoid the use of salt from the moment that the least hint of growth be apparent. In preparing new beds, adopt the deep trenching and manuring recommended above for cabbage beds; but trench three feet if possible, and use more reduced guano for the two feet of surface earth. Liquid drainage from the house closets, filtered through sand, and occasionally made to irrigate the asparagus beds during the spring and early summer, *we know* will produce a verdure and growth of uncommon character. The machinery, however, is somewhat difficult.

Artichokes.—Dress as soon as possible, by removing all the litter, and pointing in manure and any semi-decayed tree leaves that were used in the winter; trim the edges, and make the whole neat. If the plants be strong some good rooted suckers will appear, which should be carefully detached, and removed to a rich plot in an open situation, to stand about a yard asunder. Showery mild weather is favourable, and it is desirable to prepare a new row or two every spring.

Sweet herbs.—Sow the seeds of hyssop, common thyme, savory, and sweet marjoram; but prefer young offset plants, and particularly those of the lemon thyme. Slips carefully planted will succeed, and thus all the varieties of sage, rosemary, and lavender can be raised. Young plants of camomile in beds, or as edging, will often be useful. Mint is raised by forking up the young fibrous roots sent up by strong plants; draw them up carefully, and use the knife to separate the longer portions of running roots; plant them about 5 or 6 inches apart, and give water to settle the mould close to the fibres.

Plant *garlic* and *shallots*; these are compound bulbs, the portions of which are called *cloves*—they certainly require an ammoniacal manure. Of the shallot, Mr. Knight, of Downton, said that he placed a rich soil beneath the bulbs (or best detached cloves), and raised the mould on each side to support them till firmly rooted. That he then removed by the hoe, and watered from the rose of a watering pot, so that the bulbs were placed wholly out of the ground. By this treatment the growth of the plants became like that of the onion; and the bulbs though retaining their peculiar form, became less long and much broader, while the crop was fine and more abundant.

Jerusalem artichoke.—This is propagated as the potato, by planting small tubers in the present month, about 15 inches apart, in rows from 3 to 4 feet asunder; the soil should be a good loam, not binding, but its site detached from the garden. *Horse-radish* the same.

Potatoes.—What to expect from this crop it is difficult to say: at all events let putrescent manure

be avoided; prefer a light sandy earth, and employ charcoal dust, carbonised peat, or sawdust, with wood ashes, as a covering to the sets or tubers in the drills. From the late Mr. Knight's letters, I learned that he always planted, in rows which pointed south and north, *whole tubers* 4 to 6 inches asunder, crown from crown, in rows so far apart as to correspond with the length of the haulm; thus, for the ash-leaved kidney, we might take 2 feet, and for the higher growers from 4 to 6 feet: the tubers to be at least 4 or 5 inches below the surface. George Lindley wrote that the earliest potatoes are always obtained from sets with a *single eye*, cut from the crown or rose end of the tuber. (?)

From the abundance of matter for the culinary department, I must postpone other directions referring to fruits of all kinds, to April; only observing that *strawberry* plants must be trimmed from old leaves and runners—the spaces around or between mulched with long strawy dung, or covered with flat tiles, to check evaporation, and that new plantations may be made from established and strongly rooted runners. Avoid digging about the bearing plants. Some persons use brewers' spent hops as a mulch—they are very clean.

ORNAMENTAL DEPARTMENTS.

Greenhouse and conservatory.—Admit air freely, but not drip; increase artificial heat very cautiously; but let the sun act with more power—cool air by night, and solar warmth by day, are dictated by nature. Remove decayed leaves, and keep every part of the erections clean. *Cold frames* and *flower-pits* demand a corresponding treatment. Sow the seeds of annuals in pots carefully marked, and keep them under glass.

Flower beds and parterres.—The bedding-out in masses is to be preferred, because the habits of plants require peculiar soils; thus, heath soil, or decayed leaves with a predominance of pure siliceous sand, suits the hair-rooted and American tribes; semi-decayed tree leaves (not beech or laurel) are used to give colour to the lobelias; soft new loam, enriched with the horse-droppings of old mushroom beds, is suitable to pelargoniums, verbenas, and the like. Let the miscellaneous beds be neatly digged, after manuring with old cow-dung, leaf-mould, and maiden loam if required; and thus be made fit to receive annuals, seeds, and herbaceous plants.

Prune the *budded roses* of last summer as the eyes develop, and those of former seasons, so as to leave regular open heads.

If *evergreens* be planted, let there be no delay—open the roots, trickle the fine earth so that it touch every fibre; water from the rose as the filling-in proceeds; firm the surface earth truly, but gently; mulch with leaf-screenings, and water copiously.

The weather on this closing day.—It has been seasonably fine of late, at a full average of 45 to 50 degs.; and nature makes corresponding advances. The 18th was a perfectly lovely spring day, till just before sunset, when stratified clouds formed in the

west, and increased to complete suffusion, which continued on the 19th. This morning a close rain has set in.

JOHN TOWERS.

Croydon, Feb. 20.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR FEBRUARY.

During the greater portion of this month the weather in all parts of England has been very favourable for out-door farm labours. The absence of superabundant moisture has enabled our agriculturists to get upon the land without difficulty; and immense breadths have been prepared for the seed-farrow under the most satisfactory auspices. The winter wheats have presented a very cheering appearance, although in some quarters they are rather thin upon the ground. That they have stood the severe weather experienced at the beginning of the year remarkably well, is generally acknowledged; and we may safely venture to observe that an unusually small number of re-ploughings and sowings have been found necessary.

Notwithstanding that a slight rally took place in the price of wheat about the middle of the month, the transactions in that grain have been comparatively small, and the quotations have tended downwards. The present reduced value of corn is unquestionably producing much excitement and alarm amongst the producers generally; and it does not, we assume, require any argument to prove that—whatever may have been advanced by a few farming *novices* to the contrary—present prices will not repay the growers, even with a large reduction in rent. Looking to the fact that the whole world is producing for us, that the stocks of home-grown corn are seasonably large and of excellent quality, and, further, that we have still extensive quantities of potatoes on hand, we see very little prospect of any permanent rise in the value of any article for some time hence. In seasons of comparative scarcity local wants are frequently supplied from a distance, that is to say, wheat, flour, and other articles used and consumed in the inland towns are brought from the large outports; hence firmness is thus frequently given to demand and value in London, Liverpool, &c. Up to the present time, however, the trade has been almost wholly met by neighbouring farmers and millers; consequently the stocks of grain and flour in the metropolis have increased, even though the importations have been small compared with those of several

previous months. On the continent good flour may be had at from 25s. to 30s. per 280 lbs. free on board; and we should not be surprised to find a further reduction in value ere long. The depressed state of our markets has induced speculators to operate with great caution for some time past; and this will be apparent when we observe that during the month ending February 5th (current year) the total importations into the United Kingdom from abroad and our colonies were only 296,326 qrs. of grain, and 258,920 cwts. of flour and meal—the latter chiefly from France and Belgium. The holders abroad are stated to have evinced no disposition to force sales on lower terms; but we doubt much whether, in the absence of any demand from this side, the prices current at the date of our last advices will be supported.

Much attention has been very properly directed of late to the system of taking the averages of corn in this country, by which the amount payable to the tithe-owner is regulated. The evil is a most serious one, and requires to be got rid of immediately. For instance, in 1847 the average price of wheat was 69s. 9d.; in 1848, 50s. 7d. per quarter. Those high rates—as the tithe average is taken on the seven preceding years, the whole of which were considerably higher than at present—of course enter into the value now placed upon the tithes; consequently, the farmer is now paying fully 20 per cent. more than he ought to pay. In our opinion, the tithe average should, under existing circumstances, be taken every year; the seven years' average should be wholly abolished, and the growers only should be parties to make the returns to the Inspectors.

The quantity of potatoes grown on the Continent last year appears to have been unusually large. Since the 1st of September, 1849, upwards of 120,000 tons have been shipped from France and Belgium to this country, in fair average condition. We need scarcely observe that this new traffic has interfered materially with the demand for “bread-stuffs.” Not a single cargo has arrived in London from the Channel Islands, from which some years since from 20,000 to 25,000 tons were shipped annually.

Although the arrivals of foreign stock have fallen off materially, owing to the severity of the weather abroad, and the low prices ruling in our markets, the demand for fat stock has been anything but active. Sheep have, however, commanded rather more money; but the value of beasts, calves, and pigs has given way. The approaching lean stock fairs are likely to pass off heavily. Whatever may be the extent of business doing in them, prices must necessarily be low.

The early lambing season has passed off remarkably well. The fall is represented as a good one. Although the supply of grass is small, both beasts and sheep, from the abundance of dry food, have fared better than in the ordinary run of years. The consumption of linseed and oil-cake has been small in the extreme; nevertheless, the stock exhibited in Smithfield and elsewhere has been in good condition.

The turnip crop has turned out a fair average, though not a superabundant, one.

For both hay and straw, the demand, owing to the large supplies offering, has ruled heavy, and the late low prices have been with difficulty supported. Meadow hay has produced only £2 8s. to £3 10s.; clover do., £3 to £4 10s.; and straw, £1 1s. to £1 9s. per load.

In Ireland and Scotland very little business has been transacted in corn—the prices of which have not been maintained.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

Since we last wrote, the total supplies of stock, both English and foreign, on offer in the metropolitan market, have been very moderate, the time of year considered. For mutton the demand has ruled steady, on somewhat higher terms. Otherwise, the trade has continued in a very depressed state, and prices have given way quite 2d. per 8lbs. We attribute this decline in a great measure to the small numbers purchased for distant consumption—a striking proof, we presume, of the abundance of stock in most of our grazing districts. Generally speaking, the beasts and sheep have come to hand in good condition, the weight exceeding that of several past corresponding seasons. Very little stock has come to hand from Holland; but, as the navigation is now open, increased supplies may be expected, and which will, we fear, reduce prices to the lowest level obtained in 1849. The trade with Spain has been commenced; but we doubt much whether it will be continued, owing to the severe losses which many of the importers have already sustained. Freights are, however, about to be reduced 25 per cent., as several additional steamers

are to be placed upon the Rotterdam and Harlingen lines. The available supplies in Holland are represented as still large. This circumstance is calculated to induce considerable caution in effecting purchases at the approaching lean-stock fairs in this country. The consumption of oilcake and linseed is still falling off to some extent.

The imports from abroad into London during the month were as follows:

	Head.
Beasts	874
Sheep	1,350
Calves	1,646
Pigs	10

Total	3,880
Corresponding month in 1849 ..	5,642
Same month in 1848	3,546
Same month in 1847	3,984

The total arrivals at the outports, including 116 beasts at Southampton from Vigo, have not exceeded 400 head. Last year, at the same time, they amounted to 2,511 head. From Ireland, 193 beasts and 90 pigs have arrived by sea.

The annexed supplies have been shown in Smithfield:

Beasts	16,727	Head.
Cows	445	
Sheep	80,160	
Calves	998	
Pigs	1,819	

COMPARISON OF SUPPLIES.

	Feb. 1847.	Feb. 1848.	Feb. 1849.
Beasts	15,101	15,404	17,139
Cows	601	570	617
Sheep	84,830	75,160	81,050
Calves	844	859	1,240
Pigs	2,285	1,935	1,247

The bullock droves have been derived as under:

Eastern districts	6,540
Northern districts	900
Other parts of England	3,950
Scotland	870
Ireland	193

COMPARATIVE PRICES.

	Per 8lbs., to sink the offals.		Feb., 1847.		Feb., 1848.	
	s.	d.	s.	d.	s.	d.
Beef from ..	2	10	4	4	3	2
Mutton	3	6	5	0	3	6
Veal	4	2	5	4	4	2
Pork	3	6	5	0	3	10

	Feb., 1849.		Feb., 1850.	
	s.	d.	s.	d.
Beef from ..	2	8	3	8
Mutton	3	0	4	6
Veal	3	8	5	8
Pork	3	4	4	6

Up to Newgate and Leadenhall, nearly 60,000

carcasses of meat were received from various parts of the country. The general demand ruled heavy, and prices were not supported.

YORKSHIRE.

A month of great severity has been succeeded by one of mild temperature, but of wind, storms, high tides, and of floods; and considerable damage in the aggregate has been done in those situations near the coast, or near the rivers, where these inundations had peculiar influence. Farm work has gone on briskly since the storm broke up. The thrashing, getting out of manure, and obtaining food for the stock, were the sole employment of the farmers during its continuance; and now the plough, the cart, the spade, and the axe, are very vigorously employed in calling back lost time, or at least in bringing up arrears of work of this description. The turnips have suffered severely from the frost; not that the tops only have gone, which we expect to be invariably the case, and which generally happens much before this period, but the bulbs have many of them rotted. The largest and best plants being much overgrown have been the first to suffer; and a large proportion of the white varieties still left, have fallen victims to their overgrown condition. Even the latest sown in this special turnip-year have become, in many instances, noble crops; and some, only just above ground at the *middle of July*, are promising to be, and are really in every respect, the most paying crops of all, because being less in size they have been more able to resist the influences of the weather. There is another remarkable circumstance connected with the growth of turnips this season in the country—that those which had the largest amount of chemical or artificial manure applied, have suffered most from the rot. We believe this not to be any general rule in the run of seasons, but strictly confined to this peculiar season. The wheat crop looks a little bleached, but the vitality of the plant has, so far, received no adverse shock, and we never saw the plant better on the ground. The season has, on the whole, been favourable to the fattening of sheep and cattle, and the very low prices of corn have induced many farmers to give an unusual quantity to their stock. This however, so far, is only putting the low prices a stage further off, as beef, except of extremely prime quality, cannot make more than 5s. to 5s. 6d. per stone; whereas the trouble and cost of producing beef in winter cannot be less than 7s. per stone at the very least. When the grain markets will attain their lowest point it seems impossible to say. They seem to verge lower and lower, contrary to the opinions of nearly all prognosticators, and when the minimum point will be arrived at it does not seem very clear. Up to the present time it really seems a blessing that the poorest farmers thrashed out their corn early, for by it they have made by far the most money—so far, at least. Potatoes are by no means satisfactory as to keeping,

and many have suffered materially in the pits. The safety of this root does not appear to be in any way established; still efforts will be made for forcing its growth; and we should be sorry they should not, for we are by no means believers in any permanent or serious diminution of its vital power; but that the present visitation is one resembling the plague or cholera in human beings, we have no doubt whatever. This will pass away, and the root will regain its pristine vigour, as it did before from the visitations of the curl, the dry rot, &c. Nearly every town and village in the county, at least of an agricultural cast, sympathise with the protection movement, and there will be a fierce struggle for the mastery in several towns now returning free-trade members to Parliament. Prices range fearfully low: wheat, 4s. 6d. to 4s. 9d. per bushel, barley 21s. to 23s. per qr., and oats 12s. to 15s. per qr., are a fair range of prices in the agricultural markets. Great desperation prevails.—Feb. 15.

WEST KENT.

The weather has been seasonable, and, generally speaking, suitable for farming operations, having frosts, to cart out manures, which our Mid. Kent Hop farmers have done liberally, considering the prospect for hops *one more year* good; and much of hop lands are dug, particularly where rags have been used, which is desirable, as they require time to decay, in readiness to supply the fibre in summer. Hop poles are declining in price, as it turns out a large fall has taken place this year in general. The wheat plant looks all right, the snow having protected it from frost; the same may be said of the November sown peas, which look very well in general. Many are now preparing to sow spring wheat. The pork fattening has been carried to a considerable extent, corn being so low; but the market price of pork is very low, and no good will be done, except for manure, but it is *dearly* bought. I do not observe so much draining going on as is usual at this season of the year. I fear the farmers have found out the improvements don't fall to their lot to enjoy. Much has been done in the fruit orchards during December and January in thinning out such as were *too* thickly wooded; and I observe a very general movement in cutting down *high* hedges, even where situate to shelter hop or fruit grounds, it being considered they do no general good. In many places in the *weald*, hedge-rows have been grubbed up, as landlords have given leave to have any unnecessary ones removed, which gives much more land, and allows a free current of air; more still would be done, but for the outlay for labour, which 40s. wheat will not admit of. Those who intend growing potatoes are now beginning to plough the land in readiness. As early planting has answered best during the years of blight, this seems the project of all—*plant early*. It has been suggested that any very light manure is desirable to produce an early crop, such as *rags, tan, short hop bines*, or even *saw dust*. We hear less of the disease among sheep and cattle, which I trust will continue to decrease, as many suffered much loss, particularly from the *lung disease* among cows. Wages are still gradually declining, and must be lower, much to the annoyance of the farmers, but it cannot be avoided; but all now look forward with lively hopes for better times.—*Sussex Express*.

METEOROLOGICAL DIARY.

BAROMETER.			THERMOMETER.			WIND AND STATE.		ATMOSPHERE.			WEATH.
Day.	8-9 a.m.	10 p.m.	Min.	Max.	10 p.m.	Direction.	Force.	8 a. m.	2 p.m.	10 p.m.	
Jan. 22	30.36	30.48	30	33*	32	S. Westerly	gentle	cloudy	cloudy	cloudy	dry
23	30.47	30.40	33	35	34	W. by North	calm	cloudy	cloudy	haze	dry
24	30.35	30.20	32	36	33	W. S. W.	gentle	fog	cloudy	cloudy	dry
25	30.00	29.80	33	48	46	W. S. W.	lively	cloudy	fine	cloudy	dry
26	29.44	29.94	48	50	35	W. by North	strong	cloudy	fine	fine	rain
27	30.42	30.42	27	33	32	S. Westerly	lively	fine	sun	cloudy	dry
28	30.10	29.84	31	48	48	S. West	strong	cloudy	cloudy	cloudy	dry
29	29.84	30.00	40	50	40	N. W., N.E.	gentle	fine	sun	cloudy	rain
30	30.14	30.30	35	44	33	N. by East	airy	fine	sun	cloudy	dry
31	30.20	29.95	32	40	40	S. by East	airy	cloudy	cloudy	cloudy	rain
Feb. 1	29.82	29.76	41	52	51	S. West	strong	cloudy	cloudy	cloudy	drizzle
2	29.84	29.76	48	54	48	S. West	strong	cloudy	cloudy	cloudy	dry
3	30.84	29.94	43	51	40	Westerly	brisk	fine	sun	fine	dry
4	29.99	29.73	34	47	42	S. West	gentle	fine	sun	fine	dry
5	29.68	29.00	39	47	45	S. West	violent	cloudy	fine	cloudy	rain
6	28.86	29.24	40	45	36	W.N.W.	forcible	fine	fine	fine	dry
7	29.40	29.66	33	44	38	W.N.W.	brisk	fine	sun	fine	dry
8	29.70	29.70	36	50	49	S. West	brisk	cloudy	cloudy	cloudy	rain
9	29.68	29.69	44	49	38	S.W., N.W.	fierce	cloudy	cloudy	cloudy	rain
10	29.96	30.10	36	46	39	S. West	lively	fine	sun	fine	dry
11	29.96	29.34	36	46	41	S. West	violent	cloudy	cloudy	cloudy	rain
12	29.35	29.40	38	40	35	S. Westerly	brisk	cloudy	sun	fine	dry
13	29.76	30.27	31	41	31	N. West	gentle	fine	sun	fine	dry
14	30.10	29.76	38	50	50	S. West	brisk	cloudy	cloudy	cloudy	rain in
15	29.96	29.97	40	52	48	Westerly	brisk	cloudy	cloudy	cloudy	night
16	29.88	30.33	39	49	40	W. by North	airy	fine	sun	fine	dry
17	30.33	30.24	38	47	45	W. by N. by S.	airy	cloudy	cloudy	cloudy	dry
18	30.23	30.17	43	53	44	Westerly	gentle	fine	sun	cloudy	dry
19	30.16	30.05	43	48	47	Do. by S.	airy	cloudy	cloudy	cloudy	rain
20	30.00	30.16	45	50	44	S. West	gentle	cloudy	cloudy	fine	rain

ESTIMATED AVERAGES OF FEBRUARY.

Barometer.		Thermometer.		
High.	Low.	High.	Low.	Mean.
30.82	29.170	53	21	38.

REAL AVERAGE TEMPERATURE OF THE PERIOD.

Highest.	Lowest.	Mean.
46	37.53*	41.76

WEATHER AND PHENOMENA.

Jan. 22—Overcast. 23—Fine night. 24—Frost early. 25—Thaw; sunny gleams. 26—Violent squalls of wind and rain, with change to north. 27—Keen and bright. 28—Great extremes of temperature. 29—Fine till evening. 30—Same. 31—Rain at evening.

LUNATIONS.—First quarter, 22nd day, 9 h. 49 m., morn.; full, 28th day, 51 m. after midnight.

Feb. 1 and 2—Changeable. 3—Spring-like. 4—The same. 5 and 6—Strong gales; gleams. 7 and 8—Wind strong; changeable. 9—Heavy

shower; change of wind, with a lull. 10—Drying. 11—Much rain; splendid meteor. 12—Some hail. 13—Keen, drying day. 14—Wind and rain; sudden changes. 15—Overcast. 16—Fine. 17—Overcast. 18—Beautiful till sunset. 19—Very cloudy. 20—Much rain.

LUNATIONS.—Last quarter, 4th day, 1 h. 18 m., morn.; new moon, 12th day, 6 h. 29 m. morn.; first quarter, 19th day, 8 h. 21 min. night.

REMARKS REFERRING TO AGRICULTURE.—So completely had the long frost of the first month checked growth, that the mild temperature of February has as yet produced little visible effect. The buds of trees and shrubs, however, show that Nature is active. Early flowers also begin to appear, and birds begin to be heard. If, however, the farm crops are quiet, nothing seems amiss. Rain has fallen in ample quantity, and we have promise of an early spring.

Croydon, Feb. 20th.

J. TOWERS.

AGRICULTURAL INTELLIGENCE, FAIRS, &c.

ABINGDON FAIR, Monday.—Both nag and carthorses of good quality met with a ready sale, while inferior animals were unsaleable. Milch cows realized a tolerable price. Sheep rather a dull trade, at late prices.

ASHBORNE FAIR.—The number of fat stock was not so large as at the corresponding fair last year, nor was the business so extensive, as sellers were unwilling to accept the prices tendered. Beef sold at 6d. to 6½d. per lb. Calving cows were very little in request, at a slight decline on the late prices, but stirs were more inquired for. The sheep fair was flat, and every description of stock moved off heavily, mutton realizing 6½d. to 6¾d. per lb. There was a large show of horses of the second-rate quality, and a few superior ones, in which an average business was done at about the same rates as at the previous fair.

BANBURY FAIR, Feb. 21.—Cows, both barren, in-calf, and in full milk, were plentiful, but a very dull trade. There was a good supply of fat beasts and sheep, which met with a better demand. The horse fair was badly attended, and the trade very dull.

BATH FAIR.—The supply of fat beasts was very short, and poor stock sold slowly. Beef, 8s. 6d. to 10s. per score; mutton 5½d. to 6d. per lb.

BEDFORD FAIR, (Tuesday last).—There was a moderate supply of stock, and those of a good quality fetched prices quite as high, or perhaps a little better than of late. There was, however, comparatively little business done, buyers being very careful, and not over anxious to part with their stock.

BERWICK FORTNIGHTLY CATTLE MARKET, (Monday last).—The show of fat cattle was the best we have had for some time past; but with regard to the sheep the show was limited. The numbers were—Fat cattle 156, lean 50, cows 21, sheep 220, and pigs 16. The following were owners of the principal lots of cattle, but nearly the whole of the fat was of excellent quality: Mr. Elliot, Lamberton; Mr. Laidler, Fenton; Lord F. Fitzclarence; a good lot from Letham Hill; and Mr. Clay, Kerchesters; but the best cargo of fat came from East Lothian. There was a good attendance of buyers, but the sale was dull for cattle. The limited number of sheep caused a very quick sale with them. Beef may be quoted from 5s. 6d. to 5s. 9d.; mutton, small, realized 6d., and sheep of large dimensions would average 5½d. per lb.; cows from £6 to £12; and pigs from 4s. to 4s. 3d. per st. There was little demand for lean cattle, and prices can scarcely be quoted.

BRIDGNORTH FAIR, on Tuesday, was well supplied with cattle. Good beef fetched from 4½d. to 5½d. per lb. Mutton was also in greater demand at 5d. to 5½d., but a very thin supply. Pigs were looking up. Upon the whole stock of every kind was in advance.

COCKERMOUTH HORSE FAIR was well stocked, many of the animals being of a superior class. The attendance of dealers was also numerous. Good horses—saddle and coaching, as well as draught—sold freely, at somewhat high prices. The fair, upon the whole, was considered a good one.

COLDSTREAM FORTNIGHTLY MARKET.—The supply of cattle was fair, numbering upwards of 100 head, quality generally good; sales were but slowly effected, and prices ranged from 5s. 6d. to 5s. 9d. per stone; one lot of prime heifers brought about 6s. per st. The supply of sheep was smaller than usual, and sales were brisk; most of the lots brought about 5½d. to 5¾d.; one lot of very superior Dinmonts, belonging to William Smith, Esq., Learmonth, brought nearly 6d. per lb. For lean cattle there was a dull sale.

DORCHESTER FAIR, (Thursday last).—Notwithstanding the very unfavourable weather—the rain coming down heavily and incessantly from an early hour until 11 o'clock—the attendance of dealers was very numerous, and the supply of

stock was plentiful; the more preferable portion of which met with a brisk sale. Good cows, with their calves, from £9 to £13; barreners, from £5 to £9. With regard to the horse fair, there was a tolerable supply as to number, but only a few good cart-horses amongst them, for which high prices were demanded; upon the whole, but little business was done. There were a great many farm-labourers in search of employment.

DORKING MONTHLY FAT STOCK MARKET (Thursday last) was the largest we have seen here for the last twelve months. There was a very large show of fat and lean stock, also Sheep, Pigs, and Calves, and fortunately we were visited by a great many butchers from the neighbouring town, and consequently the trade was brisk. Beef, from 3s. 6d. to 3s. 10d.; Mutton (Downs), 4s. to 4s. 6d.; sucklers, from 12s. to 15s.. Store Pigs met a ready sale at prices from 14s. to 21s.

DUNSTABLE FAIR was thinly attended, and the live stock, to a great extent, remained unsold.

EXETER FAIR (Wednesday last) was remarkable for the great number of beasts driven in. Between 600 and 700 bullocks were offered for sale, nearly all being Devons; in fact there were no Irish or foreigners in the fair. The supply being so large, it is not to be wondered at that it rather exceeded the demand; though in the end most of the good animals were sold. The fair is generally remarkable for the quantity of store cattle exhibited, and on Wednesday it amply fulfilled its reputation. Of fat bullocks the supply was but moderate, and that consisted almost entirely of heifer beef, there being no very prime fat oxen. Fat beef sold at from 8s. to 8s. 6d. per score; but only the best heifers fetched the latter figure. There was a splendid show of working oxen, genuine North Devons, a great part of which were sold. The highest price we heard was £17 each, or £68 for four prime articles, which were sold by Mr. Pope, of the neighbourhood of Crediton. Mr. W. Paisley, Pinhoe, bought two very symmetrical North Devons for £32, which will be turned into capital beef at Christmas. The quotation for working oxen ranged from £12 to £17 per head. The supply of steers was very large, and poor ones hung heavily on hand; prices ranged from £12 to £20 per pair. There was a good supply of barreners in the fair. Very poor ones were not much looked at, and sold for about 4s. 6d. per score; fresh barreners, of middling quality, made 5s.; and those of a superior description, known as "good meaty bullocks," made 5s. 6d. Of cows and calves there was a fair supply, which sold at from £8 to £12 each. Yearling bullocks were offered at £4 10s. to £5 each.

HORNBY FORTNIGHT FAIR.—There was a moderate supply of cattle on Tuesday, for which there was a small demand, owing perhaps in some degree to Wray fair being last week. Prices may therefore be quoted to have a downward tendency.

LEOMINSTER FAIR (Wednesday last) was a shade or two better than recent fairs in the neighbourhood. There was a fair supply of most descriptions of stock, and of barreners rather above the average number of this time of year. The horse fair was also tolerably brisk. Beef varied from 4½d. to 5d., mutton 5½d. to 6d., prime do. 6d., and pigs 4s. 9d. to 5s.

LERRIN FAIR was rather smaller than usual. Beef, which was generally of inferior quality, brought from 45s. to 48s. per cwt. There was a good sale for sheep, nearly all of which were sold at 5d. per lb.

LIFTON FAIR.—There was a large supply of cattle, and a good deal of business done. Mr. Whithen, from Norfolk, purchased upwards of 100 bullocks.

LOCHMABEN PORK MARKET, Feb. 19.—There were 141 carcasses, weighing 1,922 stones, which were sold at prices ranging from 4s. 6d. to 4s. 11d. per stone, according to weight and quality. Mr. Steel, of Amman, purchased 1,465 stones, and thus obtained the premium as largest buyer.

LUDLOW FAIR (Monday) was not so well attended as usual, which in a great measure was owing to the fall of snow and sleet. The average price of fat cows did not exceed 5d. per lb. Some very fair animals were sold at 4½d., and inferior animals about 4¼d. Sheep realized 5d., and pigs from 4½d. to 4¾d. per lb. Cheese varied from 2¾d. to 5d., seconds 3¾d. to 4d. There were some good cart and hack horses exhibited, but few disposed of.

NORTHAMPTON FAIR, Feb. 20.—There was but a very short supply of fat mutton. The trade was brisk, and good wethers in the wool made from 3s. 10d. to 4s. per stone. The supply of store sheep was also limited, and most of them were sold early in the day. The supply of fat beef was large, and lower prices were submitted to. Store beasts were scarce, and principally Herefords, most of which were sold. For milching cows considerably lower prices had to be submitted to to effect sales.

NEWARK FORTNIGHT FAT STOCK MARKET.—There was rather more than an average show of stock. Sellers were numerous, but purchasers were by no means spirited. Good fat beef made only 5s. per stone; many things were, however, sold. The market was flat. There were 390 sheep and 58 beasts penned.

PENRITH HORSE FAIR, Tuesday.—This was a very honest sort of fair, as nearly every man kept his own.

RUGBY FAIR, Feb. 18.—The show of stock of all kinds was unusually small, and buyers scarce. Beef, 4½d. to 5½d.; mutton, 5d. to 6d. per lb. Stores and milking cows brought an improved price.

SHREWSBURY FAIR.—Tuesday last was the first fair day under the new arrangement, by which the sale of cattle and sheep is to take place fortnightly, instead of monthly, as heretofore. The weather was so severe as to be much against the new experiment; nevertheless the attendance of buyers was tolerably good, though the transactions were limited. The supply of sheep was small, prices varying from 5½d. to 6d. per lb. There were but few ewes and lambs, and they were not in demand. Yearling sheep were about 7s. per head lower than this time last year. Beef ranged from 3½d. to 5d. per lb., some prime sorts reaching 6d. per lb. There was a good supply of cows and calves, but they were not much inquired after: barrens were sought for. Good wagon horses were in brisk demand. The transactions in cheese and butter were on a very extensive scale. The supply of butter was the largest ever known at a February fair, yet all was sold at rather improved prices, fetching from 7¾d. to 8½d. per lb. In cheese, best dairies were a bad sale; middle ditto about the same as last fair, and a slight advance upon skim. The supply of cheese was large for the month, and a great deal of inferior quality was offered. Prices ranged from 40s. to 50s. per cwt. Skim, 20s. to 30s. Good dairies met with ready sale, at rather better prices. Bacon and bams 4½d. to 5½d. per lb.

WIGTON HORSE FAIR, (Wednesday).—There was a numerous attendance of dealers; and good horses for coaching and husbandry purposes, of which there was a large show, met with a ready sale at advanced prices.

WORCESTER FAIR (Monday) was attended by a large number of buyers, who appeared in greater force than on any previous occasion within recollection. The quantity of stock, with the exception of sheep, was more than is usually brought to our February fairs. There were but 500 sheep (a short supply) penned, but there were 500 cows and 100 horses; pigs scarce. Beef made from 5d. to 5½d., but many cows went back unsold; barrens, calves, cows and calves, much lower in price, being a reduction of nearly one-fifth as compared with the prices of twelve months ago. The trade in mutton, however, exhibited an improvement, 6d. per lb. being readily conceded, and all sold; some 80 sheep (small weights) that were sold by auction by Mr. Tredwell, of Evesham, making, in some instances, a shade over that figure. Mr. Hobbs, of this city, also sold a number of sheep and pigs at good prices; and Mr. Hemming, of Pershore, sold 15 handsome pigs, bred and fed by Mr. Lacey, at very good prices. The average price for pork was 7s. 6d. to 8s. per secree. In horses but little was doing. On the whole the fair was suggestive of encouragement to the agricultural interest at this period of depression.

WINCHESTER FAIR, on Monday, was tolerably well attended, considering the early date of its arrival this year. Of

horses there were about two hundred, an unusually large number, and those mostly of a superior description. Young cart-horses sold freely at good prices, and most of the others changed hands. There were about fifty or sixty head of neat cattle, and a few weanling calves, for which the demand was slack; and about 360 pigs, which also met a dull sale. In the cheese fair there was but a small quantity (400 tons) pitched, less than at any fair for these last eight years; consequently, clearances were effected pretty readily. Prime old white Cheddar, 66s. to 70s.; middling, 42s. to 52s.; skim, 25s. to 31s. The pleasure fair presented but few attractions, and those of the most inferior kind.

An Account of the Total Quantities of Foreign Corn imported into the principal ports of Great Britain (viz., London, Liverpool, Hull, Newcastle, Bristol, Gloucester, Plymouth, Leith, Glasgow, Dundee, and Perth) in Fifty-three Weeks ending Feb. 13th, 1850, since the 8th of February preceding (including the quantity of Wheat and Wheaten Flour lost from bond on that day), and the amount that would be available for revenue, if the Tariff proposed by Lord John Russell in 1841 was levied on this supply.

	Quarters.	Tariff per qr.	Amount for Revenue.			
			£	s.	d.	
Total Importations from Feb. 8 to Feb. 6, 1850:						
Wheat and Wheaten Flour...	4,422,664	8 0	1,768,065	13	0	
Rye and Rye Meal	98,332	5 0	24,588	0	0	
Barley and Barley Meal	1,080,735	4 6	243,165	7	6	
Oats, Peas, and Beans.....	1,823,949	3 4	303,989	3	4	
Imported during the week ending Feb. 13, 1850:						
Wheat and Wheaten Flour...	16,658	8 0	6,663	4	0	
Rye and Rye Meal	801	5 0	200	5	0	
Barley and Barley Meal	565	4 6	127	2	6	
Oats, Peas, and Beans.....	5,149	3 4	858	3	4	
Total	7,448,853	..	1,347,651	18	8	

BIRMINGHAM, 2ND MONTH 6TH, 1850.

CORN, MEAL, AND FLOUR IMPORTED, ENTERED FOR HOME CONSUMPTION, AND PAID DUTY SINCE 1823 INCLUSIVE, THE FIRST YEAR IT WAS LEVIED ON CORN.

Year.	Qrs. Imported.	Qrs. for Home Consumption.	Duty Paid.	
			£	s. d.
1823.....	53866	12362	10310	4 3
1824.....	612594	677195	176883	15 6
1825.....	1060837	834425	3041919	15 5
1826.....	2252271	2098944	442755	14 9
1827.....	2622283	2998866	792934	15 8
1828.....	1294378	1237494	196255	0 0
1829.....	2694423	1959355	898794	0 0
1830.....	2691884	2649348	790110	0 0
1831.....	3570569	2265392	544792	0 0
1832.....	668422	475680	307987	0 0
1833.....	481506	112408	35284	0 0
1834.....	560056	236902	97984	0 0
1835.....	321206	489088	234572	0 0
1836.....	643592	408217	149660	0 0
1837.....	1325930	842326	583269	0 0
1838.....	1534730	1960475	186758	0 0
1839.....	4591099	4657146	1098857	0 0
1840.....	3990522	3903518	1156658	0 0
1841.....	3686982	3375504	568339	0 0
1842.....	3723097	3543426	1363982	0 0
1843.....	1446123	1372315	758322	0 0
1844.....	3092293	2778591	1098857	0 0
1845.....	2131115	1552850	367022	0 0
1846.....	4911377	5466963	786807	0 0
1847.....	12257558	12746641	13960	0 0
1848.....	7355001	6368417	789785	0 0
1849.....	10826848	12003164	617000	0 0

AN ACCOUNT OF THE TOTAL QUANTITY OF WHEAT AND WHEAT FLOUR IMPORTED INTO GREAT BRITAIN FROM IRELAND FROM 1801 TO 1825:

Year.	Qrs.	Year.	Qrs.
1801.....	150	1814.....	225,478
1802.....	108,751	1815.....	189,544
1803.....	61,267	1816.....	121,631
1804.....	70,071	1817.....	55,481
1805.....	84,087	1818.....	105,179
1806.....	102,276	1819.....	153,850
1807.....	44,900	1820.....	403,407
1808.....	43,493	1821.....	569,700
1809.....	66,944	1822.....	463,004
1810.....	126,588	1823.....	400,068
1811.....	147,245	1824.....	356,384
1812.....	158,352	1825.....	396,018
1813.....	217,154		

AVERAGE PRICE OF GRAIN PER QUARTER IN ENGLAND AND WALES, FOR TWENTY-FIVE YEARS ENDING 1849, AND WHEAT SINCE 1798.

Year.	Wheat		Wheat.		Barley.	Oats.		Beans.		Peas.			
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	
1798..	50	0	1824..	64	0								
1799..	66	11	1825..	68	7	40	1	25	8	42	10	45	5
1800..	110	5	1826..	58	9	34	5	26	9	44	3	47	8
1801..	115	11	1827..	56	9	36	6	27	4	47	7	47	7
1802..	67	9	1828..	60	5	32	10	22	6	38	4	40	6
1803..	57	1	1829..	66	3	32	6	22	9	36	8	36	8
1804..	60	5	1830..	64	3	32	7	24	5	36	1	39	2
1805..	87	1	1831..	66	4	38	0	25	4	39	10	41	11
1806..	76	9	1832..	58	8	33	1	20	5	36	5	37	0
1807..	73	1	1833..	52	11	27	6	18	5	35	1	37	0
1808..	78	11	1834..	46	2	29	0	20	11	36	7	33	0
1809..	94	5	1835..	39	4	29	11	22	0	30	0	30	3
1810..	103	3	1836..	48	9	33	2	23	1	38	4	37	3
1811..	92	5	1837..	55	10	30	4	23	1	38	7	37	9
1812..	122	8	1838..	64	4	31	5	22	5	37	4	36	8
1813..	106	6	1839..	70	6	39	1	26	6	41	3	41	1
1814..	72	1	1840..	66	4	36	3	25	9	43	6	42	5
1815..	63	8	1841..	64	5	33	0	22	5	39	1	40	5
1816..	76	2	1842..	57	5	27	6	19	3	32	8	32	11
1817..	94	0	1843..	50	2	29	5	18	3	29	1	31	1
1818..	83	8	1844..	51	3	33	7	20	7	34	6	33	5
1819..	72	3	1845..	50	9	31	8	22	6	39	0	38	6
1820..	67	11	1846..	54	9	32	9	22	8	39	0	39	0
1821..	56	2	1847..	69	5	43	11	28	7	50	1	51	5
1822..	44	7	1848..	50	6	31	6	20	6	36	9	39	1
1823..	53	5	1849..	44	6	27	9	17	6	30	3	31	3

THE QUANTITY OF CORN, MEAL, AND FLOUR, IMPORTED INTO GREAT BRITAIN FROM IRELAND IN THE YEARS 1826 TO 1849:

Year	Wheat.		Oats.	Beans and Peas.		Malt.		Oatmeal	Wheat Flour.
	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Cwt.	Cwt.	
1826	241925	1179896	64885	8642	1203	194602	255240		
1827	468820	1946339	67791	11319	572	438966	618313		
1828	174994	1805366	84204	11894	853	424749	621569		
1829	340084	1417729	97140	14879	2011	402127	626268		
1830	337641	1226486	189745	21573	2820		672265		
1831	407714	1286254	185489	19171	10888	581371	524318		
1832	552740	1662786	123639	16445	8220	611412	831434		
1833	541475	1353533	101767	21760	7017	642692	1035587		
1834	462229	1277598	217855	29947	3865	772994	1110463		
1835	340535	1462581	156242	27683	10357	566006	1124343		
1836	249360	1627324	134156	20524	22214	675470	1169290		
1837	252720	1634720	187473	25690	4174	1004376	982990		
1838	209600	1946050	156467	26816	5001	1252741	1168195		
1839	90600	1290000	61676	13019	2861	877000	519000		
1840	92990	1397500	95954	15976	3456	989500	280700		
1841	113225	1667542	75568	16762	4935	1357321	333183		
1842	112400	1275200	50200	21450	3050	1549500	313500		
1843	191700	1559500	109650	25500	8600	1705300	770100		
1844	200200	1590000	90700	19600	8000	1150000	839000		
1845	371000	1678000	92000	14300	11000	1058000	1421000		
1846	187300	956000	93000	17000	11000	554000	725000		
1847	125700	493000	47500	27000	6500	330500	211000		
1848	146000	1081000	79700	14700	6300	936600	561000		
1849	94500	632000	43500	24600	5000	672000	393500		

AN ACCOUNT OF THE CORN, MEAL, AND FLOUR, IMPORTED INTO GREAT BRITAIN IN EACH YEAR, FROM 1ST JAN., 1815, TO 1849.

Year.	Imported from Ireland.		Imported from the British North American Colonies.		Imported from all other parts.		Total imported.	
	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.
1815.....	821192	25			333041		1154258	
1816.....	873865	3			319203		1193071	
1817.....	695651		25877		1775353		2496881	
1818.....	1204733		56618		3474051		4735402	
1819.....	967680		14257		1693255		2675192	
1820.....	1415722		40897		1300953		2757572	
1821.....	1822816		40916		216738		2080470	
1822.....	1063059		23439		102365		1188893	
1823.....	1828153		209		53432		1581174	
1824.....	1634000		891		609147		2244038	
1825.....	2203962		95059		962718		3261739	
1826.....	1693392		30500		2218830		3942722	
1827.....	2828460		61035		2550310		5439805	
1828.....	2826590		21600		1272396		4120586	
1829.....	2307244		7335		2680414		4994993	
1830.....	2215521		79634		2355412		4650567	
1831.....	2429182		225240		3316760		5971182	
1832.....	2990676		129476		668422		3788665	
1833.....	2737441		117745		336524		3191710	
1834.....	2792658		66829		492071		3351558	
1835.....	2679438		25016		296189		3000643	
1836.....	2958272		18561		625032		3601865	
1837.....	3030493		19060		1306870		4356223	
1838.....	3473302		19479		1515250		5009031	
1839.....	2243151		17438		4573660		6834249	
1840.....	2327782		178828		3811694		6318304	
1841.....	2855525		308382		3378599		6542506	
1842.....	2083600		247127		3475070		5806697	
1843.....	2721400		146647		1299776		4167823	
1844.....	2160800		297926		2794357		5533083	
1845.....	2992800		312438		2118707		5423945	
1846.....	1625000		431075		4480302		6536777	
1847.....	879900		546431		11769728		13196059	
1848.....	1827000		229313		7125638		9182338	
1849.....	1175000		210510		10616338		12001848	

JOSEPH & CHARLES STURGE.

PRICES OF GRAIN IN FOREIGN PORTS, PER QUARTER, IN 1848 AND 1849, MOSTLY TAKEN IN DECEMBER.

PORTS.	WHEAT—1849.				WHEAT—1848.					
	s.	d.	s.	d.	s.	d.	s.	d.		
Dantzic.....	35	0	to	40	0	39	0	to	42	0
Do. high-mixed.....	38	0	..	44	0	43	0	..	44	0
Leghorn.....	36	0	..	49	0	39	6	..	42	6
Rostock.....	35	0	..	37	0	36	0	..	39	0
Trieste.....	32	0	..	41	0	37	0	..	38	0
Hamburg.....	34	0	..	40	0	40	0	..	43	0
Petersburg.....	33	0	..	38	0	37	11	..	39	3
Genoa.....	38	0	..	39	0	38	9	..	46	0
Naples.....	36	0	..	40	0	38	0	..	44	0
Konigsberg.....	33	0	..	40	0	37	6	..	42	6
Bordeaux.....	35	0	..	40	0	39	0	..	40	0
Marseilles.....	33	0	..	36	0	37	0	..	38	6
Nantes.....	34	0	..	36	0	37	0	..	38	6
Odessa.....	25	3	..	31	10	30	0	..	32	9
Ancona.....	31	0	..	32	0	39	6	..	40	6
Stettin.....	34	0	..	36	0	36	0	..	39	0
Bilboa.....	34	0	..	38	0	44	0	..	52	0
Galatz.....	21	0	..	26	0	20	0	..	23	6
New York.....	38	0	..	42	0	40	0	..	44	0
Philadelphia.....	34	0	..	39	0	40	0	..	41	0
Montreal.....	31	0	..	34	0	37	0	..	37	6
Taganrog.....	26	0	..	35	0	20	6	..	30	0
Alexandria.....	16	9	..	18	0	18	6	..	19	4
Constantinople.....	26	0	..	35	0	27	0	..	33	0
Archangel.....	25	0	..	27	0	32	0	..	34	6

REVIEW OF THE CORN TRADE DURING THE MONTH OF FEBRUARY.

The weather has, on the whole, been of a seasonable character since our last; there has been little frost; and though a considerable quantity of rain has fallen, the wet having in most cases been followed by drying winds, farmers have been enabled to make fair progress with ploughing, sowing, &c., and spring work is perhaps as far advanced as is usually the case at the corresponding season of the year. Within the last week or two large breadths of barley and oats have been sown in a highly satisfactory manner, which, with the planting of beans and peas, and other out-door works, have kept all hands busily occupied in the fields, so as to prevent much corn being thrashed or brought forward for sale. The extreme insignificance of the supplies from the growers, and the fact that the receipts from abroad have been smaller than in any previous month for some time past, account for the somewhat firm tone which the trade has assumed. In many of the agricultural districts, where no stocks of foreign grain are held, the supplies have scarcely proved sufficient for the consumptive demand; and though the inquiry has at no period been active, the actual though temporary scarcity has enabled sellers to obtain rates in advance of those current at the close of January. We may, however, observe that operators have throughout acted with great caution, plainly manifesting their want of confidence in the stability of the rise; and within the last few days the upward movement has received a check, as will be shown when we arrive at that part of our article recording the fluctuations which have taken place at Mark-Lane during the month.

We are now about to enter a period of the year when the weather exercises a greater influence on quotations of grain than any other circumstance, and it would therefore be rash to speak positively as to what may be the course of prices. Hitherto the seasons have been favourable; the winter, though protracted and somewhat severe, was, on the whole, of a character usually considered auspicious for wheat, and since the young plant has emerged from its covering of snow we have heard of no complaints in respect to its general aspect; indeed, the accounts, on the whole, speak well of the appearance of the country; and as far as the sowing of Lent corn has yet progressed, the work may be said to have been accomplished in a satisfactory manner. There is, consequently, nothing

at present to give rise to uneasy feelings in respect to the future; and the question of price must, whilst that continues to be the case, be regulated by supply and demand. Latterly, as we have already stated, the deliveries from the growers have scarcely sufficed to supply the wants of the millers; but this has not, in our opinion, been caused by any deficiency in the quantity held by the farmers, but solely by the impracticability of keeping the markets supplied whilst all hands have been busily engaged preparing the land for the reception of the spring crops. Our own impression is, that taking the kingdom throughout, as much of the last wheat crop is held as is usual at the end of February, and that though there are no stocks of old in the country, we should be able to do very well without large importations from abroad. Holding this opinion, we cannot discover any safe grounds for calculating on more remunerating prices for agricultural produce, being fully convinced that so soon as the spring shall have advanced somewhat further, shipments on rather an extensive scale will be made from the northern continental ports to Great Britain. We have no desire to magnify the evils of free trade, but we feel ourselves called upon to look the difficulties boldly in the face, and to use our humble endeavours to clear away the fallacies with which the organs of the freetraders continue to mystify the question. Prior to the abolition of the import duties on grain, the most opposite theories were advanced by the advocates of free trade, the masses were promised cheap bread, and farmers were told that prices would not be materially lower in this country; but one year's practical working of the new system has proved how much the latter assertion was to be depended upon.

An endeavour is now being made to stifle the movement, which is at present agitating the country, by holding out delusive hopes to the agriculturists. It is boldly asserted that foreign growers will not import into this country unless prices advance here, and that matters have passed the worst point. In fact, that farmers, if they only have patience, and farm high enough, will do very well under free trade. The late division on Mr. Disraeli's motion proves, however, that the agricultural interest is not altogether powerless: and if there is to be no return to protective duties, such measures must be granted by the legislature as will

put farmers on something like a fair footing to meet foreign competition.

We have rather digressed from our subject, and must return to the consideration of what may be the probable range of prices during the ensuing summer, should nothing occur to lead to apprehension regarding the crops on the ground. To arrive at anything like a conclusion on this point, we must, in the first instance, endeavour to estimate the probable extent of the shipments from foreign countries. We may commence by taking it for granted that the stocks of old wheat were very nearly exhausted by the enormous shipments to Great Britain in 1849 all over continental Europe, which will narrow the question and render its solution less difficult. That the very high prices current in 1848, and the certainty of the repeal of our import duties in February, 1849, caused wheat to be more extensively sown in the autumn of that year, in all the chief corn-producing countries in the world, than in ordinary seasons, does not admit of doubt; there are no statistics to prove this, but the inference is too probable to be questioned.

The summer of 1849 was not particularly brilliant perhaps; but neither, on the other hand, did anything occur of a character to jeopardise the crops, and during harvest the weather was quite as auspicious as in average seasons. It may, therefore, be fairly concluded that the result of the last harvest was in general good. Excepting from France, and some small shipments from Hamburg and from Antwerp previous to the close of the navigation in the commencement of winter, but little of the new produce has reached our shores. From France the exports may, and probably will, shortly fall off, as wheaten bread is consumed there as extensively as in this country; but in the northern parts of Europe—Russia, Poland, Germany, &c.—where the bulk of the people habitually live on rye and the inferior kinds of grain, there must be a very large surplus for shipment; and that this surplus is sure to find its way to our markets sooner or later we feel perfectly convinced.

Low as prices are here, they are far above the cost of production in the countries from whence we have to expect supplies; and the Russian and Polish growers would be well paid though prices should fall several shillings per qr. below their present level. We are not prepared to say what may be the exact cost of production abroad; but this is certain, that in former years, when Great Britain has not required assistance from the continent, and a high duty has intervened to prevent the foreign grower pouring his produce into our markets, whether wanted or not, quotations at the leading Baltic ports have been more frequently under than over 30s. per qr.

Many of the best authorities maintain that the article can be profitably grown at a cost allowing it to be brought to the ports of shipment considerably below the figure last named; and, taking into account the Black Sea, &c., where, according to the most recent advices, the top price of wheat was 30s. to 32s. per qr. free on board, the prices now current on the continent do not average much above 33s. per qr.

Hitherto the value of wheat has been artificially kept up abroad, particularly in the Baltic ports, where a considerable extent of local speculation has taken place during the winter on the presumption that British buyers would appear in the spring. This calculation does not, however, appear likely to be realized; and we have no doubt that, when the supplies from the growers begin to increase, which they are sure to do so soon as the seeding of the land shall have been completed, quotations abroad will give way sufficiently to render it advantageous to consign to England. At present the best red wheat might be bought in the Baltic at 35s., which, with 5s. per qr. for freight, &c., would allow of its being imported at 40s. per qr., whilst superior Rostock is still worth 4s. to 5s. per qr. more at Mark Lane than the price named; there can consequently be little doubt that, as soon as the navigation of the northern ports of Europe shall have been completely free from ice, shipments will be made to England on a scale rendering any rise in our markets very improbable; indeed, we are disposed to think that, if nothing unforeseen should occur, the price of wheat will be lower in May or June than it has yet been. So much for the probable future. That the prospect holds out little encouragement to farmers no one can regret more sincerely than ourselves, but it is far better to know the worst than to indulge fallacious hopes. Something must be done, or much of the land in Great Britain must go out of cultivation, and then let us beware: once become dependent on the foreigner for supply, and a single bad harvest would be followed by real famine.

The trade at Mark Lane has remained in a quiet state throughout the month, but the extreme shortness of the supplies has enabled sellers to obtain full prices. The weekly arrivals of wheat coastwise into the port of London have averaged very little over 2,000 qrs. Some quantity has, however, come to hand by railway, which has not appeared in the returns. The produce of the neighbouring counties now comes to the metropolis in such a variety of ways that it is almost impossible to ascertain how the millers derive their supplies, business having flowed into new channels. The sales made by agents have taken a considerable share of the London trade out of the hands of fac-

tors, and small as has been the quantity of English wheat exhibited at Mark Lane the millers have manifested no signs of being in any immediate want. On the first Monday in the month (4th inst.) factors were under the necessity of accepting prices 1s. per qr. below those current on that day week before they could succeed in placing the Essex and Kent supply. Subsequently the trade assumed a firmer tone. On the following Monday the turn was in favour of the seller, and on the 18th an advance of fully 1s. per qr. was generally established. Since then less disposition has been shown to buy, and though no actual reaction has taken place the upward movement has been checked. On the 25th inst., fair runs of Essex and Kent wheat were sold at 38s. to 39s., and fine weighing 63lbs. per bush. at 40s. per qr.; for Lincolnshire wheat of the same weight rather more money was obtained, but in comparing present quotations with those current at the close of January very little difference will be found.

The operations in foreign wheat have, throughout the month, been on a strictly retail scale, and its value has undergone little or no change since the close of January. The reduction of 1s. per qr. which took place in the price of English on the 4th inst. did not produce any influence on the value of the finer descriptions of foreign, nor did the rise which was afterwards established on the former extend to the latter. The arrivals of wheat from abroad have been unimportant, having consisted principally of a few large cargoes from Odessa. Some of these have come to hand in fine order; but others, having been a long time on passage, have arrived in so heated a condition as to be unsaleable from on board ship. The business done has been chiefly in parcels in granary; our own millers have confined their purchases to such quantities as they have required for immediate use, and the country inquiry has also been of a retail character. Holders have refrained, however, from attempting to press sales, and prices have remained as nearly as possible stationary. We may quote fair to good Polish Odessa 36s. to 38s., Hamburg and the commoner sorts of red Baltic 36s. to 40s., and superior Rostock 42s. to 45s. per qr.; whilst for Danzig, owing to its extreme scarcity, relatively higher terms have been paid, the best high mixed having realized 50s. to 52s. per qr. It is scarcely to be expected that these terms will be supported on the appearance of the spring shipments from the continent, which explains the reason why purchasers have conducted their operations with such extreme caution.

The nominal top price of town manufactured flour has undergone no change since our last; there was some talk in the early part of the month of putting it down, but the subsequent rally in wheat

led the millers to continue the quotation as before, viz., 40s. per sack. Household flour has been selling relatively cheaper, Norfolk and other country made samples having been freely offered at 28s. to 30s. per sack, according to quality. Foreign flour having been held relatively high has met with little attention, and the tendency of prices has been rather downwards.

The arrivals of home-grown barley into London have been small throughout the month, and the display of samples at Mark Lane by land carriage from the neighbouring counties has been very moderate. The pressure which existed in the barley trade when we last addressed our readers continued during the first week or two in February, and prices suffered a further depression of fully 1s. per qr., until the top price for English malting receded to 27s. per qr. Subsequently a demand arose for fine qualities for seed; and though no portion of the decline has hitherto been recovered, the maltsters have latterly bought somewhat more freely, which has given sellers a slight advantage. The supplies of barley from abroad have been quite unimportant; but having still good stocks in granary, and considerable receipts of foreign being expected immediately after the re-opening of the shipping season in the Baltic, buyers have declined to take more than needed for present use, and the transactions have been altogether on a restricted scale, at prices similar to those current at the close of January.

No change requiring notice has occurred in the value of malt; a slight concession was in some cases made in the early part of the month, but afterwards holders exhibited more firmness, and prices are now very nearly the same as they were about this time last month.

A very large proportion of the supply of oats received since our last has been from Scotland; the receipts from thence have been more liberal than usual, but from all other quarters the arrivals have been exceedingly small. That the supplies of this grain have for some considerable time past fallen materially below the quantity required for the weekly consumption of the metropolis, and that the dealers have consequently had to draw largely on their stocks, is certain; but this has failed to give an impetus to business, and we have had a retail trade throughout the month, with little or no improvement in prices. Some of the soft and ill conditioned parcels of Scotch oats have been parted with at very low terms, say 15s. to 17s., and really fine corn has been freely offered at 20s. to 21s. per qr., without exciting much attention.

Beans of home growth have not come forward very freely, but the quantity offered for sale has kept pace with the demand. New ticks have realized 22s. to 23s., and other sorts from 24s. to 28s.;

old have been held 2s. to 3s. per qr. above those rates.

Several cargoes of Alexandrian beans have been received; the quality of these fresh arrivals from Egypt is much inferior to the average shipments from thence, and whilst fine parcels in granary have been taken in small quantities at 22s. to 23s., it has been impossible to exceed 20s. to 21s. per qr. for parcels free on board, and there have been offers of cargoes to arrive at 18s. to 19s. cost, freight, and insurance.

Picked quantities of peas for seed have brought full terms, but for all other purposes the article has moved off very slowly. English boiling peas have been offered at 24s. to 27s., and foreign still lower, whilst maple and hog have been obtainable on equally moderate terms.

The demand for floating cargoes of Indian corn, which was, it will be recollected, rather active in January, has entirely subsided since then, and at this port, as well as at Liverpool, prices have given way within the last week or two, owing to the total want of Irish orders.

In proportion as the season advances and the time draws near when the navigation of the Baltic may be expected to re-open, the importance of accurate information from the continental ports increases; and we shall devote the remainder of our space to laying before our readers the substance of the latest advices from abroad.

The ice began to break up rather earlier than usual this season; the Dutch and Belgian harbours were open the first or second week in February, and the Elbe a little later.

About the middle of the month, the communication between Rostock and the sea became clear of ice, but further to the north the navigation of the Baltic continued impeded up to the date of the most recent advices.

Letters from Danzig dated 18th inst. state, that though the thermometer had risen above freezing point during the day time, there had, up to that period, been frequent and sharp night frosts. The ice had therefore been but little acted upon by the thaw, and it would, it was calculated, require some time to set the harbour free. In the early part of the month a good deal of speculation took place at that port, but subsequently matters had relapsed into a state of inactivity in consequence of the continued dull reports from hence. So long as the sledge roads remained in good order the neighbouring farmers had brought fair supplies of wheat to market; but after the thaw had commenced a falling off had taken place in the receipts, which had perhaps assisted to maintain the confidence of holders. In point of price, very little change had occurred; but as few sales had for some time been made, quotations were not to be much depended on. Fine high mixed new wheat of 61lbs. weight had been held at 38s. per qr., free on board; but it was expected that if the English demand did not improve, the value might fall to about 35s. per qr. in April.

The quality of last year's growth of wheat is described as decidedly inferior to that of 1848, but the yield is not complained of. Fair stocks had been collected at several of the markets in the

interior, ready to be sent down the Vistula so soon as that river should have become navigable. Freights were moderate, and one large vessel capable of loading 2,500 qrs. had been chartered for Liverpool at 3s. 3d. per qr. for wheat. Old stocks were nearly exhausted; and it would appear that but little really fine wheat can be calculated on from that quarter.

From Königsberg we learn that holders of grain had begun to manifest more anxiety than they had previously evinced to realize, and that prices of most articles had tended downwards. Red wheat of 61lbs. weight per bush. had been freely offered at 32s., mixed at 34s., and high mixed at 36s. per qr., free on board, without exciting attention. Barley was also cheap at that port; small, of 48lbs. to 49lbs. weight, being quoted at 12s. 9d. to 13s., and large, weighing 50lbs., 14s. 9d. per qr.

In Pomerania, Mecklenburg, Silesia, Uckermark, &c., the quality of last year's wheat is well spoken of, and we may expect the weight of the shipments from the different ports to average about 62lbs. per bush., whilst it will not, we are informed, be difficult to pick up parcels of 63lbs. weight. This fine wheat cannot yet be bought below 35s. to 36s. per qr., free on board; but freight from Rostock, Stettin, Stralsund, Wismar, &c., will most likely be low, and a small reduction on the other side would, if our prices remained stationary, leave a fair margin for profit on consignments to England.

Taking into account the difference of freight and other charges, quotations are much the same at the nearer continental ports, and prices are gradually giving way abroad so as to meet the state of things here.

At Hamburg the market has been steadily drooping during the last week or two, owing to the want of British orders, and good parcels of Upland wheat, on the spot, weighing 61½lbs., might, according to the latest accounts, have been bought there at 36s. to 37s. per qr., free on board. Offers from out-ports had increased: there had been sellers of Pomeranian wheat, free on board, at 35s.; of Mecklenburg, at 34s.; and of Holstein, at 32s. 6d. per qr., free on board.

In the Netherlands prices are still somewhat too high to allow of shipments to Great Britain with much chance of profit, but quotations are fast accommodating themselves to the state of our market. From Rotterdam we learn that good red Rhine wheat was not worth more than 34s. 6d. to 36s. 6d., and fine 37s. to 38s. per qr., whilst at Antwerp superior Louvain (a quality much liked by our millers) had receded to 36s. to 37s. per qr. free on board.

Our letters from France inform us that stocks of wheat had been a good deal reduced by the shipments to this country, and that sellers had consequently demanded full terms for both wheat and flour.

In the north of France, where the quality of the wheat is ordinary, red might be bought at 33s. to 34s.; and at the ports from which the best descriptions are usually received, quotations do not exceed 35s. to 36s. for red, or 38s. to 41s. for white per qr., free on board.

The value of flour ranged from 25s. to 31s. per

sack—according to quality, port of shipment, &c. At most of the Mediterranean ports, prices of wheat are relatively higher than in the British markets, and the advices from thence are therefore of little interest.

From Odessa we learn that the stock of wheat in warehouse at that port amounted to about 270,000 qrs. of wheat, two-thirds of which were, however, of such inferior quality as not to be considered suitable for shipment to England.

The result of the harvest in Poland had, we are informed, been highly satisfactory, and the quality of the growth of 1849 is described as something extraordinarily fine.

Good supplies were expected in May or June, and it was calculated that the best sorts would then recede to 31s. to 32s. per qr.—indeed, merchants were willing to enter into contracts for delivery in June at the price named.

The most recent advices from the United States inform us that very little business had been done in bread-stuffs for shipment to Europe, but that, though the trade had been dull, prices had been well supported, and at New York ordinary shipping brands of Western Canal had not been sold under 22s. to 23s., whilst for pure Genessee flour 24s. to 24s. 6d. per brl. had been realized. Stocks at the ports on the seaboard were small; and though the quantity of wheat in the interior was known to be abundant, the growers seemed disposed to hold for higher rates.—Feb. 28.

PRICES OF SEEDS.

BRITISH SEEDS.

Cloverseed, red 35s. to 40s.; fine, 45s. to 50s.; white, 35s. to 50s.	
Cow Grass (nominal).....	—s. to —s.
Linseed (per qr.).. sowing 54s. to 56s.; crushing 40s. to 42s.	
Linseed Cakes (per 1,000 of 3 lbs. each)..	£9 0s. to £10 0s.
Trefoil (per cwt.).....	14s. to 18s.
Rapeseed, new (per last).....	£30 to £35
Ditto Cake (per ton).....	£4 5s. to £4 10s.
Mustard (per bushel) white..	6s. to 9s.; brown, 8s. to 11s.
Coriander (per cwt.).....	16s. to 25s.
Canary (per qr.) new.....	75s. to 78s.
Tares, Winter, per bush.....	4s. 6d. to 4s. 9d.
Carraway (per cwt.).....	28s. to 29s.;
Turnip, white (per bush.).....	—s. to —s.; do. Swedish, —s. to —s.

IMPERIAL AVERAGES.

FOR THE LAST SIX WEEKS.

WEEK ENDING:	Wheat.		Barley		Oats.		Rye.		Beans.		Peas.	
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
Jan. 12, 1850..	41	1	26	4	15	6	23	4	26	6	23	6
Jan. 19, 1850..	41	0	26	3	16	0	23	9	26	6	27	6
Jan. 26, 1850..	40	1	25	9	15	10	21	2	26	1	28	5
Feb. 2, 1850..	39	4	25	4	15	2	23	10	25	6	27	0
Feb. 9, 1850..	38	6	24	7	15	3	22	1	25	8	26	4
Feb. 16, 1850..	37	9	23	10	15	4	20	7	24	11	26	10
Aggregate average of last six weeks	39	8	25	4	15	6	22	6	25	9	27	5
Comparative ave. same time last year	47	2	29	2	17	4	26	3	29	2	34	2
DUTIES.....	1	0	1	0	1	0	1	0	1	0	1	0

HOP MARKET.

BOROUGH, MONDAY, Feb. 25.

We have a very restricted inquiry for the better class of Kent and Sussex Hops; other descriptions command no attention. Prices are tolerably firm, at the quotations annexed:—Sussex Pockets, £6 to £6 15s.; Weald of Kent do., £7 7s. to £8 10s. HORTON & HART.

POTATO MARKET.

SOUTHWARK, WATERSIDE, Feb. 25.

We have had many arrivals this last week both coastwise and continental, and a large supply by rail, which, with mild weather, has tended to lower prices in nearly every description of potato. The following are this day's quotations:—

Yorkshire Regents..	80s. to 110s. per ton.
Wisbech do.....	70s. ,, 90s. ,,
Scotch do.....	70s. ,, 80s. ,,
Do. cups.....	65s. ,, 75s. ,,
French Whites.....	70s. ,, 80s. ,,
Belgian.....	70s. ,, 75s. ,,
Rhenish.....	65s. ,, 70s. ,,

WOOL MARKETS.

BRITISH WOOL.

LEEDS, Feb. 22.—Sales of combing wools have been without any change this week. Prices may be quoted about the same as last week. In clothing wools there is not any alteration to report.

LIVERPOOL, Feb. 23.

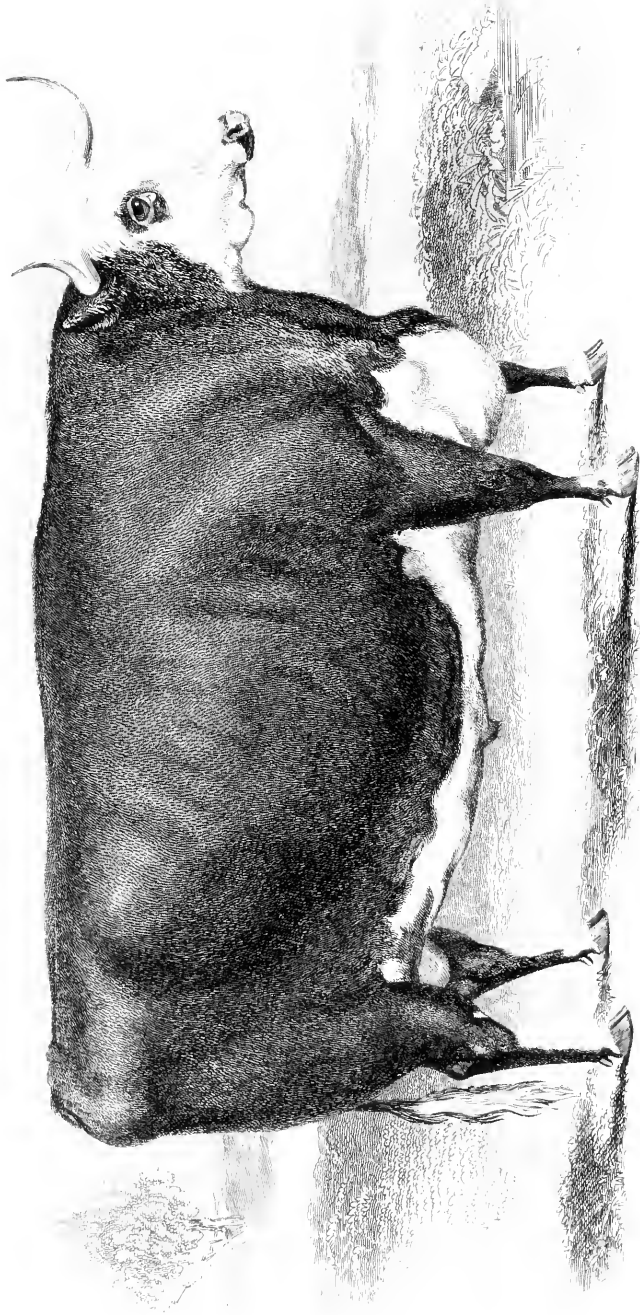
SCOTCH.—There is still a fair trade demand for Laid Highland Wool. Stocks are light. White is also in fair request. The stocks and selection of Crossed and Cheviot are anything but good; if better, no doubt more would be doing.

FOREIGN.—The public sales in London are progressing favourably, and the recent advance fully established.

CURRENCY PER IMPERIAL MEASURE.

	Shillings per Quarter.	
	OLD.	NEW.
WHEAT, Essex and Kent, white.....	40 to 47	40 to 47
Ditto, fine selected runs.....	—	46 48
Ditto, red.....	38 42	37 41
Ditto, extra.....	39 41	41 42
Norfolk, Lincolnshire and Yorkshire..	38 40	—
Ditto, white.....	42 44	—
BARLEY, English, malting and distilling..	—	22 24
Ditto, Chevalier.....	—	23 27
Ditto, grinding.....	—	17 20
MALT.. Essex, Norfolk and Suffolk....	52 53	54 55
Kingston, Ware, and town made....	53 54	55 57
OATS, Essex and Suffolk.....	—	15 17
Lincolnshire and Yorkshire (Polands)	—	17 19
Ditto, feed.....	—	14 16
Devon & West Country, feed.....	—	13 15
Northumberland and Scotch, feed.....	—	18 23
Dundalk, Newry, and Belfast, potato	—	16 18
Limerick, Sligo, and Westport, potato	—	16 18
Ditto, feed.....	—	14 16
Cork, Waterford, Dublin, Youghal, and Clonmel, black.....	—	13 15
Ditto, white.....	—	14 16
Galway.....	—	12 14
BEANS, Mazagan.....	23 25	22 24
Tick.....	27 29	24 26
Harrow.....	30 31	26 27
Pigeon, Heliogland.....	32 36	27 29
Windsor.....	—	25 27
Long pod.....	—	25 27
PEAS, non-boilers.....	—	23 25
White, Essex, and Kent, boilers.....	—	26 27
Ditto, fine Suffolk.....	—	27 28
Maple.....	—	25 26
Hog and grey.....	—	24 26
FLOUR, best marks (per sack of 280 lbs.)..	—	35 40
Norfolk and Suffolk, ex-ship.....	—	28 33
RYE.....	—	22 23







Phocaena phocaena (Linn.)
A large specimen of the species was
obtained at the University of Cambridge, England.

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THE FARMER'S MAGAZINE.

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[SECOND SERIES.

PLATE I.

HEREFORD OX.

The subject of our first plate was bred by Richard Jones, Esq., of Woodstone Lodge, near Peterborough, Northamptonshire, and obtained the First Prize of Ten Sovereigns at the Peterborough Agricultural Society's Show in November last, as the best Ox of any age; in December, at the Rutland Agricultural Society's Show at Oakham, the First Prize of Ten Sovereigns as the best Ox of any age; and at the Smithfield Club Cattle Show in the the same month the First Prize of Thirty Sovereigns in Class 1. The Silver Medal was also awarded to Mr. Jones as the breeder, and the Gold Medal as the best Ox or Steer in Classes 1, 2, 3, 4, 5, and 6.

This animal was purchased by Messrs. Righton and Farrow, of Reading, and weighed 219 stones, and is thus described in a letter from that firm: "It was one of the best and most complete animals we ever remember, both for symmetry, quality, and general proportion."

PLATE II.

A BOAR.

The property of W. Fisher Hobbs, Esq., of Boxted Lodge, near Colchester, for which the First Prize of Fifteen Sovereigns in Class 2, was awarded at the meeting of the Royal Agricultural Society, at Norwich, July, 1849.

COMPARATIVE VIEW OF THE POTATO AND THE JERUSALEM ARTICHOKE.

BY J. TOWERS, MEMBER R.A.S., H.S. OF LONDON.

Potato planting is in full operation, and, I have reason to believe, upon a broad scale; the question therefore presents itself—Is the disease, which has ravaged the crops during five successive seasons, gone, or, if not gone, so far abated as to justify the confidence which planters appear to entertain of its final extinction? It is undeniable that the yield of 1849 was so abundant, and has held out so well to the present day, that the public have been supplied with far better tubers, and at moderate prices, than they could obtain during the four preceding winters. But disease to a certain extent is certainly still found in many stores, and particularly, as I am assured, among the *Regents*. Therefore, although it would not be desirable to check confidence (for that in itself is an act of faith in the goodness of a merciful Providence), yet it would appear wise to provide against casualties; and as I am tolerably experienced in the characters and cultivation of the Jerusalem artichoke, and have recently met with a scientific article upon its constituents and chemical qualities, I think it right to bring before the reader the results of my investigation; and to commence with the potato, which, however it has been ill-treated and abused, is and ought to be considered a valuable favourite.

OLD SERIES.]

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[No. 4.—VOL. XXXII.

In the year 1827, when the crop was fine and profusely abundant, I found by experiment that, 1st, 8 lbs. of unpeeled tubers yielded—

	lbs. oz.
Amylum, or starch, like arrowroot	1 6
Pulp pressed by the hand	1 11
Loss in water and soluble matter	4 15
2nd, From 8lbs. of potatoes previously peeled—	
Amylum or starch	1 3
Peelings weighed	1 5
Pulp pressed.	1 14
Loss in water, &c.	3 10

A closer and more refined analysis of the potato, yielded, per cent., of—

Water	75.52
Starch	15.72
Sugar and gum	3.30
Dextrine	0.55
Albumen and casein	1.41
Fat	0.24
Fibre.	3.26
	100.00

When the potato tuber is burnt, and with chemical accuracy reduced to ashes, the amount of such ash has been estimated at about 4 per cent., or, in other words, at 1-25th part of the entire tuber. In one analysis by Boussingault, compared with two others made by Dr. Fromberg, the mean of the elements contained in 100 parts of the ashes has been found by the latter chemist to be—

Potash	55.75
Soda	1.86
Lime	2.07
Oxide of iron and alumina.	0.52
Magnesia	5.28
Phosphoric acid	12.57
Sulphuric acid.	13.65
Chlorine	4.27
Silica.	4.23
	100.20

Again, the fibrous parts of the potato plant yielded to combustion 1.40 of ashes in the 100, and the elements of 100 parts of such ashes gave—

Potash and soda, with a little common salt	3.72
Lime	50.84
Magnesia	10.21
Oxide of iron	3.82
Phosphoric acid	19.66
Sulphuric acid.	5.74
Silica	5.54
	99.53

Professor Johnston, author of *Lectures on Agricultural Chemistry*, observes that the fibre of the plant leaves only one-third the quantity of ash (*i. e.*, 1 40-160ths.) which is left by the whole potato, and that this ash consists chiefly of lime, in the state of carbonate and of phosphate: that “the

alkaline matter disclosed in the first of the above tables exists chiefly in the sap, while the phosphate of lime is principally attached in an insoluble state to the fibre.”

Having thus adduced the best evidences I can collect of the chemical elements of the potato bulb and herbage, we will proceed to the subject of the Jerusalem artichoke, hoping that, by the comparison of facts, the holders of land—of small domestic establishments in particular—may be assisted to form some estimate of the real value of each as food for animals and man; and also of the application of manures suitable to the habits of each plant.

Helianthus tuberosus—tuberous-rooted sunflower, commonly, but erroneously, called Jerusalem artichoke, appears to have been brought from Brazil in 1617. Though a native of a climate so warm, the plant is perfectly hardy; but it seldom produces blossoms with us. In a note at page 730 of *Lou-don's Encyclopædia of Gardening, Anno 1829*, it is said, that the term “Jerusalem,” as applied by us, is “a corruption of the Italian word *Girasole*, and “artichoke” from the resemblance in flavour which the tubers have to the bottoms of artichokes. These tubers are in considerable esteem on the continent as a substitute for potatoes, and before the introduction of that vegetable they were a good deal in use in this country. Their culture and treatment are the same as for that vegetable.”

The tuber of the Jerusalem artichoke, from an analysis of M. Braconnot, appears to contain in 100 parts:—

Uncrystallizable sugar	14.80
Inuline (element of elecampene).	3.00
Gum	1.22
Albumen	0.99
Fatty matter.	0.09
Citrates of potash and lime	1.15
Phosphates of the same	0.20
Sulphate of potash	0.12
Chloride of potassium.	0.08
Malates and tartrates of potash and lime	0.05
Woody fibre.	1.22
Silica.	0.03
Water	77.05
	100.00

M. Boussingault cites this analysis in his *Rural Economy*, but adds that he himself found 20.8 parts of dry matter, and 79.2 of water, in the tuber. He says, that “of all the plants that engage the husbandman, the Jerusalem artichoke is that which produces the most at the least expense of manure and of manual labour; thus, by giving his ground about 9 tons of dung per acre every other year, he obtains 20 tons of roots, or 10 tons each year.”

Experience has proved that the plant will grow

in any soil, and with little manure; the tubers collect close around the bases of the stems, and are not attached to independent processes, as in the case of the potato. By comparison of extractive analyses it should appear that the tubers of both plants are not very dissimilar in their nutritive elements, and in the water which they contain, as respects quantity; it is also true that the ultimate elements of sugar and of starch are not remote; those of beet and maple sugar, and of starch, being very nearly, per cent.—

	Sugar.		Starch.
Carbon	42.10	.....	43.75
Hydrogen ...	6.43	.....	6.25
Oxygen	51.47	.....	50.00
	<hr/>		<hr/>
	100.00		100.00

Now, it is proved that starch and gum are convertible into sugar, and thus may prove nutritious in a corresponding degree.

The inorganic analysis of the herbage of the two plants produces very dissimilar results, the pre-

dominance of lime salts in the haulm of potato, appearing to prove that chalk and bone-earth are called for, as manure, in far greater proportion than is required in the culture of the Jerusalem artichoke. The chief inconvenience which attends the growth of the latter, is the pertinacity with which it retains possession of the land. M. Boussingault thus alludes to it:—"The original planting," he says, "of course takes place in lines; but in the succeeding crops, and those which are derived from small tubers left in the ground, the order is lost; it is only necessary to destroy a sufficient number of sprouts which show themselves in the spring, so as to leave those which are preserved with a sufficient space between them. When they are somewhat advanced the ground should receive one or two diggings with the spade, and a hoeing or two to destroy weeds."

I myself cultivated the plant in Wiltshire and Berkshire, with short intervals, from the spring of 1826 to 1847, without change of plot in either county, manured very slightly, and never had a failure, but could not clear the ground.

P R O M P T P A Y M E N T .

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

Very considerable would be the advantages to all classes of society if the duty of the prompt payments of life more frequently engaged their attention; and still greater would be the benefit to ourselves and to those around us, if we did not only think upon this truth, but act on the conclusion to which such a reflection must inevitably lead us. A prompt payment to the labourer in agriculture, to the tradesman, and to the landlord, is only one portion of the many advantages which such ready settlements impart. Prompt payment to the farmer is an advantage equally important on the other side, to which, in a great degree, indeed, the first class of prompt payments leads. Let us then, placed, as we now are, on the verge of a season of more than wonted activity in agriculture, take advantage of our present leisure, and briefly glance at some of the many advantages of prompt payment; and although I chiefly intend to direct my attention to the labourers of agriculture, yet as this will be read by very many landlords, as well as tenant masters, let us begin on the highest ground. The landlord will feel that this is his position. To such a reader, then, I would address these home questions:—Are your payments to the tenant-farmer prompt? Do you pay him, for his produce, as promptly as he is in duty bound to pay his labourers? And has it

never suggested itself to your mind that there may be other debts owing by you to him, besides the value of the yet unpaid-for oats, or the straw perhaps long since purchased of him? Has it never occurred to you that there are certain direct or implied promises, for which you are still at least in honour his debtor? Does not sometimes a faint reflection steal over your mind, that his rent may be now a shade or two heavier than it ought fairly to be? That it remains based as it was at the commencement of the tenancy (when other prices ruled in the corn markets), upon the very same foundations, raised upon *once* fair data, which no longer exist? And will it not sometimes, in a still more fickle shadow, steal across your anxious thoughts, that the very common but doubtful palliative to such difficult considerations, "he must farm higher," only tacitly confesses what the mind is unwilling to avow—that one of the contracting parties must meet the exigencies of the case, unaided by the other, in the best way he can? And if such questions and their answers lead you to the conclusion that some debt of honour is due from you to your struggling tenant, then ask yourself the very practical question, "What in this case would be prompt payment?"

It may aid the thus inquiring landlord who is seeking for truth, and willing to extend the prompt

payment of a debt of honour to his lessee, if he just inquires the average price of wheat in this present month of April during the last ten years. I will extract it for him from the *London Gazette*, and give it here. The average price per quarter, then, of wheat during the month of April

	s.	d.
In 1839 was.....	70	1
„ 1840 do.....	69	0
„ 1841 do.....	63	11
„ 1842 do.....	61	0
„ 1843 do.....	46	5
„ 1844 do.....	55	6
„ 1845 do.....	45	11
„ 1846 do.....	55	6
„ 1847 do.....	75	10
„ 1848 do.....	49	6
„ 1849 do.....	46	0
„ 1850—what will this be?		

Descending from the class to whom I have alluded, I approach the tenant farmer. In his case, too, prompt payment has many and great advantages; and in this place I do not allude to contracts between him and his tradesmen (for they are common to all classes), but to those which exist between him and his landlord and his labourers. Of the advantage derived by the farmer from the punctual payment of rent, little need be said. If the farmer expects prompt compliance and prompt payments of both legal debts and debts of honour from his landlord, he must not be surprised if the landowner merely follows his tenant's example—they who expect justice must do justice.

As regards the payment of the farm labourer, a different class of persons, it is true, demands our consideration, but the same principles of action will guide and serve us. The best prompt payment to the labourer is not included, for instance, in the practice of those who pay their men perhaps regularly once a fortnight, late of a Saturday night, and then perhaps at an alehouse. The payment would be more beneficial (knowing, as we all do the advantages of purchasing cottage comforts with ready money, and in the daylight) if the wages were paid every week, and on a *Friday*, so as to enable the labourer's wife to quietly seek the best market for her Sunday's dinner, in the broad light of heaven, on the Saturday morning. And again, the payment would, in very many cases, be still more advantageous to both parties if the labourer's wages were paid partly in kind and partly in money. This is the ordinary practice in the north of England, and is one full of permanent comfort to both the master and the man. The practice in Northumberland was well described in 1841, by Mr. Grey, of Dilston, when he thus alluded to the manner of hiring and paying hinds or farm servants, who are householders, in the north of England (*Jour. R. A. S.*, vol. ii., p. 185):—

“Each man is provided with a cottage and small garden upon the farm, free of rent, for himself and family; several of whom, in many cases, are engaged for the year upon the farm as well as himself. The wages of the hind are chiefly paid in kind: those of his son or sons, if he has any able to work, either in money, or partly in money and partly in grain, as best suits his convenience; but it is generally an object with him to have such a proportion of the earnings of his family paid in kind as will keep him out of the market for such articles as meal, potatoes, cheese, bacon, milk, &c.; and notwithstanding what the economists say about money being the only proper medium of exchange for labour, as well as other things, the custom of paying farm labourers in kind works well for both master and servant. In times when grain sells at a high price, the conditions of the hind will cost his master more than the ordinary rate of wages for day labourers at the same season; but, on the other hand, in times of great depression the conditions are the same, though at such times the farmer would be compelled to sell nearly double the produce to enable him to pay his labourers in cash. He has also a benefit in paying for his labour in an article which otherwise would cause him some expense in sending to market, and in disposing of which he might incur the risk of making a bad debt with his corn-merchant. The conditions of a hind (I adhere to the local term) vary with the price of grain from £30 to £40 a year; and, at the present prices, are as under:—

	£	s.	d.
36 bushels of oats		6	12 0
24 do. of barley		5	12 0
12 do. of peas		3	0 0
3 do. of wheat		1	5 0
3 do. of rye		0	15 0
36 to 40 do. of potatoes.....		2	14 0
24 pounds of wool		1	0 0
A cow's keep for the year.....	£8	to	9 0 0
Cottage and garden		3	0 0
Coals carrying from the pit		2	0 0
Cash		4	0 0
		£38	18 0

“In 1841, £36.

“Each hind being bound to supply the labour of one woman or boy whenever the farmer requires it, at 1s. per day in harvest, and 10d. per day at other seasons. The other females of the family receive 10d. or 1s. a day generally, and 2s. 6d. in harvest.”

By these payments in kind other very considerable benefits are derived by the cottager—advantages to which Mr. Grey thus further alludes:

“The produce of his garden, his small potatoes, and the refuse of his dairy, enable the hind to fatten two pigs in the year. The keep of a cow, supplied entirely by its master, consists of pasturage in summer, and a ton of hay, or an equivalent in turnips, generally ten cart-loads of white turnips, or five of white and three of swedes, and as much straw as he chooses in winter. This is reckoned to cost the farmer eight or nine pounds; but if the cow be a

good one, it is evident that the advantage must be much more than that to a family. The calf, if early in the season, sells for forty shillings or thereabouts; if later, perhaps for thirty shillings; and if the good wife be a frugal manager she will sell forty or fifty shillings' worth of butter, besides an ample supply of milk and cheese for the use of the family. The wool received gives employment to the females to spin, and knit it into stockings in the winter evenings; or it is sent, after being spun into yarn, to be made into blankets. In this way habits of industry and economy are promoted, and domestic and social virtues engendered and preserved, in a manner and to an extent unknown in those districts where the younger members of a family are early driven from the shelter of the paternal roof and the control of a parent's eye; or where the parents, deserted by their children, are forced to take refuge, under the infirmities of age or the pressure of want, in the corrupting atmosphere of a parish workhouse. Look into one of our north country cottages during a winter's evening, and you will probably see assembled the family group round a cheerful coal fire—which, by the way, is an inestimable blessing to all classes, but chiefly to the poor of this country,—females knitting or spinning—the father, perhaps, mending shoes—an art almost all acquired—and one of the young ones reading for the amusement of the whole circle; and contrast this with the condition of many young men employed as farm-servants in the southern counties, who, being paid board-wages, club together to have their comfortless meal cooked in a neighbouring cottage, with no house to call their home, left to sleep in an outhouse or hayloft, subject to the contamination of idle companions, with no parent's eye to watch their actions, and no parent's voice to warn them of their errors; and say which situation is best calculated to promote domestic comforts, family affection, and moral rectitude."

It is doubtless certain that many other social, moral, and religious comforts are derived from this considerate conduct of the north of England farmers. It is also as certain that much of this good need not in practice be confined to England's northern districts alone. That a little more thought and a little more trouble might suffice to introduce some portion, at least, of this good northern custom (and let us remember what comfort comes in with the custom) into the more southerly and sunnier districts of England. There are symptoms, I rejoice to add, of the practice of carrying out of such plans ever and anon presenting themselves. Even in the last number of the "Journal of the Royal Agricultural Society," p. 379, Mr. T. D. Ackland has described the practice adopted by Mr. Sotheron, at Bowden Park, near Chippenham, in boarding his unmarried men-servants, which affords ample materials for the serious reflection of other masters—andequally kind-hearted farmers. When, according to this statement, Mr. Sotheron took his farm in hand, about four years since, he found, as usual, a

barn of double the size required; and he divided one end of it into three compartments—a dining hall, a sleeping room containing six beds, a washing room with a loft over it for keeping chests of clothes, and a sink communicating with the tank in the yard. In this building from five to seven lads have been housed and fed during the last four years. Their wages commence at £4, and rise gradually to £8 10s. per annum. Several of the boys have become excellent ploughmen, and have won prizes. After work, they amuse themselves with cricket, or other games, or with reading or writing, playing the flute, &c. The weekly expenses of their board, per head, are as follows:—

	s.	d.
Bread and flour.....	1	1
Meat and bacon.....	2	0
Groceries	1	0½
Beer	1	0
	<hr/>	
	5	1½

The following details are taken, it seems, from the average of the consumption for several weeks:—

	s.	d.
38 lbs. of bread at 1½d..	4	9
4¾ do. of flour at 1½d.....	0	7¼
9½ do. of butcher's meat at 5d.	3	11½
14½ do. of bacon at 5d.....	6	0½
5½ do. of cheese at 6½d.....	3	0
2½ do. of sugar at 4d.....	0	10
¾ do. of coffee at 1s. 2d.	0	5½
½ do. of cocoa at 8d.....	0	4
2 do. of rice at 2d.....	0	4
Pepper, salt, &c.....	0	3
Board of five boys	£1	0 6½
Board of one boy	4	1½
Beer in addition	1	0
Actual food for one boy.....	5	1½

To this must be added a small sum per head for washing, soap, candles, and firing.

The reported result of this system of boarding farm-labourers is highly satisfactory. Of the total number of youths who have been admitted, two have married, one of whom works on the farm, the other for a neighbouring gentleman; four have been placed out in good situations; three having absented without leave, were not taken back; one, owing to ill health and afterwards died; five are now at the farm. None have misconducted themselves nor been discharged for any fault.

Let my readers consider these things—let each ask himself what even little good commencement he can make in such a direction; and then, if he acts

upon the conclusion to which he is led, he may take my word for the fact, that his next Christmas fire will not burn less cheerfully, or the bright eyes around that happy place for his family circle beam

less brightly, by his thus having attempted to extend the prompt payment of the duties of his position to the poor labourers he employs, or who are the tenants or owners of the estate.

ON THE MANAGEMENT OF ROADS.

The universal establishment of railways on the great lines of this country's traffic by no means renders attention to the due care and proper management of the highways and farm roads of the kingdom unnecessary: nay, the partial diversion of local traffic by them has brought roads into use, as great thoroughfares to and from the several stations, which before were seldom used. And the necessity and value of farm roads are too well known by all persons who have witnessed anything of life to need any observation whatever.

There is not, however, any one general mode of managing roads so invariably acknowledged excellent as to receive universal sanction; and yet how much the horse labour of a farm is increased or diminished by the facilities of access, or the reverse, those only who calculate the value of horseflesh alone can estimate.

There are many plans adopted and recommended for the formation, repairing, and management of roads; for it is clear that what is good for a farm road is good also for a highway, and *vice versa*. And as "ruts" are the real source of nearly all the surveyor's grievances, there are not a few devices adopted to remedy this invariable tendency in almost every kind of road.

In some cases no sooner is a fair coat of gravel or other material placed on a road but the carters invariably lead their horses to one side where they may have one wheel off the hard stones, and thus form these objectionable indentations on the sides of the roads, which are very difficult to keep from forming. In some cases this has been prevented by repairing the road in patches of 20 yards each, leaving a vacancy of 20 yards unrepai red; and when each of the repaired pieces have been worn solid, the interstices have undergone the repairing process. The carter having only 20 yards of rough surface before his horses has not thought it worth while to drive to a side, and thus the whole has got properly consolidated. But it is evident that though this has prevented the formation of ruts on the sides of the roads, it will have no tendency to do so in the middle; though from the comparative hardness of the latter it will endure much more pressure, friction, and attention than the former.

Another plan recommended is, to fill up one rut

as it is formed; and when a solid bed is made, to fill up the other. This will necessarily tend to keep the ruts filled up, and to a certain extent will meet the difficulty; but a plan advocated by Mr. John Burnley, of Bickerton, near Wetherby, which will be given below for the general management of highways, proposes that the ruts shall be made self repairing by the peculiar construction of carriage-wheels which he recommends.

His plan has never been published; and at this period, when the whole agricultural world are looking forward to a general bill for the management of highways, it cannot fail to be highly interesting and peculiarly well-timed. And, indeed, many of the features of his plan tend to improve all kinds of roads so much, that it deserves a range of investigation far more general than the subject may at first sight warrant. We may state that he has been a practical man, and obtained early notice of the Yorkshire Agricultural Society for the practical application of his knowledge to successful drainage; and as the plain, simple language in which he has drawn out his plan will tell as well the tale he wishes as any remodelling of it could do, it is given entire in the way in which he has placed his ideas before us, and it will be found well deserving of consideration.

ON HIGHWAYS.

In this age of improvement, when every subject in civil and political society is undergoing such extraordinary changes, it becomes matter of surprise that in the management of parish highways (in most districts during the last 20 years) scarcely a step towards amendment can be observed; and this surprise is still more excited when the excellent system of management which has been generally introduced on the turnpike roads might be expected to have pointed out the defects of the old practice of road making; our astonishment will, however, abate considerably when we consider the serious evil of the present system in the appointment of surveyors, who are annually chosen in rotation from the occupiers in the parish: no matter whether gentlemen, farmers, shop-keepers, or mechanics, they must all have their turn, most of them men of very little practical observation and intelligence, many possessing scarcely the common rudiments

of education, much less of general reading or science. And experience proves that in most cases the appointment has no reference to the ability of the party elected, and, like the passing of the accounts, amounts to little more than a needless formality; and such is the anxiety to be rid of the duties of unpaid office, and certainly not a very thankful one, that every surveyor looks forward with no small satisfaction to the expiration of his term to transfer his books and duties to his neighbour. If, however, an intelligent man wishes to introduce a better system, he is, at the end of six, or at most of twelve months, superseded by the appointment of another in succession just at the moment when his theory is being reduced to practical experience; and very probably his successor, despising his "*new-fangled*" ways, undoes all he has executed during his term of office. In some instances where a road has been widened and formed after the best manner, a new surveyor has actually carted away the sides of the road to the depth of a foot or more, under the pretext of carrying off the water, leaving a surface of road not exceeding 9 or 10 feet wide. Others will contend for large stones, and during their year of office will cover a road with stones of four or five inches, so as completely to destroy all his predecessor has done to render the road smooth and even. Public peculation by annual surveyors has been by no means rare: much needless and extravagant expense has been incurred without a possibility of calling the surveyor to account, from the strange irresponsibility of his office. To remedy these evils the following brief ideas have been suggested for the better management of the highways of the kingdom.

That the highways shall be divided into districts, say $\frac{1}{2}$ miles each, or as may be found eligible and convenient; to each of such districts a permanent surveyor shall be appointed, with a salary sufficient to secure the services of an efficient and intelligent person by commissioners of highways or the magistrates. That general instructions shall be given to each surveyor for his practical direction, to be rendered imperative upon him; and under such direction it will scarcely be possible for a surveyor materially to injure the road, or to prevent under any circumstances of situation the full benefit of a good road. In cases of gross neglect or inefficiency in a surveyor, his immediate dismissal is a necessary consequence. To meet the charges of the highways under such management, it will not require a rate of more than seven year's average, which it may, if needful, be provided they shall not exceed, including the full value of the statute duty, which is now abolished. In cases where roads are so bad as to become indictable, such extra charge may be made as will accomplish such per-

manent improvement as in case of indictment would be ordered to be made. Superintendent surveyors may be with propriety appointed, including a certain number of districts, whose salary ought to be paid by the county, whose duty it shall be to inspect each district and report upon the state of the roads, to present all nuisances, neglect of surveyors, &c. It would greatly add to the general improvement if the turnpike trusts could be taken into the hands of government. The funded debt appears an almost insurmountable obstacle; but surely the nation would be bound in justice to discharge such debt, upon the same principle as the slavery abolition was commuted; and the charges of the turnpikes might with justice be laid on the county rate, throwing open every road in the kingdom, and at once abolishing the monopoly of toll contractors, with all the expenses attending them.

But the greatest improvement in the highways is to be accomplished by causing carriage wheels to be built of unequal widths; this regulation alone would at once completely alter the state of every highway in the kingdom, from a rough, rutted, and uneasy way, into a smooth, level carriage-road. The great difficulty of preserving the highways good and smooth has always arisen from the impossibility of preventing ruts; the lead horse always following the beaten track, and the driver preferring it as presenting the easiest draught. By substituting wheels of unequal widths, this hitherto insurmountable difficulty will be avoided. A variation of 6 to 10 inches, wider or narrower, will cause the wheel track to be so spread that it will be impossible to wear the road into ruts, as the wear and tear of the road must take place over the whole surface, because the wheel from its various widths will always afford a sufficient and desirable horse-track, and when once the road has been properly formed it must ever after wear into a level surface. When the roads are once beaten smooth, the draught will be no more than it is now on every well-made turnpike.

On newly repaired roads, in snow or on the breaking up of frosts, this improvement will be decidedly manifest. Under the present system on our best turnpikes all the precaution and ingenuity of the surveyor is unable to prevent ruts; whereas, if unequal wheels were in use the whole would immediately be pressed into a smooth, hard, surface. To accomplish this great object, wheels of 9-inch felloes should not be allowed to cover a less surface of road than 66 inches; 6-inch wheels a surface of 63 inches; $4\frac{1}{2}$ inch wheels 60 inches; 3-inch wheels carrying exceeding one ton weight 53 inches; and single horse carts, 56 inches or less, at the option of the owner. All four-wheel carriages to be compelled to have the track of the fore-wheels to vary

not less than the full width of the tire from the track of the hind wheels. The extension of the width of the wheel-track in all carriages of quick motion, such as stage coaches, gigs, &c., &c., would add greatly to their safety, and be attended with no inconvenience, but add to their utility.

It is greatly to be regretted that the law prohibiting wheels with a convex surface should have been repealed. It is notorious that carriages bearing a load of four to six tons' weight universally press only on the middle tire of three inches broad, grinding to dust whatever materials resist their passage.

That objections will be raised by a host of opponents may be expected; but a few months' experience of the benefit will overcome the first prejudice; and this improvement will excite surprise it has not sooner been adopted. Let every impartial observer examine any road in the country, however ill-formed, narrow, and bad; let him carefully inspect every angle, every cross-road, or considerable hill, and he must at once be struck with the smooth, even surface presented at every corner. Let him enquire into the direct cause why the road is so smooth and good for a few yards only on each side the angle, and he must be at once convinced that the impossibility of one carriage keeping the same track in turning the corner is alone the cause of a good road, till the carriage passes on again in a straight line. So in drawing up a hill, the carriage varies materially in its track by the swerving of the horses, and hence the road is smooth and free from ruts. Like the introduction of every new improvement in agricultural districts, it will meet much opposition; but the result will prove its value, and every highway in the kingdom will become as safe and good as any turnpike, though they may not always be so free from dirt for want of equal attention; but an equal distribution of the friction over the face of the road will always ensure a smooth surface. The chief and most plausible objection will arise from bye-roads and farm-roads where not repaired well with stones; on these, however, it matters not, for in wet weather the ruts invariably fill up with dirt, and in dry weather the unequal wheels will have a decided advantage by immediately causing a level and smooth road; and unless in cases of extreme necessity, as in a wet harvest, no carriages ought to move on these roads with any heavy loads but when they are dry; and even when wet, though they may be equally dirty, with unequal wheels they will invariably be of a smooth face: and where it is considered necessary to repair these bye-ways, half the materials now required will, by the introduction of such wheels, form a good road.

To Mr. M'Adam the country is deeply indebted

for his valuable and systematic improvements in road-making; but it still remains for the introduction of unequal wheels to *secure and preserve* a good road, and to accomplish effectually what no care or attention could otherwise do—a smooth, even, and level road. In its ultimate consequences to all the turnpikes, and especially to the highways, *this improvement far exceeds in moment and value even Mr. M'Adam's valuable improvements.*

Having treated on the appointment of surveyors and on unequal wheels, the subject of the formation and management of the highways next calls our attention: to make it more convenient we will consider it under several particulars:—

1ST—FENCES AND GATES.

The first step in this improvement of a highway is to cut and splash every fence on the road close to the stake root; the top not to be cut off, but buck-headed, at four feet high from the centre of the road, or, if on rising ground, from the surface of the land within the fence, which will at once secure a cheap, durable, and neat fence: in some cases it may be desirable, where there is a good quick fence, to lay it, or where there is a sufficiency of long hedge-wood, which requires to be thickened at the root. All trees should be taken down, as in turnpikeroads. To secure the better execution of this object, it is desirable that all the fences on the roadside shall be under the management of the surveyor, who shall be allowed from the occupier a compensation for the expense which is thus incurred; but perhaps it may be sufficient if the occupier give up the fence without being subject to any charge, which ought to be borne by the parish: this charge, however, after a year or two would be a mere trifle, and would put an end to the constant bickerings between the occupier and surveyor on this subject, and also secure one uniform and good fence along the whole line, adding greatly to the beauty of its appearance. When once the fence is formed, it will only require to be close-faced once in every year, which should be done after the falling of the leaf. When a wall is built, it should not on any account come beyond the stake root of the fence, so as to prevent the running of the water, and likewise cause a serious inequality in the fence. Deficient places in the fences may be readily made good in many cases by laying the heads of the growing wood in the gaps, and covering them partly with earth well pressed down, leaving the upper branches out to form a new fence, which, from the support afforded by the old roots, will soon take root and fill up the deficiencies. Where it is necessary to plant quicks, they should be defended by posts and rails for some years: it may be rendered imperative on the occupier to cut and dress the fences after one

uniform plan, but it is preferable that the fences be in the hands of the surveyor. The gates in all cases should be made to open *within the field*, and the gateway on an *exact level* with the centre of the road, and invariably covered eight inches thick with well broken stones, to prevent its breaking up and intercepting the water. No bridges across the gateways to be allowed on any pretence whatever, as they destroy the form of the road, and are indeed utterly useless if the gateway be properly formed, and the regular watercourse carried across it. There may possibly, in some cases, be found a difficulty to ascend into the field from the uneven state of the ground; this will be easily overcome by cutting away the ground *within the field* so as to admit the opening of the gate; this will indeed much improve the entrance to the field, by avoiding the sudden and dangerous turning which many gateways present to a loaded carriage; whereas, if the carriage on its entrance into the field or road be on a level with the road, the thill horse will have perfect command over the load without being distressed by having, in many instances, a heavy load to draw without the assistance of the trace horse, which, from the sudden angle, cannot be of any service, having no room to work in a straight line. In case of descent the remedy is by filling up *within the field* till the carriage is on a level with the road, before the horses make any turn to come into the road.

2nd—DITCHES AND WATERCOURSES.

In all cases where there is no running stream of water from springs, the ditch must be filled up by casting down the banks to the level of the surface of the field, *where possible*; which, though directly contrary to the general practice, will cause the fence to grow from the bottom, the old hedgewood being nearly cut through, to make them shoot out young wood. This will prevent a needless expense in repeatedly banking up the earth, and remove an unsightly object in the road. It ought always to be remembered that no bank will be so durable or so inexpensive as a natural and undisturbed sward. In cases of running water, or where the ditch is required to drain the land, in every instance it must be cut *within the field*, as is the case in some new turnpikes, which will prevent the road being weakened by a deep ditch, and also the danger attending them: there may be a few instances where, from the great width of the road, the ditch may be outside of the field; but this should in no case be allowed where there is not full 30 feet of clear surface of road. There may also be instances where the road passes through a rising ground on one or both hands—in such case the ditch must be covered in, till the difficulty ceases, to convey the water, as before directed, into the nearest outlet; this, how-

ever, is a very rare case. All bridges and water-courses across the road should be continued nine inches beyond the stake root of the fence, and not left, as in the present practice, nearly four feet short of the fence on each side; and in many cases only just sufficient for one carriage to pass.

3RD—FORMATION OF THE ROAD.

Where there are no materials already in the road it must be marked out with straight lines not less than 30 feet wide where it can be done, the hedges being raised a few inches so as to be level with the centre of the road. It must be cast and levelled so as to leave it not more than two inches raised in the centre of the road when well beaten down. The stones will give sufficient curve to the surface to drain off the water, by being some inches thicker in the centre than on the sides of the road. It should be carted upon, several weeks in the spring, or months in summer, to render it perfectly *solid and compact*: previous to the application of the materials, the ruts, if any, must be filled up; and if this plan be faithfully adopted, not half the materials will be required in making the road, which are necessary, where the usual practice is to lay the materials on a newly-formed, unbeaten road, besides subjecting the surface to become unequal from want of solidity in the foundation.

4TH—GETTING MATERIALS.

There are not many observations needful on procuring materials. Gravel and stones from rivers or quarries are chiefly carted in dry seasons or during frost, when farmers are not otherwise engaged: quarry stones will be much improved by being exposed to the influence of the weather for some months, and will bear a much greater friction, becoming, as experience proves, harder for being longer exposed. There is no impropriety in securing a favourable opportunity for carting the stones, but the filling of the road-sides during many months in the year is a great injury of the road, by contracting its available surface, intercepting the surface water, and compelling the carriages, especially in narrow country roads, to work in the centre, to its serious injury. The highway act has prohibited laying stones on a road-side within 15 feet of the centre, for more than 24 hours; but this valuable improvement is little attended to—the same practice in most townships being still followed of filling the road-side with stones for months together. This evil admits of an easy remedy by providing dépôts for laying the materials in wide parts of the roads; (not, however, by any means being allowed to lie within 15 feet from the centre,) or, where necessary, by apportioning some parts of the adjoining fields for that purpose, which should

always be, if possible, where a cross fence forms two corners in the fields, by which the fields will not be disfigured or much land wasted (for which compensation must be made): 50 or more tons may be laid together, and will generally be a much more favourable situation for an economical preparation of the stones by breaking, and prevent waste; and a single horse will readily cart them away at the proper season for their application. If the consequence of the present slovenly manner of leaving them to roll about for weeks or months by the roadside, in addition to these reasons, in the loss of human life, caused by throwing down horses and overturning the carriages, be taken into the account, and a close inquiry made, the result would present a frightful report of such accidents, and ought at once, without any other reason, to subject the surveyor to a heavy penalty for allowing any stones to lie unspread for 24 hours, or during the night. In fact, no obstruction of any description ought to be allowed to remain within 15 feet of the centre of the road.

5th—APPLICATION OF MATERIALS.

The materials having been provided and properly broken during the summer should now be laid on, and should in all cases be laid, in the first instance, thick enough to prevent a carriage indenting them into the ground on passing over them; and if the precaution before mentioned be adopted, of well beating the ground for some months, a very moderate layer of stones should be laid, not less than 15 feet wide, which will in general make a sufficient carriage-way; but where the traffic is considerable, or where materials are plentiful, it is much more desirable to cover the road from side to side. Great care must be taken to keep the materials perfectly free from ruts by raking in the stones as often as they occur, preserving the rise or curve in the surface of 4 inches, which will be quite sufficient to keep the road perfectly dry if care be taken to keep it smooth and free from ruts on the surface. In forming and improving an old road it will be necessary in some instances to lift or move the whole materials and form the bottom of the road as before, and in many instances the stones when broken will more than renew the road, and will prevent the expences incurred in the purchase of new materials. In other cases when large stones exceeding two and a-half inches shew themselves, the surface may be partially lifted, and the stones should be taken up, broken, and laid on with the new materials, if any be required, in the same form as before.

6th.—REPAIRS OF THE ROAD.

The road being thus formed and completed, it will require considerable attention for some time, till

it acquires a smooth, hard surface; it must on no account be allowed to work into ruts, but should immediately be filled up by the application of more stones where required, or levelled down with a strong iron rake, always providing that it shall, when completed, have the necessary curve. After repeated attention for a time it will settle into a smooth face, and by adopting this plan it will be kept constantly in good repair with little expense, and being thus kept smooth the friction will be materially reduced, preventing a waste of draught, the wear and tear of carriages, and what is of very serious consideration, the consumption of materials; for it is a fact, though little understood by country surveyors, that the destruction of materials on a rough road is more than double that of a road kept with a smooth surface and doing the same work. In covering a road when worn thin, it should be done in moist weather, for by so doing the new materials will more readily unite with the old surface than when laid on dry. A considerable waste of materials is caused by its coming in contact with two hard surfaces, the tire of the wheel and the face of the old road, a circumstance little noticed, though if properly examined would be found to destroy a very considerable proportion of materials, particularly if of a soft nature; in many instances nearly one half will be destroyed. Again, a new covering for the same reason should never be less than four inches thick, unless, which is preferable, the surface is lifted about two inches deep, as in M'Adam's system, so that a stone of two inches cannot possibly come in contact with the iron and the surface of the road at one and the same time, but will find its bed among the new materials. It may not be out of place here to observe that M'Adam's system decidedly excels all others; for by lifting, if only two inches deep, a soft bed is formed for the additional stones, which immediately on pressure are fixed firmly and without waste. This plan is particularly adapted for partial repairs, and prevents the destruction of many materials by confining them immediately to their bed, instead of a great part rolling and flying in all directions. Where, however, the ruts absolutely require to be filled up, they should invariably be filled with well-broken stones, and not too full; and if a few small stones be cast into the horse-track, the horses will fly and make a fresh track; but this precaution with *unequal wheels* will be quite unnecessary: there will in that case be no ruts or fixed track. It will be necessary to say that no gutters are to be cut across the road under pretence of letting off the water: they are at once useless, for if the road be well managed no water will stand; they greatly disfigure the road, and are very dangerous to passengers, particularly when

riding in the night, by throwing down the horses. Wherever it may from peculiar circumstances be indispensably necessary to adopt this plan as a temporary means where the road is undergoing a thorough repair, and the water stands in the ruts, at all times let whatever materials or earth are broken up for this purpose be levelled down or cast into the road to prevent accidents as well as to keep the road in proper form. Mud should not on any account be allowed to accumulate on the surface of a road, which cannot be kept too free from dirt and water, for the materials being kept moist or wet will not bear half the friction as when dry; on no account, however, ought road scrapings to be left on the road more than 48 hours before they are removed, which will give time for the water to drain from them previous to their removal; they should in all cases be applied to the sides of the roads if not already wide enough, nothing making a firmer and better bed; or if not needed let them be cast or wheeled into the nearest inequality, and not, as is often the case, applied to the surveyor's own purpose at the cost of the parish.

7th.—REMOVAL OF NUISANCES.

The unsightly and dangerous nuisances on all country roads are serious causes of complaint; old quarries, sand pits, &c., unfenced; mounds of earth, timber, dunghills, and a variety of other nuisances present themselves at every step, adding to the danger of travellers, and in every instance presenting unsightly objects. The remedy is, that all inequalities of surface shall be levelled, all pits and excavations filled up or securely fenced off, leaving a free and unobstructed surface of not less than 30 feet wide. This would find much useful employment to the labourers, in the absence of farm employment. No plantation or trees should be allowed to grow within 30 feet of the centre of the road, and it is desirable that no trees should be allowed within 15 feet of the fence, to allow a free current of wind and sun. While on this subject, the ruinous practice of carting away soil, sand, &c. from the road sides ought to be done away with; and if any surplus of soil remains after levelling the waste ground, it should be carted to fill up the nearest inequality in the surface.

In concluding these plain remarks the writer anticipates considerable objections from various persons; prejudice will influence some, and from others real difficulties will be started. Some will object to the authority of the surveyor having in his own hands the entire management of the fences; this has been recommended for the reasons before stated, that it is much less difficult to execute by a surveyor's servant than to command an unwilling, and possibly highly prejudiced occupier to do

it himself; the experience of the surveyors of turnpikes in the difficulty with which they accomplish this object, and the many instances wherein they are obliged to apply for magisterial interference, fully proves that the most unobjectionable plan is to place the management of the fences in the hands of the surveyors. In filling up the ditches where unnecessary, much objection will be raised by farmers of the old school; deep ditches and high banks being to many farmers absolutely necessary, as they assert, to preserve their fences; though experience proves that dry banks are seriously injurious to the growth of fences by preventing their growing from the root, and rendering them so dry that in many instances vegetation is scarcely perceived. Deep ditches, in every situation, are a dangerous nuisance and an injury to a road; and where running water renders a ditch indispensable, no private interest should prevent its being made in the field and not in the road. In the general management of the road much prejudice will have to be overcome; but when the law dictates what shall be done in this respect, which is as absolutely necessary in order to accomplish this end as it is that a carriage shall have the owner's name upon it, or any other of the many valuable regulations now by law established, this prejudice will give way, and after a short period the general complaint will be that the improvements were not sooner adopted.

The introduction of wheels of unequal widths may present many difficulties, and so have many national improvements where custom has riveted the people to their existing system. But let the law command, and the benefit will abundantly repay every sacrifice of custom to which we have been wedded.

The appointment of permanent surveyors would meet with almost universal objection, because of their wages; let it, however, be considered how would the business of a turnpike road be executed with an annual surveyor? Experience in some turnpikes now under the direction of the parish surveyors will give a ready reply in the most miserable state of such roads; equally applicable is the principle in parish roads.

It would be one of the highest enjoyments of the writer to be the humble instrument of introducing a great national improvement in the highways of the kingdom. Railways, from their original enormous cost, can never entirely supersede highways, though they may and will many of the great turnpikes. It becomes desirable, as much as possible, to adopt their superior excellence by reducing the friction on our roads, which can only be effectually done to any extent by the method here pointed out, viz., by rendering it imperative that all roads shall be subject to certain rules in their formation; he there-

fore leaves these remarks, conscious he has no higher ambition than his country's good.

Addenda.—One circumstance which I have often painfully witnessed I would call attention to—the sacrifice of human life caused by drunken carters, who are themselves very frequently the victims of their own folly. At present, I am not aware that an individual passing a drunken carter, however in point of fact incapable to manage his horses, has any authority to take possession of the team and place it in charge of an efficient driver. Within ten miles of Wetherby, for many years past, numbers of lives are annually lost for want of this precaution. Drunkards are turned out of the public houses in charge of a team of horses at the peril

of their own and the lives of others. The remedy is simple: Let any competent judge of the danger attending an intoxicated driver have authority to stop any team driven by a drunken man, place it in charge of a competent person, who shall see it home at the cost of the owner, to be recovered from his servant; and should the driver violently resist, which in most cases will happen, he may be placed in custody till sober. An information against the party for drunkenness is no pleasant task, few will be at the trouble; and this is no remedy for the immediate danger attending his journey, which so often terminates fatally to himself or to his innocent neighbour.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

LECTURE ON THE ACTION OF SOILS UPON THE CONSTITUENTS OF MANURE.

PROFESSOR WAY, the Consulting-Chemist to the Society, delivered a lecture, "On the Action of Soils upon the Constituents of Manure," before the members of the Society, at their house in Hanover-square, on Wednesday, the 20th of March, Mr. RAYMOND BARKER, Vice-President, in the chair.

LECTURE ON SOILS AND MANURE.

Mr. WAY stated that he had on that occasion to bring before the Society some facts and observations in regard to the action of soils upon the constituents of manure. These observations he believed to be perfectly new to the agricultural public, and he hoped to show that they would throw much light on some of the operations of practical agriculture. As, however, he was preparing a paper for the next Journal of the Society, in which he would go minutely into the subjects and give the results of the investigations which had been proceeding for the last eight or nine months in his laboratory, he should that day merely give an outline of those results, avoiding everything in the shape of detail. It had often been observed that the dark liquid from a manure-heap, if by chance placed upon a bed of soil through which it could filter, issued from the bottom almost or altogether deprived of colour. Again, the water of drainage, especially in heavy clay soils, was observed to be free from colour, and often beautifully clear and limpid. What was the nature of these actions? Were they the effect of mere mechanical filtration and the separation of the solid substances suspended in the water? Most persons would answer in the affirmative, and such had been the general impression hitherto, but it did not meet all the circumstances of the case.

On the table were glass filter-jars, containing a red soil from Mr. Pusey's estate in Berkshire. The soil, as the gentlemen present would see, occupied the jars to the depth of five or six inches. Upon one of these Mr. Way poured water obtained from one of the sewers of London. To another filtering-jar he added a quantity

of the fetid liquid produced in the steeping of flax. Both of these liquids were turbid, highly coloured, and exceedingly offensive to the smell; but it would be seen that, so soon as having passed through the soil they began to drop from the jar, they were no longer the same. The resulting liquid had an earthy smell it was true—a smell always accompanying soils—but was no longer offensive to the nose. Now to what ingredient of the soil was this metamorphosis due? Was it due to the sand acting as a filter? It was easily proved that such was not the cause; and that there might be no doubt on this subject, Mr. Way would pass through a filtering-jar, containing more than nine inches depth of fine white sand, a quantity of cow's urine taken from a tank in the country. The liquid was so far altered by the filtration that the turbidity was removed, as it would be by filtration through paper; but the colour and disgusting smell remained in all their intensity. Sand, therefore, obviously was not the active ingredient in soils in respect to the power under discussion. The same must be said of the different forms of gravel, which were only coarse sand. The other great ingredient of soil was clay, and to this Mr. Way attributed the power in question. As an experiment comparative with the last, he would pass the same tank water through sand, mixed with one-fourth of its weight of white clay in powder, and they would observe the result was very striking. The liquid coming through was clear, and free from smell; indeed, it was hardly to be distinguished by its external characteristics from ordinary water. There could be no doubt, then, that the property of soils to remove colouring matters, and organic matters yielding smell from solution, was due to the clay contained in them. Filtration was only a method of exposing the liquid in the most perfect form to the action of the clay, but it was not necessary to the success of the process. In proof of which Mr. Way stirred up a quantity of soil with putrid human urine, the smell of which was entirely destroyed by the admixture, and upon

the subsidence of the earth the liquid was left clear and colourless. It appeared, therefore, that the clay of soils had the property of separating certain animal and vegetable ingredients from solution; but was this property the only one exhibited? Mr. Way had found that soil had the power of stopping also the alkalies, ammonia, potash, soda, magnesia, &c. If a quantity of ammonia, highly pungent to the smell, was thrown upon a filter of clay or soil, made permeable by sand, the water first coming away was absolutely free from ammonia. Such was the case also with the caustic or carbonated alkalies, potash, or soda. This was a very wonderful property of soils, and appeared to him as an express provision of nature. A power, he remarked, is here found to reside in soils, by virtue of which not only is rain unable to wash out of them those soluble ingredients forming a necessary condition of vegetation, but even those compounds, when introduced artificially by manure, are laid hold of and fixed in the soil, to the absolute preclusion of any loss either by rain or evaporation.

But Mr. Way had found that this property of clay did not apply only to the alkalies and their carbonates, but to all the salts of these bases, with whatever acid they were combined. Here again was a beautiful provision; sulphate of ammonia, when filtered through a soil, left its ammonia behind, but the sulphuric acid was found in the filtered liquid—not, however, in the free state, but combined with lime; thus sulphate of lime was produced, and brought away in the water. In the same way muriate of ammonia left its ammonia with the soil, its acid coming through in combination with lime, as muriate of that base. The same was true of all the salts of the different alkalies, so far as he had yet tried them. Thus lime in the economy of nature was destined to one other great office besides those which had already been found for it—it was the means by which the salts ministering to vegetation became localized and distributed through the soil, and retained there until they were required for vegetation. Mr. Way pointed out that, from what he had just shown, it must be obvious that there was no provision for the ordinary salts of lime themselves. It was necessary that when the alkali of a salt is laid hold of by a soil, some provision should exist for the neutralization of the acid with which it was combined; for all other salts lime performed this useful office, but it had nothing to fall back upon for its own salts. Sulphate, muriate, or nitrate of lime, when passed through a soil, would come through unchanged. This, however, did not extend to lime itself, or to its carbonate, when dissolved in carbonic acid, as it is found in most waters. Quicklime, when dissolved in water, is removed by passing the water through clay, or through most soils containing clay; and carbonate of lime in solution is so effectually removed, that hard water may be softened by the same process.

With regard to the extent to which these actions were capable of being carried. It was not to be supposed that we could go on filtering indefinitely with the separation of the salts contained in the liquid. On the contrary, the limit was soon reached; but although small in per centage quantity, the power was, in reference to the

bulk of the soil, enormously great. He had found that a pure clay would absorb, perhaps, two-tenths per cent. of its weight of ammonia—that is to say, 1,000 grains would separate two grains of ammonia; and from reasons which need not then be noticed, a loam or a well cultivated clay soil would absorb nearly twice as much. Now every inch in depth of soil over an acre of ground weighed about 100 tons. Consequently, 10 inches of depth of such soil would weigh 1,000 tons, and would be adequate to combine with and retain two tons of ammonia, a quantity which would be furnished by about twelve tons of guano. Now, one-sixtieth of this power would suffice for the preservation of the ammonia of an outside dose of guano; consequently, he was justified in saying that the property was practically of immense activity. Mr. Way stated that he had ascertained the extent of the power in different soils and for the different alkalies. The property was decidedly a chemical one; and although he intended only to state the facts, without entering upon their explanation, he might say that he had every reason to believe that he should be able to develop that satisfactorily at the proper time.

Having thus endeavoured to call their attention to this highly interesting subject, the lecturer went on to point out very shortly the different operations of practical agriculture, upon which it was likely to throw light.

First, as to Manuring: Obviously if there was a provision in the soil for the retention of the salts of manure, and for the ammonia and other products of the decomposition of animal and vegetable matter, the soil was the proper place for those decompositions to go on, and no matter how remote the period when the crop would be taken, it would be perfectly safe to get the manure into the land as soon as practicable after its production. Again, the equable distribution was a point also which seemed of considerable importance; for, if it was an absolute necessity that a new class of compounds was found in the soil immediately the manure reached it, it seemed to follow that those compounds furnished the elements of nutrition to plants; consequently we should seek to produce them by every means in our power. Liquid manuring, wherever practicable, was an effectual way of securing this distribution. In the case of artificial manures—that is to say, manures composed of chemical salts—much simplicity was introduced by the new discovery. Henceforth we must regard the different salts (those of ammonia, for instance) as of value in relation to the price of the ammonia, or other base contained in them, since they are all alike when incorporated with the soil.

In liquid manuring it had been usual to think that the application must be made to grass, or to land bearing some crop; but now that it was known that the land, not the plant, retains the manure, no theoretical difficulty could arise in the use of liquid manure for arable land.

In Irrigation the principle now illustrated must certainly be of great importance, if, as there is but little doubt, the chemical characters of the water are of consequence, and that the soil is the means by which the salts and organic matters are separated for vegetation; then it will be obvious that the water should be made to

flow *through* rather than *over* the soil. This reasoning is consistent with the observation, that to produce the full effect irrigated land should be well drained.

The application of water to land not at the time bearing a crop would be clearly admissible under this view, and is indeed practised extensively in Germany and some parts of Italy. Mr. Way also pointed out that the proper depth for drainage must be materially influenced by this property of soils to absorb manure. Without asserting that this or that depth was the most advisable, he thought it would be admitted that the water of drainage should pass through a depth of soil regulated, amongst other circumstances, by its particular power of detaining the manures placed upon it.

To the question of the application of Sewer refuse from towns these experiments brought much light, as they clearly proved that the sewer water might be applied in an unintermittent way, provided that a due relation were maintained between the capacities of retention of the soil, the quantity of manure applied, and the amount of crop taken in a given period. The great obstacle to the use of sewer manure, based upon the belief that it must be applied to the plant in actual growth, or it would otherwise escape in the drains, is thus removed. Lastly, after adverting to the probability that the power of soils to remove carbonate of lime, and thus soften water, might be turned to account for the supply of towns with pure water, Mr. Way said that he had great hope that with the clue he now possessed some material progress might be made in the elucidation of the action of lime itself upon soils, which he had reason to believe was closely connected with the phenomena which he had that day had the pleasure of explaining.

On the motion of Mr. Fisher Hobbs, seconded by Mr. Paine, the best thanks of the Meeting were voted to Prof. Way, for his kindness in delivering another lecture before the Members, and for the newly discovered and important agencies of the soil, in reference to manure, which he had so ably explained to them on that occasion.

A very interesting discussion then ensued on the manner in which particular well-known facts in the cultivation of land were elucidated by the results thus obtained by Prof. Way in his chemical investigations.—Colonel Challoner had frequently been at a loss to account for the action produced by clay, or other aluminous matter, on manures applied to a portion of his property on Bagshot-beath, where, as it was well known, the soil was light and sandy, and through which the manure, without such application, passed off, and was lost: he now could understand the reason why, in the course of three years, such soil, from the circumstance of the manuring elements being arrested by the clay, became capable of bearing crops.—Prof. Way considered the presence of clay necessary to retain manure; not only that immediately applied by the farmer to the land, but that which was known to exist in the atmosphere in the form of soot and ammonia, and to be brought down into the soil by showers of rain.—Mr. Raymond Barker referred to the improvement of chalk lands improved by claying them.—Mr. Barclay had found some of the most fertile soils on chalk

subsoils. Professor Way's specimen of the clay then employed in his experiments was obtained from Dorsetshire; and the more permeable clay was, the more nutriment it would derive from the greater amount of impregnated liquid passing through it. Burning clay nearly destroyed the peculiar property to which he had alluded, of arresting manuring matter; but it had been found very advantageous to have a portion of the clay burnt, and to intermix the indurated fragments (or coarse brick-dust, as it might be considered) resulting from such burning, with the remaining raw clay of the land.—Captain Wentworth Butler, R.N., was much interested in the lecture they had just heard. The new agency to which Professor Way alluded threw much light on the question of liming, which, to himself as well as to others, had been hitherto a most perplexing one. They all knew that light soils did no good until clay was put upon them, and then they bore excellent crops; that bad meadows were only relieved by draining, for the purpose of allowing the confined water to escape, and new supplies to be constantly filtered through the pores of their soil; and that old pasture-ground, when broken up, would go on from year to year, without manure, yielding crops equal to those derived from lands to which manure had been regularly applied; and these several effects he thought might be mainly ascribed to the ammonia which, under the new conditions of each case, was retained by the soil.—Sir John Johnstone conceived that under drainage was the first essential in water-meadows. He had himself several near Leominster, and for some time it was thought merely necessary to put the water on them for the purpose of producing the effects required. He found, however, that the result was very unsatisfactory, under such conditions; but now, since they had been under-drained, they had become very valuable. He then proceeded to make some remarks on the quality of water, and its mode of action on water-meadows. The effect had been ascribed to the warmth of the water, and to its impregnation with manuring elements. He had no doubt that both these causes were favourable to the production of the effects required. About 20 years ago, Dr. William Smith, the well-known geologist, had laid out catch-meadows for him in Yorkshire, on the sides of hills of moderate land, of a dry, sandy quality, on the calcareous grit, where the soil was porous, and without clogging. It having been imagined that warmth was the only requisite in the water employed, irrespective of the chalk or calcareous matter held in solution, it was not considered what might be the effect of such mineral impregnation; it proved, however, that the water partook of the nature of the mineral formation, on which the catch-meadows were made; and, although earlier crops were obtained than on land not irrigated, the effect of this water was to destroy all the finer Grasses, and to leave only the rougher and inferior herbage on the meadows. The irrigation of these meadows had accordingly been discontinued.—Mr. Barker made some observations on the common opinion of the mode in which plants derived their nutriment on water meadows.—Dr. Calvert would furnish Professor Way with specimens of soil from two con-

tiguous pieces of land of his own in Yorkshire, one of which bore the heaviest crops of any land for miles round, while the other yielded only the poorest herbage; although the soils in appearance were exactly similar.—Mr. Barker thought it essential to ascertain whether the manure was applied in equal quantities to these soils.—Professor Way cited a corroborative instance of the latent causes of fertility and sterility in soils of apparently the same character. Two soils were sent to him from Sussex, with a request that he would submit them to scientific examination, and report the difference between their qualities. He found them in appearance exactly alike, their mechanical characters being identical in every respect; and chemically analyzed, they were found to contain similar proportions of clay, sand, chalk, and organic matter. He reported this result accordingly; when the gentleman who had sent the specimens to him informed him that one of the soils was one of the best in the county, yielding 5 quarters of Wheat; while the other was one of the worst, yielding only 2 quarters; on which Professor Way recommended him to try liming on the poorer soil.—Colonel Challoner enquired whether acidity in the land might not often exercise a great influence over the quality of the soil and crops? and whether chalk would not remove such acidity as readily as lime?—Professor Way replied that caustic lime had an effect that chalk had not.—Colonel Challoner observed that quick-lime, on exposure to the atmosphere, soon became converted into the carbonate of lime, or chalk; but he was not aware whether the same conversion would take place when lime was mixed with the soil.—Professor Way remarked that lime, when only imperfectly excluded from the atmosphere, retained its causticity for a great length of time; for instance, in the mortar of buildings erected 500 years ago, the lime was found to have remained in its simple state, without having combined with the carbonic acid of the atmosphere.—Mr. Rigby Wason then made some observations on the bearing of these new principles on the question of deep or shallow drainage. He conceived that we ought to drain as shallow as we could do, so as to drain effectually, in order to keep the arrested manuring matter more nearly to the crop growing on the surface, and thus render the whole of it available for the purposes of vegetation.—Mr. Baker referred to Sir H. Davy's advice to cart out all the manure, and mix it with the soil, on the day it was made.—Mr. Fisher Hobbs had never heard a lecture on chemistry of more importance to the practical farmer than the one with which Professor Way had just favoured them; nor one from which the practical farmer would eventually derive more essential advantage. By the agency pointed out to them, not only colour and smell were removed from manuring matter, but that all-important volatile substance ammonia was fixed and arrested in its passage through the soil, and retained in such combination until required as pabulum for the growing plant. He could not agree with Mr. Wason in reference to shallow draining, when it was known that a depth of 30 inches gave off thick and turbid drainage water, while a percolation 4 feet deep had the effect of entirely removing the manuring

matter, and allowing the water to pass away clear and limpid. Mr. Hobbs then gave an interesting statement of the depth to which he had known roots, especially those of Wheat, would penetrate, for the purpose of deriving nourishment to the plant; and of the result of his own experience in applying chalk or lime to the clays of Essex, which were almost unprofitable until that application had been made. He conceived that irrigation had not its proper effect, unless the lands to which it was applied were underdrained; and alluded to Mr. Parkes's recommendation of sub-irrigation, or the carrying of water by sluices and drains to the roots of the plant, and allowing it to remain below the surface a sufficient time to enable "mother earth" to abstract the warmth and nourishment required for the plants. He hoped, now, that chemistry, by its immediate application to practical purposes, would become an important aid to agricultural improvement.—Mr. Wason, in justification of the opinion he had offered respecting shallow draining, would remark, that the better the soil the shorter the root, for it would not be required to proceed far in search of its food; and the worse the soil, the longer the root, which in this case would exhaust the plant of its energies by creating the means for its radical extension, for the purpose of acquiring nutriment from the barren soil.—Mr. Paine stated the result of his experience on the application of clay to sandy land, and the abiding effects of high manuring. For several years he had known 50 or 60 tons of gault clay per acre applied to sandy soils, of which the effect was evident 25 years after the application; and was not due, as we found from Professor Way's lecture that day, to the merely mechanical action of the soil, but to its chemical agency in arresting ammonia. Hops, it was well known, required rich manuring, and a piece of Hop-ground having been grubbed up, and the ground cultivated for farming purposes, the exact line of demarcation between the manured and unmanured portions of the farm was most striking. In fact, Mr. Paine observed, manure was never lost, for the soil was a magazine for its safe retention.—Prof. Way remarked that the power of clay to retain ammonia was astonishing. He had a piece of plastic pottery clay given him by Mr. Paine, dug up in its hard dry state, from a depth of 25 feet below the surface, in the very centre of which, when broken up, he detected a very sensible quantity, namely one-tenth per cent., of that volatile alkali, obtained by the clay from some animal source at a very remote period in the geological history of the world.—Mr. John Bethell enquired of Prof. Way whether, an arable field, from the principles deduced from his researches, and laid down in the lecture just delivered, might be regarded as a reservoir for manuring matter; he thought that clay fallows in summer might be frequently watered with ammonical liquids without injury to the subsequent crop.—Prof. Way considered that they might be so watered, provided sufficient time was allowed for the ammonia to become combined with decomposing salt contained in the clay, and thus have its caustic action prevented.—Mr. Bethell further inquired, whether Prof. Way would advise liming previously to the application of ammonia?—Prof. Way would, in all cases, recommend the use of lime first,

and then the application of manures; the lime and manures not to be mixed together, but to be applied separately. — Mr. Bethell remarked that, as arable fallows, after being ploughed up, were frequently left in a plastic state, it would perhaps become a question, whether scarifying them several times during the year would not render them better filters for the liquid manure applied to them; and if so, what Prof. Way would consider the proper depth for such filtration. — Prof. Way felt a difficulty in answering any inquiry that would lead him to give an opinion on the contested question of deep and shallow draining. — Mr. Bethell was aware that guano was applied to the growing crop in damp weather; but he thought it would be well to mix guano up with the soil. — Mr. Brandreth Gibbs thought much would depend upon the point, whether the application was made to the immediate crop, or otherwise. — Prof. Way considered that it might be applied in any weather, provided it were well mixed with the soil. — Colonel Challoner applied tank-water to his fallows. He had that morning directed that two carts should convey the contents of three tanks on his Turnip land; and that the liquid should be turned in with the soil. He had found manure-water applied to Grass land in dry weather burn up the Grass, while the same application after a shower always did much good. — Mr. Barclay stated his experience to the same effect; but having named the circumstance to Col. Le Couteur, that distinguished cultivator had informed him, that in Jersey he had carried liquid-manuring to a great extent; but he had made it a rule never to apply it in dry weather. — Mr. Fisher Hobbs

had been frequently told by the late Lord Western that he would not succeed with liquid manure; but he had nevertheless persevered, and had been successful whenever he had applied it to grass in wet weather, but not otherwise. He enquired of Prof. Way, whether, in the case of gravels and sands, where there was no clay conveniently at hand, charcoal or charred peat would not retain the ammonia, and might be employed as a substitute. He had largely, and with great effect, employed the fish-salt of pilchard curers, as a manure. He had found, that when guano was sown in the field, and this fish-salt sown over it, that the salt had the property of depriving the guano of nearly the whole of its smell; and as the salt in question contained 10 per cent. of oil, he thought it probable that this oil might have the power of fixing the volatile alkali. — Prof. Way replied, that charcoal or charred peat had certainly the power of absorbing a considerable quantity of ammonia, and would no doubt have a similar effect to that of clay in retaining that substance, although its mode of action would be quite different. He also thought it very possible that an empyreumatic oil, like that to which Mr. Fisher Hobbs had alluded, would have a strong tendency to remove the causticity of the ammonia, by forming a saponaceous compound with it.

Mr. Raymond Barker then left the chair, and the meeting broke up, with the understanding that the next Weekly Council (at which all members have the privilege of being present) would be held on the following Wednesday, the 27th March, at 12 o'clock.

BOCHARA CLOVER.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

SIR, — In reply to your correspondent, Mr. Gray, I must at once freely admit that I did not try Bochara Clover as an article of green food; and from the result of his one experiment so much the more do I regret this omission.

When I received the seed from Van Diemen's Land it was accompanied with the following remarks, made by my brother, who is a settler out there: "I enclose a few seeds of Bochara Clover, grown in this island last year. Will you credit me when I tell you that it grows to the height of eleven feet; that was cut for *green food*, and allowed to stand for a second crop, when it reached seven feet, and the seed I send was the produce of it."

Thus being under the impression that it had been there successfully tried as an article of green food, the idea that our cows, horses, and pigs might refuse it as such never once entered my mind; and the quantity grown here being so small I was naturally anxious to reserve the whole for seed. However, to clear up all doubt on this point, as in duty bound, I intend raising Bochara Clover this year upon a more extended scale, and will try it in every stage

of its growth, as green food, also as hay, for which purpose I will cut a portion so soon as it reaches eight or ten inches in height; and when I shall thus have fully satisfied myself as to the true properties of this prolific plant, the result shall be made known to you.

Mr. Grey does not mention whether the cattle to which he gave this clover were at that period receiving any other kind of green food, and whether they were then entirely kept in-doors. I may here remark that the thin dried stalks of Bochara clover, from which the seed was picked, were reserved, and last week offered to three stall-fed cows, all of which partook thereof without the slightest hesitation; indeed, they seemed anxious for more.

The stalks had a fine aromatic scent, equal to any clover hay. Thanking Mr. Grey for his candid statement, and with many apologies for troubling you with my remarks,

I remain, sir, yours very respectfully,
T. MOORE.

Hillcot, Sharples, Bolton-le-Moors,
March 23rd, 1850.

MANGOLD-WURZEL, OR FIELD-BEET, CONSIDERED AS A SUBSTITUTE FOR THE POTATO.

BY MR. ROBERT OLIPIANT PRINGLE, Land-Steward at Ward Castle, Strangford, Ireland.

(Premium, Ten Sovereigns.)

The great importance of green crop culture being universally acknowledged by Scotch farmers, it is unnecessary for me to present any arguments in its favour; but as its merits are so well known, and it forms the basis of the entire system of management as practised in Scotland, it will be admitted that the introduction of other plants of this class, besides potatoes and turnips, is a matter of some importance. This will more especially be the case if the plants recommended to notice are of equally easy culture, and are found to possess equal, if not superior qualities to either of them.

With the exception of some parts of Perthshire, and of Fife, where large quantities of potatoes were grown for the London market, potato cultivation did not form a prominent feature in the management of Scotch farms; and therefore the disease which has attacked this crop during the last three years, although universally prevalent, has not fallen so heavily upon farmers in Scotland, as it has done on those in other parts of the kingdom, where the sole dependence of all classes was upon this crop. Still it has fallen heavily enough to serve as a warning to us to depend less upon it, and to turn our attention even more than ever to the extended cultivation of that class of plants, which we know by the specific designation of "green crops." Turnips have hitherto formed the principal crop in this class; and, consequently, the terms "turnip husbandry" and "green cropping" have become synonymous. There are, however, other plants belonging to the class of green crops, which deserve to be much more extensively cultivated in Scotland than they have been, and not the least important of these is mangold-wurzel, or field-beet, of the cultivation and properties of which I now propose to treat.

Preparatory cultivation.—The preparatory cultivation for mangold-wurzel is exactly similar to that required for turnips—namely, deep ploughing at an early season, with a sufficient number of ploughings, harrowings, &c., in spring, in order to bring the land into as fine a tilth as possible; but these preparatory operations, combined with weeding, being so well understood, it is needless to enter into a full detail on every minute point.

Manure.—This must consist of the very best farm-yard dung, well fermented by having been

two or three times turned in the heap; and it is applied at the same rate as we do when sowing Swedish turnips. I find bones also to be a valuable auxiliary. A less quantity of bones will suffice for mangold than for turnips, and they may be dissolved in sulphuric acid with good effect; at the same time, as the effects of bone-dust are not confined to one crop, it will be advisable to apply half the usual quantity of bones, or say eight or nine bushels per statute acre, along with half the quantity of farm-yard manure. Guano is also an excellent auxiliary in mangold culture; but, perhaps, the most important is common salt. This fact I ascertained accidentally, having, on one occasion, applied a mixture of salt and lime to land in preparation for mangold-wurzel—not with the intention altogether of directly benefiting the crop, but chiefly with the hope of destroying a grub-worm which preyed on the mangold and turnip plants, and which was very abundant in that particular piece of ground. The quantity of salt used was fully three cwt. to the statute acre, and the weight of the crop was forty tons an acre. On a succeeding occasion, with land of fully superior quality, and with an equal allowance of farm-yard manure, but no salt, the crop did not exceed twenty-six tons an acre. The situation was inland, and the soil a good sharp loam, well adapted for green crops. I find that an analysis of the mangold plant explains the reason why an application of common salt to the soil should prove so serviceable to the crop. It is stated by Professor Way (*Jour. R.A.S.* vol. viii. p. 199), that the proportions of the different inorganic substances contained in one ton of the bulbs, and in the same weight of the tops of mangold-wurzel, are as follows:—

	Bulbs.	Tops.
Silica	0.54	0.76
Phosphoric acid	0.66	1.94
Sulphuric acid	0.65	2.20
Lime	0.41	3.31
Magnesia	0.43	3.27
Peroxide of iron	0.12	0.52
Potash	4.99	7.86
Soda	3.62	2.52
Common salt	5.29	12.82

In the same weight of the bulbs and tops of turnips, the proportion of salt was—bulbs 1.49, tops

6.15; and of carrots—bulbs 1.42, tops 11.25. A consideration of these analyses will at once explain the reason why common salt should be found a powerful auxiliary in the cultivation of mangold-wurzel. Of course, local situation will have some effect on the results of such an application, because we will not find salt acting so powerfully when the locality is exposed to the sea, as it will do in an inland or well-sheltered place.

Sowing.—The different varieties of mangold-wurzel are the long red, the orange globe, and the red globe. The former thrives best in deep soils; the latter, or globe varieties, on such as are of a lighter nature; but I prefer the orange globe to the other sorts, on every description of soil. In purchasing the seed, care must be taken that the seed of the common garden beet-root is not used by mistake, instead of the larger field varieties. Sugar-beet is also a different variety from the common mangold-wurzel.

The seed is contained in a large rough husk; and in order to cause speedy germination, it is necessary to steep it for at least forty-eight hours before being sown. If this is omitted, the seed will lie a considerable time before it starts, particularly if the land is dry, and then the young plants will come up very unequally. The proper season for sowing is from the 1st of May until about the 15th of the month. In late situations, it may be done even sooner than the first-mentioned period; but in early situations, if sown too soon, the plants are apt to run to seed in autumn. From five to six pounds of seed will be required to sow a statute acre. The drills are opened from 27 to 30 inches apart. Some cultivators grow mangold at less distances, but I have never found that the crop was so good as when drilled at the widths I have stated. Sugar-beet may be grown at narrower intervals between the drills; but, even with this variety, I consider that 27 inches is narrow enough to admit of proper after-culture with the horse-hoe.

When only a small breadth of mangold is grown, the seeds may be dibbled into holes 1 inch or 1½ inches deep, 12 inches asunder, and having three or four seeds placed in each hole. A dibble is sometimes used which places the holes at five or six inches apart, the dibbling pins being set in a piece of wood, in the same manner as the teeth of a rake are set in the head. An upright handle about 27 inches long, with a cross-hand piece at the top, enables the worker to press the teeth into the ground. These narrow distances, however, I do not consider to be of any real utility, because, if a blank does occur, the plants must still be thinned out; and two plants cannot be left only six inches asunder, merely because there happens to be a vacant space between the next plants. Dibbling is,

at the best, but slow work, and has no recommendation further than the employment of women and children who are perfectly competent to perform the labour. I prefer having the turnip machine adapted for sowing mangold seed by means of a silding ring which, on being shifted, will so regulate the size of the holes, that either mangold or turnip seed can be sown by the same machine. This answers quite well, and the plants come up as evenly as those of turnips usually do. Indeed, I consider it to be a much surer mode of sowing than dibbling, because by this means we can have the drilling, manuring, and sowing following each other in that close succession which every farmer knows to be essentially necessary in growing green crops. This we cannot have, if the seed is dibbled, unless very large numbers of people are employed.

Culture.—The culture is essentially the same as is commonly applied to Swedish turnips, consisting of a liberal use of horse and hand hoeing—the former, indeed, as frequently as possible until the leaves meet between the drills. Mangold-wurzel plants are well adapted for being transplanted either into blanks, or into any vacant corners. Such as are intended for this purpose ought to be pulled by the hand, and planted during moist weather, if possible, into large dibble holes, into which a small portion of guano has been previously put; and great care must be taken that the roots are put straight down, and not doubled up in any way. Mangold plants are sometimes very slow in “coming away” at first; but when once the drills are hoed, they generally push on very rapidly, and no fears need be entertained as to the ultimate safety of the crop, from the slow manner in which the young plants come forward at first. It is fortunate that mangold is not liable to be attacked by the fly in the earlier stages of its growth, as turnips are; and the only enemy we have to contend against is the rapid growth of annual weeds—which, however, can be kept down by hoeing, to a certain extent, even before the plants are ready for being “singled.” The practice of stripping off the under leaves in autumn, for the purpose of feeding cattle or pigs, has been recommended, and is certainly done by many; but, having found the weight of the bulbs very seriously lessened by so doing, I most decidedly condemn this mode of treating mangold, and advise that the leaves be left until the bulbs are finally raised.

Storing, &c.—In consequence of mangold-wurzel being more susceptible of injury from frost than swedes, it is absolutely necessary that the crop be raised and stored before hard frost sets in. In October and November, therefore, this must be attended to. The first thing to do is to have all the leaves wrenched off; for when the knife is em-

ployed, awkward or careless people will be sure to wound the bulb, and when this is the case it is very liable to become rotten. The bulbs are next tossed out, and stored in some convenient place; and if this has a northern aspect, it will be so much the better. The heaps are made from five to six feet wide at the bottom; the outside rows being regularly built, in the same manner as a peat-stack is erected, and having the roots in the centre of the heap thrown in loosely. The heap must taper gradually to the top, and will be about five feet high. No carth is put over it, but it must be thatched and roped. When stored in this way the roots will be perfectly safe; and if turned over and examined in spring, the young shoots picked off, and the heap rebuilt, examining the same at intervals, mangold will keep throughout the whole of summer. The leaves may be given to young cattle, or to milk-cows; or, when other food is very plentiful, they may be spread upon the ground and ploughed down. Both the leaves and bulbs of mangold-wurzel are apt to produce scouring in cattle, when given in too large quantities, or when used at first; but a little attention on the part of the cattleman, and a plentiful supply of sound straw or hay, will obviate this tendency. From the early period at which mangold-wurzel is raised, it will be found as good a preparatory crop for wheat as potatoes are generally considered to be.

Value of mangold-wurzel.—As food for milk-cows, fattening cattle and pigs, mangold is of considerable value. It does not impart an unpleasant flavour to milk, as turnips do when given to milk-cows, and, at the same time, the milk is of good quality. From the experience I have had of mangold as food for fattening cattle, I am led to believe that 25 tons of it will produce as much beef as 35 tons of swedes; and this opinion is corroborated by all with whom I have conversed, having practical experience of the subject. Now, 25 tons of mangold-wurzel per statute acre is not an extraordinary crop, and 35 tons of swedes is a very superior one; so that mangold

is not only superior to swedes, weight for weight, but a good crop of it contains a much greater amount of nutritive matter than we can expect to obtain from swedes grown on the same extent of land. When given to pigs, the bulbs ought to be boiled or steamed; and when a little bean meal is added, as good bacon can be produced as by any other kind of food. The juice which is drained off during the steaming process must be carefully preserved, and given along with the food, for it contains a considerable quantity of sugar, and is therefore very valuable.

It has been recommended by some to use mangold along with wheaten or barley flour in making bread. There is nothing to prevent this being done; at the same time I must say that I prefer bread composed of carrots or parsnips to that of which mangold-wurzel forms a part. It is as the food of our domestic animals that we must consider mangold as being an important crop; and, as such, it is superior even to the potato. I do not mean to deny that, weight for weight, potatoes will go farther than mangold; but a moderate crop of it will be found to contain as much or more nutritive matter than an extraordinary crop of potatoes. Taking 25 tons of mangold-wurzel per statute acre to be a fair crop, this will be found to go as far in fattening cattle as 13 or 14 tons of potatoes. Mangold-wurzel and potatoes are, however, essentially different crops; the former being best adapted for feeding live stock, whilst the latter is chiefly used as human food; and as such, the greater part of the crop, whenever grown to any extent, invariably finds its way, in its natural state, to a market. Unless in the vicinity of large towns, where cow-feeders might create a demand for mangold, it must be sent to market in the shape of beef, butter, or pork; and as larger quantities of these articles are produced by it than by either turnips or potatoes, it is evidently a crop of great importance, and deserves to be much more extensively cultivated than it is at present.—From the Journal of Agriculture.

BOTLEY AND SOUTH HANTS FARMERS' CLUB.

The monthly meeting of the season took place on Monday, 27th January last. The chair was occupied by the President, James Warner, Esq., of Steeple-court; and the vice-chair by Richard Wooldridge, Esq., of Wickham. The following newmembers were elected—Thomas Chamberlayne, Esq., T. W. Fleming, Esq.; Messrs. C. Harrison, of the Crescent, Southampton; Mr. Gray, Bishops' Waltham; and Mr. Falvey, Southampton.

A letter was read from Dr. Newington, of Knowle, near Tunbridge Wells, offering as two prizes his patent "cultivator" and "hand-wheel dibble," to parties who would use them on two separate acres, under specified circumstances.

The lecture of the evening—On "BOX-FEEDING, AS APPLIED TO FATTING AND REARING OF CATTLE."

Mr. J. BLUNDELL, of Bursledon, then rose and

said—Mr. Chairman, by the solicitation of several of our members I consented to open the subject named on the card for discussion this day. I should certainly not have presumed to attempt such an undertaking, knowing, as I do, that many of our members are far more capable of doing justice to this subject than myself, had I not felt a strong inducement, in my sincere desire to support this club in every possible way which my humble endeavours may contribute towards it—and had I not felt satisfied when I saw so many of our members present, whom I know are well acquainted with this subject, that they would be willing to keep up the discussion, and introduce to your notice the numerous omissions of which I shall be guilty. I think, sir, I need scarcely dwell upon the great importance of this subject, not only to individual farmers and agriculture in general, but to the whole community; and will just observe, in passing, that the efforts of individuals, when well directed by talent and energy in the subject before us, as in most other agricultural operations, will generally be attended with success to themselves, as well as to the advantage of our numerous and increasing population; for it has been said with truth, that he who makes two ears of corn to grow where only one grew before, deserves well of his country (Hear, hear). And I think it may also be said, that he who fattens two bullocks where only one was fattened before, and increases the value of his manure, is also a benefactor to his country. The method I have decided upon in treating this subject, supposing it should meet your approval, is to touch upon the different kinds of food for cattle as little as possible, believing that we shall find, in considering the subject of housing cattle for fattening and other purposes, a wide field for discussion, and sufficient to engage our attention this evening. And I think, too, you will agree with me, that the feeding of cattle ought in a great measure to be discussed separately, and that it will afford at some future time a useful subject for the consideration of the club. I think it would be well that our subject should be divided into two separate parts. Firstly, the most economical and approved mode of accommodation for fattening cattle, having due regard to the manufacture of both meat and manure. Secondly, the most economical and approved mode of accommodation for rearing cattle under different circumstances, having regard to their growth and condition, and the making of manure. Under the first head of the subject, my object will be chiefly to bring before you the different modes of accommodation for feeding cattle, now in use in this country, and then endeavour to make some comparisons, with a view of ascertaining what are the relative advantages of different systems. I shall

first allude to stall-feeding, which is perhaps more generally in use than any other mode, probably on account of the facilities afforded on most farms for the accommodation of the cattle, by its requiring but little expense to fit up an ordinary shed for the purpose, and in many instances, by erections having been in use for the purpose previous to the introduction of the mode of box-feeding; some of them being valuable and costly erections made for stalling, combining great convenience for feeding, plenty of room for the animals, and the floor of the stalls so constructed as to throw off the urine into tanks made for its reception; yet I think the objection to this system consists in the necessity for the removal of the manure daily, and the difficulty of keeping it so as to retain all its virtue, and also in the urine portion of the manure being in a liquid state, it is not so available for manuring purposes in general. And when we consider in how many instances the liquid manure is wasted by the absorption of the floor, and by draining away in different directions, the system becomes still more objectionable. As regards the method and convenience of feeding the animals, I can see no reason why the same kinds of food may not be used, and the same mode of feeding at different periods of the year be adopted, as in box-feeding. I must now speak of the method of stalling, in use by Mr. Huxtable, in Dorsetshire, and his mode of catching the liquid manure in tanks, and distributing over distant parts of the farm, by the use of pumps, hose, and water-carts—not because I believe it will answer a good purpose, but because I would have you avoid a system which has in it little besides novelty and great expenses to attract attention (the speaker then fully detailed the plan followed by Mr. Huxtable, with which the most of our readers have already been made familiar). He continued—I now beg to refer to the system of stall-feeding, as carried out by Sir Richard Simeon, at Swainston, in the Isle of Wight, which appears to me to offer some advantages which cannot be obtained by any other mode of stalling which I have seen in use. The difference which I wish to speak of consists in the mode by which the whole of the excretions are made available for manure without straw bedding (Hear, hear). The floors of the front part of the stalls are paved in the usual way, but the back part of them are composed of wooden grating, the bars of which are strong, and about an inch apart, under which is a tank or cistern (if I recollect rightly, speaking from memory) about three feet wide by three feet in depth, extending the whole length of the stalls; and this tank is kept supplied with ashes at different periods, sufficient to absorb and also deodorise the manure (Hear, hear). The hind part of the animals stand directly over this grating; the

excretions, as soon as voided, pass between the grating into the tank, which makes the lying and standing for them comparatively dry and comfortable: being assisted also by gypsum, strewed over the floor and grating as cleanliness requires, which also acts as a powerful agent in fixing the ammonia in the manure, and thereby rendering it more healthy. The manure obtained in this way may be removed and made into a state fit for drilling purposes, by mixing with dry ashes, &c. The advantages of this system appear to me applicable more particularly to many farms which I have seen in some of the midland counties of England, where the proportion of arable land is small compared with the pasture land, and in consequence but little straw can be spared for litter (he then described the mode of bedding in the vale of Aylesbury, and thus continued)—The next mode of feeding which I have to speak of, is commonly called shed-feeding, in which case the animals have a shed to lay and feed in, with an open yard in front, kept bedded with straw, &c., which may answer a very good purpose for store cattle to be kept in a progressive state, as is often required in some large farms, composed chiefly of pasture land, where the buying in cattle in the month of October is found preferable to the buying in the spring of the year, when the object is to summer graze them and sell in the autumn, as the cattle, after being in yard during the winter months, become more accustomed to the climate and locality, and may also be as far advanced by feeding as may be thought desirable; indeed, the same convenience for feeding, and the same articles as food, may be used in shed feeding as in any other system; yet it cannot be considered as a desirable mode of fattening cattle, because they cannot be kept sufficiently warm and sheltered, nor can the manure made be so valuable, because of its exposure to the weather; but whatever may be the intention when shed feeding is attempted, the animals ought to be divided as much as possible, they being much quieter and less apt to disturb each other. I must now allude to box-feeding, introduced and practised first by Mr. Warnes, of Trimmingham, in Norfolk, and to whom the credit of its discovery is justly due. Nevertheless, there have been great improvements, both in the arrangements of buildings, and also in the convenience for feeding, made by different parties since its first introduction; indeed, such is now the accommodation given to the cattle, and the great convenience for feeding, as I have recently observed in different parts of the country where I have seen the system well carried out, that but little remains to be done to make it everything which is desirable and perfect, in economising food, and the making of meat and manure. For a great deal of information on this subject,

which would be too lengthened for me to notice this evening, I beg to refer you to Mr. Warnes' work on box-feeding, which book is in the library of the club. For some very excellent remarks upon the subject, I will refer to Mr. Nicholl's essay on box-feeding at page 477, and page 484 of the second part of the 5th volume of the *Royal Agricultural Journal* (which he read to them). Since the period to which the article I have just read refers, great improvements have been made in the construction of the buildings necessary for carrying out the system: the best of its kind which I have noticed, was designed by Mr. J. C. Morton, of Whitfield, and erected by Mr. Fowler, at Dartmoor, an isometrical and ground plan of which you will find at page 489 of the second part of the 9th volume of the *Royal Agricultural Journal*, and which I submit to your notice. The internal arrangements are not alluded to, but the latest improvements which have been adopted I have recently seen at Testwood House, near Southampton, on the property of Mrs. Sturges Bourne, under the management of Captain Cator, who very kindly showed me over the buildings; and, as a pattern, I can recommend it as desirable to any person who may wish to commence box-feeding. The improved arrangements here, which I will describe (speaking from memory), consist in the substantial nature of the building, being constructed of brick, with iron roofing, the size of the boxes about ten feet square, divided by three strong movable wooden rails, and sunk two feet below the level of the floor; there are several double rows of boxes, the bottoms of them made impervious to water, with a tram way between, giving space for conveying food &c. to the boxes, and for the removal of the manure; circular cast iron troughs are placed so as to afford a supply of water to four boxes, it being fixed in a hole in the wall extending into each of them; all the troughs are connected by an iron pipe, each receiving its supply of water from the same source; the feeding trough is also made of cast iron, capable of holding a bushel of food, and so placed as to rise with the accumulation of the manure; the straw for bedding the boxes is cut into four or six inches in length by steam machinery on the premises, which is highly desirable, as it is more absorbent than long straw, and more easily removed from the boxes, the common mode of removal when long straw is used being to cut the manure into squares of eight or nine inches with an old hay knife.—(Mr. Blundell then described at length the mode of box-feeding dairy cows in Bucks, and spoke, in passing, of Mr. Wilkins's objections to box-feeding. He then said:—) I will now make a few general remarks upon the subject before us. Cart horses are kept in boxes at Testwood, probably with as much advantages as the

cattle; I shall, however, leave this matter in the hands of Mr. Spooner, whom I have no doubt will give us his opinion on the subject with regard to the manner of preserving the manure after being removed from the cattle boxes. I consider it a matter of much more importance than the management of ordinary farm yard manure, because of its being so highly charged with ammonia that it cannot be exposed to the weather without great loss; it should therefore be laid out on the land, and ploughed in immediately, or else removed to a manure-house or covered building of some sort. I am not enabled to offer you any correct calculations as to the probable cost of erecting boxes, as I have seen nothing satisfactory upon that subject, beyond the cost alluded to in Mr. Warnes's place, which, I think, you would find not likely to answer anything beyond a temporary purpose. Nevertheless, I make no doubt we shall have working plans and estimates of such erections, in the prize and other essays upon the construction of farm buildings which will appear in the forthcoming *Journal of the Royal Agricultural Society*. I now come to the second part of our subject, viz.—the accommodation required for the rearing of cattle most advantageously. Upon all farms composed chiefly of arable land, I think the box system will be found desirable for feeding young cattle in, after they are about nine months old, more especially where early maturity is the object to be attained, and the intention is to sell them fat from two to three years old. I should recommend that calves, after being weaned, as soon as they will take food in addition to the usual allowance of milk, should be removed from the calf pens, and put into an open yard with shed facing southward, which should be partitioned in spaces ten feet in width; the calves should be divided into pairs, and allowed to remain there until about nine months old, and then be removed to the boxes, each animal having a box to itself, where the fattening can be carried on as long as may be required to make them fit for the butcher. On the other hand, upon farms containing a large proportion of pasture land of good quality, the calves after being taken from the weaning pens, may be allowed to graze at large on the pastures until the month of October, when the nights begin to get cold and the grass to lose its quality; they should then be removed into an open yard with shed, as before mentioned, and forwarded as may be desirable by good feeding, there to remain during the winter months, and until the month of May, where they may be turned into the pastures, and again into the yard alternately with the season, until fit for the shambles. Also, in rearing young cattle for stores, the same mode of management will be found equally desirable, the only difference required being in the

kind of food. I think rearing young cattle intended for dairy purposes forms one of the most important parts of the subject, as it applies more to the requirements of the farms in this particular neighbourhood, they being composed for the most part of arable land, and the pastures being, generally speaking, rather inferior. I beg to observe, if we wish to have good dairy cows, and well adapted to our soil and climate, we must breed them and rear them ourselves; for it rarely happens that we can purchase good dairy cows—at all events they will cost a long price, where anything like a guarantee can be obtained of their being sound, well-bred, and good milkers. The following plan, which I am about to submit for your consideration, although somewhat opposed to the general practice of the neighbourhood, is one which I have found to answer well in my own case, and which I can offer to your notice with every confidence in its success. I should recommend a yard to be provided with a shed twelve feet in depth, the open yard twenty feet in depth, and divided into spaces twelve feet in width, enclosed with three moveable rails for the accommodation of each pair of heifers, with rack and manger attached, for feeding with roots, straw, or green food, and also a trough for water: it is also desirable that the shed should be of a good height, say nine or ten feet to the laves, to allow of the accumulation of manure. The position or frontage of the shed should be facing the north west or west; for, although the general opinion runs in favour of a south aspect, I think you will find the plan I am about to state desirable, because the shade obtained by the N.W. frontage during the summer months forms a comfortable retreat from the heat of the sun, and from the annoyance of flies, &c., and in the winter it is calculated to make the animals more hardy and better able to contend with the changes of weather afterwards, as dairy cows. The produce of our arable land being better calculated to rear an animal of good size and constitution, than that of our pastures, has induced me for some years past to depart from the general practice of grazing heifers on the pasture land. I have in consequence adopted the following plan:—After the calves are weaned and begin to eat hay or green food, they are removed from the calf pens and placed in a yard with shed, in pairs, as before described, and there are allowed to remain until about two years of age, or within a few weeks of dropping their first calf, when they are separated and placed in a box or pen singly. During the whole period, they are fed, winter and summer, upon such food as may be in season, commencing with trifolium in the months of May and June; clover and tares during June, July, August and September, and from September to May in the following year with, first,

early turnips, then swedes, carrots or mangold wurtzel, in conjunction with barley, or oat straw, or pasture hay, with a constant supply of fresh water. The mode of bedding for the sake of manure, is by placing at the bottom of the yard good loamy earth or peat six inches in depth, to be littered with fresh straw or other bedding as cleanliness dictates, and allow the manure to accumulate as long as may be convenient, the manure being all the better for deep accumulation, the constant treading of the animals kneading it down so closely as to prevent any fermentation sufficient to injure either the animals or the manure. The advantages I have derived from this method are the rearing animals of a superior description and value, as compared with the usual way of grazing them on the pasture land, and their general good health, without the risk or loss from accidental causes. I have known very promising heifers lost by accident, and also by disease, induced by exposure to bad weather, and irregular management whilst grazing on meadow land, more especially from attacks of a disease commonly termed "Quarter ill," or "Kill-calf;" but since the period when I first commenced shed feeding about four years ago, I have never lost an animal from any cause. I must also call your attention to the difference in the value of the manure made in this way, during the summer months in particular, as compared with its almost total loss whilst the animals are grazing the pastures promiscuously; and I reckon that the combined advantages above alluded to are sufficient to pay for the extra expenses attendant upon the system, and to leave a good money return as profit—(cheers).

Mr. CREED, who was an experimentalist in the way of box-feeding, cordially concurred in the well arranged practical observations offered by Mr. Blundell.

Mr. W. C. SPOONER spoke at some length, and in allusion to the pamphlet on the "Present Prices," lately published, said that the principle on which Mr. Huxtable built up the theories contained in his pamphlet were subject to great objection. He started with a principle which reposed on the narrow basis of a single experiment made by Mr. Lawes, and laid it down as an axiom that land worth 20s. per acre would, year after year, produce from sixteen to seventeen bushels of wheat per acre, if kept clean, without any manure. Now he (Mr. Spooner) knew of a farm that had for some years paid that rent, and the produce of wheat had not averaged more than that amount though grown once in four years, and manured and kept clean. Sixteen bushels per acre was about the average of France, the crop, of course, receiving its share of manure. He therefore objected to principle A, passed over to B, and there found it stated that

wheat in its growth got rid of 3lbs. of ammonia out of every 5lbs. furnished in manure. They may imagine that the matter would be better explained by saying that some portion of the ammonia was washed out by the rains, and that some remained in the soil, which was not taken up by the plant. It had been proved, in many instances, that the effects of Peruvian guano were seen in the second year. Under the head D, it was said that 1 lb. of nitrogen in the food produced from 3lbs. to 7lbs. live weight, containing 3lbs. per cent. of nitrogen; consequently, when the increase of live weight was known, and the amount of nitrogen in the food, they could estimate the ammonia in the manure, or, in other words, all the nitrogen in the food not taken up by the animal remained in the manure. On this all Mr. Huxtable's calculations were based; and therefore it was of the utmost consequence to ascertain if this principle were correct. Now (said Mr. Spooner) Liebig, the best authority on organic chemistry, gave them two important experiments, one of the horse and the other of a cow in milk, two animals that may be supposed not to increase in weight for the space of twenty-four hours. During that period the whole of the food and the excretion were carefully analyzed, and the result was that in the horse one-sixth of the nitrogen taken with the food was absent from the excretions, and in the cow the loss was one-seventh, the milk being considered as an excretion. Now he would ask, what became of the nitrogen? Why it disappeared by the lungs and the skin, and perhaps somewhere else in a gaseous form; and they would find that Liebig stated that nitrogen was expired by both skin and lungs, a fact which Mr. Huxtable seemed to have entirely overlooked. In Mr. Huxtable's pig calculation, at page 16, it would be necessary for that gentleman to alter his figures, and deduct no less than 272 lbs. from the 1270 lbs. of nitrogen supposed to remain in the manure. He thought Mr. Huxtable led himself astray in his estimation of the value of ammonia, where he said it had been estimated that guano and sulphate of ammonia were worth 6d. per lb. He (Mr. Spooner) would grant this. Mr. Huxtable, however, takes this as its value wherever it may be formed, which was a great error. As well may they value iron at £500 a ton because that was its value when made into watch-springs. Mrs. Glasse says, "First catch your hare before you dress it;" so said he—first catch your ammonia, separate it from any other substances, imprison it, and then, and not till then, they might value it at sixpence per lb. In dung it was not worth more than threepence; in straw perhaps not half this sum. Why was it so valuable in guano? because of its portability, its convenience, its form, and its effects. They applied 34lbs. of ammonia to

land, in conjunction with proper inorganic manure, and they raised produce containing 171 lbs., or nine times that contained in the manure, this amount being contained in twenty tons of swedes and six tons of tops. From whence was this increase derived but from the atmosphere? Every thunder shower brought nitrogen to the land, and the plants rendered vigorous by the manure early devoured it. Mr. S., after some further observations, concluded by saying that granting for argument that all Mr. Huxtable's calculations were correct, and farmers, to meet their difficulties, fattened double the stock, how long would beef continue at 5d. per lb.?—how soon would it be down to 3d!

Mr. APPELBY cited instances of palpable failures in the attempt to grow wheat in successive seasons.

Mr. BLUNDELL briefly replied, and after a desultory conversation the following resolutions were agreed to:—

“That this meeting considers box-feeding, when carried out under the improved arrangements, the

most desirable mode of accommodation for fattening cattle, more especially on arable farms, where a large quantity of straw is produced; and that the mode of stall-feeding, by keeping cattle on boards, with grating for the manure to drop through, is most suitable for pasture districts, where little or no straw can be obtained.

“That this meeting considers box-feeding can only be applied partially as a mode of accommodation for rearing cattle; whereas yard and shed-feeding will be found desirable upon arable farms in general both winter and summer; but upon farms consisting of a large proportion of good pasture land it will be desirable during the winter months only.

“That one objection to the adoption of box-feeding is the inability of tenant-farmers to erect suitable buildings for the purpose; it is, therefore, the opinion of this meeting that it is desirable that the subject should be impressed upon the attention of landowners.”

The thanks of the meeting were given to the lecturer of the evening, and to the chairman.

—Hampshire Advertiser.

LABOUR AND THE POOR.—THE RURAL DISTRICTS.

DEVON, SOMERSET, CORNWALL, AND DORSET.

WAGES AND DIET OF THE LABOURER IN DEVON AND SOMERSET.

(From the *Morning Chronicle*.)

LETTER VII.

As regards wages, my inquiries have been extensive and minute. The reader will remember that the accident of my being in Thame when the annual fair was being held there, gave me a good opportunity of comparing the different rates of wages prevailing in the counties of Oxford and Buckingham. I was equally fortunate in South Devon, stumbling by good luck upon a ploughing match which was taking place in the neighbourhood of Exmouth. It was a grand gala day for the whole of the neighbourhood, the match being annually got up under the auspices of an agricultural association embracing some half-dozen parishes in the line between Exmouth and Exeter. A great concourse was collected to witness the exhibition. Farmers were present in scores from all the parishes interested. Men, women, and children, from Exmouth and the adjoining villages, were on the ground in hundreds. The scene was even graced by a number of ladies; whilst in the medley assembled might also be seen sailors from the port, and apparently more than one boys' boarding-school, in their best assortment of broad-cloth and linnen. The field which was the scene of the match

was by no means a felicitous selection. The usual object on such occasions is to get a field as uniform as possible in its surface. This one was far from being so; it stretched along the high road, descending gently towards the south. At its upper and lower ends, the surface, stretching back from the road, which was the direction of the furrow, was even and well adapted for the purpose; but the middle of the field, which was an unusually large one for the district, was very uneven, putting those who were to plough it at a great disadvantage. I remarked to one of the competitors that I was surprised at the selection, observing that great skill on bad ground might be outdone by little skill having to deal with a more favourable surface. His place was about the middle of the field. He shrugged his shoulders, and in reply observed, “Kissing goes by favour, and so will the prize.” Out of some twenty-five furrows, I counted but about five without any pretensions to being straight—and this, too, although each competitor had a boy to lead his horses. Some of the most crooked furrows were, however, the best thrown up. After the prize was awarded, the farmers, to the number of about 200, sat down to a hot dinner at two shil-

lings a head (cider included, I believe), in the Globe Inn, Exmouth. I bought a ticket and secured a place. The dinner was soon over, and the cloth being removed, toasts and songs became the order of the day. I heard much conversation, but little or nothing on the subject of wages. The prevailing topic was the price of corn, and the certain ruin which was impending over them all from free trade.

Finding myself very unlikely to obtain much satisfactory information on the subject of wages from the company around me, I descended to the street, and got amongst the "plough boys" and farm labourers of all descriptions and ages, who were congregated in very uproarious assemblage around the hotel. As they were from the different parishes interested in the match, I was thus afforded a good opportunity of learning the amount of wages, not in a limited locality, but over a pretty extensive district.

I first got into conversation with some boys, dressed in every variety of costume, from the smock-frock to a short jacket, and who seemed to be standing guard over some prize mangold wurzel which were being exhibited in their uncouth proportions to the gaze of the wondering lieges of Exmouth. Every now and then two or three farmers would thrust out their heads from the windows above, and look at them with admiration. Having listened for some time to their observations respecting the great event of the day, I interrogated some of the boys in reference to their work, and the remuneration which they received for it. The first to whom I addressed myself was an urchin of twelve in a smock-frock, who told me he did all kinds of work for 2s. 6d. a week. He had commenced work at eight years of age, receiving at first nothing but his "vittles," then 4d., then 6d., and then 1s. in addition thereto. For the last year, he had got "handy," and was in receipt of 2s. 6d. a-week, but he no longer received his "vittles" as a perquisite. He was now boarded with his parents, his weekly 2s. 6d. going into the common fund for the family maintenance. A boy beside him, resident in the same parish, and two years his senior, was receiving only 1s. 6d. a-week; and he also was living at home, his mother being a widow with several children, for whose support she was compelled to work herself in the fields. A third was only receiving 1s. 3d. a-week, for which he did duty by driving the horses which dragged the plough. There were several with 6d. a-week and their food, but no lodging; and a few with board and lodging, but no wages. The disparity existing in the terms on which they are severally employed was not a disparity between parish and parish, but one which seemed to depend more upon the caprice of the employer than either on the locality, the ability of

the boy, or the quality and quantity of the work performed. One farmer gives 2s. 6d. a-week to the youthful labourer who does his work no better than another who is receiving but 2s. a-week on the adjoining farm. To some extent the wages of even adult labourers depend, as to amount, on the character of their employer; this, however, being the case far more as regards female than male labourers. In different parts of the counties which I have visited I have known women get 8d. a-day on some farms for doing work, for which 7d. only was paid on the adjoining property. As regards the male labourers, however, their wages are more uniform within the bounds of their respective parishes. The disparity in the amount of their wages is more between parish and parish, or between district and district. In conversing with them I found that some had but 7s., whilst others had 8s. a-week. I could discover no difference whatever in their work to account for this inequality in their wages. Of two to whom I addressed myself, one had 8s., the other only 7s., although the farms on which they worked were separated only by a brook—but that brook divided two parishes from each other. This capricious inequality characterizes the wages of the labourer throughout almost the whole of the southern districts, from Essex to Cornwall, having existed as between contiguous localities almost from time immemorial, without any very apparent cause either for its establishment or its continuance. But a little reflection will show that, however accidental or arbitrary it may have been in its original institution, there are causes now at work which have a manifest tendency to perpetuate it. Wherever it exists, as between similar districts, it is generally, if not invariably, accompanied by a marked disparity as regards the amount of population. Where wages are low, it is usually found that population is comparatively abundant, and *vice versa*. I am now, of course, comparing, in this respect, parishes or districts similar to each other, or nearly so, in other respects; for a population which would be scanty in a rich parish or district might be superabundant in a poor one. The density or paucity of population has much to do with the difference in question, for the obvious reason, that the value of labour depends very much upon the amount of the supply of labour at command. There is frequently a greater difference in the amount of population than one would be ready to believe, between two adjoining districts similarly circumstanced in all other respects. The system of depletion, by the demolition of cottages and other devices which have been resorted to, particularly in close parishes, has mainly contributed to produce this result; and the difference being once established, the law of settlement prevents its removal. The extent to which this affects wages may

be appreciated from the fact that it frequently creates a difference of fully 50 per cent. between the rates of wages paid in one and the same county. Here a man is in receipt of 6s. a week for his toil, whilst there he receives 9s.

But although the number of the population—in other words, the amount of labour at command—exercises a very general influence on the rate of wages, there are other causes which occasionally supervene, not simply to modify, but, in some cases, even to counteract its influence. These, when at work, aggravate the evil of a dense, and neutralize the advantage of a thin, population. This is chiefly the case in districts where the land is let, not to a few wealthy and capable tenants, but to a great number of small farmers, who have little or no capital wherewith to work the land properly, and who would not know how to do so, could they press the Bank of England into their service. Where such tenants abound, wages are sure to be low and the labourers very ill off, without reference to the question of population. I have been in several parishes in the south of Devonshire which were very scantily peopled, but in which the labourers seemed reduced to the very depths of wretchedness. I almost invariably found that in these many were farmers who were “not fit to be labourers.” I have seen specimens of these farmers holding only 30, 40, or 50 acres of land, in reference to whom the expression just quoted was certainly not misapplied. As a class, the least unfavourable feature about them is their want of capital. Their want of enterprise is proverbial, and in ignorance they cannot be surpassed. In common intelligence they are frequently behind some of the labourers whom they precariously employ; whilst, as regards their physical circumstances, as already shown, they are but slightly in advance of them. Their existence is a grievous injury to two classes of men—to the labourers, to whom they pay but the scantiest of wages, and to the better-conditioned farmers, whom they compel, by their competition, to pay higher rents for their land. Many landlords cherish them on this account, whilst the more respectable farmers are speculating upon the best means of getting rid of them. At a meeting of farmers in Wiltshire, which I attended, a legislative remedy was discussed, to which I shall in due time advert.

Whatever else, therefore, may affect wages, they are very much influenced by the laws which tend to perpetuate the existing inequalities of population, and by the extent of the holdings in the hands of the employers.

On inquiring more particularly into the rates of wages in the different localities which I visited, I found them in all cases low, and with as great a

diversity in point of amount as had been represented to me by the ploughboys at Exmouth. Throughout the Kingsbridge union, which comprises a large portion of the extreme south of Devon, I found 9s. a week to be the average rate. There is more grazing in this neighbourhood than in some of the eastern parts of the county, where wages are much lower, whilst the holdings are, in the main, much larger. Throughout the union, too, the population, as compared with what it is at some points near the borders of Dorset, is thin. The consequence is, that the demand and supply are more equally adjusted, which tends to keep the wages up. The farmers likewise are, more or less, men of capital, keeping about the same number of persons in constant employment, and thus preventing the fluctuation which would occur in the rate of remuneration if whole droves of workmen were to be occasionally thrown out of work to compete with each other, as is too often the case in the over populous districts, and in parts where the farmers are destitute of capital. In Kingsbridge union the wages are not only high, as compared with wages elsewhere in Devon—or indeed with the average of wages throughout the county—but they are, or have been, remarkably steady. There has been some talk, however, of reducing them, and 8s. a week is spoken of as the amount at which they are likely to stand before the winter is far advanced.

I have already adverted to the fluctuation which characterizes the wages paid in the line from Exmouth to Exeter. The two rates generally paid are 8s. and 7s. a week. The great bulk of the property in this neighbourhood is part of what is known as the Rolle property, left by the late lord to the second son of the present Lord Clinton. In the other directions around Exeter I found 7s. a week more prevalent than 8s. Whilst driving from Exeter to Honiton, I inquired of two of my fellow-travellers, who were from different parts of the interior of the country, what the rate of wages might be in their respective localities. Both put them down at “about 7s. a week.” I asked if it was possible for men to live on such a pittance. “Not if they have large families,” observed one. “At least, one thing is clear, they can't live honestly on it,” said the other. I afterwards took the opportunity of asking the driver of the coach, who drove daily between Exeter and Dorchester, and the amount which he named was also 7s. a week. Arrived at Honiton, I inquired for myself, and found scarcely any case in which 8s. were being given. In the parish of Southleigh, already alluded to, and in the conterminous parishes, this was the maximum rate. One woman, whom I questioned, told me that her husband and son had both 7s. a week, but that the work was not steady, so that they could

not be said to earn 14s. a week between them for many weeks together. The son was quite a young man, and on my asking her if there was no difference made in the wages paid to married and single men, she informed me that an attempt had been made to get her son to work for less, but that, as he could do a man's work, he had constantly refused to work for less than a man's wages. It was in the neighbourhood of Axminster, and in the north of Devon, near the extinct lead mines, that I found the lowest scale of wages paid. In many cases, in these localities, the labourer was receiving but 6s. a week, and it was apprehended that there would be a very general reduction to that standard. About Axminster two causes co-operated to make the population dense—a good agricultural country, and a manufacturing interest which was at one time lively and flourishing. That interest has since fallen into decay, and hundreds of hands have been thrown upon the surrounding parishes, to compete for work with those who were already feeling the disadvantage of over competition. In the north of Devon, the population was enlarged by the mining operations, which have recently been brought to a close, and the termination of which has flooded the contiguous rural districts with an amount of labour for which there is no adequate demand. Many of those thrown out of work by the closing of the lead mines have wandered up the vale of the Torridge, where their presence has somewhat affected wages. With the exception of the extreme north, where farms are small, and farmers but a degree removed from the condition of labourers, wages along the Cornwall boundary of Devonshire are almost as high as in the Kingsbridge union. Taking the whole county, it appears to me that whilst 7s. 6d. might be too low, 8s. would be too high an average at which to put wages. There is but little difference in this respect between Devon and Somerset. As in the one, so in the other county, the wages differ in different localities, but the average will be about the same. I am here speaking of the average wages now paid—not what might be the average on the whole year, including the higher rates during harvest. Nor are these higher rates likely very materially to affect the general average, seeing that if more is paid at that time, multitudes are out of employment altogether during other parts of the year, or work not from week to week, but from day to day, as work is furnished them—which reduces their actual weekly receipts far below the rate per week at which they are precariously employed only from day to day.

So far, I have not spoken of the wages of women. They are more generally employed in Somerset than they are in Devon. Indeed, there are parts of the latter county in which it is rarely that they are seen

at work in the fields. This is the case in the line of country extending from about Sidmouth to the neighbourhood of Totnes. I not only remarked this myself, but it was mentioned to me by others, who could not account for it in any way. In the interior of Devon, and along the Torridge, they are as frequently seen at work as in Somerset. In that county, however, there is far more work for them of a kind for which women are more adapted than men—dairy farming being carried on to a much greater extent in Somerset than in Devon. I am now speaking, however, of labour in the fields. This comprises a variety of occupations, in connection with which cheap female comes in competition with dearer male labour. Woman hoe turnips at a much less rate than men. A man, however, will do much more in the course of a day, at this kind of work, than a woman will do. It is also too laborious an occupation for women very generally to engage in. They also plant and dig potatoes at the proper seasons; they weed the fields, particularly when fresh land is being cleaned preparatory to a crop; they pick stones from the land, and winnow the corn; they plant beans, and fill, and sometimes drive, the manure carts. These are but specimens of their work, for which they receive, on the average, from 7d. to 8d. a-day. I have known cases in which less was given, but about 7½d. may be taken as a fair average of the present rates. During harvest time they sometimes earn as much as 6s. a week.

Nor have I as yet made any account of the wages paid to the class of men designated farm servants. These are, in ninety-nine cases out of a hundred, single men resident on the farm, where they are boarded and lodged. In addition to this they receive from £8 to £10 a year as wages—sometimes higher; but £10 would be a high average of the receipts of this class of labourers. In general their fare is very good—far better, at any rate, than that of the ordinary agricultural labourer. They have generally potatoes or bread, and sometimes both, with warm milk, for breakfast: in some cases a rasher of bacon is added. For dinner they have meat and potatoes; and for supper such cold meat as may have been left at dinner, with potatoes again. Sometimes they have a meat pie for dinner, the cold remains of which will constitute their supper. When they have no cold meat left, they will sup on warm milk and potatoes, or bread. This is, to say the least of it, a substantial bill of fare for the day, and accords with our notions of what a man should eat who has to labour from morning till night and from day to day. They are not in all cases so bountifully provided—much, in this respect, as is the case with wages, depending upon the character or ability, or both, of the

employer. But those worst off amongst them are much more favourably situated than the great bulk of those who are best off amongst the agricultural labourers in the ordinary acceptation of the term.

Although I have delayed, I had not forgotten to notice a feature with respect to wages peculiar to such of the western and southern counties as are known as the "cider counties." In these counties the labourers generally receive, in addition to their money wages, so much cider per day. This is not confined to men—the women and children employed in the fields also coming in for their cider. In some cases this is compounded for, and a higher rate of wages paid; but in the great majority of cases the money-rate of wages when stated is exclusive of the dole of cider. Sometimes, however, the farmers will include it, and thus mislead the inquirer. Thus at Exmouth I was informed by a labourer, who pointed out his employer to me, that his wages were 7s. 6d. a week. A few minutes afterwards I was in conversation with his master, and on inquiring into the rate of wages in his neighbourhood, was told by him that he himself paid 9s. The discrepancy between the two statements staggered me a little, and I mentioned it to him. "Well, to be sure," said he, "I do pay but 7s. 6d. in money; but then he has his three pints of cider a day, which I reckon at 1s. 6d. more." But the farmer always reckons the cider at more than the men do. A disinterested appraiser would, taking into account the rough quality of the cider generally given to the labourer, value the eighteen pints a week which he receives at about 1s. By such statements, those unacquainted with the mode in which things are managed are often led astray. Thus, when a farmer pays so much and cider, he will put the cider into the money account, and leave you to infer, if you like, that the cider is to be put in addition to the whole. Again, when he has compounded with his workman, and pays him a higher rate in consideration of his giving up the cider, he simply mentions the wages, leaving you to find out that they are not accompanied with the usual allowance of the beverage of the county. I have often, for instance, been told by a farmer, that he paid 9s. a week. "With cider?" I would ask him. "No," he might say, "that includes the cider," reckoning it at so and so. Or if it were a case in which the cider had been compounded for, he would wait until you asked before he would inform you that it was not given in addition.

But in estimating the condition of the labourer, and that of his family, nothing can be more fallacious than to include this dole of cider as part and parcel of his wages. It has no effect whatever upon the comforts of his family, and cannot therefore be

taken into account in considering the extent of their means. In the case of a man working for himself alone, who might find his wages sufficient to enable him to indulge a little during the week, were he inclined to drink cider to some extent, that which is handed to him in the field might be taken into account as so much money, since it might save him so much, provided he were contented with what he got in the field. But even in his case, if he were not disposed to drink, but anxious to save his money, it would be anything but a gain to him. The value of the beverage in money would, in more ways than one, be far better for him, for it would not only enable him to save more, or to procure more substantial aliment, but it might also avert a danger to which he is otherwise exposed—that of encouraging a taste for more cider than he gets, and ultimately for something stronger than cider. In the case of the married man the system is far more objectionable. He does not work for himself alone, having others, and sometimes many others, dependent upon him. He has, therefore, no money to spare out of his scanty wages to indulge a taste for drinking cider, or any other liquor. He has none to spare for such a purpose even when his claim for cider is compounded for by a money payment. And it is hard to compel him to take as part of his wages that which he could not afford to purchase were his earnings paid him in full in money. If he is entitled to 9s., why force him to take 1s. 6d. worth of it in cider, when he could not afford to buy 1s. 6d. worth of cider if the 9s. were all paid him in money? The word "forced" is here not unadvisedly applied, for the great majority of the labourers, particularly the married men, would prefer the cider's worth to the cider itself. The cider's worth would go to enhance the comforts of the family—the cider itself does not and cannot. It is, in almost all cases, drunk on the field—in other words, the labourer spends daily about 16 per cent. of his earnings in drink. Whenever it is compounded for, it is for the labourer's benefit that the arrangement is made; and what benefits him in one instance would be advantageous to him in all. The difficulty in the way is chiefly with the farmers, who have an interest in keeping up the mixed system of wages. To some extent it is the truck system, and nothing else. It is equivalent to saying to the labourer, "I will employ you at so much a week, but then I expect you to remember that I keep a cider shop, and that you must buy so much cider from me, at such and such a price, every week"—the price being one which secures to the cider producer a profit at the expense of the cider consumer. It is all nonsense to say that the labourer could not work without his cider. Labourers elsewhere work without it; and why not in Devon or Somerset?

Miners are allowed to take nothing with them but water into the mine, although they are dripping wet from morning till night, and their work is as hard, to say the least of it, as that of any labourer on the earth's surface. Besides, if he could not do without it, what would prevent him from buying it? Let him have the value of the cider in money, and let him convert it into cider if he pleases; but give him the chance, at least, of applying it to a better purpose—the enhancement of the comforts of his family. We never think, if we hear of a man engaged in any other kind of work spending regularly a certain proportion of his wages in drink, of including the proportion so spent in the sum available weekly for meeting the necessities of his household; and why should we do so in the case of the farm-labourer in these counties? Let it not be said, then, that the labourer with 7s. 6d. a week and cider is in the position of the labourer with 9s. a week without cider. His means of supporting himself and family are to be measured by his money-wages, and by them alone. Taking the two counties in question, I have already stated my opinion that 8s. a week would be too high an average at which to put the money-wages paid throughout.

The cider given to the women is frequently drunk by themselves, it being sometimes given to their husbands. That given to the boys is almost invariably drunk by them. They get less than a man, but in the same proportion to their strength and wages. It is perhaps in respect to them that the system develops itself in its most pernicious aspect. "I wouldn't work without my cider," said a saucy little imp of about eleven years of age, one of those who surrounded me in Exmouth. By the time they reach maturity they are accomplished drinkers, and this from a necessity of their position. To make them accomplished smokers instead would be equally justifiable. There is no more sense or justice in compelling them to drink cider as part of their wages, than there would be in forcing them to smoke or chew tobacco. If the farmers of the west produced tobacco instead of cider, every labourer would be seen with a cigar in his mouth.

How are the many families dependent upon agricultural labour for their support to subsist during the approaching winter on wages averaging less than 8s. a week? Ask the question of anybody—even of those most likely from their position to be acquainted with the means and contrivances of such families—and they will shrug their shoulders, and tell you that it passes their comprehension.

I have already gone somewhat minutely into the diet and other circumstances of a family living on 8s. a week in Wiltshire. This supersedes the necessity of entering into such an inquiry here. To show,

however, how similar in its miseries the labourer's lot is in the southern and western districts, I shall once more transfer the reader to the village of Southleigh, and enter with him into one of the cottages. It is neither more nor less than that which I first examined—the abode of my old friend with the pitchfork. She is lighting a few broken faggots at the back of the fire-place, as if preparing for some culinary operation. It will be remembered that her family consists of five—her husband and son and two daughters. The husband earns 7s. a week, *when at work*, and so does the son; the eldest daughter adds something to the family earnings, by means of her lace cushions. But neither of them have constant employment, so that their united earnings will not much exceed the wages of one man continuously employed.

"What are you about?" I asked her.

"Going to get dinner ready," she replies.

"What is it to be?" I continue.

"Some broths" says she.

"Broths! what do you mean by broths?"

"O," says she, "wait and you'll see."

She thereupon hangs a pot over the fire, half full of water. We wait patiently till it boils. By-and-bye it begins to simmer, and she drops a little salt into it; then follows a little fat, which she got that morning at the vicar's; and last of all comes a quantity of bread cut up in small cubes, each large enough for a good mouthful. This simple compound is permitted to boil for a minute or two, when it is taken off the fire, and poured into a large dish; and lo! in a trice the family dinner is prepared. It consists of nothing but the "broths." We taste it. It is bread and hot water, little more, for the fat has scarcely flavoured it. They had the same mess in the morning for breakfast, but *without the fat*. It will be repeated at supper time.

"Do you never eat butcher's meat?" I inquire.

"Lord bless you, sir," she replies, "we wouldn't know ourselves if we did. We never have a taste of it, but when we get a bit from the lady (the vicar's lady). Sometimes I get a bone, which I boil, or a bit of mate from her, which I take home in my hand or in my pocket. At other times I get a bit of grease; and but for this we wouldn't taste mate."

"Do you never put anything else in your broth?" I then ask.

"We sometimes put turnips," she answers. "We put turnips almost always when we have no fat."

"But have you no potatoes?"

"No, sir."

"Have you not an allotment?"

"Yes; but we didn't plant no potatoes."

"Why?"

"We were afraid of the disease."

"Do you not find the want of them?"

"Very much."

"How can you keep your pig without them?"

"Well 'tisn't easy to do it, sir, and I'm afraid we'll be obliged to sell it before Christmas time."

"Have you ever any tea?"

"Sometimes we have a little."

"Do you bake your own bread?"

"Sometimes."

"Have you an oven?"

"No; but there is one in the village, at which we all bake. We each give a cake to have our bread fired."

"You buy some of your bread?"

"Yes; the bakers come round with it in carts."

"Do you get your bread cheaper now than before?"

"A good deal."

"Then you are better off now than you were?"

"We would be if wages were as high as before, and we had the potatoes."

"Then, on the whole you feel yourselves but very little better off?"

"Very little indeed, sir. We can't have bread, no matter how cheap it is, unless we have steady work, and that we haven't even at the present low rate of wages."

When I first entered the village, I met a man a short distance from it, engaged in what is called cropping hedges. His daughter, a little girl, had just brought him his dinner. It consisted of nothing but bread and potatoes, and the potatoes were cold. I afterwards saw his wife, and asked her why she did not send him something hot? "Oh," said she, "I have so much to do that I can't always send him a hot dinner, and my man is not very particular what he eats." This was a fortunate provision of nature on his account. She had her family to look after, and frequently worked out; besides which, her short stock of fuel caused her to boil at once as many potatoes as would serve for several meals.

It would answer no useful purpose to multiply instances of this nature. Those already given serve to demonstrate the general condition of the poor, as regards their diet, where families are large and wages are low. Bread alone, or bread and potatoes—or, where there are no potatoes, bread and turnips or cabbage—form their staple fare, with now and then a little tea, occasionally sweetened with treacle, and perhaps sometimes a little milk for the children. As was said to me by one well acquainted with the circumstances of the poor in these counties, they seldom or never taste meat, but what is given them by the parson, or what they may pick up as "broken meat" in the towns. This is rather a curious dis-

tribution of the smiles of fortune, so far as the poor are concerned. They are generally best paid where other circumstances besides their wages conspire to have them best fed. There is a great deal of broken meat in the towns, which goes to the support of the poor—but it is in the neighbourhood of the towns that the labourers are best paid and most able to buy meat. In the more sequestered districts, where they have the lowest wages, they have no such resource as is at the command of the poor in or about the towns.

Such being their condition in so many instances, it would almost seem as if there was but one way to its improvement—and *that* in the descending line. As regards shelter and food, an industrious man is much better off if he pauperizes himself. He has then an airy room, and a clean wholesome bed to lie upon. He has meat at least twice, sometimes thrice a week, and puddings of a substantial kind, such as suet pudding, when there is no meat. He has also occasionally his soup and his fish, and almost daily his ample supper of bread and cheese.

What keeps him from seeking this comparatively comfortable condition? Nothing but the idea of the restraint to which the workhouse discipline subjects him. But if he can get over his aversion to that, his easiest way to improve his condition is to sink the independent man in the pauper. To him independence is privation, whereas pauperism would be comfort.

Fortunately, this extreme privation is not the lot of all. Unmarried men, if they are sober, industrious, and steadily employed, may escape the extremity of suffering to which others are subjected. And so may married men, ere their families have grown numerous, provided their wages are high and their work constant. But with families of three or four—to say nothing of five, six, seven, and eight—it is impossible for the labourers and those dependent upon them to escape the greatest misery, even where wages are highest, and where 10s. 6d., instead of 8s. or 7s. are paid. But, although there are many who, from a variety of circumstances, are not so wretchedly off as those to whom I have alluded, it must be borne in mind that there is an equally large class whose circumstances are correctly illustrated by the cases which I have given. There may be many a labourer, married and single, tolerably well off in Devon and Somerset; but there are multitudes so immersed in the depths of wretchedness, that it is almost impossible to fancy them sinking lower. There are hundreds of families, with four or five children, whose sole dependence is the earnings of the husband—the children being too young and the wife too busy at home to work abroad—their earnings not exceeding 7s. a week.

It is on this sad feature of the diversified picture that public attention should be most closely riveted.

On looking into the returns of the inspector of prisons in the southern and western district for the year 1847, I find that the average total annual expense on account of each prisoner was £27 9s. 9d.

Now, at the rate of 8s. a week, a labourer's wages will amount to £20 16s. in the year, provided his work is constant, which is not always the case. Even if he has none to support but himself, he cannot spend upon himself during the year as much as the public in the district in question spends on each prisoner in gaol. But if he has a wife and five young children to support, the average expenditure on account of each member of his family is about £3 a year—or about the one-ninth part of what is expended on the prisoner. If the whole family were in gaol instead of living on the £20 16s. to which they are limited out of gaol, the aggregate cost, on their account, to the public would be nearly £200. The expenditure per week on account of each member of a family of seven, under the circumstances supposed, would be about 1s. 1½d.; whereas the actual present weekly outlay upon each pauper in one of the most economically managed workhouses that I have seen (that at Liskeard) is about 2s., exclusive of his proportion of the general expenses of the workhouse. These included, the average would be nearer 4s. than 2s. The 2s. merely include what is expended for his diet and washing. These comparisons are both curious and instructive.

There are many, especially amongst the farmers, who are prone to malign the labourers, and who maintain that the misery so prevalent amongst them is of their own making. There is no doubt but that the privations which they endure are in very many instances aggravated by their own carelessness or misconduct. But it is a calumny to say that their situation would be equally deplorable, no matter what their wages were. I have seen too many instances of prudence, thrift, and comparative comfort, to subscribe to such a doctrine—in instances few and far between, it is true, in the counties that I have hitherto visited in connection with this inquiry, but which form the rule and not the exception in other districts, where higher wages prevail, and where the well-being of the labourer is attended to by his employer as a matter of paramount duty. In these cases, instead of the extra wages being squandered in drink and licentiousness, leaving the family to pine in wretchedness at home, they are frequently applied to enhancing its comforts and improving its position. In cottages where this is observable I have often seen the extra pairs of shoes for the parents and the children, and in some cases the extra clothing for the Sunday. Let

the labourer have but an adequate amount of wages, and he will improve both the condition and appearance of his family. Persons who think otherwise only fall into the views of those who would make their own gratuitous aspersions of him one of the many reasons which they assign for keeping his remuneration as low as possible.

Labouring men have frequently complained to me of the mode in which the farmers in some districts make use of the position and conduct of young men to affect the general rate of wages. Where the practice of making a distinction as to amount in favour of married men prevails, the highest rate thus paid is often a low one, as compared with the rates paid elsewhere. If young men receive less than married men, the wages of the latter are frequently lowered on the first plausible pretext—the farmers telling them that, as they can get young men to do their work for a given sum, there is no necessity for their employing others at a higher rate. Sooner than be thrown entirely out of work, the married labourers often submit readily to the reduction, which again is made use of to lower still more the wages paid to the single men; so that the former difference is re-established between them, but with this advantage to the farmer, that he is paying less to both. Again, young men having fewer incentives to steadiness of conduct, frequently abstain from work when they have got a few shillings in their pocket, which are soon spent at the ale-house, when they are impelled to look once more for employment. The farmers, taking their conduct into consideration, tell them that if they have so much money to spend in superfluities it is clear their wages are too high, and they frequently lower them. So far, few would be inclined to find fault with them. But here again the wages paid to the young man are too often made to affect those paid to the steady, sober, and industrious head of a family. Were his wages to remain stationary, whilst those of the ill-behaved workman were being reduced, no injustice would be done. But the evil is, that when the wages of one class are being reduced, the wages of all are but too apt to go down along with them; and thus it is that many an honest and hard-working man is curtailed in his means of supporting his family, not from his own, but from his neighbour's misconduct.

One of the greatest evils that I find attending the low rate of wages now paid in so many of the rural districts, is the want of a change of clothing for the labourers, both male and female. Most of them wear flannel whilst at work, but few have a change even of that. The consequence is, that they wear the same garment next the skin day and night, although for many hours of the day it may have been soaked with perspiration. I have frequently

seen both men and women, whilst at work, perspiring most freely, with their clothes quite wet upon them. It is deemed essential to the health of a miner that he should exchange for a dry suit the clothing with which he comes dripping from the mine. But the field labourer almost invariably permits the garments which have been made wringing wet with perspiration to dry upon his person—and that, too, not merely when he is in exercise, but when he is lying on his bed asleep; for he frequently lies down enveloped in flannel, cold, moist, and clammy, after the day's toil.

Some days since I was conversing with an old man near Bridgewater, on the subject of wages. He had been a farm labourer in his youth, but had abandoned the fields for a trade, at which he had made a little competency, which, he remarked, sufficed to keep him out of the workhouse in his old age. He did not speak very charitably of the farmers, whom he characterized as a very selfish and hard-hearted race of men. I observed to him that they justified the present reduced rates of wages by the prevailing low price of corn. He replied that it was not on the side of wages that the shoe really pinched them. He remembered wages high, when corn was about as low as now. "How came they," I asked, "to keep up the wages then?" "I tell you what," said he: "they kept them up, and could afford to do so, because they neither lived in such style nor paid such high rents as they do now."

LETTER VIII.

PHYSICAL CONDITION OF THE LABOURER IN CORNWALL.

I now proceed, in prosecution of the plan laid down in a former communication, to give a brief account of the physical condition of the labourer in Cornwall. This will include his house accommodation and rent, his wages and diet. The industry of Cornwall is, from its position and resources, of a varied character. It cannot be said to possess any manufactures, in the ordinary acceptation of the term; but from its peculiar maritime facilities, and from its being the extreme and the richest part of the metalliferous peninsula which constitutes the south-west of England, it sustains, along with its agricultural, a large fishing and mining industry. Generally speaking, the various pursuits of agriculture, mining, and fishing, are carried on separately from each other; but they are sometimes combined in different ways and degrees—the agriculturist being occasionally the fisher, and the miner being, to some extent, an agriculturist. But it is seldom, if ever, that you find the two pursuits of agriculture and mining combined—the man who is accustomed to drive the plough upon the surface having apparently no inclination to descend below it in quest of a livelihood. Besides, even were he so inclined, his previous habits would by no means fit him for the work. The agricultural labourer is not a very adaptable animal. He may do his own work, but it is with difficulty that you can apply him to anything else. When he engages in fishing, it is only to do the more ordinary parts of the work. He works with, but is not of, the tribe of fishermen.

Should he descend into the mine, the chances are that he would never emerge from it. It is a rare sight to see a miner a fisherman. When he is so, it is generally in the pilchard season, when there is a great demand for hands both afloat and ashore. In nine cases out of ten in which you find him thus employed he is a surface, and not an under-ground, man. Indeed, the latter entertains for him the greatest contempt, refusing him a place in the fraternity of miners.

The county of Cornwall is divided into two great slopes, one descending to the Bristol, the other to the English Channel. They are separated from each other by a ridge of high land, which, with but few interruptions, traverse the county in the direction of its length. The southern slope has the largest surface, as may be seen from the greater number and magnitude of its streams. It is also, with slight exception, the richest section of the county in an agricultural point of view. It varies greatly, however, in fertility. Perhaps the richest agricultural tract in the whole country is about St. Germans. There the land is tolerably deep, and farming is occasionally prosecuted as a scientific pursuit. In the valleys the land is tolerably heavy and deep; but along the numerous undulations into which the surface is broken, it is light, shallow, and stony. As far as on Liskeard, and in the neighbourhood of Looe and St. Martin's, the soil, although not of the first quality, is well adapted for agricultural purposes. To the north of Liskeard it is very stony and broken, until it reaches the summit of the dividing ridge. Westward from Liskeard, and on to Bodmin, the agricultural tract is prolonged, but becoming less and less fertile every mile. Between Bodmin and St. Austle is a large tract as wild and desolate as Shap Fell, and the only product of which is the fine china clay which is prepared here for the potteries of Stafford and of France. Between St. Austle and Truro the country is generally cultivated; but soon after leaving Truro cultivation ceases, and the traveller finds himself in the midst of that bleak, rocky, and forbidding-looking region, stretching around Redruth, which is the great scene of the mining industry of Cornwall. A smaller proportion of the northern slope is arable than of the southern, and in some parts of it, where the land is cultivated, the tillage is of the lowest order, owing partly to the "hungry" nature of the soil, and partly to the inability of the farmers, who are, in numerous instances, men with small holdings and without capital. Cornwall does not raise much more than half the grain necessary for its own consumption. The deficiency used to be supplied from Ireland, and for the last year or two partly from France. But the comparative failure of the grain crops this season, in that country, has so raised the price of wheat in the French market, that it is not likely that any will come from that quarter this year. At present the deficiency in Cornwall is chiefly supplied from Sussex, Essex, and Norfolk. Few of the great improvements of the age, as regards intercommunication, have as yet made their way into Cornwall. The stage coach is the only means of transit for travellers, there being no railways but two or three short ones, connecting the different clusters

of mines with their nearest seaports. The number of those in Cornwall engaged in, and dependent for their support upon, agricultural labour, was, in 1841, taking the same calculation as in former instances, about 45,000. This is but little more than one-eighth of the whole population, being a small proportion as compared with that exhibited by the other counties considered, in some of which it was about one-third.

In proceeding through Cornwall I found that there was no lack of testimony to the superior condition of the farm labourer in the county. But, as I had over and over again heard this song in places where it had no right to be raised, I determined to examine carefully into every circumstance affecting the labourer's condition ere I concurred in the view which it expressed. If his money rate of wages were to be taken as the sole standard whereby to judge of his comforts, there can be no doubt but that the condition of the labourer in Cornwall would, in the main, be better than that of the same class in any of the counties which I have already visited, and far better than the condition of that class in some of those counties. But there are considerations which enter into the question, as regards the Cornish labourer, which, when taken into account, detract somewhat from the standard indicated by his mere money rate of wages. Still, after having made allowance for such drawbacks as may exist, I am prepared to admit that the Cornish farm labourer is, on the whole, better off than his brethren in either Bucks, Oxford, Berks, Wilts, Somerset, or Devon.

The first point to which I directed my attention was, as in former cases, to the house accommodation of the labourer. I had not long done so before I discovered that in this, at least, there was no ground for the claim of superiority, in respect of condition, preferred for labour in Cornwall. As elsewhere, there were around me abundant evidences of very straitened accommodation for a large and increasing population. The few cottages visible were, in all cases, old and mouldy; in many they had greatly progressed on the road to ruin, and in some were utterly dilapidated. Some of the worst specimens of these miserable tenements may be seen along the high road between Torpoint and Liskeard, and, though at great intervals, in the neighbourhood of almost all the parish roads lying north and south of the main highway. I am now speaking of the purely agricultural portions of Cornwall, and can assert without hesitation that the accommodation provided for the labourer in these districts is, on the average, little if anything better than that at his disposal in the adjoining counties. In extending my observations to other parts of the county, I found that in many places it was not only plentifully provided with house accommodation, but that it was thickly strewn with new cottages of a very superior description, as regards size, design, &c. But these were invariably to be seen in districts in which not only were mining operations being carried on, but mines had been long established. As in the character of their industry, so in the accommodation provided for labour, some of the miners form a striking exception to the rest of the population of the county. The description of

the labourer's domicile in Devonshire is applicable to his cottage in Cornwall. Nowhere have I seen in the latter such clusters of miserable dwellings as I have observed in the former. But there are scattered instances everywhere of abodes equally dark, damp, unstable, and unwholesome. These are not confined to the districts more especially entitled to the epithet of rural. Cornwall is dotted over with small rural towns, every one of which contains, more or less, an assemblage of tenements which are unfit to betoken the completion of the first stage in civilization. Some of them are crowded to a degree pernicious to morals and disastrous to health. This arises not only from the want of new, but also from the destruction of old cottages. If the clearing system has not been carried on in Cornwall, the work has been as effectually, if not as speedily, done by the natural decay of cottages, to save which from destruction no effort has been made. Take as an example of what is to be found in other portions of Cornwall exclusively agricultural, or nearly so, what has been done in this respect in the parishes of St. Martin's and Talland. In area, both these parishes are large, and (with but little exception) they are both entirely under cultivation. A great deal of labour is annually required for the tillage of so large an area, and yet but few of the labourers who work in these parishes live in either of them. They have been gradually driven into the towns of East and West Looe, where they inhabit the most wretched tenements, looking, in most cases, filthy in the extreme, notwithstanding the very general cleansing which cottages here as elsewhere received under apprehensions of the cholera. Some of them have taken refuge in the small fishing town of Polperro, exerting a rather baneful influence upon the morals of the community. They have either been driven out of their cottages in the neighbourhood, or induced to leave from the high rents demanded, and have made their way to Polperro, where there appeared to be some room to spare, and where rents are low. A part of Polperro is in the parish of Talland; but lying as it does at one of the extreme points of the parish, the labourers experience the greatest inconvenience in being obliged daily to walk great distances to their work. The bulk of the labourers employed in the parishes in question reside in the two Looes and in Polperro; so that some of them have to walk as much as five miles to their work. This involves, in addition to a day's work, a walk of ten miles a day—of itself, in the estimation of many, sufficient exertion for one day. This is certainly one of the greatest hardships to which the poor are subjected from the want of cottages.

As a specimen of how the lower classes in the country districts sometimes live, I mentioned in a former communication the purpose to which a parish-house had been applied on the borders of Devon and Cornwall, and not far from Launceston. Another instance, somewhat similar, has come under my observation in the parish of St. Martin's. The house in question is situated but about half a gunshot from the church and rectory of the parish. It was originally left to the parish, I believe, as a kind of almshouse, which was to give shelter to four aged women, the house having but four rooms, each

room being approached by a door from the outside so as to be independent of each other. The doors leading to the upper rooms are in the gable ends of the house, and are reached by means of dilapidated stone staircases leading to them from the outside. It is now some time since the original purpose of the donor has been departed from, and the house has, for some years back, been let apparently to as many as could crowd into it. It is now as lonely and deserted as if it had never known an occupant. And no wonder. The dread scourge which has desolated so many portions of the land fell with fearful severity upon this unwholesome and overcrowded abode. Cholera entered it and claimed five victims—the rest fled in terror from the plague.

The survivors yet occupy a small shed which was hastily erected for their reception on their abandoning the house of death. No one has since ventured back to it. The windows are broken in, the doors partly dismantled, and on looking through the open casements you can see that fire also has borne its part in the work of destruction. To purify the house, the parish authorities tore down and burnt the partition walls, and the miserable tenement is for the present a wreck. It will not cost much, however, to replace the walls; and it is supposed that ere long the parish will again have its colony of tenants in this parish-house. The reader may form some idea of the manner in which its inmates lived, previous to the visitation of the cholera, from the fact that in one room—so great was the number crowded into it, and so small was the space appropriated to them—the beds, which were three in number, (for it served the purposes of bedroom and sitting-room) were piled one above another, like the shelves of a book-case. Such is the domiciliary condition of some, at least, of the agricultural labourers of England.

In examining into the state of the labourers' cottages, I discovered that as much fault was found by the tenants with the Duchy of Cornwall as with the private proprietors. At many points I was informed that the agents and managers of the duchy exhibit the utmost indifference to the comforts of the tenants, suffering cottages to go to ruin, and listening to no remonstrance in favour of repairs. If this be so, it is unfortunate that such an example should be set by the managers of such a property. For, as regards their domestic comforts, there is nothing from which the labourers suffer so much as from the scarcity of cottages—an evil attended with a multiform disadvantage; for, whilst it compels them to crowd in great numbers into small spaces, it makes them also pay higher rents than they otherwise would do for such accommodation as they have, while it is in too many instances removed inconveniently far from the scene of their labours. If this is repeated, it is because I deem it all important that it should be strongly impressed upon the reader's mind. With such an example set to them, many of the private proprietors of course let their cottages go to wreck, and hundreds of the tenants have complained to me, that whilst they have in vain urged the landlord to grant them necessary repairs, there is no abatement made in the amount of their rents, in consideration of the gradual dilapidation of their houses.

In some parts of Cornwall—such, for instance, as the neighbourhood of Penzance—it is needless to look for decent habitations in the possession of the labourer, so long as the farmers are contented to live in hovels which are below the standard of even a labourer's comfort. In these districts farming is carried on as it were in patchwork—a man leasing perhaps but 40 or 50 acres of land, and having no capital wherewith to work it, as is the case in the neighbourhood of Axminster, in Devonshire. In these districts, however, if the tenement is poor, the rent is generally low. But there are parts of the county in which it would appear that the rents are high in proportion as the cottages are poor. Such is the state of things to be met with in what is generally known as the eastern mining district. Rents are high in all the mining districts; but in the neighbourhood of Liskeard, although the rents are equal to, and in some cases greater than, those in the west, the cottages for which they are paid are, in the main, of a most inferior description. The cottages are, in the dimensions, style, and appearance, such as are to be met with in the exclusively agricultural districts. Indeed, until within the last ten years, the neighbourhood in question was such a district. As soon as mining operations were commenced near Liskeard, a considerable emigration of miners from the westward took place. But as the population of the district increased, there was but little or no increase to the number of cottages. The result will at once suggest itself to every mind. Such cottages as existed were speedily overcrowded, lodgers being taken in every one of them where there was even a crevice to spare. This sudden increase in the demand for house-room enhanced the value of house property, and rents were speedily raised—double the amount being paid for one of these cottages that is paid for a similar tenement where no such demand exists. The cottager has thus received no actual benefit, whilst his space has been far more encroached upon than before. Many of them have told me that they are infinitely worse off now in this respect than they were before the influx of miners. They get some money from their lodgers, in addition to their wages; but it all, or nearly all, goes again in the shape of enhanced rents. It is not only in the country parishes that the pressure has been felt, it has also extended itself to the towns. Liskeard itself suffers materially from it. Some of the smaller tenements in Liskeard are crowded to an extent distressing to witness—many of the miners working in the Caradon mines, fully four miles distant, living in the town. This subjects them, in addition to their work, to a walk of eight miles per day; but they are obliged to submit to this, as they cannot find quarters nearer the mines. The houses and villages between the town and the mines are absolutely glutted with people. One case, which may be given in illustration of the state of things in Liskeard, was that of a man and his wife, who had a miner lodging with them, all three occupying the same bedroom at night. On suggesting to the woman that this must be a painful situation to her, she observed that it was, but that they could not help it. They had but two rooms, and neither of them could occupy the lower room. Their rent was high, and they were therefore obliged

to keep a lodger, whom they accommodated in the only room at their command, which could be used as a bed-room. Another case was that of a widow, who was in search of a lodger. Her house had but two rooms, the upper of which was her bed-room. I asked her if she intended that her lodger, if she got one, should sleep below. She replied in the negative. I then suggested that the lodger she was in search of was one who would invest himself with a lawful title to the occupancy of her own chamber. She again replied in the negative, and on my looking somewhat puzzled, informed me that it was her own intention to sleep below. The room was so cold and cheerless that she could not offer it to a lodger, yet such was the bed-room which she intended for herself. She said that the arrangement would suit her very well, as the miner would go early to bed, and she would have the lower part of the house to herself. I asked her when she expected him to get up, to which she replied that he was likely to do so at an early hour of the morning, as he had to walk four miles to his work. He would, in short, be up before her hour of rising, which made me suggest to her that, although she might have the lower part of the house to herself at night, she would not be equally favoured in the morning. "Oh, sir," said she, "you mustn't think us so bad as we seem; we're drove often to do what we don't like to do, or we wouldn't have a roof at all to cover us."

I afterwards inspected several of the houses lining the road leading to the workhouse. Some had but one bed-room, but the majority had two. Many of them had been recently cleaned and white-washed, but most were cheerless and uncomfortable to a degree, some being almost destitute of, and others overcrowded with, furniture. In most there was a lodger, in some two, in others three, and in others, again, four. In all cases, in which there were two rooms, the family crowded into one, to leave the other for the lodgers. In one room three men occupied one bed; but, in general, there were two beds in the lodgers' room, and sometimes both had two occupants. The first I entered was thus situated. I asked the woman what rent she paid. She replied, "Four pounds, besides poor rates and gas rates." I then inquired what amount they paid in the shape of poor rates. She told me that they paid several shillings in the course of the year, paying five rates one year; and then added, "They're far better off than we are, in the union, although it's we that have to pay for their keep." I had just returned from a visit to the workhouse, and could not gainsay her statement. There was not one of its inmates but was more comfortably circumstanced than she, and yet she was one of the contributors to their support. This is one of the most striking anomalies of our social system—let him remedy it who can.

About a mile from Liskeard, and on the road to the Caradon mines, is the village of Trevecca. That it is but of yesterday is indicated as well by the superior style of its houses, as by the fresh colour of the material used in their construction. It consists of twenty-four houses in twelve detached groups, each group consisting of two residences. The houses, which are all on one side of the road,

stand back a little way from the thoroughfare, each having a small patch of ground in front, and about the eighth of an acre attached to it behind. The cottages are two stories high, counting the ground floor as a story; the building material is stone, and the roofs are covered with slate. Altogether the houses look palatial as compared with the huts of the older villages, or such as are scattered over the face of the county. Nor is their internal accommodation inferior to their external appearance. The two end houses have each five rooms; all the rest have four, two below and two above. The lower rooms are well plastered; and although the beams which support the floor above are exposed, they are clean, with a space of from eight to nine feet between the two floors. They are also well lighted, the windows being large and framed in the ordinary manner, instead of being occupied by the leaden diamond-paned frames so common in the older cottages. The staircase to the bed rooms ascends from the inner rooms, having a good banister, being commodious and of easy ascent. The bed-rooms are large, airy, and well lighted, the walls being plastered both at the sides and over head. Between each house and the back garden is a small paved yard, with accommodation for washing and other conveniences, which should attend every household. At the extremity of the garden, far removed from the house, is a pig-stye for such as may choose to keep a pig. When I visited the village, I found but few doing so, owing to the scarcity and dearthness of potatoes—barley being expensive feeding for a pig. So clean, cheerful, and comfortable a scene at once surprised and delighted me, for it was in perfect contrast with the wretched, unwholesome, and straitened accommodation which I had elsewhere but too generally witnessed. On inquiring into the origin of so unexpected a scene, I found that it had been called into existence by the extraordinary demand which had so suddenly arisen in the neighbourhood for cottages. The property on which the village stands belonged to the daughter of one of the most respectable and influential citizens of Liskeard. She projected and executed the undertaking, which has been advantageous to all parties. Some of the tenants are themselves miners, others are not, but take miners as lodgers. Several of them are agricultural labourers, and all of them, before moving into their present abodes, knew what it was to tenant the wretched hovels of the peasantry. Whatever influence the superior style of their domicile may have had upon them, certain it is that, as regards intelligence and their personal habits, they are greatly superior to their class elsewhere. Several of them have told me that they would not return to the holes which they formerly occupied, if they were given them rent free. Their altered circumstances have superinduced an elevation of tone and manner, which it was pleasant to witness, and which were fraught with hope as regards the capacity for improvement of the labouring classes. The snugness of the dwellings, the tidiness of the women, and the cleanliness of the children, all betokened that one of the greatest barriers in the way of improved habits amongst the peasantry is the wretched condition of their dwellings.

There was one drawback, however, to the favourable state of things presented by the village of Trevecca. The great demand for house accommodation, which characterizes the district, caused most of the houses to be overcrowded. In almost all of them, the family slept in one of the bed rooms, the other being given up to lodgers. Most of these latter rooms had two beds in them, and accommodated four people. For 2s. a week each, they get their bed, their washing, their tea at breakfast, and ordinary vegetables at dinner. Some time ago they paid 2s. 6d., when they had as many potatoes as they wished; but now that potatoes are scarce and dear, they are not provided, and the extra 6d. is struck off the week's payment. The lodgers generally take their meals with the family, except when they work during the middle of the day in the mines, in which case they take their dinner along with them. When they dine at home, the dinner sometimes consists of broth, which is made up of vegetables and meat boiled together. The ordinary vegetables, such as cabbage and cauliflower—the latter being very common in Cornwall—and turnips, are supplied by the family; but if any extra vegetable is added, it must be at the expense of the party desiring it. The family contributes but its own quota of the meal, each lodger contributing his. Sometimes a meat pie is made, each party contributing his own share of the contents. I was puzzled how each man could know his own again, but was informed that they did so readily. All this would be very well but for the overcrowding which it superinduces. In Trevecca, however, the evils of this, in a sanitary point of view, are not so much felt as elsewhere, for the bed-rooms are all large and well ventilated. In a moral point of view, however, it must be equally deteriorating wherever it occurs. But it may be asked, why is the example set by the spirited owner of the village not followed elsewhere, seeing that the demand for houses is yet far from being adequately met? The truth is, that the rate-payers and authorities of the neighbouring parishes are exceedingly jealous of any attempt being made to follow it. They dissuade proprietors from building, lest the mining operations of the neighbourhood should not be permanent. Mining, they say, is quite a new thing in the district, and it may not last; if it declines, a great mischief will have been effected, by extending the number of cottages. There seems, however, to be but little prospect of such a contingency, judging from the appearance of activity displayed at the mines. If anything could arise to bring it about, it would be enhancing the cost of producing copper, which is done by the higher rate of wages paid here than elsewhere to the miners, on account of the high price of their lodgings, and other circumstances, which will be more appropriately alluded to hereafter.

A library, consisting of about 200 volumes, was established in Trevecca. All who had any desire to read having read all the books which they cared for, the library has since been removed to the mines, in the vicinity of which it will pass through the hands of a new set of readers.

The present average rate of wages paid to the agricultural labourer in Cornwall is 9s. a-week. This, however, be it remembered, is but the money

rate, and by no means indicates the real extent of the labourer's command of the comforts of life. In dealing with the wages of Cornwall the element of cider has not to be considered, as in Somerset and Devon. The whole of the wages is paid in money, subject, though perhaps in different degrees, to some deductions common to other counties. I have already alluded to the comparatively high rent paid by the Cornish labourer, as being *pro tanto* a virtual reduction of his wages. But this is not general, the highest rents being charged only in those districts where, from the vicinity of mines, there is a greater demand for than a supply of houses. This again, as already explained, only occurs where mines have recently been established, so that it is far from being general. Still, however, in the neighbourhood of all mines, whether long or recently established, rents are somewhat higher than in the purely agricultural portions of the county. As mining operations are so generally diffused over Cornwall, it therefore happens that there are but few localities in the county that do not feel the effect of their vicinity in adding something to the rents. In the agricultural parishes most distant from them the rents of cottages are on a level with those in the adjoining counties. You there, as in Devon, Somerset, or Wilts, meet with cottages with two or three rooms rented at from 40s. to 50s. a-year. In these cases the cottagers enjoy their wages independently of any reduction on this account. In all other cases, whether the rent be £3, £3 10s., £4, or £4 10s., the abatement which must be made from the nominal rate of wages is about the same. Indeed, in many cases where the rents are highest, there is the least deduction to be made, as they are always highest nearest the mines, the cottagers having thus a chance of making the difference wholly or partly up, and sometimes of adding to their means. But a little back from the mines, where the influence of high rents near them is felt, without giving the cottagers the same opportunity, the whole of the difference between the rents which they pay and the ordinary rent of a cottage may frequently be regarded as so much to be deducted from their nominal amount of wages. But the most serious deduction is that which must be made for the high price which they are now paying for their corn. I have already alluded to the arrangement which has elsewhere, as in Wiltshire, been prevalent—established for the benefit of the labourer—of letting him have corn for his own consumption at a fixed price, without any reference to fluctuations in the market value of grain. So long as the price of grain, notwithstanding its fluctuations, was generally high, the arrangement was advantageous to him; but now that there is but little prospect of it ever again reaching the price at which it is sold to him, it is obvious that the labourer must be injured by its continuance. It falls at present with peculiar severity on the Cornish labourer. The arrangement here has been for some time past to let the labourer have his grain for 16s. and 8s.—that is to say, 16s. per bushel of wheat, and 8s. per bushel of barley. The Cornish bushel is double the size of the Winchester, so that, reduced to the measurement appreciable by a Londoner, the arrangement is to give the corn at 8s. and 4s. But

to adhere to the Cornish measure, the present price of the best wheat is about 10s. 6d. a bushel, and it is not the best wheat that the labourer gets here or elsewhere. The real market value of the quality of grain given to him would be about 9s.; yet it is for this that he pays 16s. The manner in which the arrangement operates is this: In Cornwall but few of the labourers are paid by the week. Some are paid by the fortnight, others by the month. Taking 9s. as the average rate of wages, a man would be entitled to 36s. for four weeks' work. Supposing him to have a family, he would during that time consume about three pecks of wheat and half a bushel of barley to mix with the wheat. On being paid at the end of the month, the value of these would be deducted from his wages. At the rate which he is obliged to pay, the wheat would come to 12s. and the barley to 4s., in all 16s. He would, therefore, have but 20s. to receive as money wages at the end of the month. The hardship to him is this: Supposing that he was paid his full amount of money wages, and bought his wheat and barley at their real market value, how much of his wages would he have in hand after he had purchased the necessary quantity for his family's consumption? The wheat, supposing him to purchase the same quality as he receives, would come to 6s. 9d. Making a deduction of but 1s. 6d. from the price of a bushel of barley, he would get his half-bushel or 3s. 3d.; in other words, he would get for 10s. that for which he has now to pay 16s. The difference of 6s. spread over the four weeks makes a difference of 1s. 6d. between his real and his nominal rate of wages for the week. This is but a small sum in the estimation of many, but it is nearly 17 per cent. of the wages of the Cornish labourer, taking them at their nominal amount. To show that it is no trifle to him, he could pay his rent and send three of his children to school by means of the difference which he would gain, but for the arrangement in question. It is obvious, therefore, that when this deduction is made from the nominal rate of wages in Cornwall, the real rate of wages will not be found to range much higher than in Devonshire, where the analogous arrangement is not so hard upon the labourer, and a deduction must be made on account of cider. Sometimes in Cornwall you find the labourer receiving his grain at 14s. and 7s. instead of at 16s. and 8s. This is apt to mislead without inquiry. The farmer does not confer this privilege on his labourer without an equivalent. When the price of grain is lowered to the labourer, his wages are lowered also. I have known cases in which the labourer submitted to a deduction of a shilling a week in consideration of this—that is to say, he submitted to a loss of 4s. per month in consideration of a gain of 2s. 10d. If any one will take the trouble of making the calculation he will find that this is so. Some of the labourers themselves were not a little astonished at the result when I stated it to them.

Yet notwithstanding the near approximation of his real rate of wages to the average rate in the adjoining counties, the condition of the labourer in Cornwall is, on the whole, better than that of his class in these counties. This is to be accounted

for by the cheapness at which he can supply himself with fish. The most common and the most popular fish in Cornwall is the pilchard. The failure of the potato itself is not more disastrous to the poor of the county than is a failure in the take of pilchards. The average price of them is from 1s. to 1s. 6d. a hundred. This year they have, so far, been very abundant, and have sold as low as 10d. a hundred. After being salted they are retailed at the rate of seven for 2d. Such as can afford to lay in a stock for the year, will salt and lay by from 1,000 to 1,500 pilchards, for the use of a family of five or six. Others, who cannot afford to do this, buy them in greater or less quantities, as they can afford to do so, sometimes paying more for them and sometimes less. The traveller in Cornwall, whether in the highways or byeways, is scarcely ever out of reach of the smell of pilchards undergoing the process of cooking. The whole atmosphere of the county seems odoriferous with pilchards. As I now write, in the principal hotel in Redruth, the whole house is pervaded with the odour of this favourite fish. They may not be as strengthening as animal food, but they form a nutritious item in the Cornish labourer's diet, which is almost entirely wanting in that of the poor of the neighbouring counties. The potato, when abundant, is the favourite vegetable taken with the pilchard. In the absence of the potato it is eaten with bread. When used with the former, the pilchard and the potato are boiled together. Sometimes the potatoes are mashed and baked before the fire, with the pilchards on the top of them, which diffuse their oil through them, and give them a strong flavour. It is seldom that the pilchard constitutes an ingredient of the "pasty," so commonly met with as entering into the labourer's diet in Cornwall. The mackerel frequently does, which can also be procured very cheaply during certain seasons of the year. Generally speaking, the "pasties" consist of potatoes and bits of meat, more frequently salt pork, covered with a rather tough crust made of flour, and sometimes of flour and barley meal mixed together. In the absence of the potato, the turnip constitutes one of the internal ingredients of the pasty. Sometimes it is merely a mass of dough, lightened and sweetened a little by a few raisins or currants. It is few that can afford to have them frequently with meat. They are generally made for the labourer himself, his family contenting themselves with lighter and more frugal fare. "This is John's dinner," said an elderly woman to me, with whom I was one day conversing in her own house, putting at the same time a large pasty into my hand. "What does this contain?" I enquired. "Potatoes and pork," she replied. "Will John eat this at a meal?" I asked, for the pasty was large and weighed heavily. "Aye, and think nothing of it," she answered, astonished at the question. I could not avoid congratulating John in his absence on the extent of his appetite and the excellence of his digestion. The family in this case consisted of only the father and mother and one son, who was grown up, but was seldom at home. When at home he occupied the same bed-room with his parents. The wife generally contented herself with pilchards, reserving such scraps of beef and pork as she could

procure for her husband. It is only in such cases that the labourer in Cornwall is so nutritiously fed. When his work is steady and his family small, he himself may have a moderate allowance of animal food, the rest of his household feeding on fish. When his family is tolerably large, or his work is not very steady, they may all have to confine themselves to fish; but when his family is very large, or very *long*, as they term it here, it is not always that they can all get even fish, although his work should be steady. There is many a labouring family in Cornwall nearly as ill off, in a dietary point of view, as some of those in Somerset or Devon.

It will have been seen that the maximum rate of wages in Devon is the average rate in Cornwall. But, as in other counties, a reduction of wages is very generally talked of in this. The farmers are grumbling on all hands, and complain bitterly of their fate, in being obliged by the low prices of corn to curtail the comforts of those for whom they affect a very praiseworthy extent of sympathy. Not a word is said of lowering the rate at which they dispose of their corn to the labourer. They forget that he is paying them for inferior grain at the rate of 6s. a quarter, when the best wheat is selling in the market at 42s. They could materially add to the labourer's comforts in this county by permitting him to buy his corn at the market price. At all events, if they lower his wages they should in justice rid him of the very disadvantageous arrangement from which he now suffers. But it is not a reduction of wages that they contemplate immediately so much as a reduction of employment. They will begin to economise, not by reducing the wages of those kept at work, but by discharging from work many that are now employed. The blow will fall first upon such as are not altogether able-bodied. A great many of them, indeed, have already been discharged, as the increase in the number of applications for relief can testify. The applications for relief at the Liskeard union are now about ten to one as compared with what they were a few weeks ago. Amongst the applicants, however, there have been no able-bodied men. The farmers are in hopes of being able to keep them employed; in order to do which, they must discharge, as they say, some of those not able-bodied, reduce the wages of others who may be kept employed, and lastly, if necessary, lower the wages of the able-bodied themselves.

I have put the average wages of the day labourer in Cornwall at 9s. a week. In some parishes, such as that of Linkinhorn, I found 8s. paid. But then some compensation was made the labourer by having his corn given to him at a somewhat lower price. Throughout the comparatively rich agricultural district around Truro, I found 10s. a week a very common rate. On this the labourer might live with some comfort, provided his family was small and his rent as reasonable as it is in Devonshire and elsewhere. But, unfortunately, there is

about Truro a great scarcity of cottages in the outlying parishes. The consequence is, that the labourers have to herd together to a great extent in the town, paying £4, and sometimes £5 for a house. This also subjects them to the cruel necessity of a long and fatiguing walk, both before and after their day's work. One man told me that he had been working for some time on a farm near Lord Falmouth's residence, upwards of three miles from Truro. He had not been steadily employed during that time, but was paid at the rate of 10s. a week for his work. He had a family of eight, including himself and wife, to support, and had also to pay £4 for his house, which had only three rooms. He told me, that for the last week they had but a pound and a half of animal food for the eight of them. I asked him what it was, to which he replied that it was some fat mutton, with which they flavoured their potatoes.

"Have you a good supply of potatoes?" I asked him.

"We have to buy all we eat," he answered. "We could not live on turnips and barley alone."

"Why did you not plant some?" I inquired. "Because I gave up the little ground I had," said he.

"And why did you give it up?"

"Because the potatoes have failed so."

"But they have not failed so badly this year. If you had held your land, and planted some, you might now have had a good winter's supply for your family."

"That's all very well," he replied; "but when a poor man comes to pay a shilling a yard (twelve feet square) for ground, and gets nothing from it for two or three years, he's very likely to lose heart, and throw it up. I did, and so have many more."

"You have fish occasionally?"

"Yes; but we can't often afford it."

"Then what is your chief diet?"

"Bread (frequently barley), potatoes, and turnips. There's my dinner to-day, sir," he continued, breaking a pasty in two, which he took from his pocket. The tough, black crust enclosed a quantity of watery-looking turnips.

"And can you do a day's work on that?" I asked him.

"Such as it is, sir, I can," he observed; "but it isn't such a day's work as a man could do on meat."

On the whole, whilst the house accommodation of the labourer in Cornwall is little, if at all, superior to that in the neighbouring counties, his condition otherwise is a little, though very little, better; for after making all the deductions which must be made from his higher nominal rate of wages, there are circumstances connected with his case, such as his usually cheap and plentiful supply of fish, which place him in a somewhat better position, as regards diet at least, than his brethren in the counties previously considered.

(To be continued.)

THE LONDON FARMERS' CLUB.—MONTHLY DISCUSSION.

THE EXTENSION OF RATING AND SETTLEMENT TO UNIONS INSTEAD OF PARISHES
WOULD BE HIGHLY BENEFICIAL.

The usual monthly discussion took place on Monday, March 4, at the Club Rooms, Bridge-street, Blackfriars; subject, "The extension of rating and settlement to unions instead of parishes."

The CHAIRMAN (Mr. Payne, of Felmersham) said: Gentlemen, the time for commencing our discussion having arrived, I introduce to you a gentleman who, as he suggested it for discussion many weeks since, will now open it. The subject of "Union Settlement and Rating" which he is about to introduce is one of great importance, one which requires great deliberation, as it affects most materially the occupiers of the soil (Hear, hear). There are a great many points which require to be discussed; but I have very little doubt that we shall this evening arrive at a conclusion which will be particularly beneficial. I now call upon Mr. Gordon to open the subject.

MR. GORDON said: Mr. Chairman and gentlemen, besides my want of ability to treat this subject as its importance demands that it should be treated, I may state that I have for the last five days been confined to my room, and that nothing but an imperative sense of duty would have brought me from Bristol this day (cheers). I hope, therefore, that my physical suffering, added to the difficulty of this subject, will be admitted in excuse for the very inadequate manner in which I fear I shall perform it (Hear, hear). Let me say, first of all, that I proposed this subject to the committee for discussion without *previous concert* with any one in reference to the propriety of doing so. It struck me that, although it had been discussed in this room two or three years since, on an occasion on which Mr. Chadwick made a speech of great ability, but when feeling in favour of a national or even of parochial settlement prevailed over my views, yet we could not do better than discuss it again, having regard to its importance on the side of humanity, of justice, and, I may add, of gain (cheers). It has so happened that within the last week this question has been made the subject of considerable attention within the walls of Parliament. No less than three persons who have filled the office of Home Secretary have confessed that it is one of the most important subjects that can be entertained in the present state of the agricultural interest (Hear, hear). I had great hopes that Mr. Chadwick would have been here this evening; but his engagements as sanitary commissioner are so pressing that he has held out to me but very small grounds for expecting his attendance. I repeat, that on every ground—on the ground of justice, of humanity, and of gain—this question demands to be peremptorily considered. You probably recollect the narration, by Mr. Chadwick, of a number of instances in which labourers had, by the pulling down of cottages in *close*

parishes, been forced into *open* parishes in a very lamentable though not illegal manner, and had been exposed, particularly in the suburbs of towns, to various diseases, and to a species of close packing nearly as bad as that to which slaves are subjected on board ship, by the energy of the blockade squadron in Africa. There was one case mentioned by him which made a deep impression on me. He mentioned the case of a labouring man, to whom a remark was made as to the idle way in which he appeared to do his work. It was observed to him, "Why, you don't sweat at all!" To which he replied, "Why, I don't receive sweating wages." He was, in fact, one of those who were compelled to walk an immense distance to their work. Mr. Chadwick declared, what I find confirmed by the Report just made to the poor-law commissioners, and which I hold in my hand, that in many cases the labourers of this country actually do more marching than its soldiers! Such a state of things is revolting to good sense and humanity; and the evil entirely arises, I believe, from the present system of parochial settlement. I do not wish to allude to myself; but, I must confess that, having some property in a parish which is nearly close, though I have not pulled down cottages, yet the law being such as it is, I almost feel that I ought to do so in self-defence (Hear, hear). To avoid rates others endeavour to clear their parishes of cottages, and so long as the law is in its present state we cannot justly blame any one for taking that course. If the law were altered, if we have union settlement and union rating instead of parochial settlement and parochial rating, I have no hesitation in declaring that I should immediately build cottages close to the farms where labour is required, in order that the labourer might be able to give his full strength to his employer, in lieu of pulling down or letting them go to decay; but so long as the present system continues to exist I can neither wish to repair cottages when they require repairs, nor consent to build more at the risk of increasing the rates. That is, I believe, the feeling which prevails throughout the country; and those who are prevented by kindness and generosity from acting in accordance with their interest in the matter, not only suffer for their consideration, but are laughed at by their neighbours in adjoining parishes (Hear, hear). Having recently spent some months in France, I have been led to think much on the causes of the tranquillity which has been maintained in this country. I cannot help attributing it in a great degree to the Poor laws. Here the labourer, looking upon a field of wheat, says to himself, in effect, "I have a lien, under certain stringent conditions it is true, upon that crop of corn—a lien for my aged parents, for myself when I arrive at old age, and for my widow

and orphans when I am dead. I know that before the landlord can receive his rent, or the government obtain any contribution, I must have my share out of what is produced; and is it then worth my while to upset a state of things in which I have the first claim on what is produced from the land? How different is the state of things in France. In that country there is no Poor law, though some of the ablest men in that country have confessed to me their belief that to our system in that respect they must come at last. The poor of France, and those who belong to what is called the Red, or Socialist party, say "We have not that portion legally in the riches of the country that we ought to have," and there is a great deal of truth in that. In this country and in Ireland there is paid somewhere about £12,000,000 per annum for the support of the poor, and therefore the poor of this kingdom do come in for a share of the legal national wealth, and that is the fee for quiet possession of the remainder paid by the rich. But in France there is no legal claim; all that is given is given as an offering of mere private benevolence. If the poor man in France needs assistance, he must go and ask alms in charity: his feelings are, therefore, very different from those of the English labourer, who says, "I know that by the very same law by which the proprietor holds possession of his estate, I am entitled to a bye-law share of what it produces." It is this state of things, this feeling on the part of the poor generally, that they have an interest in the land, which saved us, I believe, from the effects of the revolution of 1793, and the recent one of 1848; and I repeat, that it is the opinion of some of the noblest men in France that that country will be obliged to follow the example of England. But although the labourer of this country thus enjoys what is likewise a very great boon, there still exists the hardship of parochial settlement. Ever since the monasteries were destroyed, and the poor-law of Elizabeth was passed, the law of settlement has, I believe, been the grand difficulty in the administration of the poor-laws; nor need I tell you of the immense sums which have been expended in litigation between parish and parish (Hear, hear), or of the ill-blood which has arisen from this cause time out of mind. I believe, however, that the time is arriving when this question will be probed to the bottom, and that, possessing increased facilities for communication, and having in the press the means of arriving at the truth by a comparison of different districts, we shall be able to come to conclusions which have better bases than those of former times. You are aware that there is, in the Poor-law Act of 1834, a clause which enables unions, with the consent—the unanimous consent—of the guardians, to become parishes with regard to settlement and rating. Now there is in Norfolk a union called the Docking Union, consisting of fifty parishes, with respect to which this power has been exercised. The proposal of the plan was at first attended with some difficulty, but though the experiment has not been tried very long—I think it commenced about two years ago—the result has, so far, been very satisfactory. It is referred to, amongst other things, in the poor-law

report of Mr. Gilbert A'Beckett. Although we may be, and although, in fact, a great number of us are, in favour of an alteration of the present law of settlement, there is some doubt whether it would be best to have a union or a national rate. Some, wish to have a national rate (Hear, hear). Now on that point I would observe that, if there be a national rate, the whole matter will inevitably fall into the hands of the Government (Hear, hear). A centralized system will then be established; you will lose local check and control; and I think every Englishman will consider the matter twice before he consents to the adoption of a still more centralized system of administration (Hear, hear). Such a system is, in my opinion, hostile to the great Anglo-Saxon foundation of our liberties, and to the whole spirit and character of our free institutions (Hear, hear). Although occasionally, when great abuses have occurred, as, for example, in 1834, when the poor-rates had become so high, it may be necessary to have recourse to it; yet I would, as long as possible, avoid anything which would tend to throw centralizing power into the hands of the Government, even though the Government administration might be in some respects more economical. Therefore I say, with regard to a national rate, that, however pleasing it might be to some for the moment, I think it would in the end be a cause of regret to all. Now there are, I think, but three systems for us to make choice of: the parochial system (as it is now), a union system, and a national system. There might, perhaps, be an intermediate step. If you found in unions too small an area, and if you had reason to think that the rights of the labourer, cribbed, cabined, and cruelly confined as he now is, were not in that respect sufficiently consulted, you might have county unions; but, as a general rule, though many of the unions are full large for managing purposes I advocate the union system for settlement and rating, and the exercise of the powers provided by the act for its development. I have already touched upon the great hardship to which the labourer is subjected, by having to go backwards and forwards for his work. A great loss is also occasioned by it to the farmer; while the only parties who are benefited by this system are landlords, who happen to have close parishes entirely to themselves. It is notorious, that the official returns show that, although the poor population is increasing, the healthy house accommodation is actually decreasing (Hear, hear). What can we expect as the result of such a state of things but an increase of crime? The system also operates as a great oppression to the poor; and I must say, that I think the patience which the labouring classes have shown under this evil, affords a striking illustration of the admirable character of the English labourer (Hear, hear). I am not a friend to, or a defender of, rebellions and revolts; but I must say, it appears to me wonderful that the English labourers have submitted so patiently as they have done to the injury which has thus been inflicted on them. Is it fair, or just, or wise to maintain a system to inflict on the poor a needless amount of labour, or to neglect to provide for their comforts? It does not ap-

pear that the expenses have been increased in the Docking Union. It was predicted that certain new classes there would be thrown on the rate if the union settlement were adopted: but that does not appear to have been the case. The fact of having a union settlement must make it worth one's while to build cottages rather than to pull them down. In the case of a close parish adjoining others, building will be carefully avoided; but not so where twenty or thirty parishes are united, as are these in the Docking Union. Of this I must be permitted to read you an account from the Report in my hand. If you build a school under the prevailing system in an open parish, you are in fact building it for the population of the adjoining parishes. If you project a dispensary, you must calculate on the accession of increased numbers of the poor. Everything which is done to amend and ameliorate the condition of the poor of the open parish brings a four-fold burden on the unhappy proprietors or occupiers who reside in it. The consequence is, that very often all amelioration is neglected. I could mention instances in which it has been found almost impossible to do anything for the good of the poor, because the moment it was done it only incited the adjoining parishes to pull down and pour in their pauper population. The hardship does not operate merely in a double, but in a treble, and even a quadruple ratio. I may mention the case of two adjoining parishes in Cornwall: one consists of 75 acres, almost entirely built upon with cottages; the other consists of 4,000 acres. In the first the poor-rate is 12s. in the pound; in the second it is only 4d. in the pound. There is but one cottage in the parish of 4,000 acres. The people who live in the small parish do all the work of the larger parish: surely this is a great hardship, and it would immediately be put an end to if there were a union rating. I know it may be objected that the property rated at 4d. in the pound was bought with a knowledge of this state of things; but if such an objection were allowed to prevail, there never could be any amendment of a bad system. I think the argument which was used when the country went from a paper to a metallic currency is applicable here; in matters of such magnitude we cannot enter into every detail; it would take a century to balance all outstanding claims, and to arrive at an equitable adjustment. In the case of the income-tax, for example, it would be impossible to provide for every case which may arise; or at least the expense of meeting every case would be twice as great as the amount which the tax produces. In that case, as in others, you are obliged to cut the Gordian knot, because it would be impossible to untie it with advantage to the community. This subject has derived increased interest from what took place in the recent debate in Parliament, on Mr. Disraeli's motion. This can hardly be called a political subject; men of the same party are divided upon it, and the sole question to be considered is admitted to be, "What will most tend to the promotion of the general good?" I think I may, therefore, without trenching on your rules with respect to politics, cite what some of our leading statesmen have said on this point. I find the following remarks by the Secretary of the Home Department:—

"He (Sir George Grey) did not complain that the hon. gentleman had not more distinctly foreshadowed the resolutions which he intended submitting if the house agreed to the preliminary proceeding of going into committee; but he did complain that in considering the poor-laws, and their burden on the landed interest, no reference whatever had been made to the all-important question of the law of settlement—a question which so materially affected the great bulk of the agricultural population. All the evidence taken before commissions, the result of inquiries, and the reports of commissioners, tended to show that the greatest boon that could be conferred would be a judicious and well-considered alteration of the law of settlement, and he was happy to say that government would, ere long, bring forward a measure on the subject."

I will now quote, with the permission of the Chairman, from the speech of another Home Secretary; and let me say that it is not in their political, but in their official capacity, past or present, that I refer to their opinions. There is probably no office which opens up to the holder more official information with regard to the condition of the agricultural interest than that of Home Secretary. Sir Robert Peel was Secretary of State for the Home Department at one period of his career. I find him saying, recently—

The CHAIRMAN: In what debate?

Mr. GORDON: In the debate on Mr. Disraeli's motion.

The CHAIRMAN: The period is important, as there are so many changes of opinion (Hear, hear).

Mr. GORDON: On the occasion which I have mentioned, Sir Robert Peel said:—

"Now, I don't know whether hon. members generally have read the papers laid upon the table almost since, or not above two or three days before, the hon. gentleman made this motion—papers relating to a question of vital importance to the condition of the country—I mean the operation of the law of settlement (Hear, hear). The consideration of that question will be forced upon you. It would be premature to enter upon it now; but I wish you would read the able reports that have been made by the gentlemen who have been instructed to inquire into that subject, and you will understand the difficulties which arise at present from the want of cottages for the labourers in certain districts (Hear). You will see what is the effect upon the health and comfort of the labouring poor from the very imperfect dwellings in which they now reside (Hear). You will find accounts that, in some instances, labourers come to the farm on which they are employed upon donkeys, in consequence of the distance of their residence from the place of their employment (laughter, and loud cries of 'Hear'). These things are not, and I am sure they ought not to be beneath your consideration (cheers). If such is the condition of the labourer, that in order to have employment upon one farm there are more than twenty donkeys upon which the labourers ride to that daily employment—(a laugh)—it may be a subject for ridicule, but it is one that suggests topics for very serious consideration (cheers). There are other men whose strength is exhausted by the length of the distance which they have to come to labour; and others are forced into villages, where they are paying £4 or £5 a-year for their houses (Hear, hear). Well, encourage the construction of comfortable cottages by removing the brick duty (Hear, hear). Alter your law of settlement, so that there shall be no discouragement to their finding those comfortable habitations (Hear, hear). Consider the law of settlement in conjunction with other matters. But if you admit their importance—if you admit they are part of it

series of important considerations, do not by a sudden vote to-night"

—there, I think, Mr. Chairman, we should trench a little upon politics, and therefore stop short, having, however, quoted enough to show the very great importance attached to this subject by two gentlemen who have held the office of Home Secretary.

The CHAIRMAN: Let me say that I have no desire to interrupt you in the course you are pursuing. As far as my own feelings are concerned, I shall not consider anything as political which is definitely connected with agriculture. I should be very sorry to shut out anything which came under that description; and I hold that much damage has been done to agriculturists as a class by excluding some topics, on the ground of their being political (Hear, hear).

Mr. GORDON: Very well. When I find that I am getting too near the shore I will push off (laughter). The more, Sir, your liberality the greater ought to be my discretion. Now there is a third and quite an equal authority on this subject, Sir James Graham, who has also held the office of Home Secretary. Unfortunately I have not before me that extract to quote from. Two or three years ago there was, I think, a committee of the House of Commons on this very question of rating and settlement; a report in favour of the establishment of union rating and settlement, or at least, if I recollect aright, of some alteration of that kind in the law, was carried by a majority of seven to six. In the majority were the three Home Secretaries whose names I have mentioned. But on its being moved that the report should be presented to the house the majority of one went the other way. The result was that on this mere formal motion, that the report should be presented to the house, the division was adverse. In that position the matter has stood up to the present time; a curious illustration of the forms of committees of the House of Commons. I really feel that I am a sort of Cerberus with these three Home Secretaries—(laughter)—but my hope is that I shall bite deep enough to make you remember these authorities. Here we have three practical and experienced men confessing that the labourers in many districts are very much oppressed by the present arrangements. It is acknowledged that whereas the labouring population is increasing, houses for them to live in are decreasing, except in certain over-crowded localities, where the rents are enormous for a labouring man. But rents are things which must find their level.

The CHAIRMAN: Are you alluding now to land or to cottages?

Mr. GORDON: To houses—to everything, in fact. All these things must find their level, be it high or low. I hold in my hand a report to the Poor Law Board on the law of settlement, drawn up by Mr. Gilbert A'Beckett, under instructions to inquire into "the operation of the laws of settlement and removal of the poor in the counties of Suffolk, Norfolk, and Essex, and in the Reading union in Berkshire," just presented.

Mr. SHAW: The commissioners made their inquiry in 1848.

Mr. GORDON continued: Mr. A'Beckett says:—

"The free use and circulation of labour must, of course, be greatly fettered by a system which renders a labourer liable to removal if he does not happen to find work at once where he seeks it, and subjects him to punishment as a vagrant if he should fail in a second attempt."

He declares that he has found that there is great dissatisfaction with the law, as it at present exists; the majority of opinions being in favour of the abolition of the law. He then proceeds to speak of union rating and chargeability; and here, if I shall not be trespassing too much on your time, I will read a few lines. (Hear, hear.) "With reference to the nature of the change," he says,

"that seems to be thought desirable, I found some division of opinion; but I met with a decidedly large majority in favour of the entire abolition of settlement and removal; though in all cases there appears to be a thorough conviction that some new method of distributing the burden of supporting the poor would be indispensable in the event of the law being altered. The prevalent opinion, as far as I have had an opportunity of ascertaining it, appears to be that settlement and removal should be abolished, and that the poor should be supported by an entire union, out of a common fund, levied according to the rateable value of the property within the union, and not according to the averages of former years; for it is felt that there has been much injustice under the system of averages, and that to continue that system would be to perpetuate the injustice that has already arisen. In many close parishes the rates have been unduly kept down by the clearing process which I have already adverted to; and it would be exceedingly unfair to give permanently to those parishes the benefit of an abuse which legislation is so much needed to rectify. On the other hand, it must be admitted that in many open parishes the expenditure on the poor has been considerably augmented by local mismanagement, and it would appear to be only just that those parishes should suffer from their own laxity in reference to the conduct of their affairs, instead of being enabled to shift the consequences upon their neighbours. It has been suggested, therefore, by some of those whose opinions I have heard, that there should be a gradual approach to an equal union rate, and that a certain proportion of the charges on account of the poor should be thrown upon the parishes according to their respective averages of past expenditure, and that the remaining portion should be raised by an equal rate on all the parishes comprised in the union. It has been proposed that in every year the former proportion should be diminished and the latter increased, until the whole sum required for the relief of the poor should be obtained by one uniform rate upon all the rateable property within the union. Another reason assigned for the gradual approximation to an equal rate is the fact of many leases being yet in existence that were entered into upon a calculation of the usual outgoings for the relief of the poor; a consideration by which the amount of rent has always been very materially affected. It is believed that a period of six or seven years would be quite long enough to allow for the expiration of these contracts. It is, however, urged on the other hand, with some justice, that engagements entered into with a reliance on the continuance of a manifest abuse—for such must the minimizing of poor-rates in many cases be pronounced—scarcely deserve the consideration to which at first sight they might appear to be entitled."

Under the head, "The fear that union chargeability would lead to extravagant expenditure," he proceeds thus:—

"With reference to the question of union rating, it may be proper here to remark that the system has within the present year (that is, 1848) been adopted by the Board of Guardians of the Docking Union in Norfolk, and as far as experience has hitherto gone the plan has given perfect satisfaction, even to those who for some time had opposed its introduction, and regarded the step as one of considerable hazard. I have been favoured with a communication on this subject by Mr. Blyth, to whose exertions the change made at Docking is mainly owing; and his statement, which I have placed in the appendix to this report, will be found to confirm what I have said as to the satisfactory working of the new system."

Subsequently he says, under the head "Docking Union":—

"I have reserved this union for the close of that portion of my report which relates to the county of Norfolk, because the case of Docking has a bearing on the entire question, and is valuable as a practical test of the working of the principle of union rating and extending the field of employment for the labourer. In the evidence of Mr. Chadwick before the Committee of the House of Commons on settlement, which sat in 1847, it was stated that Mr. Blyth, an eminent farmer in Norfolk, and himself the owner of a close parish"—[that is a very strong fact—"himself the owner of a close parish"]—"had proposed to the Docking guardians a set of resolutions, with a view to the adoption of union rating and union settlement. It was necessary for the attainment of his object that there should be unanimity among all the guardians of the 50 parishes comprised in the union, and he at first expressed a hopelessness of success. But in a subsequent communication he spoke rather more sanguinely. In December, 1844, Mr. Blyth had only 10 supporters at a board of 37; but on the 10th March, 1847, his proposition obtained 31 votes in its favour, there being two against it, and one neuter. Of 29 absent guardians he calculated that the division would be nearly equal; but so great has been the advance of opinion on the question of settlement and rating, that the guardians have at length adopted the following

"REASONS FOR UNITING PARISHES IN DOCKING UNION FOR PURPOSES OF SETTLEMENT.

"I. That many labourers are compelled to reside in parishes where they are not legally settled, because there are not dwellings for them in those where they work and where they are settled. That this want of cottages is attributable to the dislike which owners of land have to build upon their estates, because of the expenses to which that property becomes liable by every additional settlement, and because many settlements have been made, and in future nearly all will be made, simply by residence.

"II. That this discouragement to the building of cottages has the effect of compelling labourers to go greater distances daily to their work, and they are obliged to hire such dwellings as they can meet with, often without either garden-ground or yard-room sufficient for ordinary accommodation, or even the common decencies of life; and they are transferred as tenants from the property of a large landowner, where the rents are usually moderate, to that of the small proprietor, with whom the rent is more an object as an income, and therefore more frequently high in proportion.

"III. That the ratepayers of the larger parishes have cause to complain of an amount of rate consequent upon the influx of labourers working elsewhere.

"IV. That the union of all the parishes as one for the purposes of settlement will fix the expense of each parish in

future at the same proportion as was determined by the scale of averages declared in June, 1846, and that therefore there will be no reason on the score of settlement, or probable increase of expense, to prevent the building of cottages upon or near the farm where labourers are employed, neither will there be any increase of rate because of an increase of residents.

"V. That the union of parishes will give a greater freedom of choice to the labourer in seeking employment, and to the master in choosing his labourer; it will no longer be the individual farmer whom the labourer can annoy by throwing himself upon the parish because he and his master cannot agree, neither will it be the interest of the farmer to decline employing an active workman because he belongs to another parish, or because there is a surplus of labourers in his own.

"VI. Workmen of character, skill, and good conduct, will be more sought after by the master, and therefore the advantages of skill, character, and good conduct, will be more clearly understood by workmen.

"VII. All expenses attending removals between parishes in the union will be avoided; and the management of the affairs of the union, as it regards the administration of relief, and the accounts to be kept by the several officers, will be greatly facilitated."

Those were the reasons which led the guardians of the Docking Union to adopt a union settlement. Now I believe there are 11,000 parishes in England and Wales, and 800 unions. You may then easily imagine what a diminution there would be in the expenses of litigation, if the rival interests of unions were substituted for those of parishes. Nor is that all. As the capital of a monied man is his money, so is the capital of a labourer in his skill and muscular strength; but through the present system of settlement, there are many cases in which higher wages are given to a bad labourer than to a good one, simply because the bad one happens to be within the boundary of this or that parish. (Hear, hear.) I grant that the same objection would be applicable in a certain degree to union settlement; but observe that in the one case there is a range of fifty parishes for the labouring man, while in the other he is restricted to a few yards. If our system as a nation is to be that of free trade, I maintain that the labourer has a right to spread his labour over a much larger area than is accessible to it at present. Perhaps he would say that he has a right to the range of the whole island; but in order to arrive at practical results, we are often obliged to cut off extreme principles. ("Hear, hear," from Mr. Shaw.) I think it would be quite enough to begin by granting to him the union area, for the exertion of that strength and of those abilities which God has granted to him as his capital in life. (Hear, hear.) At present he appears to be "cribbed, cabined, and confined" most unfairly—(Hear, hear)—and there is a kind of premium on keeping him down, in the operation of the Law of Settlement. (Hear, hear.) The boundaries of parishes are perhaps the most ancient relics of past times in this country; they are, in many cases and in many respects not at all adapted to the present times. Education sometimes suffers through their retention, and grievous is their operation for settlement purposes. If a school be established, it is at such a distance from the labourer's dwelling that it is practically useless. Whilst everything

else has been changed by act of parliament, the position of the labourer has continued what it was. I feel that I am trespassing on your time, but this is a point of so much importance that I cannot refrain from proceeding (cheers). In our calculations on this subject, we often think, perhaps, of the labourer as walking to his work in fair weather, and along a good road; but we know practically that labourers have often to perform their journey in wet clothes; and labourers generally having very little fuel, this is a most serious matter. (Hear, hear.) How many of our poor do we find suffering rheumatic pains in old age! (Hear, hear.) Even the question of the shoe leather of the labouring man who has to walk so far is a very serious one.

Mr. TATTERSHALL: I know one case in which a labouring man walks fifty miles every week, independently of his walking and work during the hours of labour. (Hear, hear.)

Mr. GORDON: I pity his employer as well as the labourer. In the report to which I have referred, many instances of the same kind are mentioned. Mr. A'Beckett says:—

“Union rating and union settlement having been put in practice by the Docking Board, it became a matter of considerable importance to ascertain how far the experiment had answered the expectations of those who had agreed to try it. I had elsewhere heard fears expressed that union rating would prove very injurious to what are called the half-men; and I inquired, therefore, particularly how such men had been affected by the alteration in the administration of the affairs in the Docking Union. I learned from the relieving officer that no individual of this class had been thrown out of employ by the change, and I found, moreover, that there had been seven or eight of these aged, or partially disabled labourers, who, it had been foretold, would be immediately discharged when their parishes would be no longer exclusively liable for their support, but who, the relieving officer assured me, had made no application for relief, and who must, consequently, have continued to find employment. It did not appear that there is any greater laxity than before in the administration of relief, but, on the contrary, the whole board having an interest in every case, there is more reason than formerly for general vigilance.

“The farmers entertain the hope that the new system will put an end to the practice of clearing close parishes, which has prevailed to such an extent, that some farms can only be cultivated by labourers living at a distance of four miles from their work, and coming to it exhausted with the fatigue of walking. On the day of my attendance at the board”—

Now comes the donkey affair mentioned by Sir Robert Peel: doubtless he saw this, and had it in view:

—“a woman applied for money to buy a donkey for her husband to ride to his work, as he had four miles to go to it. She said he was obliged to get up at three in the morning, and seldom got home before nine at night, having to go from Docking to Suetsham and back, the former an open, and the latter a close parish. Mr. Beck, a farmer, who was present at the board, said that out of from 15 to 20 labourers he employs, all but one have to walk from three to four miles to and from their work, and there are about 20 donkeys daily in his yard, which donkeys must, of course, be fed somehow.”

We know how donkeys are generally fed, namely by opening farmers' gates, and turning the donkeys in for the night—(laughter)—therefore the present system in-

volves a loss in that respect. “And it is too often the case,” continues the report,

—“that the possession of a donkey leads a man to gaol, for he sometimes begins to steal corn, and from that he goes to other delinquencies. Mr. Beck, who is an occupier, and not an owner, wishes there were a law to make owners build cottages, as he experiences very great inconvenience from the distance at which his labourers reside. I heard cases at the board of persons somewhat advanced in years applying for relief; and upon a guardian saying to them, ‘Why do you not come to me, I can give you work?’ the answer has been, ‘Why, sir, it is too far; the walk to you would be as much labour as the job I might be employed upon.’ It is hoped that cottages may be built to accommodate the labourers where they are required, now that parochial chargeability no longer exists; and it will be seen by the following resolutions, passed in pursuance of the object of my inquiry, that so far as experience enables them to judge, the guardians of the Docking Union have not merely reason to be satisfied with the change they have made, but are desirous for a still further extension of the principle they have adopted.”

So much, gentlemen, for the Docking Union. I must say that that is a tolerably successful experiment, and it is one which I, for one, think it desirable to imitate. Happily those who possess close parishes are but a small minority; but I trust that all will soon be led to consider and consult the general interest in this matter, and be led to the conclusion that by the adoption of union rating and settlement the farmers will obtain a better supply of labour, the poor-rates will be diminished, and the interest of the now oppressed agricultural labourer will be secured. I do not know whether or not I am strictly in form in suggesting that a petition should be presented to Parliament from the Farmers' Club in favour of the adoption of union rating and settlement; and I think that under all circumstances such a petition should be presented without delay, provided it shall appear that the majority are in favour of the alteration which I have advocated. I regret that the subject has fallen into such bad hands as mine; but it is a subject upon which, were I in tolerable health, I could almost become eloquent, were such a thing possible (laughter). It is, in fact, a subject which might well be expected to animate any one who has the good of his country at heart (cheers). I will only add, that in the *Globe* of last Friday evening there is an article on this subject, which is well worthy of perusal. The writer complains that though the question has been so long before the public, nothing has yet been done towards its settlement. In conclusion, I thank you sincerely for the patience with which you have listened to my remarks (cheers).

Mr. WILLIAMS would be glad to know whether or not in the Docking Union, to which so much reference had been made, there was a revaluation for the purposes of rating? There might be a difference of 5s. in the estimate for different parts of so large a union.

Mr. GORDON would state nothing with regard to the matter on his own authority: he drew nothing on the subject from the book.

Mr. WILLIAMS said it appeared to him that, if a union

were formed for rating purposes, there must necessarily be a revaluation.

Mr. R. BAKER, of Writtle, said: I cannot think that the observations of Mr. Williams have anything to do with the question. The question under discussion this evening seems to be, not so much the mode or principle of rating, as the mode of applying the rates for the relief of the poor (Hear, hear). I have directed my attention very much to that question, more especially since Mr. Chadwick spoke upon it in this room; and after looking closely into it, and comparing my own opinion with the opinions of others who are more versed in the matter than myself, I have certainly come to a rather different opinion from that which I held when the subject was last discussed by the Club. I was then inclined to the opinion that any interference with the principle adopted in the relief of the poor would rather be prejudicial to the poor than beneficial. I thought so because we had so long been in the habit of looking after the interests of our respective parishes, and had been induced—sometimes unwillingly—to employ men for the sake of employing them, or rather for the sake of our own pockets, feeling that it was better to employ the poor ourselves than to throw them on the parish allowance. I thought, in fact, that we were then directly interested in the employment of the poor, and that if a union rating and settlement were established, a large number of labourers would be immediately thrown out of work. Since then, however, I have arrived at a different conclusion, and I now quite agree with the proposer of this question, that for all purposes union settlement is the best settlement that can be adopted. If we had a national settlement, there would be no local interest. In times of pressure, when there ought to be a strong disposition on the part of farmers, traders, and manufacturers to employ the poor, I think no such disposition would be found to exist, and the poor would be mercilessly thrown on the public fund for their support. The same observation is of course applicable, in a degree, to union settlement. It may be said that, inasmuch as a union is but an extended parish, there would be as great a disposition to disputation respecting the settlement of the poor between union and union, as there now is between parish and parish. But when we reflect that the difference of interest will be diminished in proportion to the difference between 11,000 and 800, as was observed by Mr. Gordon, we must feel that there will be much less contention than there is at present (Hear, hear). Under union settlement, we should exercise the same kind of local controul as we do at present; but, instead of the guardians of the union meeting together to look after the individual interests of the parishes which they represented, the whole number of guardians would study the general interest of the entire union. Whether there was a larger or a smaller number of guardians present on any particular occasion, the interest would still be the same; and I think that in that respect very great advantage would accrue from the alteration (Hear, hear). I have myself long served as guardian of the parish of Writtle, in Essex, which belongs to the Chelmsford Union, and I have always found

that, when any of the guardians of parishes were absent, an opportunity was taken by guardians present of turning this circumstance to what they conceived to be their own account (laughter). The course pursued has always been different from that which would have been pursued if the parties immediately concerned had been present to defend their interests, and if all the parishes of a union were constituted, as it were, one large parish, that evil would be removed. Allusion has been made to the fact that in many close parishes there is frequently seen the pulling down of cottages, and the labourers are thus driven to reside in neighbouring parishes, where the poor-rate is accordingly considerably increased. Now it happens that the parish of Chelmsford adjoins that in which I reside. For a long period no building land could be obtained in the town of Chelmsford, the whole of the land being shut up, as it were, in entailed estates. A few years ago, 400 acres of land were liberated, and so enormous was the demand, that those 400 acres realized £80,000. Houses of an inferior description were run up in every direction, and this mania resulted, as might have been expected, in there being 500 houses at one time without occupants. The consequence was, that the labourers shifted from house to house. Houses which were let at 3s. a-week one quarter, would only fetch 2s. 6d. the next, and in the succeeding one, perhaps, only 2s. As houses could be obtained at a much lower rent in Chelmsford than in Writtle, a great number of labourers flocked there, the situation being quite as convenient in many cases with regard to employment. The result as regards the poor-rates has been that, while the rates in my own parish have been very much diminished, Chelmsford has been overwhelmed with poor, and property has been depreciated to a great extent below its value previous to all this building. I only mention this to shew the disproportion of benefit under the same circumstances. By providing accommodation for the neighbouring poor, the town of Chelmsford has had the burdens of other parishes thrown upon it; and I feel that a great act of injustice has been done to that town, to say nothing of the injustice to the labourer. With regard to the claims of the labourer, I quite accord with the observations which have fallen from the introducer of this question (cheers). I think a vast advantage would be conferred upon the labourer by carrying out his (Mr. Gordon's) proposition; it would be advantageous I think, both as regards the amount of employment, and his having access to it at all times. To a man who is much fatigued with his daily labour an extra walk of a mile must be a matter of very great consequence. I find that the present system interferes very much with the carrying out of garden-allotments, which are so prevalent in my own district. Wherever a person who has a garden-allotment—and I have 100 tenants of that description—has a great distance to walk from his cottage to his work, the allotment is of scarcely any benefit. What takes place as regards the labourer's own cultivation, may be expected to take place as regards mine. As regards the local watching of the guardians, and those who employ the poor, I do not see

that that is likely to be at all diminished by having to deal with the interests of a number of parishes instead of separate parishes. Though the labourers will have a more extensive field for their labour, the guardians would always be able to guard against imposition. I have always thought that if we had a general system of rating, one great evil which would result from it is that we should have the country full of itinerant paupers. Supposing a national system of rating were adopted, and every man were relieved in the parish in which he resided, or in which he became necessitated to seek parish-relief, we should have the country crowded with wandering paupers. The poor would remove from union to union to be boarded and lodged, until their real character could be ascertained; and when they found it no longer possible to practise imposition, they would remove to another district (Hear, hear). Under such a system it would be impossible to have the benefit of that local control and management which now exists.

Mr. RAMSEY said: Coming amongst you as a comparative stranger, I feel that I need your indulgence. I think that great credit is due to Mr. Gordon, for the masterly manner in which he has handled the whole subject; but I must say that, coming as I do from the north of England, there are some things which have been introduced, the bearing of which I am at a loss to understand. I think sympathy for the poor working man was one of the leading features in Mr. Gordon's address (Hear, hear). He has told us that in many cases the labourer is driven from the parish where he works to another parish for a cottage, and that he has to exhaust his strength by walking several miles to get to the place where he is employed. Now I cannot for a moment understand how a person who has to buy labour can be induced to buy it in an exhausted condition. In the north of England, supposing there were an estate of 500 acres, the first question which would occur to an intending occupier would be whether there were proper farm-buildings for himself, and suitable cottages for the labourers. Unless you have your labourers on the spot, I see not how, in the time of turnip-sowing, and at other periods of the year—I see not how the work is to be done. By driving the poor from close parishes to open ones, it appears to me that while on the one hand you would save perhaps four per cent., on the other hand you must lose ten per cent. (Hear, hear.) Will any one tell me that the intelligence of the agricultural body in this country is in such a low state that they will actually throw away a considerable sum of money in punishing their neighbours? Why if my men lived four miles away from me, what would become of my cattle? In what position should I be, in case I needed their services on the instant? I must conclude that what has been said relates only to one portion of the labourers—it cannot relate to all (“No, no”). There must be some labourers on the farm; otherwise those who do live there will have a great deal to do which strictly belongs to those who live at a distance. In my opinion the proper cultivation of the land depends on our having labourers within call. I know, at least,

that in my part of the country we never get our labourers from a distance if we can help it. With regard to the question of union settlement and rating, I must say that I do not think the working of the union system would be quite so smooth as Mr. Gordon supposes. In the first place, as my friend behind me (Mr. Williams) has suggested, it is a necessary preliminary that there should be a fair and straight-forward revaluation. If the rating valuation be incorrect, the whole system must be defective (Hear, hear). I was not aware of the existence of the act of Parliament which has been mentioned this evening; I was not aware that a union could be constructed in the manner that has been stated. That appears to me to be a considerable step in improvement; but I believe we must go a great deal further, and make the system national; provided, that is, we can have security against extravagant expenditure (Hear, hear). Let me here say that it is not the national principle which is objectionable, but national or central management (Hear, hear). The principle of a national rate is, in my opinion, sound; but if the government is to interfere in this case, as it does in the case of so many of our social institutions, then I think the evil would outweigh the benefit (Hear). I have the honour to be the chairman of a union including a population of 50,000 persons; I was overseer of the poor when only nineteen years of age; and, consequently, I have seen a great deal of the working of the present system. One great evil of that system is that there is one species of property in towns, and another in the country (Hear, hear); and while there are mixed interests, agricultural and manufacturing, the difficulties which we have to deal with are almost insurmountable. The other day there was brought before Parliament the question of the rateability of tenements. There never was a greater species of injustice than that which exists in that respect. A man who has £10,000 can lay it out in a populous town without rendering himself liable to the payment of poor-rates. As the law stands you cannot assess the occupier, who is generally a poor man; and one result of this state of things is, that houses are run up of a description against which our sanitary boards have set their faces; houses which are totally devoid of all the requisites for the preservation of health. I feel that we are greatly indebted to our friend Mr. Gordon for bringing forward this subject in the manner that he has done. There are, however, one or two points which he has omitted to mention. Considering the penny travelling by railway which is now established, it appears to me astonishing that labourers should be contented with 8s. or 9s. a week in one county when they might obtain 15s. by removing to another county. I am very glad that this matter is being discussed in this room. Many of us who are members of boards of guardians naturally inquire what is said by the London Farmers' Club, and the other farmers' clubs of the country; and it is very desirable that instead of taking a narrow view of our own supposed interests, we should consider the whole question in all its bearings. Mr. Baker said that the representatives of parishes, when sitting at the board, occasionally loaded others a little more heavily than they

would like to be loaded themselves; very probably that is so, it accords with all that we know of human nature. I am of opinion that if a man accepts a trust, whether it be that of representative of the people in Parliament, or of his fellow parishioners, he ought to be able to give a good account of himself (Hear, hear). For my own part, I have taken care to have a list published in a newspaper in my neighbourhood, of the days of attendance of every guardian; so that if any particular guardian had not attended as often as he ought to have done, on his presenting himself for re-election the rate-payers might decline to give him their support, and choose another representative. When men take upon themselves responsible duties they should perform them, and if this had been done generally there is scarcely one of our institutions but what would stand in a better position than it does at present (Hear, hear). In a short time we shall have become so enlightened by the high price of wheat (laughter), that we shall all be looking a little more after our own interests. As for the twaddle attributed to Sir Robert Peel, I pass that over with the utmost contempt (laughter). I have seen so much of his writing, and heard so much of his speaking—making such large matters of such small things—that I think what he says upon these matters scarcely deserves the least consideration. This kind of small talk on important matters in which Sir Robert Peel indulges is what I really cannot at all respect him for. With regard to building speculations, I think the evil mentioned must tend to remedy itself; you will not find a succession of men imitating what has taken place at Chelmsford. What I principally rose to say, however, is, that I do not believe any proprietor can be otherwise than interested in building convenient cottages for the labourers on the estate, in order that they may be able properly to perform their work, seeing that all the energies, both of master and men will be required to keep up the value of farming property (Hear, hear).

Mr. ACROX said: I cannot refrain from making a few remarks on a question of so much importance to farmers and labourers, and to the agricultural interest generally. Knowing, as I do, Dorsetshire, I am happy to say that we have there nothing resembling what has been described as regards distance in connection with other parts of the country. Our labourers are very badly paid, receiving, I regret to say, only 6s. to 7s. a week; but there are no donkeys used. About two years ago Lord Portarlington, the owner of a close parish called Milton Abbey, was, as you will remember, called over the coals rather severely by Mr. Osborne, and I must say that I do not think his lordship came out of the affair very well. An improvement has, however, taken place. I agree with Mr. Ramsay that it is quite impossible for labourers who have to walk four or five miles to their work to prove efficient. I recollect a dreadful case which I met with in Yarmouth, when I was there in 1845: a man, who walked five or six miles to his work, absolutely died from exhaustion (Hear, hear). It was said, indeed, that he died of cholera; but I believe what I have stated to be the truth of the matter (Hear, hear). I believe that by a union settlement and rating the poor

would be greatly benefited. The *Times'* commissioners—I do not like the term, I should prefer the name of correspondents (Hear, hear)—have stated that the labourers in Dorsetshire obtain fuel and potato land for nothing. I am sorry to say I cannot confirm that statement. A hedger, ditcher, or woodman certainly is allowed a faggot, or as much as he can carry home at his back; but fuel is not generally given except in sickness. As to the potato ground, the farmers plough them in and cart home the produce, and charge them at the rate of from £4 to £5 per acre for it. Can this be called giving it to them? I really care not, Sir, whether rating to parishes or unions be adopted so that the poor be actually benefited by the change; but, Sir, I think with Mr. Shaw that when Tenant-right is extended throughout the country, and a better understanding introduced between landlord and tenant, the labouring classes will be more benefitted than by stopping to inquire whether it is better to extend ratings to unions instead of parishes.

Mr. SHAW said: I think we have had to-night the best illustration that has ever been afforded since the formation of this Club, of the advantage to be derived from the existence of such a body. We sought to promote by its establishment that species of communication between farmers and persons connected with agriculture in different parts of the country, which should enable them to intercommunicate with each other; and I do not remember any occasion on which I have been so sensibly struck with the advantage of such communication as I have this evening by the observations made by our friend, Mr. Ramsey. A deeper impression may have been made on me than on yourselves; though I feel satisfied that this is not to be ascribed to any greater acuteness on my part, but rather to my watchfulness of the subject, and to my anxiety to see the objects of this Club fully carried out. I am at all times glad when I see any little incident evidencing the advantages conferred on agriculture by this Club. Now, the point to which I particularly allude is this: You must all have noticed the astonishment which was manifested by Mr. Ramsey at what Mr. Gordon stated as to the manner in which labourers are treated, or rather the position in which they are placed with respect to their employers. (Hear, hear). One would really suppose that Mr. Ramsey had been residing in some district of this country to which the poor-laws did not extend, and where, therefore, no such system as that which has been adverted to could ever have existed. There is inherent in his remark, and in the principle which it conveys, something more than a reference to the position of the labourer; it applies also, in a most important manner, to the position of the tenant. What says Mr. Ramsay? He says in effect, "The first inquiry which I should think of making with reference to an estate is this—Are there convenient and comfortable cottages for the labourers? We, in the north, should not think of cultivating farms without that species of accommodation." Is that one of the reasons why the farmers of the north have the reputation, which I have no doubt they deserve, of being better farmers? Is that the reason why we frequently find

less complaint in the north than elsewhere? Further, is that the reason why we do not find north of the Humber one incendiary fire in 50 as compared with those which take place in the southern counties? (Hear, hear). Without wishing, for one instant, to attribute a want of principle, or to ascribe ill-feeling, to labourers generally—I am one of those who have always denied that they are generally actuated by bad-feelings—I must say that there are times and circumstances under which a man can hardly be expected to endure the oppression to which he is subjected; and therefore it is that he revolts at all hazards. (Hear, hear). Although I am free and happy to confess that in the great majority of instances the incendiary fires which have been discovered are ascribable to the acts of idiotic parties, and people of demented dispositions, rather than to personal feelings, arising out of suffering; still, in many instances, I think extremely low wages, or the absolute want of employment, sufficiently account for incendiarism (Hear, hear). I go the full length of the observations which have been made as to the desire which all parties should entertain to afford increased accommodation to the labourer; and that is a question which not only affects the object which has been so ably and lucidly advocated by Mr. Gordon, namely, that of serving the labourer himself, but is also a most important ingredient in the position of the tenant farmer. I think that as regards the principle of the extension of the area of settlement, we have had ample evidence to night that to a certain extent, at all events, it may be adopted with safety as an experiment. I feel, however, so strongly on the improvidence and impropriety of adopting that hasty species of legislation which carries abstract principles at all hazards, that I am most unwilling to advocate any course which may be calculated to involve us in difficulty before we have made a fair and satisfactory trial by way of experiment. Hence, though my predilections are for a settlement more extensive than that of unions, I think the most prudent course would be to take that step first (Hear, hear). In the Docking union referred to by Mr. Gordon we have an instance of the successful adoption of the principle, and I would strongly recommend every person who takes an interest in the question to peruse the report lately laid before parliament, and which was made by gentlemen selected by the late lamented Charles Buller, who took great interest in this subject. The report to which I refer is not made by gentlemen unacquainted with the subject, and arguing only theoretically. Mr. A'Beckett, one of the gentlemen, went carefully through the counties of Norfolk, Suffolk, and Essex, and communicated with many parties immediately connected with the working of the poor laws; and derived his information from practical men engaged in the management of union affairs, instead of putting forward any crude notions of his own. It is to such reports as these that importance should be attached (Hear, hear). Much as it may be the habit of some parties to animadvert on the use of the term "practical," still, whether in farming or in other pursuits, I always place more confidence in the opinions of practical men, than in those of persons who have only studied the subject theoretically (Hear, hear,

and laughter). Mr. Baker has made some observations illustrative of the disadvantages which result from the crowding of cottages in one parish to the injury of another. It seems to me that the only cure for such an irregularity is an extension of the area of settlement. You would thus remove the temptation to pull down cottages in close parishes; and no one would build an excessive number in open parishes. A remark has been made in reference to the inequality of the present rating, and the necessity for a new valuation. It appears to me that that is quite a secondary question. I think there would be no difficulty in obtaining a fair valuation, if you once determined upon adopting the principle of extension of the settlement. Valuations are now made over much more extended surfaces than parishes, and they might be extended to counties. The observations made by Mr. Williams on the point of injustice arising from unequal rating, would be applicable if there were not an assimilation of value; but that is, I repeat, a secondary question: its consideration would necessarily follow the decision of the settlement question. I concur in the remark that the evil of centralization does not exist in centralization as a principle, but arises from bad management; and I believe that the tone of the public mind, and the circumstances in which we are placed, are such that all the disadvantages which have hitherto resulted from centralization will be remedied; because the management will be henceforward more carefully watched over. With respect to the soundness of the principle I do not know that we could have a better illustration of it than we have had to-night. There may be fifty parishes in a union; as there are in the case of the Docking union. That is a species of centralization; but you have had evidence that the centralization of fifty parishes in one union has not had a bad, but a good effect. And why? Because it is manifest that throughout the whole of the proceedings great care and attention have been bestowed on every point connected with the management. Let the same care be adopted generally, and the evils hitherto connected with centralization will be avoided; while, on the other hand, we shall have the benefit of the adoption of sound principles on an extensive scale. I believe that if we had men of integrity and ability who were carefully watched over—for even they should not be without that guardianship (Hear, hear)—we should be more likely to attain a useful end by means of an extended system, than by a system under which we have to deal with local influences and personal feelings. I shall not occupy your time longer, but I could not refrain from offering a few observations on a question of so much importance. I entirely concur in the view which has been taken by Mr. Gordon. I consider that union rating would be a step in the right direction; and I look forward to the adoption hereafter of a much more extended system, namely, that of the abolition of settlement and a national rate (cheers).

Mr. MECHT said: I witness too often the evil operation of the present system of rating. During harvest-time I have known men leave their homes at half-past three in the morning, reach their work at four or five, and not return until ten in the evening. Why, no farmer

or landlord would allow his horse to walk four or five miles before commencing the day's work, and the same distance after finishing it (Hear, hear). Surely humanity, common sense, and calculation upon whose work and power of working depends the success of our harvest, the same principle that we apply to our animals, and to take care that they are not placed in a worse position. Mr. Shaw had a throw at me when he said that he preferred practice to theory (a laugh, and "No, no").

Mr. HOBBS: What, are you only a theorist then? (renewed laughter).

Mr. MECHI: If I understand the term theory aright, it is a logical deduction from sound common sense, and reasoning in the absence of practical evidence. But I do know instances in which practice is opposed to both of these (laughter). There is, for example, the case of the farmer who habitually allows his liquid manure to be wasted, when theory and common sense would direct its application to the growth of the food of the people.

The CHAIRMAN: I did not hear Mr. Shaw allude to you (a voice, "The cap fits," and laughter).

Mr. BAKER said: Experience had taught him that it was easy to assimilate the different values of parishes. A farm in each parish in the union might be valued, and then the several valuations might be compared, and a fair proportion struck between them.

Mr. ACTON apprehended that by the system proposed, such towns as Manchester, Birmingham, and Chelmsford, would be inundated with casual poor. He would like to know how that was to be prevented?

Mr. BAKER said: The law would not be altered in that respect, but the union would occupy the position now occupied by the parish.

Mr. WILLIAMS said: Experience has taught me that there has been within the last few years more mislegislation on this subject than on almost any other; and the result is, that we are now reduced to such a condition, that it is absolutely necessary to make some alteration. The crowning act is, that of settling the paupers of England wherever they may have been resident for five years, and rendering them irremovable. That will, I believe, be admitted to be one of the most flagrant Acts of Parliament ever passed ("No"). After it became law, even the Poor Law Commissioners could not define its meaning. On account of the feelings of attachment supposed to have been created by a five years' residence, the Government proposed that paupers should be irremovable. But they did not define the principles of their legislation, but left a great deal to the Commissioners and the lawyers. The Commissioners were applied to first; they said, "You cannot remove paupers. If you send them to their parishes, they will be told that they do not belong to them, and told to apply where they have been residing." On going to the parishes where they had resided, many paupers were treated as casual poor, and as such it was necessary to maintain them. Then arose the question, To what place did they belong? It was thought that they belonged to the place of residence; and thus the grossest injustice has been inflicted on many parishes. I am acquainted with a parish in Hampshire (Overton) which is an open parish: the ad-

joining parish was a close parish, belonging to the late Mr. Portal. Mr. Portal was averse to the building of cottages for labourers. I believe there are but two farms in this parish, the largest being one of 1,200 acres, occupied by a relation of my own; and there not being more than four or five cottages, the labourers were nearly all obliged to go to the neighbouring town of Overton (a considerable distance) to obtain dwellings. Sir Robert Peel has described labourers as going to work on donkeys. I believe that could he have foreseen what effects would be produced, he would not by the course of legislation have consented to settle the poor of Ash on the parish of Overton: I cannot believe that he would have aided the establishment of a system by which the landed proprietor of an estate is led to depopulate his parish, and by which the poor's-rates which properly belong to one place are saddled upon another. Property has its duties as well as its rights. A proprietor is naturally bound to build cottages on his estate, in order that labourers may be able to give their labour to his tenants unexhausted, and that the labourers may enjoy all the advantages arising from residence on the spot. An Act of Parliament which sanctions the depopulation of one parish and the saddling of its poor on another parish, must be opposed to every just and right principle. I hold that landed property ought, as far as possible, to be made to afford employment to the poor in the neighbourhood. There are, I conceive, one or two objections to the union system. If you rate the whole union instead of the parish for the maintenance of the whole of the paupers which it contains, two evils may arise: One is, that unless you have an equal rate throughout you commit an act of injustice towards those who are rated to the full amount, and you will make one class of parishes support the poor of another class not so highly rated. Secondly, in many places where there are a number of casual paupers, you might throw upon agricultural districts the maintenance of those who would otherwise belong to towns (Hear, hear). Moreover, in a large parish, you would have great difficulty in getting all the farmers to unite in order to employ the paupers, each looking to his own individual interest. You might, of course, meet with some men who were more philanthropic than others, and who had at their disposal larger means of employing the poor; but the more widely your operations were extended the greater would be the difficulties with which you would have to contend. Many farmers would say, "I will only have the labour which I want; for if I employed more I should only be benefiting a parish at the other end of the union with which I am not connected, and of which I know nothing." Thus, I fear, only such an amount of labour would be employed as was absolutely required by the farmer. I may be wrong, but I think it right to bring forward this adverse side of the question; and if any objection which may be offered will not stand the test of practical investigation, it will no doubt be answered (Hear, hear).

Mr. W. F. HOBBS: I think that this meeting is very much indebted to our friend, Mr. Gordon, for the able manner in which he has brought forward this question, and he has expressed himself generally in views which so far

coincide with my own, that I need not long detain you. He has, I have no doubt, succeeded in disarming the opposition of many, who had an idea that the extension of settlement would be injurious to the interests of the labourer. I have communicated with many farmers in different parts of the kingdom, with the view of ascertaining their opinions on the subject, and many agree with me, that it would be a great national benefit to have union settlement. There are some persons who imagine that it would be injurious to the condition of the labourer; but I feel persuaded that the remarks which have fallen from several speakers this evening will lead to remove that notion. Though this is a question which is well worthy of the consideration of the club, it is in fact only part and parcel of that great question of labour, which may shortly come before the legislature. I was not surprised to find that a member of the Government had stated the other night that it was intended that that question should be introduced. In the present condition of agriculture, the settlement of this question alone could not be satisfactory. I am, of course, well aware that much improvement may be made in the condition of the agricultural labourer. I agree with Mr. Gordon, that if free trade is to be the system, the labourer has a right to a free market for his labour, and we have an equal right to it; and looking at all these matters in their connection, I consider that a very important crisis is at hand, with regard to the general management of labour on farms (Hear, hear). I have no wish to go into political subjects, but I am one of those who think that if we are to compete with the foreigner, who has at his command labour which costs no more than 3½d., 5d., and 7d. per day, it is our duty to look to that which is the only tangible thing that we have under our control. Whilst the extension of the settlement would confer advantages on the labourer, it will, I really believe, be advantageous also to the occupier of the soil. During the last winter, I had a good deal to do with the employment of labourers in stubbing up wood and so forth; and I found men coming seven miles to obtain free labour. These men worked for me not by the day, as is too much the practice, but by the piece; and I have seen one man, not more able-bodied than another, earning twice as much money. One advantage which the extension of settlement will give to occupiers is, that it will enable the good labourer to repair to a better market, while the indifferent man will have to take the time's price in his own locality. Feeling that much might be done, not only with regard to the law of settlement, but also for the improvement of cottages, I am rather surprised that nothing has been said with regard to the duties which might be taken off for the benefit of the labourer. The remission of the duty on bricks would be a very great advantage to our labouring population; and that is one point which ought, I think, to be considered with any alteration in the law of settlement. I myself have witnessed the injuries which have been inflicted on labourers by their being driven out of parishes under the operation of the present system. Some years ago I lived in a close parish, where I farmed a considerable quantity of land. There were

only five houses in the parish: only one labourer lived in it, and he did not work there. I had no opportunity myself of enabling labourers to reside in the parish, and I was obliged to offer them a temptation to come from a distance; as, for example, by giving them a certain quantity of beer, per day, over and above the general allowance of the neighbourhood. Some of those men walked a mile-and-a-half, others as much as three miles; whereas, if union settlement had existed, I believe the landlords would gladly have erected cottages for the protection of their own property, and not, as is now the case, have done all in their power to exclude the labouring population. I think that great weight is due to the remark, that the assessment of the poor should be made upon all kinds of property. The present system of assessment must, I feel, undergo great change, and this question is only part and parcel of a great measure to which it behoves every farmer to give his best attention. I was not much surprised to hear Mr. Mechi take up the remark of Mr. Shaw in the manner that he did (laughter). I expect to see a pamphlet from him very shortly, containing his confessions of his altered opinions with regard to agriculture. After some years' practice he is, by his own confession, only a theorist (laughter). I feel persuaded that the longer we meet him in this club, the more shall we find his opinions in unison with those of practical farmers, and the less he will be disposed to put forth those extreme views which so many theorists entertained.

Mr. HUGHES said, that though not a member of the club, he would be happy to give an example of the inequality of rating under the present system.

Mr. ACRON said it was a point which had never been a subject of doubt, the rating ranged from 1s. 7d. to 3s. 6d.

Several members exclaimed that the inequality was evident.

Mr. HUGHES could not express his admiration of the philanthropic spirit exhibited by Mr. Gordon in his address that evening. Such a spirit was extremely commendable. At the same time he must remind the meeting of the old adage, "that one swallow did not make a summer." He happened to live in a county (Kent) which was densely populated. In that county there was, he believed, no such thing as a close parish. Though there were, doubtless, such cases as had been described, he trusted that they were comparatively few in number, and that the evil complained of did not prevail to such an extent as some of the speakers appeared to suppose.

Mr. TATTERSHALL thought there would, at all events, be more unanimity of feeling under union settlement than existed under parish settlement. He came to the meeting with the feeling that a national rate would be preferable to any other; but the arguments which he had heard had led him to the conviction that for all practical purposes a union rating would be preferable to any other. If the rating extended over a large surface the management would not be so good, nor could so much practical knowledge be possessed by the managers as if it were confined to a more limited area—the area of a union.

That which was nobody's express business would never be properly attended to.

Mr. CHEETHAM said: Although the case of the union in Norfolk, which has been so much referred to, holds out to us a hope that union settlement would prove beneficial, yet I do not think the test is exactly a fair one for the country. If I understand the matter, the property rated in that union is wholly agricultural.

Mr. GORDON said the report did not state whether that was the case or not.

Mr. TATTERSHALL believed it was agricultural.

Mr. CHEETHAM: Where a union is thoroughly agricultural there can be no difficulty; but if the district included manufacturing and mining interests, I conceive there would be very great difficulty. Although much good will probably arise from the discussion to-night, yet I cannot but regret that the subject has been so much narrowed. I was glad to hear our friend Mr. Shaw advocate as he did a national rate. For my own part, I have come to that conclusion as the result of fourteen years' close attention to the working of the poor-law. I should like to see no settlement at all existing. I should like to see the maintenance of the poor made a Government charge (Hear, hear). I see no reason on earth why the funds of the Government should not be administered by local bodies precisely in the same way that they are now. I would not advocate the making of the support of the poor a national charge if I thought that Government officials would administer the funds and have the management; such persons would be totally unacquainted with local interests, and the interests of the poor would therefore be neglected. With respect to rating, I should like to know why all other descriptions of property should not be rated in the same proportion as agricultural property. It happens that, though a farmer, I live in a market and a county town, which is, as you are aware, not a very usual thing for a farmer to do. There are, perhaps, not more than a dozen persons possessing considerable means in that place; and I, though but a small farmer, pay as much for rates as the whole of them. If a tradesman makes £1,200 a year by his business, and a farmer the same amount by his farm, why should not the two be rated equally? Why should not all other descriptions of realized property be made to contribute to the support of the poor as well as land? Why should not funded property, for example, contribute its proportionate share? I hope to see this done before many years have elapsed. I never omit to avail myself of an opportunity of bringing this subject forward in public; for I consider it my duty to speak of it.

Mr. ACORN: Funded property is not visible; it is not tangible.

Mr. CHEETHAM: Not visible! not tangible! Why it is both visible and tangible to the income tax ("Hear, hear," and laughter). Why can it not be brought as easily to account with respect to the poor rate as with respect to the income tax? Fourteen years' experience have, I repeat, led me to the conclusion that nothing on earth is so great an injury to the labouring classes as the present law of settlement. I would, were I not afraid of detaining you too long, illustrate this rather forcibly.

I have in my eye at this moment a man who had lived with a farmer for years with great credit to himself. When he married he continued to work on the same farm, but his settlement was in another parish. At length the farmers agreed to employ none but those who belonged to their own parish. This poor fellow was accordingly sent adrift, and sent to his own parish; where he was but little known and less cared for. The order for removal was resisted by the parish officers; and this man was knocked about from pillar to post until his spirit of independence was completely broken. He is now on his way to Australia; where he will, I trust, find more friends and less need of friends (cheers). Mr. Gordon has spoken of close and open parishes. It is my misfortune to live in an open parish, surrounded by close parishes; and you may imagine, therefore, what is my position with regard to poor rates.

Mr. GORDON said he was in just the same predicament.

Mr. CHEETHAM: The law, instead of making provision for the increasing population, has absolutely offered a premium for the lessening of the house accommodation. One consequence of this system is, that in open parishes interested and mercenary individuals have been led to run up houses at the smallest possible cost, and therefore with very bad accommodation, a man and his wife, with six or eight children, being often confined to one sleeping room. That crime, poverty, and disease, should abound is scarcely to be wondered at. I have known more than one instance in which a man bearing an excellent character has been forced out of his own house, and not being able to get another, either in that parish or in the surrounding parishes, has absolutely lived for a time with his wife and children in the parish pinfold, which was covered with an awning (Hear, hear). This continued until the magistrates interfered. Although I have a great respect for landlords generally, I cannot but consider it as a stigma upon them that they do not provide more accommodation for the labouring poor (Hear, hear).

Mr. B. WEBSTER said: Having just returned from Ireland, where large unions, or electoral divisions, are now being reduced in size, because it was found expensive to have such extensive areas, I am convinced that this is a subject which well deserves consideration. One great object of agriculturists should be to perform the duties in relation to the poor. It is a question whether it would be possible to pass and carry out a law to compel every owner of a thousand acres of land, and of smaller or larger amounts proportionally, to employ a certain number of people, or to pay for their support; so that owners of land should be interested in providing comfortable cottages for the poor instead of pulling down those which exist.

The CHAIRMAN: Some of the objections to Mr. Gordon's plan are removed by the mode in which the present law is administered. A person having lived five years in a parish does not entail any incumbency on that parish as regards employment; but if anything happens to him he is put upon the common fund of the union, which is a step in the direction in which Mr

Gordon would have us proceed. It is but justice to the Duke of Bedford to say, that without regarding the question of close or open parishes, he has built many cottages of first-rate character. Previous to the passing of the late act, all parties resident in the town of Bedford, who belonged to the different villages and parishes in the neighbourhood, were actually maintained by the parish of Bedford; such parties have now ceased to be so maintained, and are upon the common charge fund of the union.

Mr. GORDON replied: He said he agreed with the Chairman, that the Act to which the Chairman had referred went a step in the right direction. The law to which the Chairman alluded was designed to prevent persons who had long lived in one parish from being ousted and turned over to another. It secured the settlement, and the support of the parties was thrown on the union rate. But though the object of the Act was benevolent, the result had been that the parties interested had moved heaven and earth to get rid of the poor as soon as possible, in order to avoid having to pay for them in the union. If union settlement were established, the benevolent object of the legislature in the case of which he was speaking would be accomplished. With regard to the Duke of Bedford, he must say that his Grace's estates were so large that he might be said to deal with unions where others dealt with parishes. He admitted, however, that there had never been built a set of cottages more calculated to promote the comfort of the poor, and he believed his Grace's name would be handed down to posterity as that of a benefactor of his country. If they succeeded in obtaining union settlement and rating, his Grace's example would probably be very generally followed; but as the law now stood, it was too much, perhaps, to expect landlords who possessed not such ample means as the Duke of Bedford to build cottages in one parish, while the owners of the adjoining parishes were pulling cottages down. (Hear, hear). He was glad that a Northumbrian (Mr. Ramsay) had been present on that occasion, as the men of the north were very able in their financial management. The farmers south of the Humber were, it should be remembered, in a somewhat different position from those who lived north of it. Mr. Ramsay had alluded to a bill now before Parliament, which had reference to the rating of tenements. He did not know whether he meant the bill, the purpose

of which was to make landlords liable for the parish rates of cottages under £6 a-year.

Mr. RAMSAY said that was the bill to which he had referred.

Mr. GORDON said that bill had been introduced by Mr. Halsey. It was founded on the Hemel Hempstead plan. There were a hundred places which were regulated at this moment on the same principle, under the operation of private acts, including Aberdeen, Brighton, and a place in Essex by the side of the water. He approved highly of the system. A measure founded on that principle was lost by one vote ten years ago. The principal opponents were persons at Liverpool who had built a number of houses for the poor. Lord Sandon, now the Earl of Harrowby, led the opposition.

Mr. ACTON said the principle was acted upon in the neighbourhood of London, in Camberwell and in Kingston, and in the city to a great extent.

Mr. GORDON: As regarded the valuation, he would observe that when all the parishes of a union were rated together, the new valuation must come of itself. He certainly would not consent that one parish should be rated at a third and another at a half, and so on. The whole union should be rated equitably. The question of rating funded property for the relief of the poor was rather irrelevant to the present discussion. With regard to Mr. Webster's plan, he would observe that it was adopted, in the shape of a labour-rate, some years ago, and, after a trial, was admitted to be impracticable. It would be very hard upon farmers to compel them to employ a given number of men; it would be an improper interference with the freedom of his operations (Hear, hear). He regretted that the plan of publishing the attendance of guardians stated to have been adopted north of the Humber was not in operation in the southern counties. In conclusion, he thanked the meeting for the acknowledgment of his efforts, and expressed a hope that they would all agree with him that union settlement and rating were preferable to the system which now existed.

On the motion of Mr. SHAW, the meeting adopted the following resolution: "That the extension of rating and settlement to unions, instead of parishes, would be highly beneficial."

A vote of thanks to Mr. Gordon as the introducer of the subject, and to the Chairman for his conduct in the chair, terminated the proceedings.

HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND.

A monthly meeting of this Society was held in the Museum Hall, on Wednesday, the 13th February. Sir John McNeill, G.C.B., in the chair. There were present—Sir David Dundas, Sir James Ramsay, Sir Alexander Maitland, Sir Michael Bruce, Sir James Russell, Sir Graham Montgomery, Mr. Pringle (of Whytbank), Mr. Elliot Lockhart, M.P., Mr. MacLachlan (of MacLachlan), Professor Low, Professor Balfour, Mr. Falconar (of Carlowrie), Mr.

Aitchison (of Alderston), Mr. Lamont (of Lamont), Major Houston, Mr. Macgill (of Kemback), Mr. Burn Murdoch, Mr. Lamont (of Knockdow), Mr. Brodie (Abbey Mains), and many other proprietors and tenant farmers.

Copies of the premiums and regulations for the Glasgow Show were laid on the table, and attention was called to the great sweepstakes for short-horn bulls.

Mr. DOUGLAS, Athelstaneford, inquired whether one party could show more bulls than one for the sweepstakes.

The SECRETARY replied that he believed that a party contributing more than one subscription could show more than one bull. The subscription was £2, and by contributing two subscriptions two bulls might be shown.

Mr. DOUGLAS suggested that by contributing one subscription in full, and a half subscription in addition, two bulls might be shown.

The SECRETARY said that Mr. Douglas' suggestion would be submitted to the directors.

It was announced that the subject for the meeting on Wednesday, the 13th of March, was to be, "The best Varieties of Oats to Sow," to be opened by Mr. Finnie, Swanston; and that Mr. Henderson, Longniddry, Mr. Douglas, Athelstaneford, Mr. Wright (Southfield), Mr. McLean (Braidwood), Mr. Sadler (Nortonmains), and Mr. Sinclair (Sunderland), would be requested to conduct the discussion.

Mr. HALL MAXWELL said that before proceeding to the business of the day the meeting had to come to some resolution on the question discussed in January—"The advantages or disadvantages of subsoil ploughing, and of trench ploughing." Owing to the great difference of opinion expressed by the speakers, he had experienced some difficulty in framing a resolution, but he begged to submit the following:—

"The meeting, while it approved generally of deep ploughing, was not in a position to adopt any definite resolution with regard to the advantages or disadvantages of subsoiling, or of trench ploughing, partly in consequence of the want of comparative experiments, the results of which might have furnished data for a decision, and also owing to the great difference of opinion expressed during the discussion, by gentlemen equal in experience and professional knowledge. It was unanimously, however, admitted that subsoiling ought not to be performed on undrained ground, or on gravelly sandy loam on an open subsoil. It was considered desirable to call the attention of agriculturists to the great importance of instituting comparative experiments, for the purpose of determining the merits of a question so important, and with reference to which there exists so much uncertainty. The statements of the different speakers, though founded on their general experience, involved matter of opinion rather than of fact; and in no instance had it been tested by actual experiment how far the expense of the operations was compensated by the increased production consequent on them. It was hoped that the discussion of the subject would induce farmers to institute some of the comparisons for which pre-

miums had been offered by the Society, and that the means of arriving at a more definite opinion than can now be formed would ere long be acquired through a series of accurate and carefully conducted experiments in different parts of the country."

The CHAIRMAN stated that it must strike every one present that the resolution now read was a proof of the great value likely to result from the monthly meetings of this society. Prior to the discussion on subsoil ploughing, there were few of us who were not disposed to consider that its advantages were universally admitted. The results of that meeting, however, showed a very great diversity of opinion among practical men of the highest standing, and proved the necessity that exists for having further light thrown upon it by careful experiment; and he could contemplate no more desirable result than that the society should have their attention from time to time directed to subjects on which experiments could throw light; and he thought that farmers should continue to have their attention thus directed, because the experiments which they might thereby be led to make would be of material value in throwing light on subjects on which much difference of opinion existed. He thought it could not but be the opinion of every one present that these experiments hitherto had been eminently useful (applause).

Mr. HALL MAXWELL then stated that Mr. Usher would give some explanation of his steam plough, although this was not previously included in the business of the meeting. It would be premature to have any discussion at present, but Mr. Usher would give answers to any questions that might be proposed to him.

Mr. USHER said—Gentlemen, you are all aware that many fruitless attempts have been made to cultivate the land by steam power, the reason of which, in my opinion, has been that the parties have proceeded on an entirely erroneous principle, as, from the method they have pursued, they could never get the machine to progress along the land. This, I think, can be simply explained by stating that all former attempts have gone on the principle that ploughs must be *dragged* through the earth. Now if you will consider for a moment, you will see that the plough-share and its bearer are exactly similar to a common anchor, which if you throw into the sea, it will hold the largest vessel fast, much more than a small engine of ten-horse power. To obviate this great difficulty in the present machine, I have reversed the plough, and made it as an anchor thrown out afore ship, by which the sailor hauls his vessel into position; and thus, instead of making the anchor a power to hold the vessel back, I make it a power to pull it forward, or in other words, I

make the plough a paddle-wheel instead of an anchor cast astern, and thus I propel the carriage along the land. In thus making the plough a paddle wheel, the next difficulty was that 5 or 6 ploughs entering the earth at the same time would lift a solid piece of earth and carry it round: while to put the ploughs each on a separate axis would involve such a length of machine, that it might not work. To obviate this I put all the ploughs on the same axis, and place each share a little behind the preceding, and by this arrangement no two shares come into action at the same moment, and the first set have turned over their given quantity of earth before the next set enter the land. On applying the power of the steam engine then to the ploughs, I found that they ran along the earth without turning it over, and it became necessary to put a drag on the wheels to prevent the carriage running away from its work; but instead of putting on the common railway drag, I thought it better to connect the wheels of the carriage with the wheel that drives the ploughs; thus I obtain an uniform stroke for each plough as it enters the earth, and it cannot progress until it has turned over the desired area. By this you will perceive that the ploughs drive the carriage wheels at the necessary reduced speed, *the forward motion of the machine being communicated from the plough to the carriage*, instead of from the carriage wheels to the ploughs, as in many agricultural implements now in use: or, to apply again a former simile, the paddles drive the vessel, instead of the vessel driving the paddles, and you are all aware that there is a much greater resisting power in the earth than the paddles have in the water; and it is strange indeed that we have been able to plough the ocean these 50 years, and cannot yet cross a 50 acre field with a steam plough. Had time permitted, I might enlarge on this subject; but I hope these few remarks may convince you, that the principle I proceed on is a correct one. The general objections urged against my plough are:—1st, That it will not work on hills; 2nd, That it will not do on stony land; 3rd, That the weight will be too great; 4th, That it will be too expensive. To the 1st, I answer that no locomotive will travel up more than a small incline, as the water leaves the tubes of the boiler; they would therefore burn and spoil the engine; but I shall presently show you, that 13 feet on the hundred can be ascended with ease by this machine. To the 2nd objection, I must say that where there are land-fast stones near the surface I do not pretend to use this machine; but where there are the usual descriptions of stones, as on all well cultivated lands, my plough has fewer objections than those now in use, for the common plough comes against stones embedded in the solid clay; but in my plough, as each separate

share comes into action, the preceding one has dug away all the earth before it, and it has therefore only to lift the stone out, as you would in quarrying lift all the earth off before you tried to raise your block. This certainly does not get over all the difficulty; but any very stony or very hilly land I must leave to horses, or to spade husbandry, to which my machine approaches much nearer than to the common plough. The 3rd objection is the weight; this I think of very little consequence, as a machine of 10-horse power will not weigh more than about 4 tons, and it is quite common for one horse to take 30 cwt. out of a field in a cart weighing 10 cwt., and by using broad wheels and a roller, as I do, I think the weight will be no objection; indeed, I believe considerable pressure will be necessary to keep the plough in the ground. The last point is the price, which will certainly be considerable, as I do not think it can be under £400; but if it will do the work of ten horses, and the engine be also made subservient to sowing, harrowing, thrashing, and, as I hope soon to show you, to reaping also, I think if the farmer cannot afford to lay out so much money, the landlord will readily do it; and then, gentlemen, we may defy the world for producing cheap corn. I shall now proceed to show you the working of my plough; but I must premise that while the earth I work on is natural or nearly so, the machine is reduced 144 parts, and you must not expect the same precision of working that may be looked for in the full sized implement.

Mr. GIBSON, Woolmet, said—Sir J. M'Neil and gentlemen, in opening the discussion upon the important subject of "Feeding of Farm Horses," I shall not preface the remarks I have to make by any apology for my inability to do the subject justice, as I consider it to be the duty of every member of the society to come forward when called upon, and to support, to the best of his ability, the Secretary and Directors in these most important and useful practical monthly discussions. In the remarks I have to make, I shall confine myself entirely to my own experience; but previous to taking up the subject more immediately before the meeting, I hope I may be allowed to make a few remarks upon the "Breeding and Rearing of Farm Horses." I have generally found that those bred upon the farm are more hardy, easier kept, and less liable to disease than those brought from a distance; great care and judgment ought to be used in the selection of the animals bred from; the sire and dam ought to be well shaped in their different parts, sound, strong, well formed limbs and feet, with good action, and well tempered, with sound constitution; if this is properly attended to, it will generally be found that "like produces like." Many inferior animals are

no doubt bred, but this is more frequently the result of the injudicious selection, and constitutional defects of the parent, than from any other cause. Cart mares ought not to foal until the spring work is over, and the prospect of grass is near; when the foal is weaned in autumn, it ought to be fed with nutritious food. In the winter season young horses ought always to get a due proportion of soft food, and be kept in a roomy place, where they can take the necessary exercise; and where enclosures are conveniently situated for letting them run out in fine weather, it will be found most beneficial. They ought not to be put to grass too early, and should be prepared gradually for the change, and upon no account let them remain at grass too late in the season; they should be carefully and frequently handled, and kindly treated—if this be attended to they will be easily trained to work. When changing their teeth they have difficulty in masticating their food, which should then be soft and nourishing to support them; if at this period they are allowed to get into too low condition, it impoverishes the blood, checks their growth, and renders them more liable to diseases at future periods. If it can be avoided, young horses ought not to be put to work before they are three years old, nor carted before they are five, as the better they are treated at this tender age the longer will they wear. In the construction of farm-offices it too frequently happens that sufficient attention is not paid to the stable accommodation of this most useful animal—stables ought to be at least 18 feet within the walls, and the width of stall for a full sized cart-horse should not be less than six feet; and particular attention ought to be paid to their being well ventilated. There are few diseases in the horse that cannot be traced to some cause, and were these causes more generally attended to by those having the management of them, many troublesome and fatal diseases might be prevented. Nothing is more essential to health than cleanliness and careful grooming; at no time when in a profuse state of perspiration ought they to be allowed to drink cold water, or to stand exposed to the inclemency of the weather; and when they have been exposed to wet weather they ought to be carefully rubbed down, and a covering thrown over their loins. I disapprove of horse-ponds, as horses are often taken there when over-heated, and to save grooming; I prefer the application of the curry-comb to cold water. Regularity in feeding is also of the greatest importance; if, from some cause or other, on any particular day this has been prevented, on no account ought an increased quantity of food to be given at once, to make up the deficiency. At no season of the year ought the horse to be allowed to get into too low condition, as t will generally be found that poverty generates

disease. The system of feeding I adopt is as follows:—From the middle of October till the end of May my horses get one feed of steamed food, and two feeds of oats daily, with the best oat or wheat-straw for fodder. I never give beanstraw, having often seen the bad effects of it—partly owing, I think, to its long exposure to the weather, and from the quantity of sand which adheres to it; I use it generally for litter. The steamed food used is well washed Swedish turnip and potatoes, in equal proportions, mixed with sifted wheat chaff. In those years when we had a total loss of potatoes Swedish turnip alone was used, but not with the same good effects as when mixed with potatoes. This year, having plenty of diseased potatoes in a firm state, I give a larger proportion of potatoes than turnip, and never upon any occasion gave oat husks, commonly called meal seeds, having often seen their injurious effects. At five o'clock in the morning each horse gets 6 lbs. weight of bruised oats, at noon the same quantity of oats, and at half-past seven P.M. 47 lbs. weight of steamed food. I find that it takes 62 lbs. weight of unsteamed potatoes and turnip to produce 47 lbs. steamed; to each feed of steamed food 4 oz. of common salt is added, and mixed up with one-fourth part of a bushel of wheat chaff, weighing about 1½ lb. A greater quantity of wheat chaff than this has generally too laxative an effect. Each horse eats from 14 lbs. to 18 lbs. of fodder during the 24 hours, besides what is required for litter; during the spring months I sometimes give a mixture of bruised beans and oats, instead of oats alone; from June to the middle of October, those horses that are required for the working of the green crop, driving manure, and harvest work, are fed with cut grass and tares in the house, and about 7 lbs. of oats each day, given at twice, increasing or decreasing this quantity according to the work they have to do; I turn out to pasture those horses only that are not required until the busy season. I disapprove of horses that are regularly worked being turned out to grass, and exposed to all the changes of our variable climate; I believe it is the origin of many diseases. The expense of this mode of feeding, at present prices, in the district, for each horse per annum, is as follows:—

12 lbs. of oats per day for			
	30 wks., is	7½ qrs. of 42 lbs. per bush.	
7 lbs. of do. for 22 do.	is	3½ do. do. do.	
			£ s. d.
		10½ qrs. at 17s.,	9 0 7
145 stones straw consumed, at 4d. per stone of 22 lbs.			2 8 4
Each horse consumes 5 tons 16 cwt. of turnips and potatoes in 30 weeks.			
58 cwt. potatoes at 1s. 6d.			4 7 0
58 cwt. turnips at 9d.			2 3 6
53 lbs. salt, 1s. 8d., 52 bushels wheat chaff, 4s. 4d.			0 6 0
22 weeks on cut grass and tares, at 9d. per day			5 15 6

For the 30 weeks, the keep of each horse per day is 7d. for oats, 7½d. for steamed food, and 2½d. for fodder; for the 22 weeks the keep is—grass 9d., oats 4d. or 1s. 1d. per day. The expense of preparing the steamed food, including coals, is 0½d. per day for each horse. Two hundred and sixty stones of straw will be required for litter for each horse during the year; for this no charge is made, as it is left in manure. By this mode of feeding, the horses are always in fine sleek condition, and able for their work. I have acted upon this system for the last 15 years, have always had from 16 to 20 horses, and during that period I have lost only 7 horses, 3 of them being from accidental causes; and I attribute this, in a great measure, to the mode of feeding, and, in particular, to the steamed food.

Mr. BINNIE, Seton Mains, said—For the most part, the soil of my farm is of a light nature, and the system I have generally followed in feeding my work horses has been attended with success. I consider that economy in feeding the horse embraces the health, condition, and stamina of the animal, and I have found those ends well served by adopting, as nearly as possible, the following mode of management:—viz., From 1st October to 20th May, my horses are fed thrice a-day; the morning and mid-day feeds consist of 7 lbs. of oats and bruised beans each feed (one part of the latter, to two of the former), the present cost of both diets will be something like 9d.; the evening's feed is composed of 35 lbs. turnips and 6 lbs. barley well boiled together, which (with the expense of coals, salt, and woman's wage of cooking) I put down at 6½d. I only use wheat or oat-straw (uncut) as fodder, and I will take the cost at 3d. a-day. From 20th May (when, by top-dressing, I have generally cutting-grass) until 1st July, I allow two feeds of oats and beans, as I have before mentioned, and as much cut grass as satisfies the horse in stable during day, and turn him to the pastures for the night. From 1st July to 1st October, I find, on an average, that my horses consume, as nearly as I can calculate, a feed of oats each per day; and, taking cutting and pasture grass at £7 per imperial acre, my statement resolves itself into a cost, as nearly as possible, of £28 10s. per horse per annum. In my calculations, I have assumed the value of 42 lbs. oats to be 19s. per qr., 65 lbs. beans to be 28s., and barley, weighing 53 lbs. per bushel, to be worth 20s., and turnips 15s. per ton. I can strongly recommend the black Tartarian oat for the use of the horse, as, from its peculiar formation, the horse is necessitated to masticate it thoroughly, and it has also the advantages of giving a very large acreable produce, and having a high standing in the oat class for its fineness of husk and mealing properties. I would also advise the growth of the

white Belgian carrot, as a most nutritious, safe, and economical article of food for the horse. It is easily raised, and can be grown to yield 18 tons an imperial acre on moderately free land. On account of the carrot keeping its moisture much longer than the turnip, I have found it most beneficial in its raw state, for spring feeding. I beg to close my remarks by saying that home experience, as also that acquired while engaged as inspector to a cattle insurance company, have taught me that too much care cannot be given to the properly ventilating and cleaning of our stables, as I am convinced that more horses are lost by inattention to these points than by any mode of feeding I have ever seen practised in the Lothians.

Mr. STEEDMAN, Boghall, said—Gentlemen, being called upon to take part in the important discussion on the "Best and Most Economical Mode of Feeding Farm Horses," I can give you no mode better and more economical (at least as far as I know) than the one I myself adopt. In the first place, my horses get in the morning 5 lbs. of oats, along with two or three small Swede turnips (raw), and the same at 12 o'clock, or dinner time; in the morning the boiler is filled with 56 lbs. of turnips and ½ lb. of linseed for each horse; the linseed being difficult to boil, is put into a small bag, and then placed in the middle of the boiler amongst the turnips; when boiled without a bag it is apt to boil over, and liable to sit on and burn, and in consequence the most nourishing part of it is lost. After the turnips and linseed are boiled, they are thrown into a large trough or cooler, and a little wheat-chaff, along with a handful of salt for each horse, well mixed together, and cloths, or a lid for the purpose, put over the cooler, and allowed to cool slowly; the weight of the turnips being 56 lbs. when put into the boiler, you will find reduced to about 40 lbs. About the half of this is given at dusk, or whenever the horses return from work, and the remainder at 8 o'clock, when the men go to clean and do them up for the night. The expense of the oats and turnips, twice a-day (at the present prices), is about 8d., and the boiled food 5d., making in all 13d. a-day; giving them oat-straw, upon which I place no value, allowing it to go in lieu of manure from the horses. Under this system, which I have adopted for the last six years, I have found my horses healthy, in good working condition, and always ready for their work, working them from daylight to dark in the winter months (except when they are feeding in the middle of the day); and, when prevented from farm operations by the weather, they go to Edinburgh for dung, and seldom, or I may say, never return, with less than 30 cwt. gross. Previous to boiling, I used to steam turnips and potatoes, but lost upwards of 40 horses, and

since I commenced to boil, I have been at a great expense with boilers cracking; but for some time past I have used a malleable iron boiler, made by Mr. Slight, engineer, Leith Walk, which I find to answer the purpose admirably. In the spring of the year, instead of giving the horses oat straw, they get hay, which increases the expense to about 3d. each; but their work being harder, and hours longer, I consider it necessary. In summer they get grass, costing about 6d. each, which I believe to be far more profitable than driving it to Edinburgh and getting a shilling, in consequence of making more manure, and saving labour. I may mention that the late Mr. Scoon, tenant of Pentland Mains (an adjoining farm to mine), used to feed his horses with two feeds of oats a-day, and at night they got raw potatoes, just as they were lifted from the pit or potato house (only riddled), and during his 19 years' lease, never lost a horse. The present tenant, Mr. Brown, has nearly run another 19 years, and to my knowledge has lost 15 or 16 horses, with feeding them differently. The only way I can account for this is, that Mr. Brown feeds higher and works harder. The breed of horses Mr. Scoon had was a breed rare to be seen now-a-days; they were mostly all blacks, with short legs and backs, deep ribbed, broad chested, with a good flat bone, and rare action—very unlike the present breed, long legged and backed, narrow chested, and with as much hair and clay on their legs, carrying along the road with them, as I am sure would weigh more than 4 lbs., and more like camels than horses; at least our forefathers, had they seen them, would have called them so. The great point in keeping horses in good condition (and consequently keeping them cheap), is to feed regular, and have them well groomed; also to attend to the ventilation of a stable, which, I am sorry to say, is rather overlooked in many cases. In addition to the present ventilators, which you frequently see placed in the roof of a stable, there ought to be a common drain tile about 3 or 4 inches in diameter, built in the wall, from 3 to 4 feet above the horses' heads when standing, and 4 feet apart, the same on the opposite side, or behind them; then you will always find your stables sweet and wholesome, the horses healthy and with good appetites. There is apparently a great loss attending horses' feeding, in consequence of the mangers not being properly constructed; I would, therefore, strongly recommend all those who are about to build a stable, to have cast metal mangers, placed on one side, levelled in the bottom, and fluted at the top, that is to say, with a projection over the inside about three inches. I have no doubt but that most farmers must have noticed horses, when feeding, throwing their meat out of the mangers with their

noses, and frequently throwing a considerable quantity over, which would not occur if the projection I have spoken of was attached to the manger, also having a rack on the other side, filled with hay or straw, as horses frequently eat when lying. Grain, at the present prices, would be cheaper than turnips to boil; but the change on the system of feeding might possibly cost a horse or two, and neither I, nor, I believe, any other tenant, is at present in a position to try experiments which might perhaps add very materially to the loss of money which we are now undergoing, and which had little need to be increased; therefore, I am contented to let well alone, as far as feeding horses is concerned.

Mr. FINNIE, Swanston, said—I am not aware of anything more deserving the attention of farmers, or indeed of any one possessing property in that invaluable animal the horse, than a searching inquiry into the best mode of supplying him with food; and, once ascertain that, economy will follow as a natural and necessary consequence, in one sense at least; for if the food is given in a manner most likely to insure health and ability to perform work, the large amount of capital invested in that description of live stock runs less risk of being encroached on by death, or unduly deteriorated in value; and the labour, which is the only way of turning that capital to a profitable account, must be admitted to be greater and more secure, in proportion to the uniform health and strength in which the owner of the horse can maintain him. I am, at the same time, aware that it would not be consistent with profitable practice to lay down rules for giving certain quantities of food, and hold out these for general adoption, as in this, as well as in other departments of farm management, much depends on the nature of the farm and soil—the nature and extent of the work to be performed; and, consequently, the adaptation of the food to the amount of labour must just be left to the skill and attention of the farmer. This, however, I would maintain, that it is essential to successful practice, in this department of rural economy, that a proper and economical system should be in operation. Far be it from me, for one moment, to allege that my brother farmers either want system or economy in the management of their horses; all that I intend by my remarks, on the present occasion, is to lay before this meeting those principles and rules, which, in my humble opinion, should form the basis of what may be termed an economical system or mode of feeding farm horses. The primary and all important of these I would state to be, an artificial preparation of the food, and which may be embraced under the following heads:—1st, The cutting or chopping of the fodder. 2nd, The bruising of the grains. 3rd, The boiling or steaming of the

roots. Various are the articles which may be used as food for the horse: take the grains, we have oats, barley, bran; of the leguminous plants, beans and peas; of the roots, the potato, turnip, carrot, parsnip; and what is used as green food, clover, tares, &c., and even whins; and then the grasses in their dried state, the straw of the cereal grains, and even linseed-cake, linseed, &c.; but upon the present occasion, and for practical purposes, we ought, I think, to confine ourselves to the produce of the farm. Now, in support of my first principle, viz., the artificial preparation of the food, I would say by its adoption we will be found consulting the laws of nature, and by doing so, can never fail in being right. My attention was early directed to this fact by reading an article (on cooked food for horses), in the *Quarterly Journal of Agriculture* in 1832, from the pen of our able and celebrated professor of veterinary surgery, Mr. Dick, and which it would be well worth while to republish. Mr. Dick very properly calls in question the prevailing indifference on the part of owners of horses to the state in which that animal generally receives his food, describes the peculiarity of the process which his food undergoes before it passes on to be digested, and from his knowledge of the anatomy of the horse, argues that an artificial preparation of his food cannot fail to be economical. Mr. Dick concludes thus—"That before the food can properly yield nourishment to the animal, it is necessary that it be minutely broken down and cooked, either naturally or artificially, before digestion can take place, and I further conclude that the more completely we do this the more readily and completely will the nutritious portions which the food contains be taken into the system, and thus by avoiding almost the possibility of waste, the animal will be supported in the same condition at a less cost to the owner." I think it is unnecessary to add more upon that point, but shall proceed to the practical working out of this theory, and will commence with the fodder, suppose that to be straw, but which I would restrict to that of either beans, oats, or wheat, barley straw being universally admitted to be bad for horses. Bean straw I propose not to refer to again, although I believe it to be the most valuable, and even within the scope of my remarks; still not being a grower of beans, I wish to advance nothing but what is founded on my own experience. Now the article of straw contains a high relative value in certain localities, and when such is the case there is less waste by cutting or chopping it; but even take a district where the principal object is to convert it into manure, I would even argue in favour of artificial preparation, having found from experience—1st, That the horse will thus be induced to take a much larger proportion of it within the 24 hours. 2nd, That

you will afford him some hours during that time of additional rest, to recruit his exhausted system, as, comparatively speaking, he requires almost no time to fill himself; and 3rd, and not the least important consideration, that the more fodder he eats the better will be his condition, for I maintain that any stranger going through a stud of farm horses will have no difficulty in pointing out to the farmer his best consumers of fodder. But, before passing from the cutting of fodder, there is still another recommendation which I think it has. We all know that as the winter advances, and the spring commences, very little of the natural sap remains in the straw, consequently it becomes less palatable, and invariably after wetness in harvest, which we rarely escape from, it is never good, and being one of those that think that hay should to a great extent, if not altogether, supersede the use of straw, where no beans are grown upon the farm, I am firmly convinced that give a farm horse as much of the grains as he can consume, if his fodder is indifferent, that animal can never be kept in a thriving state; this may be accomplished by use of the cutting machine, but not without it, as I know the profligate waste whenever ploughmen have leave granted to frequent the hay-stack. By cutting, however, the farmer can well afford either to give hay alone, or in a certain proportion mixed with the straw, for, in either case, he will find that less corn will suffice. Then as to the bruising of the grains: and need I do more than direct attention to the solid excrement of the horse? and as appearance will require no further demonstration to prove that grain given entire produces the loss of a very large proportion of nutrition, some allege a tenth part, I would say much more, but at all events a good deal, will be seen voided without having undergone any change. It is, I think, unnecessary to occupy the time of this meeting with any further remarks on this point, as there cannot be a better illustration of there being an unnecessary expenditure of food, if bruising of the grain is neglected. I shall now refer to the steaming and boiling of the roots, viz., the potatoes and turnips, and perhaps I may be found differing with many of my practical friends; but I will state what my conviction is, and which has been founded on some little experience, and I would say, first, that by boiling or steaming the potato and turnip there is less risk of endangering the health of the horse; and, secondly, that you maintain him in better condition. I would instance the practice of horse dealers, whose object is to obtain that condition which is essential to enable them to realize a profit between purchase and sale; and I believe they will admit that either boiling the roots or grains, or steaming the roots, is indispensable to their business; but I would say further, that it is

surely more in keeping with the laws of nature, when you subject the system of the horse to what may be termed an artificial treatment, to study the food most congenial for him under such circumstances; and I think it can hardly be disputed, that after exposure to cold, wind, and wet, that a comfortable supper of moderately warm cooked turnips and potatoes, well seasoned with salt, is a more inviting and salubrious mess than if they were given in their crude and unprepared state. Some farmers give two feeds of steamed or boiled roots per day—to that I have no objections—all that I would wish to maintain is, that the horse, during the winter months, should have at least one mess cooked for him in the day; and if it is not found profitable to give either potatoes or turnips, let a boiled feed of beans or peas be substituted, and that at the close of his day's work. Before disposing of my straw-cutter and bruised grain, I may further remark that Mr. Dick is not my solitary authority. I may point to the practice of our enterprising townsmen, Mr. Croal, to Mr. Isaac Scott, or to the Messrs. Laings; I believe the two former have been found cutting their hay and straw, and bruising their grain for at least 20 years; I know the former, 17 years back, had no hesitation in stating that his annual saving in his establishment by doing so was not less than £150. Go to London, and there I found the establishments with from 100 to 300 work-horses doing the same. I believe it is very general on the Continent; now, such authority as that I hold to be worthy our imitation and consideration, inasmuch as in such establishments the food is all purchased, and must be obtained, at whatever cost, and the very success of their business depends upon the condition in which they can turn out their horses, and often to the hardest work. I now come to the treatment of horses during the grass season; and here I may be found at variance with other practical men. My opinion, however, is, that the objections to the pasturing horses are unanswerable. In the first place, I would say it is a most expensive manner of feeding them, inasmuch as less ground would suffice if the grass was cut green, and given either in the stables or yards; secondly, that there is a great waste of manure; and lastly, but not least, the poor animal is turned adrift to roam about and search for his food, with an exhausted system, and is thus deprived of the rest necessary to enable him to perform the requisite labour you extract; and besides, after great exertion and copious perspiration, with a relaxed system, having every pore in his body open, he is left to seek his bed on the cold, and often wet ground, exposed to the elements, and which treatment cannot fail to predispose him to disease, instead of being well groomed, just as important for

him as the much-cared for racer, well-littered, and allowed to use what, otherwise, would be an empty stable. There is one thing, however, I should wish to notice in connection with soiling horses, and that is, that, in order to avoid waste, the grass, when cut, should be put into bunches, and let the size and number of those be apportioned, from time to time, to the consumption; as I need not remark, that in proportion to the mixture of clover, its wet or dry state, or the succulency of the rye grass or tares, will be the ratio for the daily allowance of each horse; and when these are brought home, every ploughman receives the number allotted for him; thus from the field to the rack there is no loss in transit. When, on the other hand, it is brought home in a loose state, each ploughman with his fork selects what suits his fancy best, scattering and treading no small portion of the heap, filling his rack to overflowing, and what is not consumed at the time is left to ferment until his return to the stable, when it is cast to the dunghill. I have found from actual experience that the difference in saving between bunches and bringing home grass in a loose state amounted to 1s. per head per horse per week, and that upon an establishment of 20 horses was no small consideration. Having, I fear, exhausted the patience of this meeting by extending my remarks on what I thought the most important points to be attended to in farm horse management, I shall be very brief in what I have to say about the quantity each horse may be expected to require per day. This, as I said before, must be left entirely to the judgment of the farmer, as well as the grain and other farm produce which ought to predominate in the feeding of his horses—I would say invariably let it be what is of least marketable value. If during the grass season the work is light, the grain may be very much restricted or even dispensed with altogether; and in the winter season, even at regular work, from 10 to 12 lbs. per day, in addition to their cooked food for supper, will be found sufficient; when hay is given, from 2 to 3 lbs. less of grain will suffice. I find my best fodder eaters consume at the rate of 17 lbs. per 24 hours of cut oat straw, and the saving between giving hay entire and cut will be in favour of the latter in the proportion of a third; and the only point in which I differ from my friend Mr. Dick is in preferring my oats to be bruised rather than ground, as I think my horses masticate them as well, and certainly appear to like them better. Another point I ought not to admit, and that is in changing from heavy to light grain, or *vice versa*; the feed should be in proportion to the weight. If this is neglected, overfeeding at one time and underfeeding at another must take place; and it being the usual practice of all farmers to con-

sume all the light oats first, and when they run out to fall back upon the good, and that a difference of 6 to 8 lbs. per bushel is often found to exist, the necessity for this test I think is plainly made out. I shall only trouble you with one other observation, and that likewise bears upon the economy of farm stable management. It is the undesirableness of trusting the feeding of the horses upon a farm to any one whose employment is that of a regular ploughman; for, without calling in question the honesty of one in such a situation, I would say his horses seldom appear in worse condition than that of the others. This occasions heart-burnings among the other ploughmen; that is not all, there is often favouritism. I likewise object to the system of each man being the custodian of his horses' corn; I do not think economy can exist in either case. My own practice is to entrust one to serve out the grain given to the horses, totally unconnected with the ploughmen, and the advantage of doing so rests in having the food of the horses distributed in proportion as they require it. If at easy work he restricts it; that a regular ploughman will never do. And as in every establishment some horses are more easily kept than others in good condition with this arrangement, the food is given in either smaller or larger quantities, as the constitution of the horse or the nature of the work to be performed requires: and in this way a more thorough control can be exercised over a department in farm management which is certainly not the least expensive to maintain. Mr. Finnie concluded his speech by remarking that, with regard to the annual expenditure required for the horse, his experience coincided with the details given by Mr. Gibson. He (Mr. F.) considered, however, that Swedish turnips were of too laxative a nature for the horse, and he had made use of boiled peas. Before the potatoes became so bad, he had been in the habit of using five parts of turnips to one of potatoes. But, in the main, he was disposed to corroborate the statements of Mr. Gibson.

Mr. THOMSON, Hangingside, said—The opinions which have been entertained, and given forth upon this subject, have been numerous and exceedingly varied, while each has been supported by a feasibility of argument, sufficient at least to induce adoption; still the matter has not been reduced to any thing like a fixed principle. Nor will this be obtained, until science enable us to know exactly the property of each ingredient that is commonly used for the purpose of sustaining those animals used in farm work. There are certain general laws of nature, which, if carefully considered, may, under close observation and a certain knowledge of the constitution of the horse, guide in common practice; but it is for chemistry to elicit the food best suited

to repair the waste produced upon the performance of a given amount of work by any animal employed by man. Experience has pronounced that the food best adapted to enable the horse to perform the greatest amount of severe work is good oats, well made clover and rye grass hay, with occasional mashes, and alterative medicine to keep the stomach and bowels in proper tone; if this be so, it must be held as the best under all circumstances, and for any sort of work; but as farm horses are usually kept upon a different description of pulse, a corresponding alteration becomes necessary in the amount and kind of the nutritious food given them. The course I have adopted for many years has been as follows:—viz., during the summer months, two feeds of oats per day, of 6lbs. each, with grass; and during the winter and spring months, the same quantity of oats, with a boiled feed at night, consisting of Swedish turnip, mixed with beans, barley, and clean chaff, weighing 40lbs. to each horse, using salt and 1½ oz. nitre to each animal once a week; by this mode of treating my farm horses, disease has hardly been known in my stables. Care should be taken that this quantity of the prepared food should not be exceeded, as it may be considered the maximum to be safely given. Important as is the amount of nutritious food allotted to a horse, not less important is the kind and quality of the fodder that is to be the accompaniment; if possible, the fodder of any year's growth should not be used in the same year: that is to say, the fodder of crop and year 1848 should form the supply over the whole of 1849. At this period of the season, the natural moisture which produces fermentation in the stomach of the horse is exhausted in the crop of 1849, and the animal is saved from those acute attacks arising from disordered bowels which the susceptibility of his system renders him liable to. Barley-straw should never be given to a horse; it is so productive of flatulence that he hardly ever eats it unscathed. As to the question of economy—the food which supplies the largest amount of fat and muscle, torn from a horse by hard work, is the cheapest. Regularity in the treatment of the horse is of the utmost consequence, whether as regards food, drink, work, or mode of keeping and dressing. He is the most easily affected of all the domestic animals by any sudden change, and is more subject to inflammation than any other. He should have but one day in the seven for rest, and as seldom as possible be over wrought; an extra hour or two will tell upon him for several days. As different horses have different constitutions, they require to be treated accordingly—the appearance of the coat speaks at once to the eye, but the state of the bowels is the surest index of the health of the animal. Bruised corn is preferable to whole, both

as it obliges the horse to masticate, and is more easily digested.

Mr. BLACK, Dalkeith, said—I am afraid that my system of feeding farm-horses will not be approved of by farmers generally, as they may consider it expensive. All the farm horses under my charge are allowed 16lbs. of hay, 12lbs. of bruised corn, and 28lbs. of boiled turnips per day, during winter and spring, which at present prices in my locality will amount to 1s.6d. per day. I consider boiled turnips, when given judiciously to cart horses, a most palatable, nutritious, and gratifying food, particularly to young horses; and not less so to those intended for coach or saddle than for farm work—they grow much faster and look much healthier, with nice sleek coats. I have generally from 20 to 30 horses young and old, fed on boiled turnips; and to convince you that they are wholesome, I have only had one death from disease during these last four years, and that death was occasioned by the bursting of a blood-vessel. I consider it of the greatest importance to keep farm horses in good condition, or rather fat, as I consider good condition in a farm horse a good flesh coat. Weight is always advantageous in slow work, indeed weight is power in the heavy draught. With regard to the remarks my friend, Mr. Gibson, made at the opening of this discussion, anent the rearing of horses, I think them most judicious; great care is necessary in selecting both dam and sire. In selecting a hunting horse, I believe the first point to be looked at is his hind quarters, to see if he has muscle enough to propel him over his fences; in a roadster, his feet, fore legs, and shoulder; but in selecting a cart horse, the back ribs are the first points to be examined, unless they are high and well back towards his haunch bones, he will never be easily kept, or endure much fatigue. I hope you will excuse the digression I have made from the subject of discussion.

Mr. SCOTT, Craiglockhart, remarked that he very much agreed in the statement made by the gentlemen who had previously spoken. But he did not altogether concur with Mr. Gibson in the opinion that bean straw should not be given to horses; he (Mr. S.) had long been in the habit of giving that kind of food, and he was aware that others had; and his opinion was, that its value was not much inferior to hay. He had also found much advantage when horses were working hard, especially in the spring months, to adopt a judicious plan of a division of the food. The interval, he considered, was too long for a horse to want food, from an early hour in the morning to twelve o'clock, and a small feed of oats at about eight o'clock he found was valuable to the animal.

Professor DICK remarked that he was not pre-

pared to enter at length upon the subject now before the meeting, as he was not present at the commencement of the discussion; but from what he had heard, he thought he could gather pretty accurately the opinions of the farmers as to the feeding of their farm horses. There was one point, however, which had been but incidentally touched upon, and to which he would suggest that more attention should be paid. He alluded to the giving of food to horses at shorter intervals. He approved of cooking food, but the danger lay in giving it in too large quantities at a time. In the evening, when the animal's system was somewhat exhausted, and the cooked food was easily swallowed, the stomach became overloaded, and every farmer well knew the consequence. Food ought to be given in the morning before going out, and again, as had been recommended, at eight o'clock: indeed, a greater division of food would at all times be found advantageous. He knew one gentleman who had lost a number of horses by inattention to this, and though he (the professor) was generally sent for, he always found the animal dead before he got to the place (laughter). He suggested an alteration in the way of feeding the horses, especially that the evening meal should be divided into two feeds, instead of giving it all at once. When the animal came in from its work, one portion could be given, and the second portion some time after. He (Professor Dick) did not think that the gentleman referred to lost a single horse afterwards, except on one occasion, when a servant gave one of the animals a too large feed. He (the professor) would also mention the advantage of allowing a horse to rest twice during the day at least. It was most injurious to a horse, to allow it to work on for a number of consecutive hours without food. The stomach of the animal was small, consequently could not contain food sufficient to enable it to work a great portion of a day without a renewal of food and rest. Sometimes the stomach was literally stuffed full, and its power of contracting and acting on the contents was thus destroyed. In consequence of the peculiar structure of the animal, the stomach soon became empty, and when distended either with food or by the want of it, it was much injured. A combination of hay and oats chiefly would be found the best kind of food—though some thought it expensive; and to cut the hay and bruise the oats was much to be recommended. If the corn be bruised or ground, it could be taken with safety; for it would be deprived of its vitality, and thus digestion be quickened. Mr. Thomson recommended hay and oats with a little bran mash, as the best feeding; and in this he is right. He added to this the propriety of giving a little alterative medicine—he (the professor) was

one who was more in the habit of giving medicine than in taking it (laughter), and he would advise Mr. Thomson to try a handful of salt among his horses' food instead of any *alterative medicine*. No doubt, an alterative medicine would make an alteration (laughter), but what kind of an alteration? It would be found that any interference with the profession of the regular practitioner was by no means a good thing for the farmer (laughter). When medicine was really necessary, let the farmer send for the doctor in *time*; let him give small quantities of salt amongst the food; but let him have little to do with alterative medicines. All kinds of medicine were alterative; but he would have his farmer friends to have more faith in a handful of salt and good food judiciously given than in quack alterative medicines, which were so plentifully advertised (laughter and applause). He had that day had some cake sent him as being

good food for horses, and suited to their strength; but he had no specimen of it with him. He might observe that a certain quantity of innutritious food was necessary to go along with the other, because if the food be too rich or nutritious the animal would assuredly suffer (applause).

The CHAIRMAN said that the meeting was certainly much obliged to those gentlemen who had given their opinions on the subject of feeding farm horses, and now Mr. Usher would show the working of his steam-plough.

Mr. USHER then exhibited the model of his steam plough, which created a very great interest among the numerous farmers and others present.

On the motion of Sir JAMES RUSSELL, K.C.B., a cordial vote of thanks was tendered to the chairman, for his able discharge of the duties of the chair.

THE AGRICULTURAL DISTRICTS OF ENGLAND.

FROM THE TIMES COMMISSIONERS.

(Continued.)

LETTER III.

HIGH WYCOMBE, BUCKS, Jan. 24.

A glance at the geological map of England will show that the southern and eastern portions of the county of Buckingham are occupied by that great bed of chalk which extends from Dorsetshire, eastward into Sussex and Kent, and in a north-easterly direction as far as Yorkshire. As no survey of the condition of agriculture in this county would be complete without a description of the method of cultivation pursued on its chalk soils, we proceed to explain what that method is. The farms are not very large, varying from 100 to 200 and 300 acres in size. The occupying tenants sometimes hold their tenure by leases, and sometimes from year to year. The landlords do not as a class appear to interest themselves more in the permanent improvements of the land than is the case in the other parts of the county which we have visited. On these chalk soils the farmers do not consider drainage necessary, the earth being already too dry. That source of outlay, therefore, may be reckoned, if the practice of the district be right, as saved to the proprietor. It would, in consequence, be expected that the description of farm buildings would here be considerably improved, and that substantial and conveniently arranged outhouses would be found. Such, however, is far from being the case. The barns, cow-houses, and feeding sheds are still, in most instances, constructed of wood with thatched

roofs, and though the materials of which they are composed scarcely appear compatible with durability, they all seem to have been constructed many years ago. In our tour of inspection we passed the seat of the late Earl of Buckinghamshire—once the residence of John Hampden, and we could not help remarking that Hampden-house wore better and had a more modern look than most of the buildings around it. In fact, were Hampden to raise his head and take a glance at the present condition of the farm buildings near the spot where he once lived, it is not likely that he would see much to disturb his belief that the days of the Roundheads and Cavaliers had not passed away, and that the world was 200 years younger than it actually is. On the chalk lands the amount of rent charged seems less than on the clay and gravel soils of Buckinghamshire. It was stated to us as varying from 15s. to 30s. an acre. The farmers spoke very disparagingly of the productive powers of their farms, and appeared to consider a return to prosperity with low prices as impossible on chalk, as the farmers on clay think it impossible in their case. We inquired particularly to what extent reductions of rent had taken place in this neighbourhood, but could not ascertain that any reduction worth mentioning as such had been made. There were five cases of farms becoming vacant from causes connected with the present pressure on the agricultural interest. Two of these farms belonged to the same

tenant, who gave them up because he saw no prospect of making anything by farming hereafter. His place was immediately supplied by others, and at a very slight reduction of rent, if any. Of the three remaining farms alluded to, two are the property of Mr. Disraeli. Public attention has already been drawn to the subject of these farms, or we should not, perhaps, have deemed it proper to refer to it specifically. Having, however, inquired into the circumstances on the spot, we deem it right to state the facts as we heard them:—Mr. Disraeli's estate is about 800 acres in extent, and the two farms in question are the rent-yielding portions of it. The family occupying one of these farms has been 32 years in possession; that occupying the other 20. The former proprietor (Mr. Norris) is described as a kind indulgent man, who let his land for less than its real value. Mr. Disraeli bought the estate a year and a half ago, on a valuation made after the death of Mr. Norris, which took place four years ago—the valuation being made during the period of high prices, and with the view to a sale. The tenant whose family has been longest in possession succeeded a man who only produced 10 bushels of wheat an acre, and was unable to make anything of the land at a rent of 7s. 6d. per acre. Mr. Norris provided farm buildings at his own cost, for which he charged an increased rent to cover the interest of his outlay. During a tenure for 32 years, in the course of which the original lessee died, leaving the farm to be managed by his widow and young sons, the original average crops have been doubled. The valuation under which Mr. Disraeli purchased increased the rent, it is said, 25 per cent., and this increase was paid by the occupiers for two years, in the hope that during that time they might extract from the soil the capital they had invested in it, and which they must have lost if they had immediately given up possession. Even if prices had remained as high as when the valuation was made, the occupier states that he would not have agreed to pay the increased rent charged for a continuance. Therefore when prices fell so low he applied to Mr. Disraeli for a reduction of rent to the amount of 10 per cent., and his fellow tenant also applied. The rates, it should here be mentioned, had during the last five years increased from 4s. 6d. to 8s. 6d. The application for a reduction of rent has been refused by Mr. Disraeli, who has let the two farms on terms little, if at all, under those which the retiring tenants refused to pay. The new tenants are neighbouring farmers. These are the bare facts as communicated to us on the spot; and we give them thus fully, as it is likely that on a point involving Mr. Disraeli's conduct as a landlord some curiosity may be felt by the public. In this district we found the rates unusually high

—a circumstance which was accounted for by great mismanagement in the affairs of the union a year or two ago.

From the information we received there appeared to be a very uniform system of management adopted on the chalk districts of Bucks. The fields are not encumbered with too numerous hedgerows; stock farming is adopted only as a means of forcing corn crops, from the latter of which the farmer has hitherto looked for his remuneration. By raising green crops and feeding them on the land with sheep, he is enabled to draw from the soil crops of wheat, barley, and oats, which, without this enriching preparation, it would not produce. His chief attention is therefore directed to the culture of green crops for consumption on the land as the foundation of his after success. The rotation followed is termed "a five-field course," commencing with (1) turnips, followed by (2) barley, which is sown out with (3) seeds (the first crop of which is mown, and the second eaten on the ground); after the seeds the land is dunged, then ploughed, and sown with (4) wheat, and this again is followed by oats, which form the fifth and last crop of the course. There are thus three corn crops and two green crops every five years, and it is obvious that on thin chalk land this system cannot be successfully continued without a liberal expenditure either in artificial food or manure. The land should, therefore, be twice dunged in the course—first for the turnip, and second for the wheat crop; whilst, in addition to this, the best farmers give a large quantity of corn or cake to the sheep while feeding on the turnips. If, besides this, ample doses of artificial manures are used for the turnip crop, the farmer finds his land improving under what might otherwise be thought a severe system of cropping. We were sorry to learn that on account of the low prices of corn many of the occupiers of this class of soil had been obliged to discontinue all expenditure, both in artificial manures and feeding stuffs; that their system formerly was to purchase the sheep stock they required by the sale of their corn crop; but so much more of that was now necessary to be sold for the payment of rent and labour, that a smaller balance was left for investment, and a scantier flock of course made to suffice. Corn being the only thing the farmer of these soils can at present raise from them to convert into cash, we were informed that he is compelled to plough up a larger proportion of land than formerly, thus extending his corn crops and diminishing the green or manure-making crops. It is said that necessity is driving many of the farmers to this, and that next year the chalk lands will have a larger average in corn than was ever known before. It appears an anomalous state of matters that the farmers should

sow more corn with diminishing prices; but, if the fact be so, it is a ruinous system on these thin lands, and shows more plainly than the loudest complaints the necessities to which many have been reduced by the sudden transition of prices. They say—"We are quite conscious that nothing but increased expenditure in artificial food and manures can enable us to maintain larger sheep stock, and increase the yield of our corn crops; but meantime our capital is gone, and we have not the means of making the necessary outlay."

In all this district, some 30 miles distant from London, no vegetable produce or roots, early or late potatoes, are grown for sale by any one who considers himself entitled to rank as a *good* farmer.

The sheep stock kept are chiefly South-downs, changed every year, though some tenants are turning their attention to breeding the stock they require, having found that the Hampshire breeder and the London butcher hitherto divided the whole profits of the animal, fattened at the expense of the Bucks farmer, between them. Very few cattle are kept, and these seem to be fed, in the large yard which occupies the centre of the homestead, chiefly on straw, which is thus, with the help of the horses and a few pigs, converted into a species of dung. The superfluous liquid is suffered to run off into the nearest ditch or stream, no provision being made for saving it in any of the farm buildings which came under our notice. The implements in use are waggons and two-horse carts, cumbrous wheel ploughs, and the flail for threshing.

The average produce of crops on the better class of chalk lands was stated to us at 20 to 24 bushels of wheat, 32 to 40 of barley, and 36 to 48 of oats per acre. The number of sheep kept on a 200 acre farm, during winter and part of summer, is about 300.

Turnips are generally sown broadcast. One field of swedes which we walked over, and which was one of the best we saw, would not exceed 10 tons an acre. The bulbs were small and far apart, and, by the superiority of a portion running through the centre of the field, it was plain that if the whole field had been equally well treated, the crop might have been doubled. Labourers' wages have fallen 1s. since last year, being now 8s. a-week.

Before leaving Buckinghamshire there are a few observations that occur to us as proper to make with reference to the general condition of the land, the opinions entertained by the farmers, the home comforts they enjoy, and the care for their interests displayed by their landlords. As to the condition of the land, we observed that in the chalk districts the fields had a rather exhausted look, there being but a very small proportion of them sown in grass, and that portion showing little sign of verdure or

fertility. That this could not be wholly ascribed to the effects of the frosty weather was apparent from more than one field which we saw in the same district, the high cultivation of which exhibited itself in a marked manner notwithstanding the weather. The opinions of the farmers with reference to their own condition form a very important element in trying to estimate correctly the existing state of agriculture. These opinions of course influence to a great extent the character of the culture pursued in each district, and we therefore consider it proper to indicate the views we found prevalent in each district as we close our survey of it. In Buckinghamshire the attention of the farmers appeared intently fixed on prices as the only source from which could come any effectual relief. They seem to consider reduction of rent, or an increased produce on their farms by means of increased capital invested, as quite inadequate modes of helping them over their present difficulties, even if those modes were practicable. On the grass lands it was thought that something might perhaps be done by lowering rents, but on the tillage lands this source of hope was generally considered quite unavailing. With reference to the increase of farm produce by an increased investment of capital, it was said that the farmers' means had already been exhausted, and that, even if high farming was beyond all doubt profitable in its results, it could not now be adopted. "Paying prices" were, therefore, what they considered would alone save them, and those "paying prices" they defined as meaning, with reference to wheat, from 56s. to 64s. a quarter. We did not find that any hope was entertained of a return to protection; indeed, one respectable farmer told us that the labouring classes were now so well educated, and read so many tracts and newspapers, that they would rise in a body to prevent it. This statement was made by a man in every way opposed to free trade principles, and was accompanied with expressions of regret at the "evil effects of knowledge upon the poor." Another point which struck us in our intercourse with the farmers of Buckinghamshire was their apparently slight appreciation of the advantages of railway communication generally, and especially with a view to the London markets. In fact, we heard one farmer express his opinion very strongly that railways had done a great deal of harm to the county, having brought remote districts into competition with theirs for the custom of the metropolis. With regard to the house accommodation and house comforts of the Buckinghamshire farmers we must be permitted to say a word of commendation. They are nearly all kept in perfect order, they generally command a fine prospect, and the ground in front of them is frequently laid out in a neat and tasteful manner with ornamental

walks and plants. We should, however, have been glad to have observed attached to each dwelling a greater number of good sized gardens, such as one naturally associates with the other comforts of a farmer's house. The last observation as to the state of agriculture in Buckinghamshire which we have to make relates to the care evinced by the landlords for the interests of their tenants. Wherever the cultivation of the soil is carried on in a defective manner it is obviously the duty of the landlord, as it is his interest, unless he is himself a good agriculturist, and able to conduct the general management of his estate, to place himself in the hands of a steward or agent thoroughly conversant with the best systems of practical farming. Feeling the importance of this, we made particular inquiries how far the stewards and agents of properties in Buckinghamshire were qualified to fill the situations which they occupied; and we regret to say that in too many instances we ascertained that they were men without any adequate experience in the cultivation and economical management of land.

LETTER IV.

OXFORD, January 26.

The county of Oxford possesses a variety of soil, which must have a great influence upon the character of the farming pursued in it, and upon the success which the different methods of cultivation adopted meet with. There are beds of chalk, green sand, the upper oolite formation, Oxford clay, the lower oolite formation, and the lias formation, each succeeding the other from the south-eastern to the north-western boundaries of the county; and to such an excess does this rapid succession of strata affect the quality of the surface-soil, that in the same farm, and often in the same field, two or more kinds of staple will be found, demanding totally different treatment as to drainage and cultivation. The land lying in the south-eastern part of the county, and extending thence towards Oxford, generally appears to be remarkably well adapted for tillage; and the account given of it by the farmers fully bears out the conclusions which the traveller would arrive at from his hasty survey. They state that it is in most instances easily wrought, rapid in its yield, and capable of undergoing very readily changes in the system of cropping and management. The fields are of great extent, and very little encumbered with hedges and hedgerow timber. The farms are from 200 and 300 to 600 acres in size, and the system of cultivation adopted, as will be seen from the details which we give, exhibits a considerable improvement on that pursued in Buckinghamshire. Grass lands are to be met with, but the greater part of the soil is

under tillage. The relations between landlord and tenant do not differ very materially from those which we found existing in the adjoining county; farms being held sometimes on lease, but more frequently from year to year. Where drainage is required, the farmer generally finds the labour, and the proprietor the tiles. Hitherto, however, the execution of nearly all permanent improvements, and the cost of them also, appear to have fallen almost entirely on the farmer. In passing along, we did not remark that the gravelly soils were deficient in drainage, but the clay still appeared to be so, nor did we find on inquiry that there was any prospect of this evil being soon remedied. The clay lands, from the difficulty and expense attending the working of them, have lately gone completely out of favour in this part of the country, and we heard of several instances where farmers had given them up in despair to their landlords. Nor, from what we have heard, do they appear to be made the objects of competition when vacant, like other kinds of soil. The explanation given of this is, shortly, that when wheat was high, farmers could afford the expense of working their stiff clay lands; but now that wheat is cheap, it no longer pays to do so. One gentleman with whom we conversed on the subject told us that of a farm of 500 acres, which he held, 100 were clay, and that he had given these 100 acres up. He estimated the difference in value between his clay and sound lands as not less than 25s. an acre. The average produce of wheat on the former description of soil he estimated at 24 bushels, and that of oats sown after a well-manured bare fallow at 64 bushels, per acre. The rent of sound land over the district to which this letter refers varies from 30s. to £2. In a good number of parishes there is no tithe-charge, and in those in which it exists it is not very heavy. The rates, also, we generally found very low; but in reality the amount of poor-rate does not indicate the extent to which the rent is raised by that tax. In many parishes the farmers, by mutual agreement, divide the whole superfluous labour of the parish among them, thus preventing the rates from being swollen by the expense of supporting the unemployed, and relieving themselves, to a certain extent, from the burden of supporting the poor. Of course, they find the benefit of an arrangement which enables them to get labour in return for what they pay, instead of being saddled with a heavy and unproductive rate. The effect, however, is curious enough when worked out in figures, and looked at in the light which the principles of economical farming throw upon it. For instance, one gentleman, with a farm of 500 acres, told us that he gave regular employment to 26 men and 7 boys, being 7 men more than he required to do the work of his farm. Another gen-

tleman, we were told, had at one time so many extra hands thrown upon him for support in this way that he resorted to spade husbandry as the most profitable way of employing them. Being anxious to obtain information on a point so important, we called on this gentleman; but he declined generally to answer our questions, and we are therefore left to the conclusion that he is so well satisfied with the profits of farming in his own case as to think that the complaints of the agriculturists, and the inquiries on the part of the public which these complaints have led to, are both unnecessary. The practice of employing men rather than permit them to fall on the rates appears to be regarded with favour by the most intelligent farmers, but it may be questioned how far a superabundant supply of labour on a farm is consistent with that economical management, that careful apportionment of work, and those habits of sustained industry, which are so essential not only in this, but in every other occupation. Notwithstanding the pressure of the times, wages appear to have fallen very slightly, if at all, in this part of Oxfordshire. Many farmers still continue to pay 9s. a-week to their labourers, and some who have reduced the amount of their weekly labour-bill have done so, not by decreasing the wages of all, but by diminishing the number of hands employed. A few have reduced wages to 8s., but even with that pay an experienced farm-bailiff told us that the labourer was better off than when he was receiving 11s. and 12s. a-week during the period of high prices. The same loud complaints which reached us everywhere in Buckinghamshire are repeated here. Every farmer appears to have calculated his losses; and if the figures given by them be correct, it is not extraordinary that they are dissatisfied. The wealthiest and the best farmers complain as much as the poorest and worst, stating that as their capital invested has been largest, so their loss has been most severe. It seems to be the opinion of the most intelligent that prices will soon improve. We observed that some of them were storing their last year's grain crop, and had bought seed in the market at the prevailing low prices, in the hope, by-and-by, of making a profit. We observed, also, that, to a very considerable extent, the old course of farm management has been made to accommodate itself to the demands of the market—that, for instance, early lambs are got ready for London, and that even the Oxford market is cared for in the amount of this delicate fare provided. The most marked proof of a new system, however, is in the increased cultivation of green crops, and the development of those branches of the agricultural process with which they are united. As yet few farms, if any, have been vacated owing to the pressure of the times, and few landlords have

agreed to an abatement of rent. It is said, however, that the last half-yearly payments have been made, in some instances, by ruinous sales both of grain and live stock, and that as there will be no incomings till harvest-time, the demands of the next half-year cannot be met. We have heard one or two cases of farmers being even already unable to settle their weekly accounts with their labourers. In a few cases, also, landlords have agreed to a deduction of 10 per cent. on the half-year's rent. With these trifling exceptions of a positive character, the state of farming in this part of Oxfordshire does not exhibit any decided symptoms of disaster and ruin. "Somehow or other," as one of themselves expressed it to us, "tenants have not made money under protection; they have improved the soil at their own expense, unassisted and unremunerated by the landlord."

On the better class of clay farms in the southern part of Oxfordshire the mode of management adopted is precisely the same as has been already described to be the practice on similar land in Buckinghamshire—viz., "three crops and a fallow." It is proper to state the reasons which the farmers give for using five horses in a plough during the winter season. First, they allege the stiffness of the clay and the consequent heavy draught; second, that they find their horses stand the work much longer when not too hard pressed; third, that part of the team consists of young horses, which are thus exercised, and assist in the labour, without injury to themselves; and as to their being yoked in line a-head of each other, instead of two-a-breast, it is so arranged to prevent the injury which would otherwise be done to the soft surface-soil by the feet of the "land" horse. In wet undrained land the injury done in this way would, no doubt, be very considerable, and even when this heavy land is drained, the trampling of horses is hurtful in wet weather. But if we suppose a person who was entirely ignorant of the operation of ploughing and its effects looking at these five large horses, following each other in a straight line in the bottom of the newly-turned furrow, and carefully watching the close succession in which their 20 heavy iron-shod feet beat into the waxy subsoil, he would conclude that the operation intended was to render that subsoil impervious, and that the turning over the furrow was merely a subsidiary process. And when one considers that the bottom of every furrow in the field is subjected to the same repeated pressure, he sees at once a reason for this soil being easily wet in winter and suffering readily from drought in summer. If the soil is really of such a character that five horses are necessary to plough it, and if, to save the surface, it is requisite to sacrifice the subsoil, it becomes a question whether the spade

and manual labour would not be found at once cheaper and infinitely more effectual. On the poorest description of clay, oats are taken after a bare fallow instead of wheat; and in favourable seasons, when the land has been well manured, the yield amounts to 64 bushels per acre.

The management of the fine turnip farms of this county forms a marked contrast to anything we have yet met with in our tour. The nature of the soil, which we have already described, admits of a very perfect cultivation; and the level open character of the fields, and the large extent of each enclosure, are very favourable to the exertions of their highly intelligent occupiers. The system pursued is the four-course, worked with great industry and skill in the following manner:—

1. Wheat, drilled.—As soon as the crop is reaped the land is ploughed, and one division sown with rye, another with vetches, and another with hop trefoil, all of which are eaten off by sheep in succession the following spring. As each portion is cleared, it is ploughed and prepared for—

2. Turnips.—These are eaten on the ground with sheep, and the land ploughed and prepared for barley. Part of this division is sown with peas early in spring, which are drilled in rows 20 inches apart, and when hoed the second time white turnip seed is sown between the rows of peas, and covered by the hoe. As soon as the peas are reaped the white turnips are hoed, and being by this time well forward they prove a fair crop, and are eaten on the ground by sheep, after which the whole division is sown with—

3. Barley.—The half of this is laid out with clover; the other half, as soon as the barley is removed, is planted with winter beans, thus forming the fourth crop of the course, viz.—

4. Clover and beans.—The clover is once mown, and the second crop eaten off with sheep, after which it is ploughed, and, along with the part in beans, is sown with wheat, which begins the course again.

By diligently following out this course the land is never suffered to lie idle. As soon as one crop is removed another takes its place, and, even before the peas crop is reaped, that which is to succeed it has been sown. The nature of the soil is admirably adapted for this constant succession, its dry friable texture favouring the extirpation of weeds, which yield at once to the skilfully applied labour of the farmer. The rye, vetches, and late turnips are grown during the winter months, and derive much of their sustenance from the damp atmosphere, and, being all consumed by sheep on the ground, return to it more than they derived from it, especially if the sheep are at the same time fed with corn. The droppings of the sheep and their treading of the land give it that richness and solidity

which, on these warm soils, are eminently favourable to successful grain crops. The crops, both white and green, are sown in rows, and carefully and frequently stirred and hoed, manual labour being lavishly expended to insure perfect cultivation. The advantage of employing labour is well illustrated in the more rapid progress of the sheep when fed on cut turnips, placed for them in troughs, as compared with the old practice of suffering the sheep to gnaw the turnip on the dirty ground. A very skilful farmer told us that he was certain the same sheep would make equal progress fed on turnips so cut and prepared, *without* the addition of corn, as they would *with* corn and without that preparation. On the large farms machinery is employed for threshing the wheat crop, but barley is threshed by the flail, both to give employment to labourers and because the machine cuts the grain too short, and thus injures it for the maltster. Average crops of wheat are 28 to 32 bushels; and of barley 40 to 48 bushels.

Next to the cultivation of the land, the chief attention of the farmer is devoted to the management of the sheep stock, the most remunerative part of which is the breeding of early lambs for the London and Oxford markets. In the beginning of January the ewes, which are of the South Down breed, drop their lambs, having been previously placed in a dry well-littered yard, surrounded with warm sheds, cheaply constructed with hurdles, and roofed with loose straw. Here the ewes are supplied with cut turnips in boxes, clover hay, and ground beans. The lambs learn to eat the beans, of which they are allowed to take what they like, and do consume sometimes as much as a pint a-day. With this high feeding they are soon fit for the market, being ready to be disposed of at Easter and the month following, and then bringing, on an average, 30s. each. The lambs thus early removed, the ewes are soon made fat, and are of course much easier kept on the pastures than if they were suckling their lambs. Some farmers have a second flock of ewes, which drop their lambs a month or six weeks later. They are wintered in a straw-yard, getting no food but bean or peas-straw until they lamb, when a few cut turnips and clover hay are added. This flock is pastured, and fatten their lambs during the summer, without receiving any corn. The store-sheep are purchased when required, all that are bred being sold fat as lambs. The manner in which the store-sheep are fed depends altogether on the taste and means of the farmer. If he wishes to have his farm in the best condition he supplies the whole flock daily with beans, in addition to their other food—rye, vetches, clover, or turnips, as it happens. If this is too expensive a system to pursue throughout, he reserves the beans for the

feeding pen, into which the best sheep are draughted weekly to supply the place of those which are sent off fat, weekly, to London. In this pen the whole flock is finished with corn, each sheep being in it a month or so, and receiving a pint to a quart of beans daily. But if the farmer's lease is coming to a close no corn whatever is supplied, as in this county there is no compensation to the tenant for unexhausted improvements. And, of course, where the farmer has not even the security of a lease, this system of good farming cannot be entered on with safety at all. The quantity of sheep fed on a farm varies with the amount of artificial food supplied to the flock. On one farm which we visited as many as 3,000 sheep and lambs had been sent fat to London in the course of a season. A farm of 500 acres passing off 1,000 sheep in a year, or two sheep to the acre all round, is considered very fair management. The value of sheep has been much depreciated, and severe loss was sustained by the large holder who bought dear and was obliged to sell cheap. He will not lose as much now, as his last purchase was in the same proportion less with his sales. The value of wool has increased—what brought only 18s. two years ago is now fetching 26s.

The management of cattle is not attended with any thing like the same skill displayed in the feeding of sheep. The usual plan is to have a few run-

ning loose in the farm-yard, where they live on straw, few or no turnips, and sometimes a little hay. Nor does the same careful economy guide the operations of those who feed cattle; on one farm, otherwise conducted with very great skill and practical knowledge, we found a lot of large cattle being stall-fed on bean and barley meal and hay, without any turnips or other green food. Each animal is supplied with 13 lbs. of meal daily, mixed with hay-chaff, and costs the feeder 10s. a-week. This obviously cannot pay, especially with a low rate of prices. Indeed there would be something wrong if it did, for it can scarcely be right to expend as much on the food of a fattening ox as would well suffice a labourer and his family. The farm horses are in some cases kept in stables, in others they are put from their stables, loose, into the yard every night. Considerable numbers of pigs are kept on most farms. They roam about the straw-yard, picking up what they can get, and are fed on meal besides. The farm buildings on the larger farms comprise two or three extensive barns, stables for the horses, cow-house, and a large straw-yard in the centre with shelter sheds. The farmers do not complain of want of accommodation, as their system of sheep-feeding is chiefly conducted out of doors, and does not, of course, demand a great extent of farm buildings.

(To be continued.)

HINCKLEY AGRICULTURAL SOCIETY.

The usual Monthly Discussion Meeting was held at the Bull's Head Inn, on Monday, July 2nd, when a good number of the members were present.

The CHAIRMAN, C. D. Breton, Esq., briefly stated that the subject for the evening was the continuation of Mr. Francis Spencer's paper on the "Breeding, Rearing, and Fattening of Cattle."^{*}

Mr. F. SPENCER, of Wibtoft, who, upon coming forward, met with the hearty applause of the company said—Mr. Chairman and gentlemen, in renewing this discussion upon cattle, my observations will principally relate to the proper selection of animals to be fattened, their treatment during that process, and the management of their pastures and food, in order to fit them for the market. I need not remind you that animals that have been bred with care and attention will be found the most profitable for the grazier; nor need I tell you that stock *well selected* is a very material point. But any one of

experience and observation will at once admit the difficulty in finding such stock as will please him and meet the approbation of his customers, the butchers, without considerable trouble and perseverance. I shall here repeat an old expression and urge it upon you as of great importance, that *one pound of hair is worth two pounds of flesh*. There is much truth in it, for beasts intended for grass feeding never ought to lose their coats previous to going out to grass. I have frequently seen beasts comparatively poor get fat before others turned out half beef. Now to prevent the early shedding of winter coats, I should recommend beasts lying out not less than eight hours per day during the winter; and, wherever convenient, to lie loose in yards; I have always found outlying cattle to thrive the best. Then as to keep—first give them straw and turnips, or your inferior hay, increasing the quality as you advance nearer grass-time; but never give cattle, intended to be fattened, barley-straw alone. If you wish to consume straw without roots a small portion (say two pounds per head

* For the former part see the February number of the "Farmer's Magazine," p. 120.

per day) of linseed cake should be given, for I am sure that there is no gain by giving straw alone: in all feeding you should go on progressively, carefully noticing the state of the body of the animals; though this remark relates more to stall than grass-feeding. For early grass, perhaps seeds are the best, to be succeeded by old turf, which should be stocked before the pasture gets too long, as you seldom find beasts to do well when grass gains too great a head before midsummer. Small inclosures, say 10 or 12 acres each, perhaps are the most advantageous for giving a frequent change of pasture; and where you have good shades, high hedges are a nuisance, as they shut out a free current of air, and are one of the causes of sore bags, enlarged joints, &c. I have generally found those beasts that have been well attended to, and gone off fat in the months of August and September, to have answered better to the grazier than any other time of the year. Those intended to run on to Christmas, require in the autumn yards to ran in, or to be tied up in stalls and kept warmer; as beasts exposed to the weather grow hair faster, and lose their soft handling—to such I should not recommend turnips or vegetables, but oilcake, in chaff, with bran, meal, &c. Now milking cows require the opposite treatment to barren cows, or oxen intended for grass-feeding, as warmth and protection from draughts of cold air are highly essential for a due secretion of milk; and they should have a fair proportion of roots, with a small quantity of old bean flour (say four pounds per head per day) with bran (or linseed cake substituted for the bean flour.)

A MEMBER here remarked that nothing was so beneficial for milking cows, either as regarded the butter or cheese produced from the milk, as bean flour; but not new beans, as they were apt to cause flatulence and indigestion.

Mr. SPENCER,—We will now talk about stall-feeding; and I must say I cannot reconcile my mind to the system of *box-feeding*, which with sunken floors for the accumulation of manure, liquid as well as solid, must be detrimental to the health of animals: I do not consider loose boxes necessary for any but young stock, which require exercise for the proper development of muscle. The man who attends to feeding cattle ought to be on good terms with the cattle he is attending to, and should ascertain as near as possible what quantity of food they require; they should have plenty, but never be cloyed: on the contrary, they should eat all up greedily. I have noticed that some beasts will eat considerably more than others, some on account of extra size; and these large eaters should be indulged with a greater proportion to satisfy the requirements of nature; but not too much at once—little and often, with warmth and cleanliness, I consider

best. A bushel (50 pounds) to a bushel and a-half of turnips per head per day, with four pounds to eight pounds of oilcake, is sufficient for any beast, with other kinds of food—as hay, &c. Keep their bodies, by regular feeding, in a regular state, and they will thrive faster than when allowed over quantities. If sometimes they are allowed to over-gorge, and at others are stinted, the system is disarranged; and, if forced too fast on highly stimulating food, more time may be lost by the disarrangement of the animal system than by steadily progressing. When beasts arrive at a certain stage of fattening they require more nice attention and observation, they are more inactive, their appetites diminished; and should you find they have become cloyed, I would recommend food to be given very sparingly for a time, when, in all probability, they will recommence feeding with increased appetites. I have often heard graziers remark that their stall-fed beasts have begun to do bad, and they do not perceive them to come on. It is often the case that through immoderate feeding they have become feverish and out of health, and sometimes they have been turned out of the stalls as ill thrivers, while the fault rests with the owner or the attendant. Whenever you intend getting up beasts for public exhibition, a constant succession of roots must be provided, with green food of several kinds; and do not feed *too fast at first*—like horses in a race, if they start too fast they are almost sure to be beaten at the *last pinch*. Calculate your time, and go on progressively, giving better food in small quantities, and increase gradually. With these few remarks on cattle, I shall now speak of sheep, making a like distinction between grass-feeding and turnip-feeding. Sheep, like all other stock, require gentle treatment, and the smaller quantities of all artificial food given at a time the better. Early seeds are of great advantage when you want to get your sheep off early; but when the weather is hot, old turf will be found the best, until the clover aftermaths are ready (I am now alluding to fat shear-hoggs). If you intend keeping them longer than September you should give cabbage, when the clover nobbs become full of seed, to prevent the yellows: you will find cabbage often prevent that complaint. Perhaps some will differ with me when I condemn the growth of white clover, but in my experience I have never seen sheep do well on it, particularly lambs; and cows give less milk when turned upon it.

The CHAIRMAN here remarked that he quite agreed with the observation that there was not much nutriment in the white clover; he had seen his own dairy cows refuse to eat it, and seemed as though they would pine before they would touch it. This opinion was confirmed by others of the members.

Mr. SPENCER,—No doubt you have all made your own observations, but my mind is quite made up, as lambs invariably scour, and old sheep thrive less on white clover than on red or old turf. I approve of early shearing of sheep, and neglecting to dip your lambs directly after the dams are shorn is one of the greatest omissions a flock-master can be guilty of: it is a great preventive of the fly galls. Lambs frequently require care and attention after weaning, and not unfrequently they do the worst on the best keep. I have seen them injured from dipping, when it has been done at the time of *weaning*: therefore I prefer it done while *sucking*, for it has a peculiar effect that I cannot account for.

When you commence giving your lambs turnips I should always recommend giving chaff, with a small portion of oilcake or corn (just sufficient to entice them to eat the chaff), the chaff to be cut from dry clover, or the best hay and oats in the straw. The same is also a good plan to adopt with regard to shear-hoggs, or sheep intended for turnip-feeding; and by this plan you will seldom have much loss.

In the management of turnip-fed sheep I have experienced great advantage from observations I made in Staffordshire: I consider, generally speaking, the farmers in that county have a *better* and more *regular* system than we in this neighbourhood. When commencing their turnips, they usually place a straight row of fleaks parallel with the hedge, at about 30 or 40 yards distant from it; then a short row of fleaks from the hedge across to the fleaks, forming a pen for the first day; also a second row of fleaks across, to form a second pen. As soon as the man shepherds the second morning at 6 o'clock he lets the sheep into the second pen, and in the afternoon pecks up the turnips in the first pen, and forms a pen for the next morning—and so on in succession. By thus giving fresh turnips daily you mix the food—they have the same proportion of top and bottom one day as another. Another advantage, and an important one, is, that by thus stirring up the sheep early in the morning they relieve themselves of their water; for fat sheep, allowed to lie too long and accumulate too much water, in cold weather, often are injured. I invariably make it a rule to *quietly* put up every sheep when I go into the field. By the Staffordshire plan the manure is more evenly distributed over the field than if they are allowed a week's consumption of turnips at once. When you give the chaff or corn it should be given as early as you like after daybreak, and just before sunset at night. I am inclined to think more fuss is made about cutting turnips for *fat sheep* than is necessary, particularly on good layer, if attended to as I have just described.

Common turnips I think quite equal to swedes, nay, I prefer them up to the month of January, and frequently longer, particularly for lambs, as swedes cannot be eaten by them without being cut; but sheep must not be expected to eat up all the husks—but they will often fall back upon them, and in the end very few will be wasted. As the spring advances they should have plenty before them, and they should be pecked up early, as the sun and wind will soften them. I think sheep cutting their own turnips do not eat so much dirt as when cut for them, particularly in wet weather. In cold and frosty weather the shepherd cannot be too much amongst them: frequently have I seen the sheep leave their food for the want of the man to encourage them. In his presence they eat more and thrive faster. Do not put too many together, say not exceeding 50 fat sheep or 60 lambs—less sooner than more.

I shall now, Mr. Chairman, make a remark on my observation in this immediate neighbourhood. I often see six or seven score, and sometimes 200 sheep penned together upon turnips, with sufficient given at a time to last a week. It is evident to all that the first three days they have too much, and the last three they half pine, or are obliged to eat a lot of filth and dirt, which, I must observe, will cause them to be very irregular in their bodies. I have seen graziers profess to give them corn, when one-half of the sheep have not tasted a bit; and when the shepherd goes amongst them, instead of going quietly, he takes a dog, over which he has little or no control, and runs them all of a ruck, pacing them about till the pen is more like a lane than food for stock. Gentlemen, does not this fault rest with yourselves, in a great measure? do you not set your shepherd too much to do by one-half? I do not say keep him idle, but the work he has to do is hurried over and done in an improper manner. Now this is my standing order to my shepherd:—“*Perform what I set you to do, and if you cannot do it yourself take some one to help you.*” I consider the *halt* easily cured by proper attention. Sheep should not be put upon the turnips before they are sufficiently grown; and see that the sheep do not get halted before you attend to them. I hear farmers say that their farms are so subject to it that their sheep are never free from it. I have occupied land of all descriptions and in various localities, both strong and light soils; and although it has appeared at times, I could always keep it down without material injury to the flock: perhaps the shepherd, having too many things to attend to, has something to do with this. I give strict injunctions to my shepherd *never to leave a field with a lame sheep in it without examining it.*

In the counties of Oxford and Gloucester it is

not uncommon for the lamb-hoggs to be wintered in yards, giving them cut turnips, with a great deal of corn and oilcake, with fenugreek to finish them—say ½oz. to 1oz. each per day; they will bear this keep about two months, and then must be sold. I believe this practice is also carried out in Nottinghamshire, but Leicester sheep will not bear it—as, if you keep them in yards and give them peas they lose the use of their legs, and become diseased; but in getting up sheep for anything extraordinary, there is a great deal of care required, particularly rams intended for use. Now every kind of food given should be of the very best quality, *but of all bad food, bad oilcake is the worst*; and if you happen to give peas or beans (things that I do not recommend for rams) they should be always given in the shape of meal, with sweet bran, and plenty of vegetables, such as carrots, cabbage, or turnips. Whenever sheep refuse to eat vegetables be sure something is going on wrong. If you stop with the sheep while they are feeding they will continue to eat much longer than if left to themselves, especially when they become very fat. I have noticed that there is one time in the day when all sheep eat better than any other—it is about six o'clock in the evening, and many times have I stayed with them till nine; and by attention I think I have at times shewn sheep in better *health and condition* than my neighbours, but of this others may judge better than myself.

My observations on pig feeding will be very short—like all other stock, they require great regularity and attention in feeding. I notice great loss of food for want of enclosed styes for them, as in open yards the poultry get at their troughs, and want of warmth and shelter often hinder their fattening. Pigs fed on whey ought to have a portion of corn or meal, and should be kept clean.

Lastly, as regards farm horses, they should have moderate quantities of corn throughout the year: frequently corn is taken away while they are at grass, when it is most required; and in the spring many farmers give it in profusion, when they are already over-heated with it. With a constant moderate supply you keep the blood in a more regular state, and by such attention they seldom require bleeding or medicine. And in conclusion I make a general remark, that I prefer moderate feeding, taking a reasonable time. Mr. Spencer sat down midst the hearty applause of the company.

JOHN ASHFORD, Esq. (Surgeon), said—He wished to explain that part of what Mr. Spencer had said respecting where food of too stimulating a nature had been given, and fed to repletion, the animal had been cloyed, was feverish, and for a time did not thrive, &c. He contended that this state

of things arises from a disease very common to cows. I think I may say that near two-thirds of the beasts slaughtered have an enlargement of the right ventricle of the heart, and which I designate "*the pouched heart.*" This cavity or pouch has to sustain the weight of the venous blood before it is propelled into the lungs: hence we may see that by blood being made faster than what the lungs can purify, this disease is the consequence. Mr. Ashford here exhibited some diagrams he had prepared exhibiting the disease, and expressed his surprise that none of the professors of the veterinary science had brought it before the public.

STAMP GARRARD, Esq. (Surgeon), said—Two-thirds was a very high average, and would ask Mr. Ashford if the disease was not found in lean cattle; and as the beasts slaughtered in this neighbourhood were principally cows which had produced calves, might not the re-productive process have had something to do with it.

Mr. ASHFORD,—The question is a fair one, and as regards the re-productive process ought to be duly considered; but I am certain that whether found in lean cattle or not, it does not militate against my argument; lean cows are seldom slaughtered except in a state of disease, where frequently occurs the *pouched heart*, and, in all probability before time, occasioned by the very process I speak of.

PEAT CHARCOAL MANURE.

TO THE EDITOR OF THE MARK LANE EXPRESS.

SIR,—You challenged me to give public proof that *peat charcoal* possessed the power of deodorizing excretory matter, the admixture to produce "*an offensive manure capable of being transported by any conveyance, and of being used with the drill.*"

I met the challenge; and in your paper of Oct. 8, 1849, you obligingly stated that I had "*fairly won the thanks and honour of my fellow-men.*"

Permit me to say I now challenge you.

Your position gives you the power of having tested, in a manner perhaps beyond the reach of others, the real value of this combination as a manure. Neither you nor the world will, nor perhaps should, believe my *individual* statement, that "*peat charcoal manure*" is the most valuable that has yet been produced. Still, I **AVER THAT IT IS**, and I seek for proof to the contrary.

I now place at your disposal 12 sacks (3 cwt. each) of this manure.

The charcoal to produce this combination has been manufactured under my direction for "*THE IRISH AMELIORATION SOCIETY,*" the admixture made in London: 6 sacks contain equal parts in weight of *general*

excretory matter and charcoal, the remaining 6 equal parts of peat charcoal and urine.

Pray place this in the hands of six different persons to test each kind against guano or any other manure they please.

First, I seek comparison for one season; next, that the test be extended to THREE or EVEN FOUR without renewal.

I feel assured you will select those of eminence in agriculture who will take the trouble of making the test fairly, and who will fully report results.

I have the honour to be, Sir,

Your faithful servant,

JASPER W. ROGERS.

[We entirely concur in the view taken by Mr. Rogers in his letter, that the peat charcoal and night-soil manure should be carefully and accurately tested by experienced and competent practical farmers. We accept his challenge, and have no doubt shall readily obtain the assistance of able, trustworthy parties to test the merits of his proffered quantities of the manure.—ED.]

PEAT CHARCOAL AND MANURE.

PEAT-ASHES, WOOD-ASHES, SOOT.—I have been in the habit of using all these for the last twenty years, to the great benefit of all sorts of plants; but if we could purchase this peat-charcoal mixed with night-soil, how much more beneficial it would be even to gardeners. To the farmer it will far surpass guano in its fertilizing properties, and being of easy carriage, it can be sent to the remotest part. As for the expense, I hesitate not to say, from the millions of tons lying waste, both in Ireland as well as Scotland, that the price per ton on the ground where it will be burned would amply pay at 10s. per ton—nay, more than pay. There is ten times more peat found above, than coals underneath. I know one estate in Scotland where several hundreds of acres are covered with solid black peat, varying from ten to twenty feet deep, containing millions and millions of tons, belonging to Sir David Dundas, the Judge Advocate-General. Therefore, I think, I have made out a good case to prove the cheapness, that in time it can be bought where it is charred. We all know that there is a deal of labour in bringing the coals to the pit's mouth, and still they are sold for the low price of from 8s. to 12s. per ton there. No one, as yet, can at all arrive at the mighty benefits that Mr. Jasper Rogers's mixture will do—which I shall christen, "Rogers's British Manure." In the first place, it will be a mighty benefit to the poor in those districts where the peat is charred; it will also be of great benefit to the landlord; it will also be very beneficial to the health of the country to have the peat districts drained (as attention is sure to be paid to that, on account of the value of the hitherto valueless peat); it will also employ many hands in the shipping interest—as well

as when it arrives at the various coast towns. No one can make any calculation of the benefit it will be to thousands, even before it is put on the land; and no one can have a doubt of its value, as a first-rate manure, afterwards. For instance, look at what a poor farmer has to pay, in remote districts, where he is far removed from towns, for a waggon full of solid rubbish (all the ammonia, all fertilizing matter gone)—and a whole day lost, with a man and three horses, in bringing this load of delusive and high-priced rubbish home—and a pound paid for it in the first instance. Farmers, with free trade in full operation staring them in the face, cannot stand this any longer; therefore, great praise is due to Mr. Rogers for bringing this valuable mixture before the public in such a spirited way. The next point to be considered is, how is the manure to be made. As far as I have read the plans for the drainage of London, in the *Daily News*, none of them, in my opinion, will answer, on account of the enormous expense and difficulties to encounter, and having their works at different points, instead of one. It is well known to every one that the Thames is the lowest part, and the only course to carry off all sewerage; therefore, I should simply advise sewers to be made on each side of the river. The north sewer could not pass any farther down than London Bridge, where I would carry several iron sewers across the bed of the river, and empty into the south sewer—the south sewer following the river's course, and striking off for Plumstead Marshes, where the works and reservoirs could be formed; a canal then cut to allow the clear water to run down to the river, as well as to allow the peat charcoal to arrive at the works, and there mixed. The charcoal being dry, would at once absorb and take up all the gases and the moisture of the solid, and would be very little trouble in the drying process. But there are hundreds of towns and villages where the charred peat would be used in the open privies and dunghills, and would at once absorb all those valuable gases for the land, although highly deleterious to the air when allowed to escape; therefore, I hope that Mr. Rogers will meet with that support which he so justly deserves, from Great Britain, well knowing how difficult it is to surmount the prejudices of even those to whose it-er-benefit it will be sure to do good. Hoping the press, in general, will see the great benefit that the above splendid manure will be, not only to the land, but the labourers, and the country at large.—JAMES CUTHILL, Florist, Camberwell. [Mr. Cuthill, in a note accompanying his paper, dated 21st instant, says:—"Should you mention the Irish peat-charcoal again, don't forget that letter of mine, which you published in the beginning of the year, to Mr. Smith, of Deanston"—(see 'Scottish Agricultural Journal,' No. 1, p. 9, in which he alludes to vast quantities of peat bog in the Island of Lewis, from 1 to 20 feet deep, which he suggests should be burned in heaps, along with sea-weed, shell-sand, &c., after the manner of burning bricks.) "I am now giving the Irish peat-charcoal, mixed with night-soil, a trial; and you may depend upon it, that the two combined is far surpassing guano. I have strawberry plants in pots; geraniums and many others plants growing luxuriantly, with a small quantity of the mixture in each. But the plants, in this mixture, are finer plants than the others, and have much finer roots. Even peat-ashes are valuable, as mentioned in my letter to Mr. Smith, in your paper. I am using charred peat, ever since Mr. Rogers's lecture at the London Mechanic's Institution, down the privy, and have not been annoyed, in the least sense, by smell].—Scottish Agricultural Journal.

GREAT SALE OF SHORT-HORNS AT HAZELEY.

On Wednesday, Feb. 27, the entire herd of improved pure-bred short-horn cattle belonging to the eminent breeder, Mr. Joseph Gillett, of Hazley Court Farm, near Oxford, was submitted to public auction, by Mr. Wetherell, of Durham. Between 400 and 500 persons were present, all of whom were entertained with a substantial luncheon, by Mr. Gillett, previous to the commencement of the sale. Among the company present were the High Sheriff, H. Hall, Esq., Sir G. Dashwood, Major Weyland, Mortimer Ricardo, Esq., G. Davey, Esq., W. Aldworth, Esq., — Field, Esq., — Elliott, Esq., D. Smith, Esq., H. Stafford, Esq. (Editor of the Herd Book), C. Venables, Esq., J. Chamberlain, Esq., J. Castree, Esq., — Peto, Esq., Messrs. Druce, Roberts, Gale, Hitchman, Chullingworth, Thompson, Trumper, Dodwell, Arkell, Harriman, Slatter, Stanbridge, Taylor, Hobbs, Goddard, Latham, Richmond, Watson, Phillips, Shrimpton, and most of the leading agriculturists in the neighbourhood. The sale was well-conducted, and the general impression was that the stock sold well, considering the depressed state of affairs. The entire stock was in the finest condition, and comprehended some of the best blood in the country, Mr. Gillett having at various times made considerable purchases, regardless of expense, at the sales of the late Earl Spencer, Mr. Burgess, Mr. Hutton, and other eminent breeders. Subjoined is a list of the lots and the prices realized, amounting in the aggregate to about £2,000.

- 1 Cathlene, red, 12 years, 31 guineas.—Mr. Castree
- 2 Splendour, roan, 11 years, 25 gs.—Ditto
- 3 Susannah, red and white, 9½ years, 18 gs.—Mr. Watson
- 4 Barmaid, red and white, 10 years, 15 gs.—Mr. Shrimpton
- 5 Gandy, roan, 10 years, 17 gs.—Mr. Watson
- 6 Favourite, roan, 6 years, 23 gs.—Mr. Trumper
- 7 Miss Fairfax, white, 8 years, 40 gs.—Mr. Elliott
- 8 Snowdrop, white, 6 years, 30 gs.—Mr. Wetherell
- 9 Nerissa, white, 6 years, 22 gs.—Mr. Romney
- 10 Gandy, roan, 7 years, 26 gs.—Mr. Harris
- 11 Lucilla, roan, 7 years, 19 gs.—Mr. Wetherell
- 12 Camellia, roan, 4 years, 23 gs.—Mr. Harriman
- 13 Ida, red and white, 6 years, 28 gs.—Ditto
- 14 Harpsicord, red and white, 6 years, 24 gs.—Mr. Robinson
- 15 Bloom, red and white, 9 years, 16 gs.—Mr. J. Gillett
- 16 Countess, (1st), red and white, 6 years, 24 gs.—Mr. Slatter
- 17 Countess (2nd), roan, 5 years, 25 gs.—Mr. Sartoris
- 18 Jennie Dean, red, 7 years, 31 gs.—Mr. Richmond
- 19 Ellen Fairfax, roan, 4½ years, 34 gs.—Ditto
- 20 Auricula, roan, 3 years, 15 gs.—Mr. Thompson
- 21 Mirth, red, 4 years, 17 gs.—Mr. Roberts
- 22 Laurestina, roan, 4 years, 40 gs.—Mr. Wetherell
- 23 Susan, roan, ill, not sold
- 24 Bright Eyes, roan, 5½ years, 27 gs.—Mr. Sartoris
- 25 Charmer, roan, 4½ years, 21 gs.—Mr. Richmond
- 26 Pearl, roan, 3 years, 18 gs.—Mr. D. Smith
- 27 Agatha, roan, 3¼ years, 22 gs.—Ditto
- 28 Donna Bella, red and white, 12 months, 22 gs.—Ditto
- 29 Lola Montes, roan, 12 months, 16 gs.—Mr. Arkell

- 30 Magnolia, red and white, 2 years, 30 gs.—Mr. Slatter
- 31 Bella Donna, red and white, 3¼ years, 21 gs.—Mr. D. Smith
- 32 Young Novice, white, 3 years, 19 gs.—Mr. Hobbs
- 33 White Lady, white, 3 years, 38 gs.—Mr. Phillips
- 34 Marchioness, white, 4 years, 20 gs.—Mr. Druce
- 35 Milkmaid, red and white, 3¼ years, 23 gs.—H. Hall, Esq.
- 36 Witchery, roan, 2 years, 39 gs.—Mr. Peto
- 37 Necklace, white, 2 years, 29 gs.—Mr. Chamberlain
- 38 Rosabell, red and white, 2½ years, 45 gs.—Mr. Peto
- 39 Rosebell, red and white, 2½ years, 24 gs.—Slatter
- 40 White Duchess, white, 2¾ years, 17 gs.—Mr. D. Smith
- 41 Florid, red and white, 3 years, 13 gs.—Mr. J. Gillett
- 42 Miniature, roan, 2¾ years, 14 gs.—Mr. J. Gillett
- 43 Claudia, white, 2½ years, 17 gs.—Mr. J. Gillett
- 44 Emmeline, red and white, 21 months, 13 gs.—Mr. J. Gillett
- 45 Miss Lakin, roan, 2 years, 25 gs.—Mr. J. Gillett
- 46 Jenny Lind, white, 2 years, 20 gs.—Mr. Druce
- 47 Garland, roan, 2½ years, 10 gs.—Mr. Aldworth
- 48 Clorinda, roan, 18 months, 20 gs.—Mr. Harriman
- 49 Maria McIntosh, roan, 17 months, 35 gs.—H. Hall, Esq.
- 50 Spring Flower, roan, 14 months, 25 gs.—Mr. Peto
- 51 Lady F. Fairfax, white, 12 months, 23 gs.—Mr. Harriman
- 52 Lucy, roan, 12 months, 12 gs.—Mr. D. Smith
- 53 Bashful, roan, 11 months, 15 gs.—Mr. Staunbridge
- 54 Dahlia, roan, 11 months, 17 gs.—Mr. Arkell
- 55 Heiress, red and white, 10 months, 14 gs.—Mr. Staunbridge
- 56 Laburum, white, 10 months, 20 gs.—H. Hall, Esq.
- 57 Sylph, roan, 9 months, 10 gs.—Mr. Stanbridge
- 58 Calliope, white, 8 months, 12 gs.—Mr. Chamberlain
- 59 Grace Darling, roan, 6 months, 23 gs.—Mr. Wetherell
- 60 Rosabella, red and white, 6 months, 15 gs.—Mr. Arkell
- 61 Donna Maria, roan, 5 months, 11 gs.—Mr. Dodwell
- 62 Coral, red, 3 months, 7 gs.—Mr. Taylor
- 63 White Rose, white, 11 weeks, 8 gs.—Mr. Taylor
- 64 Charity, white, 11 weeks, 5 gs.—Mr. Taylor.

BULLS AND BULL-CALVES.

- 65 Monzani, roan, 8 years, 30 gs.—Mr. Castree
- 66 Duke of Richmond, roan, 3 years, 170 gs.—Mr. Elliott
- 67 Wolverton, red and white, 22 months, 90 gs.—Mr. Richmond
- 68 Protector, white, 12 months, 25 gs.—Mr. D. Smith
- 69 The Gambler, roan, 11 months, 12 gs.—Mr. Phillips
- 70 Merlin, red and white, 9 months, 9 gs.—Mr. Arkell
- 71 Burton, roan, 8 months, 15 gs.—Mr. Ridgway
- 72 True Blue, roan, 6 months, 34 gs.—Mr. Elliott
- 73 Brigaud, red, 4 months, 9 gs.—Mr. Dodwell
- 74 Lord Milton, white, 3 months, 11 gs.—Mr. Watson
- 75 Nestor, white; 76, Benson, red and white—dead
- 77 Lord Lennox, roan, 2 months, 12 gs.—Mr. Goddard.

The following had been calved since the catalogues were printed :

- 78 White heifer calf, 3 gs.—Mr. J. Gillett
- 79 White heifer calf, 12 gs.—Mr. Arkell
- 80 Red bull calf, 5 gs.—Mr. Latham
- 81 Red heifer calf, 5 gs.—Mr. J. Gillett.

CORN AND CATTLE.

"It is not surprising if, in a controversy of this kind, we should find the free-traders openly contradicting each other, and very often themselves, in the advice which they gratuitously offer to the agriculturist. One section recommends further outlay on the land, more extended and elaborate tillage, and prophesies in return an augmented cereal crop. Another totally repudiates this view, but advises that the loss should be made good by green crops, wider pastures, and an infinite multiplication of cattle. The former philanthropists want more grain; the latter insist upon an extended consumption of butcher's meat. The tendency of late legislation has been in favour of the latter view, and the consequence has been a depreciation in the value of cattle throughout the kingdom of at least from 15 to 20 per cent. The consumer has not yet got the full benefit of it, but the farmer has incurred the loss; and we know instances of pasturings on which, for the last two years, not a single shilling of profit has been realized. The cattle when sent to market, after being fattened, have brought the same price which was given for them in their lean and hungry condition. The free-traders are very bold about cattle, alleging that, in this respect, there is nothing to fear from the effects of foreign competition. And undoubtedly, to a casual observer, this would appear to be one of the least objectionable parts of their scheme. Still there is something mysterious in the fact of the great depreciation. The prices of cattle have fallen, until profit has been nearly extinguished; and if we exclude altogether the idea of foreign competition, the necessary conclusion will be that the supply has vastly exceeded the demand. This is but poor comfort to those who are told to look to green crops for their remuneration. But we think that the subject requires a closer examination than it has yet received. We are convinced that the depreciation of live stock is intimately connected with importation, and the result of our inquiries will show whether we are right or wrong. But first let us glance at the ascertained effects of importation under the relaxed tariff.

"The first fruit of the unrestricted trade in live stock—which exhibited a number that mounted up, for the first five years, at a rate increasing annually fourfold, until the number of 'oxen and bulls' reached from 1,385 in 1843 to 27,831 in 1848—was no doubt sufficiently alarming. But, judging from the trade of the year ending 1848, and of the present season, this influx would appear to have reached its full. Assuming this to be the case—as the entire number would not, on a rough calculation, furnish more than a week or ten days' supply of beef to the whole country—perhaps there is not much reason to apprehend any great depression in home prices, from the influence of the importation of foreign live stock. Besides, from the tendency of recent improvements in agriculture—should these fortunately continue in operation—to increase materially the supplies of beef and mutton, it is possible that these necessities could in future be afforded at such a price as to exclude the probability of any great accession to our importations for many years.

"We believe that the only considerable harm which has resulted from the importation of live stock has been the importation of two very fatal diseases, which have since then carried off numbers of cattle and sheep, and which, like most epidemics, will in all human probability become permanent. The mortality was so serious that

Parliament has already passed an act establishing a sort of conditional quarantine; and it has been calculated by those who are skilled in such matters that the number of animals that have died in consequence is considerably greater than the whole amount of the importation. In this way it is easy to reckon the amount of our losses and our gains.

"But there is a farther importation of butcher's meat in another shape, which is far more difficult to contend against—namely, that of 'cured beef, bacon, and pork.' The importation of these articles has increased so rapidly and enormously since the introduction of free trade—the two latter to upwards of sixfold since 1847—that the whole together, it may be reckoned, now afford a quantity of food exceeding in weight four times that of the 'oxen and bulls' imported during the last year. This is a mere beginning, but already the effects of it have been widely and calamitously felt. It is not only affecting the graziers, but it is displacing a large and hitherto flourishing trade, both in Britain and in Ireland; and if carried out further, as it clearly will be, not one single rallying point or chance of escape will be left to the British agriculturist.

"The following is the statement of a Liverpool correspondent, dated 6th December last:—

"I enclose you a price current, with the latest quotations of American provisions, which are the prices to the wholesale dealers. In the best qualities of beef and pork the trade generally get 5s. to 10s. a package profit, and on an ordinary article a much larger margin is allowed.

"American beef is far superior to Irish, and brings more money. The import of the latter is about 1,000 tierces—of the former, 20,000 tierces. Irish pork stands higher than American, and the finest quality eastern will sell within 5s. per barrel of Irish. The import of Irish is about 3,000 barrels—of American 35,000 barrels.

"The following table will show the comparative prices of Irish and American produce:—

"COMPARATIVE TABLE OF PRICES OF IRISH AND AMERICAN PROVISIONS AT LIVERPOOL, IN DECEMBER, 1849.

	Irish.		American.	
	s.	d.	s.	d.
Prime mess beef, per tierce,	80	to 85	67	6 to 81 0
30 lbs.				
Prime mess pork, per barrel,	62	to 66	34	0 to 60 0
200 lbs.				
Mess do., per do.	54	to 60	45	0 to 50 0
Bacon, per cwt.	15	to 48	30	0 to 32 0
Lard, per do.	38	to —	33	6 to 34 0

"These are figures which may well astound the boldest free-trader, for they show that the provision trade is altogether passing from our hands. To those who regard the welfare of Great Britain, they furnish additional proof of the headlong rate of our decline."

Another statement from a gentleman at Dun, Lec, "who stands nearly at the head of the meat-curing business in Scotland," fully confirms the above. He shows that the present price of one tierce Scotch beef is £6 8s.; whilst the present prices of prime mess American beef is £4 7s. 6d.; being a difference of no less than £2 0s. 6d. per tierce, or 14s. 9d. per cwt. in favour of American! Foreign pork, too, greatly depresses home prices.—Blackwood's Magazine.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

Professor Way, the Consulting Chemist to the Society, delivered a Lecture "on Guano and its adulteration," before the members of the Society, at their House, in Hanover-square, on Wednesday, the 27th of February; Mr. Raymond Barker, Vice-President, in the chair.

LECTURE ON GUANO.

Mr. Way commenced his lecture by observing that he had been induced to make guano the subject of a lecture, partly because the present was the season when farmers were purchasing their supplies of the manure, partly on account of the insufferable extent to which the adulteration of guano was now carried, and which had been brought before the attention of the Council of the Society in so circumstantial a manner at a previous weekly meeting, as to induce them to refer the whole question to the serious consideration of a monthly meeting. Mr. Way would carefully avoid any remarks which should have the appearance of prejudging the case, or of dictating to the Council the line of conduct they should pursue; but he considered it his duty, as the Chemist of the Society, to bring the facts before them.

He should confine himself to Peruvian guano, the other varieties having comparatively ceased to be of importance; and 1st, he would endeavour to establish the fact, that the true Peruvian guano, as it reached this country, was not subject to much variation. By the examination of more than 30 specimens last year, he had found that the per-centages of ammonia and phosphate of lime, the most important ingredients of guano, were confined within narrow limits. A diagram before the meeting showed this plainly:

VARIATION IN THE COMPOSITION OF PERUVIAN GUANO.

(32 specimens examined.)

	Lowest.	Highest.	Mean.
Water	8.88	22.68	13.09
Organic matter and salts of ammonia	37.78	58.82	52.61
Sand	1.17	2.95	1.54
Earthy phosphates	19.46	34.45	24.12
Ammonia yielded by 100 parts	15.98	18.94	17.41

The specimens alluded to were carefully taken from ships in the river. Since the publication of these results in the Journal of the Society, he had made many more analyses of good guano, and was more than ever convinced of the uniformity of its composition. But whilst the authenticated specimens were very similar in composition, samples were continually reaching the laboratory, which, upon analysis, exhibited every shade of chemical characters—that these samples were adulterated, there could be no doubt.

While good guano, when burnt, gave an ash almost entirely soluble in acids, and leaving only 1½ or 2 per cent. of sand, these adulterated specimens contained often from 25 to 35, or more, of insoluble matter—sometimes sand, sometimes clay. In proof of this, he submitted, in a diagram, the analysis of six specimens which had reached him within the last few weeks from different localities:

ADULTERATED GUANOS.

	1.	2.	3.	4.	5.	6.
Water	7.77	6.64	..	10.92	12.32	11.22
Organic Matte, and Salts of Ammonia ..	36.18	29.42	..	32.44	34.86	34.68
Sand, &c.	23.14	7.84	25.34	32.50	27.23	5.44
Earthy phosphates	6.80	10.24	16.40	16.60	13.30	21.09
Ammonia	10.10	8.37	12.20	10.29	8.96	8.14

In many cases these specimens had been sent to him in the belief that they were genuine, but there could be no hesitation in pronouncing them spurious. Of the loss to the farmer in the purchase of such sophisticated manures it was difficult to speak with any great degree of accuracy—the loss was not confined to that of the purchase-money—it was the disappointment and failure in the crops resulting from their use which constituted the severity of the evil. Of the loss on purchase-money, some notion might be formed by a calculation founded on the value as manures of ammonia and phosphate of lime. He estimated the ammonia at 6d. per lb., and the phosphate of lime at 3d. per lb.; but it would be necessary to make a deduction from the value so obtained, inasmuch as guano at £10 per ton furnished these substances at about one-sixth less than the above-named prices.

MONEY VALUE OF ADULTERATED GUANOS.

	Per cent.	Price. £ s.	Value.		Loss to Buyer.
			£ s. d.	£ s. d.	
1. { Ammonia	10.10	8 10	5 9 0	3 1 0	
{ Earthy Phosphates	6.80				
2. { Ammonia	8.37	7 10	4 10 0	3 0 0	
{ Earthy Phosphates	10.24				
3. { Ammonia	12.20	9 10	6 12 0	2 18 0	
{ Earthy Phosphates	16.40				
4. { Ammonia	10.29	..	5 18 0	....
{ Earthy Phosphates	10.60				
5. { Ammonia	8.96	..	5 14 0	....
{ Earthy Phosphates	13.30				
6. { Ammonia	8.14	..	6 4 0	....
{ Earthy Phosphates	21.09				

The diagram which was formed from the analysis of the specimens just described, proved that whilst the dishonest dealer reduced the value of the guano by sand

and other admixtures to one-half, he only lowered the price by one-fourth. For £7 10s. the farmer obtained, therefore, a guano which was intrinsically worth £5 or less. It could not be too widely known that it was impossible in the general way of business that they should buy good Peruvian guano for less than £9 5s., because the importers, Messrs. Gibbs, Bright, and Co., who had an exclusive agency from the Peruvian Government, never sold any sound guano below that sum. It was true, indeed, that there were sales now and then of damaged guano; that is, of the parts of the cargoes that had been subject to leakage on the voyage; but the competition for these lots was so great, that they generally fetched a higher price than their intrinsic value justified; they were often mixed with some substance to dry them up, and then the farmer paid the cost. Nothing was a greater delusion than a cheap guano: if the farmer could not afford the full price, let him buy half the quantity.

Mr. Way then went on to mention the substances generally employed in the adulteration, and to remark that at present the methods employed were very gross, and comparatively easy of detection—yellow sand, ground limestone, yellow marls and clays, gypsum, and ground coprolites; all and each of these had been detected in the analyses of samples he could bring forward. The adulteration was not confined to 10 or 15 per cent., which itself would seem to offer a fair remuneration for the fraud; but it was in most cases above 25 or 30 per cent. The use of ground coprolite was a certain step of refinement in this nefarious trade, because the coprolite consists in great measure of phosphate of lime—itsself an ingredient of genuine guano. By-and-bye he feared that those who adulterated, being more closely watched, would become more clever in their calling, and the little chance (for unfortunately it was little) that the farmer, unaided, had of discovering the imposition, would be still further diminished. He wished he could make known some easy and simple method by which the buyer could, for himself, make an examination of his purchases; but there would seem to be none short of chemical analysis, which met all cases.

The lecturer then went on to show, by specimens on the table, the difficulty of deciding between a good and bad specimen by external indications. The colour was usually considered a criterion; but a sample exposed for a short time to damp air became dark and of a suspicious appearance, although in truth perfectly good, and really only containing 2 or 3 per cent. more water. On the other hand, guano adulterated with 40 per cent. of yellow clay was in no respects distinguishable by its colour from the pure article. On the table were specimens purposely mixed with 10, 20, 30, 40, and 50 per cent. of white sand. This was a gross falsification, and yet he thought that gentlemen in that room would have a great difficulty to distinguish between any one of them containing less than 30 per cent. of sand and the pure guano lying beside them. The character of smell was also very deceptive. No doubt the pungency was reduced by mixture with most substances; but even good guano was not all alike in this respect; and if by acci-

dent it became slightly damp, the smell was greatly increased. The driest and the best would therefore frequently have the least odour. Perhaps of all practical tests that of specific weight was the best. Adulteration was happily at present practised with substances heavier than guano, and therefore a great weight, compared with equal bulk, was a suspicious circumstance. By a great many weighings made under the directions of the importers, he was able to say that the average weight of a bushel of good Peruvian guano was about 68 lbs. The variation on these trials was, however, somewhat great—a bushel sometimes weighing as much as 73 lbs., at others not more than 61 lbs., a circumstance due to the lumpy and unequal character of guano, and to different methods employed by various persons in the experiment. A bushel of guano adulterated with 40 per cent. of any of the substances he had before named, would, however, greatly exceed the above weights, although he could not state the precise difference. Some value was, therefore, to be set on this method of judging, although eventually he feared it would not serve the purpose. Some simple experiments were in the reach of every farmer, and would serve to protect him against the more flagrant modes of falsification. Thus, when pure guano was burnt on a hot shovel till the blackening had gone off, the ash ought to be white—not yellow or brown: these latter appearances indicated an admixture of clay or coprolite. The ash, too, ought almost all to dissolve up in muriatic acid, leaving little residue insoluble.

A still better plan was to burn 100 grains of the sample with twice its weight of powdered nitre, and when the mass had ceased to swell up to dissolve the nitre in water. If pure guano had been used, the white phosphate of lime would easily float off in the water when decanted. On the other hand, a mass of yellow or black heavy stuff at the bottom of the glass would lead the experimenter to suspect adulteration. Having expressed his regret that the circumstances did not admit of an easy and certain test of good guano, to be applied by the farmer himself, Mr. Way said that it was some satisfaction that the fraud was open to detection by the aid of chemistry. There were numbers of chemists throughout the country quite competent to decide in these cases, and the farmer who purchased largely of guano without having recourse to the unerring guidance of analysis was himself partly to blame if he lost his crops and his money. The Council of the Society had made arrangements by which the cost of analysis of all sorts to its members had been considerably reduced. If they should be able to strike out any plan by which the access of farmers to chemical aid would be facilitated and cheapened in regard to this particular manure, he was prepared on his part to co-operate with them in any way that his professional assistance might be useful.

Lastly, Mr. Way would advert to the practical result which might flow from a more general employment of analysis in the case of guano. Could the farmer refuse payment for an adulterated guano? or, could he recover from the fraudulent dealer for loss of money and loss of crop? These were the great questions. He did not profess to understand the law of the case, but he could

not conceive that, in a common-sense country like England, deliberate fraud affecting the vital interests of a mass of the community could be allowed to flourish unchecked; and he believed, sooner or later, whatever the difficulties, the farmer would find his redress. Mr. Way stated that it had always appeared a difficulty to him how, in case of his being called upon to give evidence in a court of law, he should answer such a question as this, "You say that this guano has a different composition to the average cargoes, and therefore it is adulterated—have you analyzed every cargo that has reached England during the last year?" This would be a troublesome question to answer, however much he might morally be convinced of the adulteration. This difficulty had, however, been entirely removed by a promise which he was authorised to make on the part of the importers—that samples of each cargo of Peruvian guano reaching England should be reserved with all proper authentications—not by persons in their employ, but by independent witnesses producible in a court of law, and that portions of these samples should be available for the establishment of any case of fraud. This arrangement was a great step. Let the farmer always insist upon knowing from the dealer the name of the ship, and the date of importation, and with a power of reference to the original cargo, the links of legal evidence would appear (at least to him, as a person unlearned in the law) to be complete.

Before he sat down, Mr. Way wished to say that in attacking the unprincipled dealers, he would distinctly express his conviction that there were very many honest and upright men from whom guano could be purchased, and it was hard that the just should suffer for the unjust. The dealers had in great measure introduced this valuable manure into use, and should not hastily be deprived of their rightful advantages because there were some black sheep amongst them.

On the motion of the Rev. James Linton, seconded by Mr. Slaney, M.P., the best thanks of the meeting were voted to Prof. Way, for his kindness in lecturing before them on that occasion.

Col. Challoner, Capt. Wentworth Buller, Mr. Miles, M.P., Mr. Parkins, and Dr. Calvert, offered remarks to the meeting on topics connected with the Lecture, and Mr. Barugh Almack suggested that an authorised list should be published of those dealers who had never been known to offer adulterated guano for sale.

A Monthly Council was held at the Society's House in Hanover Square, on Wednesday, the 6th of March: present, His Grace the Duke of Richmond, K. G., trustee, in the Chair; Lord Camoys; Sir Thomas Dyke Acland, Bart., M.P.; Sir Charles Lemon, Bart., M.P.; Sir Robert Price, Bart., M.P.; Mr. Raymond Barker; Mr. C. Barnett; Mr. S. Bennett; Mr. Bosanquet; Mr. Bramston, M.P.; Mr. Brandreth; Mr. French Burke; Col. Challoner; Mr. Garrett; Mr. Brandreth Gibbs; Mr. Grantham; Mr. Hamond; Mr.

Fisher Hobbs; Mr. Hudson, of Castleacre; Mr. Lewes; Mr. Neil Malcolm; Mr. Miles, M.P.; Mr. Milward; Mr. Pusey, M.P.; Prof. Sewell; Prof. Simonds; Mr. Shaw of London; Mr. Villiers Shelley; Mr. Slaney, M.P.; Mr. Stausfield, M.P.; Mr. Turner, of Barton; Mr. C. Hampden Turner; Prof. Way; and Mr. Jonas Webb.

Finances.—Colonel Challoner, Chairman of the Finance Committee, laid before the Council the Monthly Report on the accounts of the Society; from which it appeared, that on the last day of the month just ended the current cash balance in the hands of the Bankers was £2,634 (including the subscription of £1,260 from Exeter). The Chairman also reported the investment of £1,247 in the purchase of Stock in the public funds, as ordered by the Council at their last Monthly Meeting; and laid on the table the Bank Receipt for such purchase.

Essays and Reports.—Mr. Pusey, M.P., Chairman of the Journal Committee, reported to the Council the receipt of 64 Essays and Reports, in competition for the prizes of the Society, in that department, for the current year. The Council referred these Essays to the Journal Committee, with a request that they would take as usually the requisite steps for their examination by respective classes of Judges, and the adjudication of the prices.

Country Meeting.—The Duke of Richmond, as Chairman of the Charter and Bye-law Committee, in reference to the Society's County Meeting in 1851, laid before the Council the Report of that Committee, which was adopted by the Council. His Grace then favoured the Council with various suggestions, founded on an extensive enquiry he had made of the law officers of the crown and other high legal authorities of the kingdom connected with the measures it would be desirable for the Council to take, in consequence of the Resolutions passed at their Special Meeting on the 20th ult. The Council thanked the Duke of Richmond for the favour of these suggestions, which they ordered to be recorded in their minute book for adoption, when the proper time for their application should arrive.

Mr. Raymond Barker, and Mr. Miles, M.P., renewed the notice they had given on the 20th ult., for a motion at the Monthly Council in April, to rescind the resolution of May 3, 1847, and substitute an amended resolution in its place.

Mr. Grantham gave notice that at the proper time he should be prepared to submit to the Council a strong presumptive case in favour of Lewes, as the place of one of the Country Meetings of the Society.

Chemical Lectures.—The Report of the Chemical Committee having been read, the Council accepted with their best thanks, Prof. Way's offer to deliver a Lecture before the Members, in the Council Room of the Society, at 12 o'clock on every third Wednesday of the month during the current session of the Society, namely, in the months of March, April, May, June, and July, the next Lecture to be delivered on the 20th inst.;

"On the subject of a newly observed Property of Soils, affecting the use of manures, irrigation, &c."

Guano Adulteration.—The Council referred to the Chemical Committee the recommendation of the weekly Council of the 13th inst., that Mr. Hunt's statement of the extensive adulteration of Guano at present taking place in the neighbourhood of the Metropolis should be taken into special consideration, with a view to the adoption, if possible, of a remedy for the evil.

Irrigation.—On the motion of Mr. Fisher Hobbs, seconded by Mr. Pusey, M.P., the Council resolved: "That an opportunity be taken, at the Exeter Meeting of the Society in July next, to obtain information on the Theory and Practice of Irrigation and Catch-meadows; and that arrangements be made accordingly," referring to their General Exeter Committee the steps to be taken for effectively carrying out the details of the proposed measure. This subject led to an interesting discussion on the subject of Irrigation, and to a communication of facts connected with the advantages derived from its application in localities where it had been adopted, and with the want of it experienced in those parts of the country into which it had not yet been extensively introduced.—Mr. Bennett gave a most favourable statement of the appearance of grass crops in Cornwall and Devonshire, during a recent journey he had made through those counties; and in envying their rich growth, he strongly felt the advantage to be derived by the transfer to his own county (that of Bedford) of a similar beneficial system of early, vigorous, and repeated growth of such crops. Mr. Shelley had last autumn, in Sussex, laid down 60 acres under irrigation; and the effect was most striking.—Mr. Slaney regretted that the system had not yet extended to Shropshire. An obstacle still existed to its adoption, arising from the refusal of intervening occupiers to join in carrying it out. This had long been provided for in Lombardy, and he hoped it would soon be so also in this country.—Mr. Turner, of Barton, gave an interesting statement of the nature of his own operations connected with irrigation in Devonshire, and of its peculiar advantages.—Col. Challoner thought that as a new implement in the Show-yard lost half its value when left unexplained by its inventor, so would these water-meadows in Devonshire, when seen by the Members of the Society, unless the proprietors made arrangements for the details of their construction and operation being explained by their bailiffs, or other persons, whom they would kindly direct to be in attendance.—Sir Thomas Acland and Mr. Turner expressed their entire willingness to afford every explanation in their power on this subject, and they each gave to the Members of the Society a most hearty welcome to their respective establishments.—Mr. Pusey thought that the Society on this occasion might with very great advantage imitate the example of the Archaeological and British associations, by paying personal visits in a body to the various objects of attraction to farmers in Devonshire, especially to an inspection of their system of irrigation.—Mr. Fisher Hobbs alluded to the excellent paper on this subject, by Mr. Pusey himself, in the last number of the Journal,

which led strangers to the system to feel a strong desire to witness the reality.—Sir Thomas Acland could only express, on the part of the Devonshire farmers, his thanks to Mr. Pusey for that interesting statement, which brought into so prominent a notice this great feature of their agricultural operations.

Filling-in Drains.—The Council accepted, with their best thanks, the liberal offer of Mr. Slaney, M.P., to renew, this year, his prize of £10, for the best Plough to fill-in the soil cast out of drains, with not more than four horses (two and two abreast), to be awarded at the Exeter Meeting; referring the details and conditions of the prize to the Implement Committee.

Draining.—Mr. Bullock Webster addressed a letter to the Council, expressing his intention of justifying the statements he had made in his paper, published in the Journal, and of correcting the misconceptions into which some parties had fallen, who had called that paper in question.

South Devon Cattle.—Mr. Phillips, of Broomborough, appeared before the Council, on the part of the Breeders of the South-Hams Cattle, and learned from the Council the Conditions under which Prizes for that Class of Stock could be offered at the Exeter Meeting.

A weekly Council was held at the Society's House in Hanover-square on Wednesday, the 13th of March: present, Mr. Raymond Barker, Vice-President, in the chair; Sir John V. B. Johnstone, Bart., M.P.; Mr. Almack; Mr. French Burke; Dr. Calvert; Mr. Colthurst; Mr. Cahel Cure; Mr. Dyer; Mr. Majendie; Mr. C. E. Overman; Mr. Parkins; Mr. Slaney, M.P.; Mr. Augustus Smith; Professor Sewell; Professor Simonds; Mr. Reynolds Solly; and Professor Way.

Thibetian Sheep.—Colonel the Hon. C. B. Phipps communicated to the Council, on the part of H.R.H. Prince Albert, further information connected with Her Majesty's Flock of Thibetian Sheep at Osborne; which was received with the best thanks of the Council, and referred to the Journal Committee.

Warmth and Ventilation.—M. Noirsain, the inventor of the Belgian Fire-place presented to the Society, requested leave to postpone the presentation of his Report on its operation, until his arrangements for its adaptation, and the experiments he had in progress connected with its action, should be completed. Mr. Slaney, M.P., took that opportunity of referring to a very simple, economical, and effective mode of warming the upper chambers of cottages and the store-rooms connected with stables, coach-houses, granaries, and other outbuildings, which he had adopted on his own estate with great comfort to his cottagers, and advantage to the store articles contained in those rooms. Having remarked that in building a cottage with the fire-place in the outside wall all warmth from the back part of the fire was carried off by the external air and lost to the inmates, he had tried the experiment of placing the chimneys of his cottages in the mid-wall dividing two of their rooms, one the

kitchen, the other the wash-house or scullery. In building the chimney he had a small hollow recess, forming an air-chamber, left in the wall at the back of the kitchen chimney, into which the external air was introduced, by means of a flue of common drain-pipe-tiles 2 in. wide placed under the floor; and becoming heated by the fire, it passed on continuously by means of a small aperture into the back adjoining room, and conveyed into it a warm, fresh, and uncontaminated atmosphere. The room was thus constantly kept moderately warm and dry, and the wet shoes and clothes of the labourer being hung in a row during the night on pegs placed above the aperture, were made perfectly dry for his use by the next morning. The upper rooms could also at any time be warmed from the same source, by temporarily closing the aperture of the flue leading to the adjoining lower room, and leaving a half brick flue open above the air-chamber into either of the upper rooms, the lower opening being always shut for the time the upper one was kept open. The cost of this arrangement was very trifling, and the comfort great. Sir John Johnstone had employed a similar plan in his cottages in Yorkshire, but he had constantly found the apertures for the admission of the warm air into the chambers adjoining those in which the fire was placed, as carefully closed up as a draught of cold air would be in ordinary cases, the occupiers having a prejudice or dislike to a mode of warming their rooms in which the source of heat was not immediate and obvious. He had seen a very agreeable and effectual mode of warming large bodies of ascending air, as in halls, vestibules, staircases, and galleries, where there was a free passage for the ascent or outlet of the warm air, by means of an iron pillar formed of a double cylinder, open at the bottom and throughout along the line of their common axis, but closed by the junction of their upper edges, placed above a ring of jets of burning gas laid on from the street. Mr. Majendie, Professor Sewell, and Professor Way, also favoured the Meeting with remarks on the subject of warming and ventilating rooms.

South-Devon Cattle.—Mr. John F. P. Phillips, of Broomborough, as Secretary and Treasurer to the Local Committee of the South-Devon Association, transmitted to the Council the acquiescence of that Committee in the suggestions offered to them by the Council at their last Monthly Meeting, in reference to the Prizes which that Association wished to offer for South-Hams Cattle at the Exeter Meeting, under the 18th Regulation of the Prize Sheet. The following is accordingly the Schedule of Prizes to be adopted for that occasion, the competition to take place as in the case of the other Prizes for that Meeting, subject to all the Rules and Regulations of the Society:—

SOUTH-DEVON OR SOUTH-HAMS CATTLE.

Class 1.—To the owner of the best Bull calved previously to Jan. 1st, 1848	£ 20
To the owner of the second-best do. do..	10
Class 2.—To the owner of the best Bull calved since Jan. 1st, 1848	10
To the owner of the second-best do. do..	5

Class 3.—To the owner of the best Cow, in-calf or in milk, having produced a living calf within the previous 12 months	15
To the owner of the second-best do. do..	5
Class 4.—To the owner of the best in-calf Heifer, not more than 3 years old	15
To the owner of the second-best do. do..	5
Class 5.—To the owner of the best yearling Heifer	10
To the owner of the second-best do. do..	5
	£100

Mr. Phillips further communicated the following suggestion, on the part of the South-Devon Association, namely, "That any person exhibiting in these Classes shall be required to sign a certificate that the animal exhibited is directly descended from South-Hams Cattle." The Council referred this suggestion to their General Exeter Committee, which they directed to be summoned for that day week.

Armenian Wheat.—Professor Lindley favoured the Council with a specimen of Wheat grown at Erzeroom, on Mount Ararat, and with a communication from James Brant, Esq., H.M. Consul at that place, relating to its cultivation. The seed had been obtained from Trebizond, and the variety was supposed to be that of the *Triticum compositum*. The Council ordered their thanks to be sent to Dr. Lindley for the favour of this communication. The presentation of this wheat led to an interesting discussion on the produce of wheat grown under different circumstances, and on the relation between the produce per acre and the average number of grains in a single wheat-ear of the crop.—Mr. Slaney gave an interesting detail of his cultivation of a piece of very bad land in Shropshire, which, by draining and subsoiling, had now for the first time borne turnips, and the best crop of barley in that part of the country. He particularly dwelt on the peculiar advantages to be derived from *subsoiling*, in addition to draining and general cultivation.—Sir John Johnstone had employed Wilkie's plough across the drains with great advantage.—Mr. Overman and Mr. Slaney favoured the members with the result of their experience in the use of Garrett's Horse Hoe, and its adaptation to their respective purposes; although Mr. Slaney conceived that improvement was still required in the means for hoeing wheat.—Mr. Dyer had, in his own case, observed for the last 10 years a curious law to hold in the ratio between the average number of grains of wheat in a single ear of the crop, and the number of bushels in the produce, each such grain in the ear being correspondent to a bushel per acre in the produce when thrashed out. In his crops the average number of grains in the ear had been 28, while the bushels per acre produced had also been 28. He did not mean to express his belief in the generality of such law, but he merely referred to it as a curious case occurring within his own observation.—Mr. Barugh Almack entirely concurred with Mr. Slaney in his remarks on the advantages of subsoiling and draining, and he had every reason to think highly of Mr. Garrett's Horse Hoe. With regard to Mr. Dyer's interesting statement on the correspondence between the number of

grains in the ear, and the number of bushels per acre, he thought the fact must be taken as a singular case under given limitations and conditions. He conceived, to obtain a correct general result, that not only should the average number of grains in each individual ear be taken, but also the number of ears themselves in a crop; otherwise the rate of bushels per acre would be dependent on the size of the ear, and irrespective of the total number of the ears, which might easily be shown to lead at once to incorrect conclusions. He thought, that assuming in some cases the rule to hold good as to there being as many bushels of wheat per acre as there are grains in an average ear, yet that it was quite clear no additional number of grains per ear could make up for the fact of the ears being as wide apart as apple trees, for instance, usually are; and accordingly, that the rule could not be relied on in extreme cases of thin sowing. He had alluded to an extreme case, in order that the fallacy of the rule might, in some cases, be made more obvious. Mr. Dyer had remarked that he sowed three bushels per acre; consequently, in Mr. Almack's opinion, Mr. Dyer's case proved two remarkable facts:

1. That as he generally finds as many bushels per acre as there are grains in an average ear, it follows that he usually has about as many wheat ears per acre as there are grains in a bushel of wheat.
2. That as he only obtains as many ears of wheat per acre as there are grains of wheat in one bushel, although he sows three bushels per acre, it seems that he sows three grains of wheat for each ear that he obtains.

He thought that something similar had been stated by one of the advocates for thin sowing, and he had no doubt it would be a very interesting matter for consideration if all would reflect on it with due caution, and without taking it for more than it proves. Mr. Almack would not at that time offer an opinion as to the question of thick or thin sowing, although he thought that some experienced farmers would at once, on seeing the crop, give a better guess at the number of bushels per acre, than any one could do by merely counting the grains in an average ear. He was still glad to learn from Mr. Dyer the singular law which he had found to hold good in his own case. He conceived that practical farmers would always be desirous of having their attention drawn to similar facts; it was only necessary that inexperienced farmers should be cautioned against the probability of the rule holding good in all cases. He would endeavour to show in another form that the rule in question could only be fairly expected to hold good, where the number of ears per acre are the same, or nearly so. He would suppose that a given area of land was accurately measured and divided into two equal parts, and that on one of these parts there are 30 ears of wheat, each containing 40 grains, the total produce would be 1,200 grains; on the other part, 40 ears containing 30 grains, of which the total produce would also be 1,200 grains; and as in both cases the quantities of land were equal, the produce per acre would in each case be the same, unless we assume the grains to vary in size.

Mr. Almack concluded by observing, that if we suppose these last cases to represent two fields occupied by different farmers, he thought it obvious that if one expected to have ten bushels per acre more than his neighbour, he would be disappointed.

Communications were received by the Council from Mr. Warry, on drainage, covenants, and agricultural education; from Mr. Looms, on prizes; and from Mr. Fulbrook, on Meteorology.

Prof. Spooner and Prof. Morton, of the Royal Veterinary College, made presents to the Society of their respective works; the former, of a copy of his "Introductory Lecture on Veterinary Science;" and the latter, of copies of his works on "Veterinary Pharmacy and Calculous Concretions," and of his "Veterinary Toxicological Chart." Mr. Roberts presented a copy of his work on the "Dwellings of the Poor"—for all which, and other presents made to the Society, the Council ordered their best thanks.

The Council then adjourned to their weekly meeting on that day fortnight:

Prof. Way's Lecture being fixed for that day week, the 20th inst., at 12 o'clock.

NEW MEMBERS.

The following new members were elected:—

Abrey, Thos. Shaw Hellier, Nether Hall, Bradfield, Manningtree
 Baxendale, Joseph, Woodside, Whetstone, Middlesex
 Bletchley, John, Buckover, Thornbury, Glouce.
 Braddon, William, Blackland, Plympton St. Mary, Devon
 Brydges, Thomas, Marwood House, Barnstaple, Devon
 Burnett, Alexander, Merton, Crediton, Devon
 Carter, Henry, Milton House, Pembroke, Leominster
 Chilcott, Rev. Wm. Francis, Rectory, Monksilver, Taunton
 Clarke, Thomas, Tremlett House, Wellington, Somerset
 Clare, Charles Leigh, Hindley House, Liverpool
 Coletson, W. H. Morris, Lydford, Somerton, Somerset
 Counsell, W., St. Mary Church, Torquay, Devon
 Edwards, Joseph, Hutton, Somersetshire
 Farthing, Samuel, Stowey Court, Nether-Stowey, Bridgewater
 Gurney, Rev. William Walter, Roborough, Torrington, Devon
 Hamling, Henry, Dean's Prior, Ashburton, Devon
 Hanbury, Sampson, Bedford Lane, Clapham.
 Heseltine, Samuel Richard, Chase Side, Enfield, Middlesex
 Heysett, Lewis Risdon, Boracott House, High Hampton, Crediton
 Moon, John, Lapford, Crediton, Devon
 Morse, Arthur, Swaffham, Norfolk
 Ormerod, Henry Mere, 85, Mosley Street, Manchester
 Park, Lawrence, Haldon House, Exeter
 Pedler, John, Baron's Wood, Zeal-Monachorum, Crediton
 Shaw, John, Beddington Lodge, Croydon, Surrey
 Spragge, Francis, Torquay, Devon
 Toleher, Edward, Ridgeway, Plympton, Devon
 Wilson, Joshua, Islington, Middlesex.

CALENDAR OF HORTICULTURE.—APRIL.

The usual *Retrospect* must, on account of the extraordinary weather, be delayed to the close of this report, as a change seems to be announced by the fluctuation of the wind, and other phenomena that now immediately follow the severe frost of the 15th night, wherein, before sun-rise, the sky being then clear, the spirit themometer marked 7 degrees of actual frost (25 degrees Fahrenheit). Such a period of fine, though by no means bright weather, with a very high barometer—far above 30 inches—it may be difficult to retrace. The roads are covered with dust; and with us not an hour's rain has fallen since the 16th of February, with one exception. The *Equinox* approaches, also, and furnishes another reason for the postponement announced.

OPERATIONS OF THE VEGETABLE GARDEN.

Potatoes.—Hasten the setting, otherwise, if disease tend to prevail, the later planting will be perilled. In a previous article I have ventured to dwell somewhat minutely upon the products of the tubers and herbage of this vegetable, obtained by several eminent analysts. Now, however, three distinct experiments on the tubers, by Dr. Dawbeny, the results of which (all differing to some extent) are before me. I have calculated the averages of the figures as they stand under their several heads, and find them to be the following:—

Potassa	40.52
Chloride of potassium, or muriate of potash.	3.25
Soda	0.26
Chloride of Sodium (common salt).	2.24
Lime	2.96
Magnesia	8.09
Peroxide of iron.	5.10
Silica	4.66
Sulphuric acid	3.71
Phosphoric acid.	11.83
Carbonic acid	9.18
Carbon and sand	7.50
Loss about . . . . .	.60
	99.90

N.B.—The quantity of ash yielded by 100 parts of tuber was about 1.4 per cent.

By these averages the planter can discover the remarkable preponderance of lime that is detected by the analysis of the herbage and fibre of the plant; the proportion being 129.7 from the herbage, and only 3.31 from the tuber, according to the estimate made by Professor Johnston.

“The substances that ought to be in potato-manure are the following, arranged according to their proportions in tons:—

Bases	{	Potash	1180	} = 2250 lbs. to every ton,”
		Magnesia	87	
		Soda	87	
Acids	{	Lime	50	
		Sulphuric acid.	416	
		Phosphoric acid	235	
		Chlorine	195	

indicated by analyses, as detailed in the *Transactions of the Highland and Agricultural Society* for March, 1847, p. 685.

But land differs so materially in its natural constituents that no one can venture to give a strong opinion. In ordinary culture we should say that the ground, if a loam, would furnish much of the potassa and lime-salts; and carbonised vegetable matter, with some leaf-mould, the elements of *organic* enrichment. Let the tubers be entire, though small in size, and planted in five-inch deep drills, pointing south and north, a yard to four feet apart, but the sets only five to six inches asunder.

Peas and beans—the latter for the last time—must be sown very early; peas again as succession. *Kidney beans* and *runners* are much forwarded by sowing thickly in pans, sheltered by a frame; there they can remain till the first true leaves are protruded a little, and till the dry, warm state of the open ground warrants their final removal. No time is gained by early attempts in the open garden, for the *phaseolus* is a genus which cannot be rendered hardy. Sow *lettuce* of any kind early, in a rich light soil; also *radishes* of both sorts, in open ground, not shaded by trees; *spinach* for succession; *cabbage seed* for summer and autumn use; *borecole* and *savoy* twice; *broccoli* of several kinds, toward the close of April, for autumn and winter supply; *carrots*, to come in soon, or for drawing young.

Forward *cauliflowers*, under hand-glasses, should have a little reduced dung forked between them, drawing the earth up their stems; continue the coverings during wet weather, and in all frosty and very cold nights. Plant out the strongest young cauliflowers that were raised early in the year; choose a piece of good and manured loamy ground, and water the plants directly, and whenever they become dry. Guano water will be very serviceable.

Celery, raised in February or March, will be fit for pricking out at the middle of the month into a

nursery bed of rich light earth, over a gentle bottom-heat excited by a deep bed of tree-leaves. Sow more *celery seed* about the 12th, over a like heat, to raise plants for the general supply. Sow and plant slips of the *sweet pot-herbs*: *lemon thyme* is the best of these plants, and is freely produced by rooted slips. The *early stone turnip* can be sown at any time for a full summer crop.

Hoe among all crops, to destroy weeds; and draw earth toward the stems of *peas, beans, cabbage, cauliflower*, and such plants that stand in rows widely apart. In dry seasons an efficient, thorough hoeing promotes growth, and supplies the plants with moisture.

Asparagus beds, manured with salt before growth is visible, will be found to require little trouble in weeding during summer. Dress the earth with the rake now, prior to growth, and make the edges of the beds neat. Sow seeds in prepared ground, either for permanent plantations or for transplanting when fit for forcing. Plant *artichoke* rooted off-sets in showery weather; they are very apt to fail if the ground and season are dry.

HARDY FRUIT DEPARTMENT.

Finish the grafting of *apples, pears, and plum-trees*. *Vines* will begin to grow if the season become soft and mild; in which case attend to the position of the shoots, to select those that are well placed, and to remove such as will be useless. Great care and tenderness must be observed when the first long growths are trained, as they are extremely tender at the point whence they emerge from the ripe wood.

Disbudding of *wall-trees* will generally be deferred till May. But the buds that have succeeded on stocks that were worked last summer will soon begin to push. Suffer no wild shoots from the stock, above or below, to remain; and when *that* from the bud has fairly made its shoot, head down the stock to a few inches above it, in order to leave a support for it, to which it may be carefully tied with a soft band of worsted, aided by a straight twig or piece of smooth lath on the other side.

Strawberry beds or rows. Do not dig the earth, but hoe it to destroy weeds; then cover the earth with spent hops, old tan, decayed fern-earth, or flat tiles, and press the surface firmly, in order to retain moisture. Some persons mulch the spaces with stable litter, and do well with it, but many have it not at command.

FORCED FRUITS.

In this department there is found much difference of opinion, and theory, on many points, is in a state of transition. Thus, in the vinery, some insist upon the almost constant use of the syringe,

with a highly vaporous atmosphere, and a close house. Others prefer a dry atmosphere, much air, and a hot sun. At all events, when the fruit is changing colour—as that in the early house will soon be—water and vapour should not come near the trees; day heat can scarcely be too high, provided the full sun do not scald the grapes. Roughened glass, or a light screen, is often indispensable. I transcribe parts of a passage from *The Gardener's Chronicle* on pines and figs, which may be profitably perused: "Such pines as are still grown in pots require a shift into larger pots, using three-quarter peat for the youngest plants, increasing the loam as the plants advance towards fruiting: the same will hold good when they are grown without pots, as at Mendon, and by Mr. Fleming, at Tentham, in pits where the soil is heated by means of hot-water pipes. If the bottom heat is supplied by fermenting materials it will require frequent turning and examination to see that the heat (which ought to be steady at 75 to 80 degrees) does not decline, and thereby check the plants that are growing rapidly." It is easy to say what ought to be, but the practical man knows that beds of tan, of leaves, or of dung and leaves, are always subject to sudden and great variations, because the action is chemico-electrical, and affected by secret atmospheric transitions. Hence nothing can be so much depended on for a plunging material as sand and charcoal-dust, kept rather moist, and heated by water tubes, or a tank. "Assist pines whose fruits are swelling, with clear liquid manure; but give no water of any kind when they begin to change colour." How, we ask, is the water to be prepared? for the writer directs it to be made in a tank, and clarified by adding some lime or coarse charcoal; and, "so soon as the liquid has become clear, it should be drawn off into a second tank, the top of which is nearly on a level with the bottom of the first." If this liquid manure be in a black state, like the drainings from a dunghill, the reader should bear in mind that lime will combine with and carry down any humus extractive that may be present, and thus decompose its manure.

"*Figs*.—Increase the amount of air gradually, using the syringe in fine weather to keep down the red spider; maintain an equable moderate state of moisture about the roots, for the fruit becomes liable to fall off from extreme of drought and moisture.

"Stop the young growth at the fourth or fifth eye, by breaking, not cutting, the points out, as, if broken, they do not bleed so much." Mr. Knight, of Downton, recommended the compression of young green shoots at their joints, between the thumb and forefinger, till the substance was felt to yield. Such shoots might ooze a little at a crack,

but not to any extent; and he maintained that fertility was thereby promoted.

FLOWER DEPARTMENT.

In the absence of suitable frames for raising *verbenas* and similar plants for bedding-out, a display by masses of annuals sown in places where they are to remain may be created. For this purpose sow in light fine soil the seeds of red and white *clerkia*, *nemophilla*, *atomarea* and *insignis*, *eutoca*, small stock, dwarf lupin, *colleopsis* of sorts, yellow and orange *eschscoltzi*, &c. Sprinkle a little very fine screened earth over the patches, and cover with an inverted pot, having over its large drain-hole a flat piece of glass. *Geraniums* and red *verbenas* will produce scarlet or crimson beds; *lobelias*, *cærulea*,

and others of dwarf habit, also the elegant superb *larkspur* are adapted to a blue display. The choice and selection are, however, endless, and must depend upon the amateur's taste. Neatness as respects order, symmetry, and the often urged assiduous attention to lawns, box-edging, and gravel walks, must, however, be observed.

Our *Retrospect* will require but few words. The *Equinox* of the spring quarter passed about 11 p. m. of the 20th, with the cold, dry, northerly weather which has so long prevailed. Low temperature and many keen mornings have occurred of late, and rain will soon be acceptable. As yet heavy clouds threaten in vain, and the prognostics induces the belief of a dry summer.

Croydon, March 21.

JOHN TOWERS.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR MARCH.

Throughout nearly the whole of this month the weather has been extremely cold. Vegetation has, consequently, made very little progress; yet our accounts respecting the appearance of the winter wheats, though they have suffered somewhat from the prevailing easterly and north-easterly winds, are tolerably favourable. As might be expected the progress of all out-door farm labours has been very rapid, and a large portion of the spring wheats, as well as barley, oats, beans and peas, has been sown under the most satisfactory auspices. The want of rain is, however, beginning to be felt on most of the light lands, especially those sown with barley and peas. Notwithstanding the extremely low prices of wheat in the whole of our markets, and the miserable prospects as respects the future value of all grain, it is pretty generally understood that the breadth of land under wheat culture this year, is, if anything, somewhat in excess of that of last season. There appears to be a falling off in that of barley and oats. Potato planting has, we perceive, become more in vogue, not only in England, but likewise in Ireland, in which latter country the farmers appear to entertain the opinion that they will be in a position to supply a large portion of the demand here during the last three months of the year. The arrivals of foreign potatoes into London and the large out-ports have continued very extensive. Since the 1st of August, 1849, to the present time, nearly 70,000 tons have

arrived in the metropolis alone. Compared with those of some previous seasons, they have exhibited a considerable improvement in quality, while those of home growth have come forward in great abundance. The condition of most kinds being good the demand has ruled heavy in the extreme, and prices have fallen, since the beginning of the month, about 20s. per ton. The stocks on hand in the agricultural districts are still extensive, and we regard even the present low figures by no means safe.

The clearances of foreign clover-seed in England have fallen considerably short of those of last season. This has, no doubt, arisen from the depressed state of agriculture in general. For cakes there has been literally no demand, even though they have been offered freely, at lower figures.

The actual sales of English wheat in the open markets have been somewhat larger than were those at the corresponding periods in 1849; nevertheless, the supplies at this time in the hands of the growers is very extensive, and in excellent condition. The stocks of spring corn are likewise abundant.

Advices from Ireland and Scotland state that ploughing and sowing have progressed steadily. The markets have been seasonably well supplied with most articles, the demand for which has ruled very inactive. In prices, however, no material change has taken place.

The live stock markets have ruled very dull, at drooping currencies.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

For the time of year, as will be seen on reference to our comparative statements, the supplies of fat stock on sale in Smithfield Cattle Market have been somewhat extensive, and we may add, of full average quality. From Norfolk both beasts and sheep have come to hand in very even condition, and for the most part have "died" well. The continued arrivals from abroad, and the long-prevailing cold weather, which latter circumstance has been productive of increased supplies of dead meat from various parts of the country, have operated against the demand for live animals. Prices have, therefore, given way to some extent, and we see very little prospect of any improvement in them, as the foreign importations, notwithstanding the high rates ruling in most parts of Holland, are likely to be nearly or quite equal to those of last season. Lamb has sold to a fair extent at steady figures, but the value of beef, mutton, and veal has given way quite 2d. per slbs., at which clearances have been with difficulty effected.

The approaching large stock fairs are likely to be well attended. Should the graziers submit to low prices a large business will doubtless be done. The number of both beasts and sheep at this time on most farms is undoubtedly large.

The foreign importations into London during the month have been as under :

	Head.
Beasts	1,910
Sheep	3,333
Calves	761
	<hr/>
Total	6,004

Corresponding month in 1849 ..	8,034
Same month in 1848	4,421

At the northern outports about 1,500 head have been landed, mostly from the Dutch ports, while at Southampton two cargoes of Spanish beasts have been reported.

TOTAL SUPPLIES ON SALE IN SMITHFIELD.

Beasts	16,715	Head.
Cows	506	
Sheep	95,480	
Calves	1,321	
Pigs	1,881	

The above shows an excess of about 1,000 beasts and 4,000 sheep compared with the supply exhibited in March, 1849.

The bullock supplies have been thus derived :

Norfolk, Suffolk, Essex, and Cambridgeshire.....	} 8,000
Other parts of England.....	3,600
Scotland	1,400

From Ireland, 225 beasts, 48 sheep, 30 cows, and 128 pigs have reached us.

COMPARISON OF PRICES.

	Per slbs., to sink the offals.			
	March, 1849.		March, 1850.	
	s. d.	s. d.	s. d.	s. d.
Beef from ..	2 6	to 3 8	.. 2 4	to 3 8
Mutton	2 10	to 4 4	.. 2 8	to 4 4
Lamb.....	4 10	to 6 4	.. 5 0	to 6 0
Veal.....	3 8	to 4 10	.. 3 0	to 3 10
Pork	3 2	to 4 2	.. 3 0	to 4 0

Up to Newgate and Leadenhall markets about 15,000 carcasses of meat have come to hand. The general demand has ruled very inactive on somewhat easier terms.

Per slbs. by the carcass.

	s. d.	s. d.
Beef, from	2 2	to 3 2
Mutton	2 8	to 3 6
Lamb	4 10	to 5 10
Veal	3 0	to 3 10
Pork	2 10	to 4 0

It is gratifying to observe that the reports from most parts of England state that no severe losses have been sustained by the long complained of epidemic. The remedies had recourse to by some of the graziers to arrest its progress appear to have met with success. The number of lambs lost by the severity of the weather has been comparatively small. The fall has turned out a most productive one, particularly in the forward districts.

BERWICKSHIRE.

We cannot recollect of so favourable a seed-time as we have enjoyed for the last three weeks; scarcely a drop of rain has fallen, and the land is in first-rate order; oat-sowing is about to close, and a week or two longer will see the barley mostly in the ground. March-dust has been more plentiful this year than for twenty years past, and we trust that we shall have as favourable a summer and harvest. Winter wheat is now looking uncommonly well—fresh and even on the ground. Turnips have stood the winter well, but are now spoiling in many places. Potatoes are already being planted in early spots, and a great breadth will be planted this season, as confidence is again being restored. Our corn markets have varied little for many weeks past, and although prices are very low, demand is better, and grain is more easily disposed of. Wheat brings 35s. to 36s.; barley, 19s. to 21s.; oats, 14s. to 16s. per qr. Cattle and sheep are in better demand, at higher rates.

AGRICULTURAL INTELLIGENCE, FAIRS, &c.

ABERGAVENTY FAIR (Tuesday last) was pretty well supplied. The attendance of horses was quite equal to what we have seen at this fair in previous years, but the trade in them was very dull. There was a large number of store cattle, which hung on hand very much. The supply of fat beasts was short, and those that appeared were quickly bought up at tolerably good prices. Sheep sold well, though the supply was rather limited.

AYLESBURY MARKET AND PALM FAIR, Saturday.—This being Palm Fair-day, the market was very largely attended by dealers in all kinds of stock. This being the largest horse fair in the year, there was a very large supply of horses of all descriptions in the market, from the most splendid cart and nag horses to the most miserable hacks. This day was also the show day for stallions, and a large number of truly beautiful animals were paraded round the fair for the inspection of farmers, and others. We particularly noticed one belonging to Mr. Coles, of Tang Crenon, Bucks., which for beautiful proportions, fully realized our idea of an English cart horse; indeed, all were most beautiful animals, and were much admired by all who saw them. The trade in horses was, with the exception of the best description, rather brisk, and prices ruled for nags from £20 to £60 each; cart horses from £20 to £60; other descriptions according to value. There was a large supply of cattle, but the trade was extremely dull, milch cows were almost unsaleable, at lower rates; some good oxen were at market, but we did not hear of the price being asked for any of them. Barren cows were rather firm, and a good many changed hands at from £7 to £12 each. The sheep trade was also very dull, and the supply large; couples from 26s. to 36s. each; tegs, 18s. to 34s. each. The supply of calves was large, and prices were rather lower; nevertheless, all were sold, at from 10s. to 38s. each. The pig trade was dull, and prices ruled rather lower than last week, good stores sell at from 17s. to 30s. each; fat pigs, from 7s. 6d. to 8s. per stone. There was a large supply of slaughtered meat at market, and the trade was rather brisk at the following prices: Beef, 4½d. to 6½d.; Veal, 5d. to 6½d.; mutton, 5½d. to 7d.; Pork, 5d. to 5½d. per lb.

BERWICK FORTNIGHTLY MARKET.—The show of Cattle and Sheep was large, the number being—fat cattle, 251; lean, 41; cows, 36; sheep, 519; and pigs, 18. The prices may be quoted—fat, from 5s. to 5s. 6d. per stone; mutton, 6d. per lb.; cows, from £8 to £11; and pigs, from 4s. 6d. to 4s. 9d. per stone. The market was dull upon the whole, although the greater part of the fat cattle and sheep was sold; there being a great many buyers from the south, but the prices asked were above what could be given in several instances. With regard to cows and lean cattle there was very little demand, and few of either kinds changed hands.

COWBRIDGE FAIR.—There was a large supply of stock of every description, the demand for which being rather better than latterly. We noticed several large lots going off with the dealers, which evidently shows an improvement in the times. Good fatlings realised from 4½d. to 5d. per lb.; fat sheep, from 5d. to 6d.

CALLINGTON FAIR was not well supplied, there being the smallest quantity of sheep ever seen at a March fair at this place. Fat bullocks sold at from 46s. to 47s. per cwt. Fat sheep fetched 5d. per pound.

CASTLE-DONINGTON MARCH FAIR was better supplied with stock than any previous spring fair; high prices were demanded, but a general giving way took place on the part of the sellers, and the sales made were at a low figure. Barren cows were much sought after, and several changed hands. A small quantity of cheese was pitched, which realized 5d. per lb.

COLDSTREAM FORTNIGHTLY MARKET.—There was a fair supply of both beef and mutton; the beasts num-

bering about 150 head, and the sheep about 450. Sales were heavy, but ultimately (with the exception of one or two lots which were sent home) the market was cleared.

DORKING MONTHLY MARKET.—We had a good show of stock, and a great many sheep. Beef, 3s. to 3s. 4d.; mutton, 4s. to 4s. 4d.; veal, 4s. to 4s. 4d.; tegs, 22s. to 26s.

DERBY FAIR (Thursday) was very flat. The supply of beasts large; buyers few. Very few good horses were to be seen; such as were passable were in tolerable request.

DODBROOK FAIR, March 20.—There was a very full supply of both fat and lean stock, of excellent quality, with a tolerably good demand; nearly the whole was disposed of at a slight advance on the price of best quality of fat bullocks; in other descriptions, and on sheep, no alteration. Wool has declined, since our last, full a halfpenny per lb. Prime fat heifers, 45s. per cwt.; middling quality, 40s. to 42s.; ordinary steers and cows, 36s. to 40s.; cows and calves (very dull sale), 35s. to 43s.; store stock, owing to the scarcity of grass, met a slow sale, at from 20s. to 26s. per cwt. Sheep.—Small mutton, full 5½d. per lb.; large sheep, 5d. to 5½d. Wool barely 6½d. per lb.

DONCASTER FORTNIGHTLY MARKET, Tuesday.—The show of both sheep and beasts was exceedingly large, and that of a very superior quality. The number of sheep penned was 964, and although the market was exceedingly well attended by buyers, trade ruled heavy, a portion remaining unsold. This is not a matter of surprise, when it is considered that sheep in the markets held elsewhere on the preceding day were much better to buy. The beef was of an excellent description, and included 169 fat beasts, together with a large quantity of lean cattle. All the fat found purchasers at rather better rates, which was a matter of some surprise, looking at the number exhibited. Prices for beef ranged from 5s. to 6s. per stone. Sheep, clipped, 4½d. to 5d. per lb.; in wool, 5d. to 5½d. per lb. So long as our market is so well supplied there can be no doubt of its ultimate success. The buyers in attendance were fully as numerous as could be desired, hence the briskness exhibited in the beef trade.

GLOUCESTER MONTHLY MARKET was very scantily supplied, particularly with sheep; those of first quality and moderate weight sold readily at fully 6½d. per lb.; inferior, from 5½d. to 6d.; nice fat heifers were worth 5½d. per lb.; second quality, and aged, from 4½d. to 5d.

HORNBY FORTNIGHT MARKET.—On Tuesday last the supply of fat stock was rather below the average, prices ruling extremely low; good beasts varying from 4½d. to 5d. per lb. Inferior beasts very dull of sale.

KNIGHTON FAIR was well attended with stock of all sorts, which sold well. Fat cows brought from 5d. to 5½d.; fat sheep from 5½d. to 6d. per lb., and fat pigs 4s. 6d. per stone of 12lbs. Store pigs are very high, and considerably dearer than they have been for some time. Cart horses were in great demand, and we saw several sold from £27 to £34 each. There were some very good hacks in the fair.

LOCHMABEN PORK MARKET, March 19.—The whole pork produced—99 carcasses, weighing 1137 stons 10lbs.—was purchased by Mr. Steele, of Aman; and, though he was unopposed, the prices he gave were higher than we have reported during the season, being from 4s. 9d. to 4s. 11d. per stone; but the pork was admitted to be excellent, both as regards weight and quality.

LONGRIDGE FAIR.—The show of both calves and drapes was much above an average; but stock not being much looked after, prices were low, and sales dull. There were a good many dealers in the fair, but they were exceedingly shy at purchasing, notwithstanding the decline in prices.

NORTHAMPTON FAIR, March 18.—There was a fair supply of fat sheep, with but little variation in prices from

former rates. The best wether mutton, in the wool, made about 4s. per 8lbs.; shorn wether sheep, about 3s. 6d. per 8lbs. Good store sheep were plentiful and almost met with a dull sale, at about former prices. The store beast included some excellent Herefords and a few lots of Welsh and Scotch beast. Good milking cows were scarce. The show of horses, ponies, colts, &c., was good, but the trade was very flat.

TORRINGTON GREAT MARKET was tolerably well supplied, the cattle generally being in good condition. The attendance of dealers was good, though not so large as at former periods. The sales were chiefly confined to store cattle. There were but few fat bullocks exhibited, and those but little in demand. The supply of sheep was limited, and consisted principally of store sheep, the business done being confined to this description, as fat sheep were scarce, and deserving of little notice. The following is the quotation of prices.—Oxen, £14 to £18 10s.; steers, £6 to £12; fat bullocks, 7s. to 8s. per score; cows and calves, £7 to £12, or 6s. 6d. to 7s. per score; lease heifers, 5s. to 6s. per score. Poor cattle very little in request. Store Sheep about 5d. per lb.

TALGARH FAIR was not so fully supplied with stock as is usual at this season, nor were there so many buyers. Good steers and barrens met with a ready sale, and were in demand. Fat cows may be quoted at 4½d. to 5d. per lb. Mutton (of which there appears to be rather a scarcity) fetched 6½d. per lb., and met a quick disposal. In the horse fair useful carters were bought at a fair price, but others were a drug.

WORCESTER FAIR.—A very large attendance of buyers and sellers. The stock of beef shown was exceedingly great, but the very best sorts could realize only 5d.; inferior meeting with a dull sale at 4½d. In cows and calves and barrens a great reduction was submitted to; lots which would have fetched £17 last year, now producing no more than about £12 10s. A great many cows were driven back unsold. The show of sheep was nearly 1,000; the best quality was readily sold at 6d. and 6½d. There was a good supply of horses, but very few changed hands, and that at a decline in prices; these animals, for instance, which last year produced £40, now fetched only £32. But little was done in pigs; those sold realized good prices.

WANTAGE QUARTERLY CATTLE MARKETS.—The first of these markets took place on Wednesday last, and from the excellent quality and supply of all kinds of stock, bids fair to become, in future, of great importance to the neighbourhood. There were also some very superior cart-horses, which realized good prices. The trade, considering existing depression, was good, and there was a fair attendance of butchers and dealers, who seemed much pleased with the quality of stock produced. Down tegs realized from 23s. 6d. to 50s.

READING FARMERS' CLUB.

The members of this club met at their reading-room on Saturday, Feb. 23, by adjournment, to discuss the question of "The best means to be adopted to meet times' prices." When the debate was opened by Mr. Hewett, of Caversham, who, after some introductory remarks on the importance of the subject, and his inadequacy to do justice to it, stated that in his opinion the present low prices were to be ascribed chiefly to the repeal of the corn-laws, which he contended had the effect of raising prices to an artificial and unnatural level. Now that prices had resumed something like their natural position, and were lower even than in some of the continental ports, the tenant farmer ought to be placed in a position to enable him to produce as cheaply as his continental neighbour. This could only be done by a reduction of rent, say twenty per cent., which would en-

able him to live, and which reduction, he remarked, landlords, as a class, were in a position to afford, as they were receiving an equivalent in a reduction to even a larger amount upon the leading articles of their consumption and expenditure. Tithes ought also to be reduced in the same proportion, as well as tradesmen's charges, and all the other outgoings of a farmer. But it was to the reduction of general taxation, also, that the farmer had a right to look, as a means to enable him to produce cheaply. Upon the same principle that he thought it fair and just, under present circumstances, to ask a reduction of twenty per cent., he thought it equally just to demand that the salaries of all placemen, pensioners, &c., should be reduced in like proportion, as well as the pay of all under government employment. Low prices for produce could only now be calculated upon, and it was to cheapened production that they must look to enable them to live. But the tenant farmer must not relax in his exertions; on the contrary, the utmost that he could do in the shape of a wise application of capital, skill, and energetic perseverance, would all be required to enable him to subsist, after all that he had referred to had been accomplished. Mr. Hewett then passed some remarks on Mr. Huxtable's pamphlet on "times' prices," which he denounced as fallacious, and only calculated to mislead; he contended that high farming was utterly insufficient to enable tenant farmers to exist, with present prices and expenditure.

A conversational discussion then ensued, of considerable length, on Mr. Huxtable's pamphlet, in which most of the members present took a part, as also upon the advantages or otherwise of increased cultivation of root crops, cattle feeding and breeding, improved buildings, drainage where required, "tenant right," and other topics connected with agricultural improvement, the substance of which may be gleaned from the following resolution, which were carried before the meeting broke up:—

It was proposed by Mr. Hewett, and carried unanimously, "That, the prices of agricultural produce having been reduced to the level of the continental markets, by the repeal of the import duties, and as the cost of cultivation in this country has been raised to an artificial and unnatural height under a system of protection, it is the opinion of this meeting that the only true and legitimate means of meeting such reduced prices, is by a general and immediate reduction of rents, tithes, and all other items which compose the cost of production—a removal of burdens which press peculiarly on land—and an equalization of local and government taxation."

Proposed by Mr. Dickson, "That, as a means to enable the tenant farmer to meet present prices, it is necessary that, wherever required, draining should be done by the landlord; that all old hedge-rows and hedge-row timber be completely removed; that proper and efficient buildings be erected, where wanted, by the landlord, for the shelter and comfortable accommodation of stock, and for the preservation of manure (liquid and solid); that in all cases, whether holdings under lease or otherwise, 'tenant right,' or agreements for payment, on quitting, to the tenant for all unexhausted improvements, ought to be universally adopted. That the tenant ought, in all cases, to have the right to kill game; and that there ought to be no restrictions as to the mode of cropping, except during the last two years of a lease; that where farms have been taken previous to the last two or three years, an equitable adjustment of rent is necessary, to enable the tenant farmer to meet times prices."—*Reading Mercury*.

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.	
Feb. 21	30.15	30.15	40	51	45	W. by North	v. brisk	cloudy	cloudy	fine	dry
22	30.27	30.33	45	54	44	W. by North	gentle	fine	sun	fine	dry
23	30.33	30.26	39	49	40	West, W. by S.	gentle	cloudy	sun	cloudy	dry
24	30.26	30.27	39	40	41	Easterly	gentle	cloudy	cloudy	cloudy	dry
25	30.33	30.33	38	45	40	E. by S., by N.	gentle	cloudy	cloudy	cloudy	dry
26	30.33	30.33	39	46	40	S. West	gentle	haze	cloudy	fine	dry
27	30.28	30.20	34	54	40	S.E. var.	gentle	haze	sun	fine	dry
28	30.16	30.17	38	44	41	S. Easterly	gentle	haze	cloudy	haze	dry
Mar. 1	30.26	30.31	40	54	48	S. West	gentle	haze	fine	cloudy	dry
2	30.30	30.13	45	50	45	S. West	brisk	cloudy	cloudy	cloudy	dry
3	29.94	29.68	42	48	44	S. West	lively	cloudy	fine	fine	dry
4	29.90	30.36	36	44	35	N. by East	lively	cloudy	fine	fine	rain
5	30.48	30.48	28	46	39	N. by West	gentle	fine	sun	fine	dry
6	30.50	30.52	34	56	44	N. by West	gentle	hazy	sun	fine	dry
7	30.50	30.48	36	48	40	N.W., W. by S.	gentle	fog	fine	fine	dry
8	30.46	30.33	39	44	41	N.W., N.E.	calm	fog	haze	haze	dry
9	30.21	30.20	39	56	42	N. East	gentle	cloudy	sun	fine	dry
10	30.20	30.27	36	55	45	Sly. to N.W.	gentle	fog	sun	fine	dry
11	30.38	30.48	34	52	39	N. by East	brisk	fine	sun	fine	dry
12	30.51	30.50	28	51	38	N. by East	gentle	fine	sun	fine	dry
13	30.52	30.44	31	56	42	N.N.W.	gentle	fine	sun	fine	dry
14	30.45	30.45	36	43	39	Var. N. by E.	calm	haze	cloudy	cloudy	dry
15	30.43	30.40	36	44	33	N.E., E. by N.	airy	fine	sun	fine	dry
16	30.28	30.20	25	44	32	Var. N.E.	lively	haze	fine	fine	dry
17	30.23	30.27	28	45	31	N. Easterly	lively	fine	sun	fine	dry
18	30.26	30.20	26	48	40	N. Easterly	airy	fine	sun	fine	dry
19	30.11	30.10	33	45	40	Var. Northerly	airy	cloudy	cloudy	cloudy	rain
20	30.10	30.13	36	44	41	Northerly	gentle	cloudy	cloudy	cloudy	dry
21	30.13	30.20	36	43	36	Northerly	gentle	cloudy	cloudy	fine	dry

ESTIMATED AVERAGES OF MARCH.

Barometer.		Thermometer.		
High.	Low.	High.	Low.	Mean.
30.77	28.870	66	24	43.9

REAL AVERAGE TEMPERATURE OF THE PERIOD.

Highest.	Lowest.	Mean.
48	35.7*	41.85

WEATHER AND PHENOMENA.

Feb. 21—Overcast till evening. 22—Spring-like. 23—Lunar halo 24, 25—Generally overcast. 26, 27, 28—Three hazy mornings; some sun on the 27th.

LUNATION.—Full moon at noon, 26th day.

March 1—Fine; red sunset. 2—Overcast. 3—variable; gleams of sun. 4—Rain in the night, and change of wind. 5—Superb, after keen white frost. 6—Superb. 7—Wet fog till 1 P.M. 8—

Damp haze. 9—Fine; a smoky haze at 5 P.M. 10—Cold, wet fog; fine. 11—Biting wind; fine. 12—Red, hazy sunset; solar spots on every observation. 13—Clear. 14—Cold; overcast sky. 15—Fine; sharp, frosty airs. 16—Generally gloomy and cold; showers about. 17—Brilliant. 18—Very fine; keen air. 19—Masses of clouds; light drizzle only. 20—Equinox 11 P.M.; promising. 21—Overcast; fine night.

LUNATIONS.—Last quarter, 5th day, 8 h. 5 m., aftern.; new moon, 13th day, 11 h. 17 m. night; first quarter, 21st day, 3 h. 58 min. morn.

REMARKS REFERRING TO AGRICULTURE.—Few persons can recall a season so equable. It has been rather under the average mean temperature; consequently cool, very healthy, and propitious to all the labours of the farm. Rain will soon be acceptable. The prognostics are—a dry summer.

Croydon.

J. TOWERS.

REVIEW OF THE CORN TRADE DURING THE MONTH OF MARCH.

The fall in the value of agricultural produce has now continued, with but temporary checks, ever since the removal of the duties in February last year; and even the most violent free-traders have become uneasy at so great and long continued a depression. They are unwilling, however, to admit that the present position of the grain trade, and the consequent ruinous losses sustained by the cultivators of the soil, have been caused by the policy which was to have had the effect of bestowing prosperity on all classes of her Majesty's subjects. To make this apparent is, however, by no means an easy undertaking; and the most approved plan seems to be to throw the whole blame on the protectionists and their organs. This is certainly easy, but scarcely ingenious. Mr. Cobden set the example in the House of Commons, by hinting that it was not politic on the part of those who found their property daily diminishing in value to say anything about the matter. All the landlords had to do was, he implied, to remain quiet, and farmers would continue to pay high rents. Farmers are next told that they are very foolish to sell their corn at such low prices, and that foreigners cannot afford to import. But unfortunately they have no choice. Their losses were heavy in 1848, owing to short crops, potato blight, &c; the wretchedly low rates at which they have since had to sell have further reduced their capital, and to be told that in the course of a year or two free-trade will be found to work very well can afford those who see ruin staring them in the face but little consolation.

That we may hereafter have high prices in this country we deem by no means improbable, for it must be self-evident that when it becomes unprofitable to grow corn its production will naturally diminish. Much of the poorer descriptions of land will, in all probability, go out of cultivation; and whenever that occurs, and we become in a great measure dependent on the foreign grower for supplies, one bad harvest would be almost certain to be followed by a great rise: but who would benefit thereby? clearly not the present industrious middle class of tenant farmers.

That the value of corn may have fallen below what is warranted by circumstances, we are not prepared either to deny or admit. Our situation is altogether new; the past affords no parallel instance, and we question the applicability of de-

ductions drawn from statistics of past years to our present position. Both in and out of the House of Commons great efforts have been made of late, by the free-traders, to prove that it will not pay the foreign grower to send corn to this country whilst prices continue as low as at present; and the most singularly contorted statistics have been brought forward to prove this position. It requires more than words or figures to restore confidence; and we are, unfortunately, unable to discover anything in the present position of affairs to allow us to take a very sanguine view of the future, if the present policy should be persisted in.

Hitherto the value of wheat has been kept up abroad by local speculation; and so long as foreign merchants fancy that Great Britain may stand in need of supplies, they will probably hold back their corn; but should the seasons prove favourable, we should most assuredly receive large imports during the ensuing summer. We maintain that wheat is at present about 10s. per qr. higher in the Baltic than its usual price in years when England has not required to import; in 1822 the price at Danzig was only 26s., in 1833 25s., and in 1836 21s. per qr. It is true that quotations have been much higher of late years, but this has been caused by a succession of indifferent harvests in Great Britain, and the enormous loss of food in consequence of the potato disease.

The produce of grain last year was not only good in these islands, but over nearly the whole of Continental Europe, and though potatoes were not altogether free from the disorder which has proved so fatal to this root since 1845, still they were much less extensively injured than in any previous season. We are, therefore, of opinion that we are likely to stand in need of very little foreign aid, and that unless speculation arise, owing to inauspicious weather or other unforeseen causes, the prices now current abroad will not be maintained. Past experience has proved that with very few exceptions the standard of value for wheat has been ruled by the English markets over the whole of Europe, and we see no reason to suppose that because we place the more distant countries in a position to compete with those nearer our own shores, which the removal of the duties has unquestionably done, that prices will now rule relatively higher in the Baltic than they have done in former years, when, owing

to the fluctuations and uncertainty of the duty, the nearer ports possessed a great advantage over those more distant.

The weather has hitherto been very auspicious: we had sufficient rain in February to supply the soil with the requisite amount of moisture. March came in cold and dry, and scarcely a drop of rain has fallen. The ploughing and preparing of the land has consequently been carried on without the slightest interruption; and rarely have we known a season when the Lent crops have been committed to the soil in a more satisfactory manner. The severe night frosts which have been lately experienced have given rise to no uneasiness, as, from the absence of anything like forcing weather earlier in the spring, vegetation had not made sufficient advance to be in danger of being injured by the cold. The accounts from all parts of the kingdom in regard to the appearance of the wheat plant are decidedly favourable; the plant is generally thick on the ground, and without being in any way prematurely luxuriant, looks healthy and promising. We are inclined to think that in England and Scotland quite the usual breadth of land is under this crop; but in Ireland, wheat was not, we believe, sown so extensively last autumn as in ordinary seasons, which, with the auspicious character of the weather in February and March, has caused barley and oats to be very extensively sown in the sister isle this spring.

The breadth of land planted with potatoes in Ireland is probably greater than in any year since 1845, the past having apparently failed to check the cultivation of that precarious crop.

The numerous occupations which have required farmers to engage most of their hands in the fields have allowed them but little opportunity for thrashing or bringing corn to market; and the deliveries from the growers have throughout the month been small. The hope which many have indulged in, that the spring might bring an improvement in trade, has also tended to prevent supplies being brought forward freely, and it is probable that the more wealthy class of farmers, whose pecuniary position may enable them to hold, may prefer to trust to the chapter of accidents for something to turn up in their favour rather than sell their corn at present rates, and incur certain loss. Still we are of opinion that the markets in the agricultural districts will now begin to fill; and as merchants and millers seem determined to work with short stocks, we can discover no grounds for calculating on higher prices, so long as nothing occurs to create uneasiness in regard to the probable future supply of home grown grain. On the other hand, we do not anticipate any further immediate fall of consequence, as

the unremunerative rates now current will naturally have the effect of rendering farmers very unwilling sellers, and preventing them bringing more forward than they are obliged to do to raise sufficient funds to pay current expenses. The arrivals from abroad are also likely for a time to be moderate, owing, in the first place, to the protracted character of the winter, which prevented many of the rivers and harbours being wholly freed from ice until this month, and partly to the disposition which foreign growers have manifested to speculate on higher prices. There has not been much change in the value of wheat since our last monthly notice, but prices of spring corn have undergone a further reduction. The chief characteristic of the trade has been a total want of confidence—an unwillingness on the part of purchasers to take more than wanted for immediate use, and a disposition on the part of holders to realize, though to effect this it has been necessary to make further concessions.

The arrivals of wheat coastwise into London have not been quite so small as in February; still the weekly receipts by water carriage have fallen short of 3,000 qrs. The land supply is not so easily estimated, as no official accounts are kept of the entries into London by rail, waggon, &c.; but that the total quantity has been small may be fairly inferred from the paucity of samples at Mark Lane. Moderate, however, as has been the show on the Essex, Kent, and Suffolk stands, a great difficulty has been experienced by factors in effecting sales, and the tendency of prices has been decidedly downwards, quotations being now lower than they were at the close of last month, notwithstanding a small rally which has taken place within the last few days. White wheat has been in better request at Mark Lane than red, and whilst the value of the former has remained nearly stationary, the latter has almost imperceptibly receded, and good Kentish runs, which about the close of February were worth 38s. to 40s., have lately been selling at 37s. to 38s. per qr. Lincolnshire and Cambridgeshire wheat has not given way in the same proportion, owing to the offers from thence having been comparatively few, some of the Yorkshire markets having lately offered better prices than have been obtainable in London. During the first fortnight in March we had very small supplies of wheat from abroad, but since then the imports have rather increased. The greater part of the arrival has been from the nearer ports, and has consisted of new wheat of only moderate quality.

The stocks in granary have held out better than many expected (at the commencement of winter) would have been the case, and we have still at least 200,000 qrs. warehoused at the port, but of this

quantity a good deal is very inferior. Really fine samples of old, more particularly Danzig and Rostock, having become very scarce have commanded full terms, and have not been at all affected by the downward movement in English, but the commoner sorts of new red have hung very heavily on hand, though offered at less money. Very good samples, weighing 61 to 62lbs. (French and Belgian) have lately been selling at 38s., and soft parcels received from Hamburg, Bremen, and Holstein ports, at 36s. to 38s. per qr. Polish Odessa has commanded relatively high rates, being wanted for mixing with our own as well as with the new German and other foreign wheats.

In the early part of the month the town millers found it necessary to put down the top price of flour to 38s. per sack, and other kinds immediately receded in proportion. This was followed by a somewhat better demand; but within the last week the inquiry has again slackened, the bakers having apparently secured sufficient for their present requirements, and being by no means anxious to hold largely. Besides fair arrivals of country-manufactured, we have had rather liberal supplies of foreign flour into London. France continues to send us from 3,000 to 5,000 sacks per week, and the millers complain sadly of this competition. We have on former occasions noticed the depressing effect produced by imports of flour; the article being ready for immediate use, without the employment of British labour, our millers are deprived of the profit which they would derive from the manufacture of wheat into flour, and a portion of their customers being supplied without their intervention, they naturally require a less quantity of wheat, so that the effect is felt by all parties in the trade.

English barley has not come to hand freely; still the value of this grain has tended downwards throughout the month, the supplies having been more than equal to the demand. In the early part of the month there was some inquiry for the finer descriptions for seed, which caused a moderate competition; and the maltsters were under the necessity of paying full terms for the best descriptions. Latterly the seed demand has nearly ceased, and 26s. per qr. may now be regarded as an extreme quotation. Prices of fine qualities have been better supported than those of the commoner sorts, the sale of the latter having been greatly interfered with by importations from abroad. During the last week or two foreign barley has been very pressingly offered, and has been sold cheaper than at any previous period for many years past: say, good 53lbs. Danish and similar qualities, 18s. per qr.; and in one instance a sale of a large parcel belonging to a

firm which had been under the necessity of suspending payment was forced at 17s. per qr. Since then a further decline of 6d. has been submitted to. These rates must of course involve serious losses to the importers, still we continue to receive liberal supplies from abroad; and we have lately had offers at 13s. 9d. to 14s. 6d. per qr., free on board at Danish ports, from whence freights are now very moderate. What a prospect for our barley growers!

The continued decline in the value of barley has had the usual effect on quotations of malt, and the latter article has gradually receded until fine Ware has fallen to 54s. per qr.; and the reduction on other sorts has been proportionately great.

The total supply of oats into London has not been large; indeed, in the early part of the month the receipts were decidedly short, and though we have recently had good arrivals from abroad, the home supply has been much below the average. The trade has nevertheless remained in an inactive state, the dealers having manifested a decided disinclination to add to their stocks; under the impression that considerable supplies of foreign will be received when the spring shall have further advanced. The transactions have consequently been of a retail character, buyers having generally confined their purchases to as narrow limits as have been compatible with their absolute wants. There was, however, very little change in prices during the first three weeks in March, and even now really fine corn is hardly to be had at lower rates than at the close of February. Quotations for feeding may be said to range from 14s. to 17s. per qr., including English, Scotch, and foreign. Some very ordinary sorts may be had lower than the first-named price, and picked lots higher than the last; but for all practicable purposes the quotations given will be found to embrace the value of fair to good horse-corn. It will be observed that we are still without supplies of oats from Ireland, and there seems little chance of much being received from that quarter. This deficiency has hitherto been made good by larger arrivals from Lincolnshire, Yorkshire, and Scotland than we have generally been in the habit of receiving; but it is probable that the receipts from those quarters will ere long fall off, and it is therefore likely that it will require large imports of foreign to keep prices down to their present very low point. Whether these will be forthcoming may admit of doubt; but considering that offers are made to ship from Königsberg at 9s. 6d., and from nearer ports at 11s. to 12s. per qr., free on board, we can hardly hold out much hope to our growers of more remunerative rates.

Though the quantity of English beans brought

forward has not been particularly large, and the arrivals from Egypt have been smaller this month than they were in February, prices have not improved; indeed the article is lower now than it was when we last addressed our readers. English tick beans, new, may at present be bought at Mark-lane at 21s. to 22s., and mazagans at 21s. per qr.; whilst the extreme value of handsome small pigeon is not over 27s. to 28s. per qr. The quality of the Egyptian beans is inferior this season to the usual shipments from that quarter, and much difficulty is therefore experienced in effecting sales at 18s. to 20s. per qr.

The supplies of English peas have about kept pace with the demand. In the early part of the month prices gave way 1s. to 2s. per qr.; but this decline has since been partially recovered, and quotations are now only about 1s. per qr. lower than they were at the close of February. Good Kent and Essex white boilers have lately sold currently at 25s.; but it has been difficult to make 26s. for picked parcels. Dun and maple peas have moved off slowly at 23s. to 25s.; and foreign peas at prices varying from 21s. to 24s. per qr., according to quality.

Indian corn, of which large arrivals have taken place at Liverpool from the other side of the Atlantic, has fallen 1s. to 2s. per qr. at that port; and its value has also receded in the Irish markets. At Mark-lane there has not been much doing in this article. We have had occasional inquiries for floating cargoes, on Irish account, but at rates which the Greek houses have declined to accept; and comparatively few bargains have been closed. French and Spanish may be quoted 25s. to 26s., and Galatz 27s. per 480lbs.

Though we have made casual allusion to prices of grain abroad in the foregoing portion of our article, a more full notice of the position of the grain trade at the different foreign ports may be useful. On the whole, prices of wheat have been better supported abroad than might have been expected, considering the very discouraging tone of the advices from hence. At the principal markets in the Baltic hardly any change has occurred in quotations, but the firmness of holders appeared, by the latest accounts, to have rather given way. The disposition to speculate, which had been very great throughout the winter, had in some degree abated, and we are therefore inclined to think that an increase in the supplies, such as must be looked for so soon as the sowing of spring corn shall have been completed, may be followed by a reduction in prices.

The winter has been very severe and protracted,

over the whole of northern Europe; and, by the most recently received accounts, we learn that many of the rivers and inland water-courses had not been wholly freed from ice, which had interfered with the transmission of supplies to the seaboard. The roads had also been much cut up by alternate periods of frost and thaw, so as, in a great measure, to cut off the land supplies, which had, no doubt, tended to keep up quotations.

From Danzig we learn that the Vistula, near the town, had again become covered by ice, and that the grain-laden brigs could therefore not come down the river; this, with the shortness of the stocks in granary, had caused holders of wheat to insist on former terms. Fine high-mixed *old* wheat had been held at 40s. to 42s., and new, of moderately good quality, at 36s. to 38s. per qr. free on board; these prices being above the limits of the few foreign orders on hand, hardly any business had been done for export. Vessels are plentiful, and freights to Great Britain low, charters having been closed at 3s. 3d. to 3s. 6d. per qr. for wheat.

From Konigsberg we learn that a few parcels of wheat had been bought there on Dutch account (principally secondary qualities). This trifling demand had sufficed to support prices, and 61lbs. red was quoted 31s. 6d., mixed 33s., and high mixed 34s. 6d. per qr. free on board. Spring corn had met with little attention, and the value of oats and barley had tended downwards. The latter article had been offered at 12s. 3d. to 14s. 3d., and the former at 9s. 6d. per qr. free on board for fair 37 to 38lbs. feed.

At those ports in the Baltic from whence the best red wheat is shipped, Rostock, Stettin, Stralsund, &c., holders had, up to the date of our last letters, refused to make any concession; still, there were appearances of weakness, which warrants us in expecting that, with increased supplies, quotations would not be supported, unless a demand from hence should hereafter arise.

Nearer home the markets are more immediately influenced by the English accounts. At Hamburg, from whence freights to London by sailing vessels is only 1s. per qr, fair red wheat, of 60 to 61lbs. weight per bushel, was obtainable on the 22nd inst. at 33s. 3d. to 33s. 6d. per qr. free on board.

In Holland and Belgium prices have been inclining downwards throughout the month, and this has also been the case in France; present prices in those countries at ports nearest our own coast, and from which the freight would not much exceed that charged on wheat from Lincolnshire or Yorkshire to London, being 34s. to 35s. 6d. per qr. for

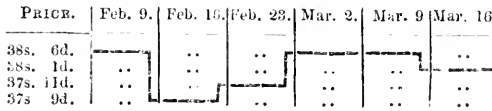
very capital qualities of red wheat, weighing 61½ to 63lbs. per bushel.

The advices from the Mediterranean are at present of little interest, and there is no chance of wheat being shipped from thence to this country, prices being higher there than here.

From the Black Sea we shall no doubt, later in the year, receive supplies; but quotations were, according to the most recent advices from thence, relatively too high to hold out much inducement to consign to Great Britain.

The reports from the United States are of a similar character as those previously received. At all the principal ports on the seaboard stocks of flour were light, holders firm, and prices actually above those current here. At New York, on the 5th inst., good shipping brands of Genessee were quoted 22s. to 22s. 9d., and fine 23s. 3d. to 24s. 4d. per barrel.

DIAGRAM SHOWING THE FLUCTUATIONS IN THE AVERAGE PRICE OF WHEAT DURING THE SIX WEEKS ENDING MARCH 16, 1850.



CURRENCY PER IMPERIAL MEASURE.

	Shillings per Quarter	
	OLD.	NEW.
WHEAT, Essex and Kent, white	41 to 48	41 to 48
Ditto, fine selected runs	—	47 49
Ditto, red	39 43	38 42
Ditto, extra	40 42	42 43
Norfolk, Lincolnshire and Yorkshire	—	38 41
Ditto, white	—	42 44
BARLEY, English, malting and distilling	—	22 24
Ditto, Chevaler	—	23 27
Ditto, grinding	—	18 21
MALT	43 45	44 48
Kingston, Ware, and town made	44 50	46 51
OATS, Essex and Suffolk	—	15 17
Lincolnshire and Yorkshire (Polands)	—	16 18
Ditto, feed	—	14 16
Devon & West Country, feed	—	13 15
Northumberland and Scotch, feed	—	17 22
Dundalk, Newry, and Belfast, potato	—	15 17
Linrick, Shgo, and Westport, potato	—	16 18
Ditto, feed	—	14 16
Cork, Waterford, Dublin, Youghal, and Clonmel, black	—	13 15
Ditto, white	—	14 16
Galway	—	12 11
BEANS, Mazagan	22 24	20 22
Tick	23 25	22 24
Harrow	28 30	25 26
Pigeon, Heliogland	30 35	26 28
Windsor	—	24 26
Long pod	—	24 26
PEAS, non-boilers	—	22 23
White, Essex, and Kent, boilers	—	24 25
Ditto, fine Suffolk	—	25 26
Maple	—	23 25
Hog and grey	—	23 24
FLOUR, best marks (per sack of 280 lbs.)	—	32 36
Norfolk and Suffolk, ex-ship	—	27 31
RYE	—	22 23

FOREIGN GRAIN.

	Shillings per Quarter
WHEAT, American	39 to 42
Canada	35 42
Dantzic and Konigsberg	42 45
Dantzic, fine white, extra quality	45 50
Stettin and Hamburg	37 42
Danish	35 39
Rostock, Pomeranian and Rhine	41 44
French and Belgian	36 41
Mediterranean, Odessa, and St. Petersburg	35 38
Black Sea (nominal) hard to soft	34 38
Buck or Brank	24 26
BARLEY, malting	19 21
Grinding and distilling	17 19
Hamburg, Dantzic, Konigsburgh, and Riga	17 19
Danish, Mecklenberg, and Pomeranian	17 19
OATS, Dutch, brew Poland, Friesland, and Groningen	15 18
Danish and Swedish	13 16
Russian	13 16
BEANS Small	22 26
Egyptian	20 22
PEAS, white boilers	21 24
Yellow ditto	23 26
Non-boilers	21 22
MAIZE, white	27 28
FLOUR, American, sweet	22 23
Ditto, sour	20 22
Canadian, sweet	21 23
Ditto, sour	20 21
French, per sack	27 32
RYE MEAL (per ton)	£6 6s. to £6 10s.
INDIAN CORN MEAL (per lrl. of 196 lbs.)	15s. to 16s.

IMPERIAL AVERAGES.

FOR THE LAST SIX WEEKS.

WEEK ENDING:	Wheat.		Barley.		Oats.		Rye.		Beans.		Peas	
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
Feb. 9, 1850..	33	6	24	7	15	3	22	1	25	3	26	4
Feb. 16, 1850..	37	9	23	10	15	4	20	7	24	11	26	10
Feb. 23, 1850..	37	11	23	7	15	6	20	11	24	8	26	0
Mar. 2, 1850..	38	6	23	9	14	11	21	11	24	4	25	11
Mar. 9, 1850..	38	6	23	10	15	5	23	3	24	7	25	4
Mar. 16, 1850..	38	1	23	8	14	11	22	7	24	1	25	2
Aggregate average of last six weeks	38	3	23	10	15	3	21	11	24	8	25	11
Comparative ave. same time last year	45	10	29	4	17	2	26	6	30	5	32	10
DUTIES	1	0	1	0	1	0	1	0	1	0	1	0

ACCOUNT SHEWING THE QUANTITIES OF GRAIN AND FLOUR IMPORTED INTO THE UNITED KINGDOM DURING THE MONTH ENDED 5TH MARCH, 1850, THE QUANTITIES ADMITTED 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.	
Wheat, from British Possessions	808 7	808 7	35 6	
Barley, do.	—	—	—	
Oats, do.	—	—	—	
Peas, do.	—	—	—	
Beans, do.	220 0	220 0	—	
Maize or Indian Corn, do.	650 0	450 0	—	
Wheat, foreign	1268 3 3	13 577 6	21276 1	
Barley, do.	7267 1	7275 1	563 6	
Oats, do.	3191 7	3207 7	1100 6	
Rye, do.	1211 2	1211 2	106 7	
Peas, do.	2889 6	3181 5	975 5	
Beans, do.	28725 1	28925 1	96 4 2	
Maize or Indian Corn, do.	109899 4	100899 4	1485 4	
Buckwheat	16 1	—	—	
Beer or Bigg	—	—	—	
Flour from British Possessions	1289 0 19	1289 0 19	—	
Flour, foreign	207400 2 5	207605 3 5	10050 1 11	

COMPARATIVE PRICES AND QUANTITIES OF CORN.

Averages from last Friday's Gazette.		Averages from the corresponding Gazette in 1849.	
Qrs.	s. d.	Qrs.	s. d.
Wheat .. 77,113 .. 33 1		Wheat .. 79,266 .. 45 4	
Barley .. 57,923 .. 23 8		Barley .. 52,038 .. 29 2	
Oats 23,463 .. 14 11		Oats 26,829 .. 17 0	
Rye 14 .. 22 7		Rye 76 .. 23 9	
Beans 8,392 .. 24 1		Beans 4,386 .. 30 11	
Peas 1,733 .. 25 2		Peas 918 .. 30 8	

SEED MARKET.

There was very little passing in the seed market, and prices underwent no particular change.

Tares were obtainable on easier terms, fine large Brunswick being offered at 30s. per qr.

BRITISH SEEDS.

Cloverseed, red 35s. to 40s.; fine, 45s. to 50s.; white, 35s. to 50s.	
Coa Grass (nominal)	—s. to —s.
Linseed (per qr.) .. sowing 54s. to 56s.; crushing 40s. to 42s.	
Linseed Cakes (per 1,000 of 3lbs. each) ..	£9 0s. to £10 0s
Trefoil (per cwt.)	14s. to 18s.
Rapeseed, new (per last)	£35 to £38
Ditto Cake (per ton)	£1 15s. to £5 10s.
Mustard (per bushel) white ..	6s. to 9s.; brown, 8s. to 11s.
Coriander (per cwt.)	16s. to 25s.
Caajary (per qr.) new	72s. to 74s.
Tares, Winter, per bush., nominal; Spring, 3s. 6d. to 4s. 6d.	
Carraway (per cwt.)	28s. to 29s.; new, 30s. to 32s.
Turnip, white (per bush.) —s. to —s.; do. Swedish, —s. to —s	

FOREIGN SEEDS, &c.

Clover, red (duty 5s. per cwt.) per cwt. (nominally) 33s. to 50s.	
Ditto, white (duty 5s. per cwt.) per cwt. ..	24s. to 42s.
Linseed (per qr.) .. Baltic 33s. to 44s.; Odessa, 42s. to 46s.	
Linseed Cake (per ton)	£6 0s. to £8 0s.
Rape Cake (per ton)	£4 10s. to £5 0s.
Rye Grass (per qr.)	—s. to —s.
Coriander (per cwt)	—s. to —s.
Hempseed, small, (per qr.) 32s. to 33s., Do. Dutch, 33s. to 34s.	
Tares, (per qr.) small 22s. to 26s., large 30s. to 34s.	

HOP MARKET.

BOROUGH, MONDAY, March 25.

Our market continues without any alteration since our last report, and in the absence of transactions, prices have undergone no change. HORTON and HART.

POTATO MARKET.

SOUTHWARK, WATERSIDE, March 25.

The arrivals, both coastwise and continental, are very considerable, and more than adequate to the wants of the trade, and it is with difficulty the following prices are realized:—

Yorkshire Regents ..	70s. to 100s. per ton.
Wisbech do	60s. ,, 70s. ,,
Scotch do	60s. ,, 65s. ,,
Do. cups	50s. ,, 60s. ,,
Do. Common Whites	40s. ,, 45s. ,,
French do	50s. ,, 65s. ,,
Rhenish & Belgian.	40s. ,, 55s. ,,
Dutch	40s. ,, 45s. ,,

COUNTRY POTATO MARKETS.—YORK, March 16.—

A good supply at lower prices, being 8d. per peck. MALTON, March 16.—A good supply, at from 7d. to 8d. per peck. RICHMOND, March 16.—3s. per bushel. MANCHESTER, March 19.—8s. to 10s. 6d. per 252 lbs. NEWCASTLE,

March 21.—Red 9s. to 10s.; white, 11s. to 12s. per load of 20 stones. CARLISLE, March 16.—A most abundant supply, at 4d. to 6d. per stone of 11lbs. LEEDS, March 19.—A good supply, a dull sale, at 9d. to 10d. per score of 21 lbs. DURHAM, March 16.—A good supply, at from 8d. to 9d. per peck.

ENGLISH BUTTER MARKET.

MONDAY, March 25.

We note a further reduction in the price of new milk Dorset Butter, to the extent of about 4s. per cwt. The small stock of old Butter left is quite neglected.

Dorset, fine weekly	100s. to 102s. per cwt.
Ditto, middling	84s. to 94s.
Ditto old	Nominal.
Fresh	8s. to 14s. per doz. lbs.

BELFAST, (Friday last).—Butter: Shipping price, 76s. to 82s. per cwt.; firkins and crocks, 7½d. to 8¼d. per lb.; Pork sells at from 35s. to 39s. for lots, and 35s. to 39s. 9d. per 120lbs. for country pigs. Bacon, 39s. to 42s.; Hams, prime, 65s. to 70s. per cwt.; second quality, 56s. to 58s.; Mess Pork, 60s. to 65s. per brl.; refined American Lard, in bladders, 40s. to 44s.; kegs and firkins, 38s.; Irish Lard, in bladders, 40s. to 46s.; kegs or firkins, 40s. to 41s. per cwt.

Mar.	Butter, per cwt.			Bacon, per cwt.			Dried Hams, per cwt.			Mess pork, per brl.						
	s.	d.	s. d.	s.	d.	s. d.	s.	d.	s.	d.	s.	d.				
21.	98	0	16	0	42	0	44	0	54	0	60	0	55	0	62	0
1846	98	0	15	0	36	0	63	0	68	0	76	0	58	6	64	0
1847	98	0	15	0	36	0	63	0	68	0	76	0	58	6	64	0
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	80	0	77	6	80	0
1859	72	0	82	0	38	0	40	0	68	0	80	0	76	0	77	6

TIMBER.

	£	s.	d.	£	s.	d.	
Baltic Timber, per load of 50 cubic feet ..	2	15	0	to	3	10	0
Yw. Deals, per standard hundred ..	10	10	0	to	15	10	0
Deck Deals, per 40 feet 3 in.	0	16	0	to	1	2	0
Pipe Staves, per mille	105	0	0	to	125	0	0
Lathwood, per fn. of 6 feet	9	0	0	to	10	0	0
Petersburgh, Riga, and Archangel .. .	12	0	0	to	15	0	0
Yw. Deals, per stand. hundred .. .	9	10	0	to	10	0	0
White	12	0	0	to	14	0	0
Yw. Battens	2	15	0	to	3	15	0
Riga Logs, for 18 feet cube	75	0	0	to	130	0	0
Stettin Staves, per mille of pipe .. .	2	15	0	to	2	17	6
Swedish Timber, per load	17	0	0	to	23	0	0
Göthenb. Yw. Deals, per 100 12ft. 3in. 9in. ..	15	0	0	to	19	0	0
White ditto	11	0	0	to	14	0	0
Yw. Battens, per hd. 12 ft. 2½ in. 7 in. ..	23	0	0	to	24	0	0
Christiania Yw. Deals, per hd. 12ft. 3in. 9in. 23	20	0	0	to	22	0	0
White ditto	18	0	0	to	16	10	0
Quebec and St. John's Spruce Deals .. .	12	0	0	to	16	10	0
per 100, 12 ft. 3 in. 9in.	8	19	0	to	10	10	0
1st qual. yw. Pine Deals, per st. hd. ..	7	0	0	to	8	0	0
Second do. do.	15	0	0	to	20	0	0
Third do. do.	2	15	0	to	3	10	0
Red Pine Deals, per hd. 12ft. 3in. 9in. ..	2	10	0	to	3	10	0
Red Pine Timber, per load	3	10	6	to	4	10	0
Yw. ditto	3	0	0	to	3	5	0
Birch ditto	3	10	0	to	4	10	0
Elm ditto	55	0	0	to	70	0	0
Oak ditto	18	0	0	to	17	0	0
Standard Staves per mille standard ..							
Puncheon Staves, per mille							

MAHOGANY, &c.

Mahogany, St. Domingo	6d.	to	1s.	9d.	per foot.
Cuba	6		1	6	
Honduras	5		1	0	
African	5		0	7	
Cedar	5½		0	6½	
Rosewood. Rio	12d.		20d.	per ton.	
Bahia	9d.		14d.		

HIDE AND SKIN MARKETS.

		s. d.	s. d.	
Market Hides, 56 to 64lbs.....	0 11	0 11	per lb	
Do. 64 72lbs.....	0 13	0 13	"	
Do. 72 80lbs.....	0 2	0 2	"	
Do. 80 88lbs.....	0 24	0 24	"	
Do. 88 96lbs.....	0 3	0 3	"	
Do. 96 104lbs.....	0 34	0 34	"	
Do. 104 112lbs.....	0 34	4 0	"	
Calf Skins, light	2 3	3 0	each	
Do, full	5 0	5 6	"	
Horse Hides	6 0	6 6	"	
Polled Sheep	5 8	7 3	"	
Kents and Half-breds.....	4 4	5 4	"	
Downs.....	4 3	4 10	"	
Shearlings	0 6	0 7	"	

BARK.

Per load of 45 cwt.

English, Tree.....	£14 0 0	to	£15 10 0
Coppice.....	15 0 0		17 0 0

FLAX.

BELFAST (Friday last.)—Fine, 70s. to 80s., good, 65s. to 70s.; good middling, 50s. to 65s.; middling, 53s. to 65s.; mid., 46s. to 56s.; coarse, 44s. to 45s. per cwt.

HAY MARKETS.

THURSDAY, March 28.

At per load of 80 trusses.

	Smithfield.	Cumberland.	Whitechapel
Meadow Hay	46s to 72s	50s to 74s	48s 72s
Clover Hay	69s 92s	60s 88s	69s 92s
Straw	21s 29s	22s 30s	21s 28s

OILS.

Linseed, 32s. 6d. to 32s. 9d. per cwt.; Rapeseed, English, refined, 41s. 6d.; do. brown, 41s.; Gallipoli, per ton, 50L; Spanish, 50L; Sperm, 82L; do. bagged, 83L; South Sea, 33L to 34L; Seal pale, 39L 10s.; do. coloured, 33L; Cod, 30L to 31L; Cocoa Nut, per ton, 38L to 40L; Palm, 32L.

WOOL MARKETS.

BRITISH WOOL.

LEEDS, March 22,—We have not any change of moment to report in this branch of trade during the present week. Sales have been limited. Prices remain at last week's quotations.

EXETER, (Friday last.—We cannot note any improvement in price, or any renewed excitement in business. Staplers offer 6d. to 6½d. per lb.; and as many holders refuse this price, little is doing.

SOUTH DEVON.—Within the last month the price of yolk wool has declined. The trade has assumed a cheering appearance for several months past, and it is gratifying to state that all the factories and wool shops still afford full employment to all hands. An immense quantity of yolk wool has been purchased at 7d. per lb., but the price has receded, at present from 6d. to 6½d. per lb., at which price agriculturists who a few weeks since refused 7d. are now selling at 6d. per lb. Thanks to the blessings of free trade the working classes have

full employment and a plentiful supply of provisions good and cheap.

SALISBURY.—The wool trade is much depressed; ewe and teg wool equally mixed, and the prime lots, too, are selling at 11½d. per lb.; inferior ditto, 11d. per lb. The skin-trade, of course, suffers alike. Murrains fell this day 3d. each.

LIVERPOOL, March 23.

SCOTCH.—There has been less doing in all kinds of Scotch, but as stocks are unusually light, there is no disposition on the part of holders to give way in price.

	s. d.	s. d.
Laid Highland Wool, per cwt.....	8 0	8 6
White Highland do.....	10 0	10 6
Laid Crossed do., unwashed	10 0	12 0
Laid Cheviot do., unwashed	12 0	14 0
Do. do., washed.....	16 0	19 0
White Cheviot do., do.....	22 0	24 0

FOREIGN.—The long continued easterly winds prevent any fresh arrivals, and as the stocks are very light, there is little to report.

FOREIGN WOOL.

The market for wool is dull, and prices are barely supported.

Accounts of Dec. 2 from Sydney, by the overland mail, state that Wool had been sold at very high prices. The advance compared with the current values a few months previously was very considerable.

MANURES.

LONDON, MARCH 25.

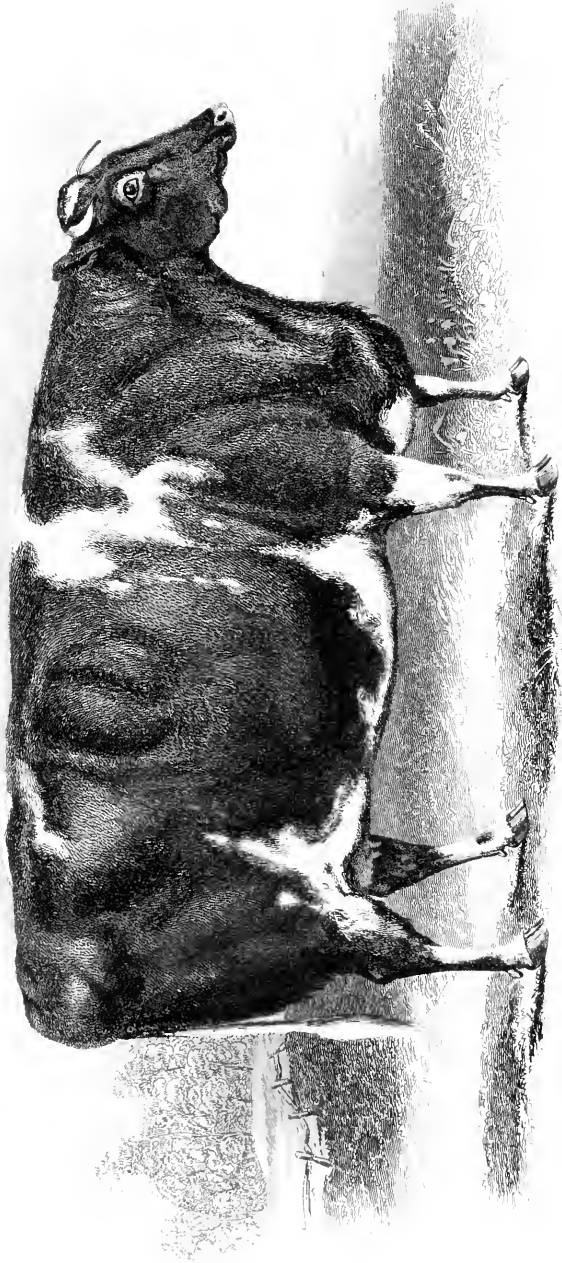
PRICES CURRENT OF GUANO, ARTIFICIAL MANURES, OIL CAKES, &c.

GUANO.—The demand continues good, the importers delivering only in limited quantities.

NITRATE SODA firm at our quotations.

LINSEED CAKES.—The low price at which barley, beans, and other feeding produce are selling, renders it difficult to dispose of Cake in quality.

Guano, Peruvian	per ton	£0 0 0 to	£9 5 0
„ In quantities under 5 tons ..		0 0 0 to	9 10 0
Nitrate Soda		15 0 0 to	0 0 0
Nitrate Potash or Sulphate		28 0 0 to	30 0 0
Superphosphate of Lime		0 0 0 to	6 6 0
Soda, A-b or Alkali		0 0 0 to	10 0 0
Gypsum		1 10 0 to	1 15 0
Coprolite		2 15 0 to	3 0 0
Sulphate of Copper, or Roman Vitriol for Wheat steeping....		27 0 0 to	29 0 0
Salt		0 0 0 to	1 1 0
Bones, ½ inch	per qr.	0 0 0 to	0 14 0
„ Dust		0 0 0 to	0 15 0
Oil Vitriol, concentrated	per lb.	0 0 0 to	0 0 1
„ Brown		0 0 0 to	0 0 ½
Rape Cakes.....	per ten	4 5 0 to	4 10 0
Linseed Cakes—			
Thin American in barrels or tags ..		7 0 0 to	7 10 0
Thick ditto round		6 5 0 to	6 10 0
Marseilles		0 0 0 to	6 5 0
English		6 10 0 to	6 15 0







THE FARMER'S MAGAZINE.

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No. 5.—VOL. XXI.]

[SECOND SERIES.

PLATE I.

A SHORT-HORNED COW.

The subject of our first plate is Lady Chandos, the property of Mr. Samuel Wiley, of Brandsby, near York, calved in October, 1842. She was got by Buckingham (3239), dam (Mayoress) by Carcase (3285), g. d. (Matron) by Tyro (2781), gr. g. d. (Miss Mason) by Falstaff (1993), gr. gr. g. d. by Dr. Syntax (220), gr. gr. gr. g. d. by Charles (127), gr. gr. gr. gr. g. d. by Henry (301), gr. gr. gr. gr. g. d. (Lydia) by Favourite (252), gr. gr. gr. gr. gr. gr. g. d. (Nell) by the White Bull (421), gr. gr. gr. gr. gr. gr. g. d. (Fortune, bred by Mr. C. Collings) by Bolingbroke (86), gr. gr. gr. gr. gr. gr. g. d. by Foljambe (263), gr. gr. gr. gr. gr. gr. g. d. by Hubback (319), gr. gr. gr. gr. gr. gr. g. d. bred by Mr. Maynard.

In August, 1849, she was exhibited at the Meeting of the Yorkshire Agricultural Society held at Leeds, where she won the first prize in class 11, as the best Fat Cow or Heifer of any age; and at the Smithfield Club Cattle Show, in December, same year, she obtained the first prize of Twenty Sovereigns in class 8, and the Silver Medal; also the Gold Medal as the best Cow or Heifer in classes 7, 8, and 9.

PLATE II.

LADY EVELYN; WINNER OF THE OAKS, 1849.

Lady Evelyn, bred by her present owner, Lord Chesterfield, in 1846, was got by Don John, out of Industry, by Priam; her dam Arachne, by Filho da Puta—'Treasure, by Camillus.

Don John, bred by Mr. Garforth in 1835, is by Tramp, or Waverley; dam (Hetman Platoff's dam) by Comus, out of Marciana, by Stanford—Marcia, by Coriander—Faith, by Pacolet. Don John, it will be remembered, appears on the record as a Great St. Leger winner; while as a stud horse, in addition to Arkwright and Distaffina, own brother and sister to Lady Evelyn, he is also the sire of Iago, Lovelace, Maid of Masham, Mrs. Taft, Grist, Clerk of the Council, and many other winners.

Industry, bred by Lord Chesterfield in 1835, left the training-stable with proportionate *écâté*, having carried off the Oaks for her noble owner the same season Don John brought him home for the St. Leger. She was put to the stud in 1841, and has thrown a foal regularly every year since, including, as already mentioned, Arkwright and Distaffina, with Barcelona, by Don John; Stitch and Stultz, by Hornsea; a filly by Pantaloon, in 1847; and a cross to Touchstone, last spring.

Lady Evelyn is a mealy brown mare, standing fifteen hands an inch and a-half high. She has a small, lean, blood-like head; rather strong neck; and beautiful oblique shoulder. She has a great depth of girth, good back, fine arms and thighs, and powerful quarters, with sound, wearing legs and feet. Lady Evelyn is altogether a handsome model of a race-horse—low and lengthy, with a good development of muscular power, but without any of that coarseness we too often now find associated with it.

Lady Evelyn takes her title after a daughter of her noble owner—an honour, however, which was not conferred until her Epsom essay proved her worthy of it.

In 1848, at two years old, Lady Evelyn won the Clearwell, the Bretby, and another good stake; and in 1849 the Oaks, the Coronation Stakes at Ascot, the Park Hill at Doncaster, &c. This spring she has only appeared once, when she ran second to Osterley, for the Port, Newmarket Craven Meeting.

Within the last few weeks Lord Chesterfield has sold off the whole of his stud, and Lady Evelyn now runs under Mr. Ford's colours.

THE ECONOMY AND APPLICATION OF FARM-YARD SEWAGE.

BY M. M. M.

Farm-yard manure is manifestly of all things the most varying in its constituent elements. This arises not only from the nature and porportion of the stock and food, but the drainage from the farm-yards is evidently far more varying: it may contain four per cent. of matter in solution to ninety-six per cent. of water, or it may contain one-half per cent., or one-twentieth per cent., according to the water which is poured upon it.

Few, if any, farm-yards are protected from the droppings from the heavens; and this is sufficient, generally, to wash out a great deal of the soluble parts of manure. If we take the average time that farm-yard manure is allowed to remain in the yards exposed to the action of the weather at one month, (and it will be within rather than without the real time,) and if we take the monthly depth of rain which falls in winter to be three inches—which is certainly not above an average*—and take the average depth of manure to be two feet, we shall have twenty-one gallons of water poured upon every cubic yard of the manure. But it seldom happens that so little as the mere water which falls upon it is all it has to contend with. There is in almost every farmstead a variety of buildings which are totally unspouted, and the eaves of fully one-half of the entire area are not unfrequently pouring down upon the manure the whole of the rain collected upon them. Now, if the area of farm buildings generally be one-half of the space occupied by the manure in the farm-yard, there will be one-fourth more rain poured upon the unhappy manure, or twenty-six gallons and a quarter of water poured upon a cubic yard of manure. Take, however, the quantity to be twenty-five gallons only, and assuming this water to weigh ten pounds per gallon, we shall have as much as two hundred and fifty

pounds of water to a cubic yard of the manure. Now, if a cubic yard of manure weigh one ton, there will be something like a pint and one-fifth water poured upon every fourteen pounds of manure. It must, therefore, be clear that two effects must be produced by this process. The first must be, that a very great portion of the very best parts of the manure is washed away somewhere; and the next must be, that the watery matter carried away will contain so little solid matter—valuable in kind as it is—that it is like seeking a needle in a bottle of hay.

Applying the previous calculation, and assuming a fold-yard to contain 200 cubic yards of manure—a very small quantity—there will be, in addition to all the urine of the animals, as much as 5,000 gallons of water.

Here we have 50,000 pounds of water, and it may be that this has washed out one hundred pounds of soluble matter, or it has washed out five hundred. If only one hundred, it is quite manifest that if we carry this manure to the land we shall have to cart away twenty-two tons of liquid for less than one hundred weight of the soluble matter; and this, I believe, is one very prominent reason why many farmers say they see no good result from applying their tank liquor. How should they? they are applying only coloured water!

The error commenced evidently at the first point; they should not allow anything like so much water ever to come upon their manure, unless they had the means of allowing the water to irrigate their lands, for it is evidently not worth the cost and labour of cartage.

But another inconvenience arises from the cartage of the liquid drainage. If there is no provision to keep the water off the manure heap, there will be the most to cart away, of the least value, and the soil will be in the worst state for cartage being performed upon it; and it is in weather like this that we often see the tanks running over, and the contents wasting as before.

But it is not always weak liquid drainage which is unsuccessful when applied by the water cart. In winter, when the soil is generally saturated, and in cases where it is carted and spread on the land, it only trickles over the surface and runs down the furrows, and little of it is absorbed by the soil.

In summer, however, with the heat and rapid evaporation, the converse operates with equal dis-

* The following is a statement of the rain which fell in January, February, and November and December, in four years:—

	Nov.	Dec.	Jan.	Feb.
1846-7	— 1·43	1·21	1·31	9·94
1845-6	— 2·11	2·61	2·85	1·47
1844-5	— 3·06	0·39	2·97	0·93
1843-4	— 2·13	0·58	2·25	2·27
Average ..	2·18	1·19	2·34	3·65

The most manure is in the yards in January and February.

advantage, for the very parts which are useful are dissipated by the summer sun.

Are we, then, to go on allowing it to trickle away? We spread it on in winter, and it does little good: we do the same in summer with the same result, or we get so much water with it that it is not worth the cost of cartage. Are not all these ample reasons for farming as our fathers did before us, and allowing the brown liquid to trickle along as usual? By no means. The farmer is not a man to be overcome by one or two little difficulties; he must adopt some other course.

Now, every farm has upon it a great accumulation of porous absorbent vegetable matter, or soil or refuse of one kind or another. Where there are old fences there is abundance of hedge sides and "cans," as the mounds on which such antiquated fences were once planted are provincially called; and this material is of all others the most calculated to form a vehicle for removing the liquid—more portable, manageable, and economical than the liquid manure carts. It is a store-room of the liquid from the tank, of all kinds the most valuable, for it may be saturated over and over again almost *ad infinitum*, as it acts exactly on the principle, and is, in fact, a filter. The watery particles percolate through it, but it holds the whole of the organic and inorganic matter of the drainage, and after one saturation is speedily fit for another dose, nor is there any end of the facilities it affords for drinking up the liquid fertilizer. It may be charged with ten, twenty, or one hundred times its weight of liquid; and, while it will retain the whole of the solid parts, will allow the water to run off, and therefore it can here be stored up until the entire mass may be of the value of guano itself.

The use of this compost, as it may be called, is as old as Authur Young. His experiment made many years ago has not produced on the mind of the public that impression which it ought to do. In his experiment on potatoes—

	Bushels per acre.
Undressed soil gave	280
32 yards dung, and 160 bushels lime . .	480
32 yards dung, with 480 gallons urine. .	520

Here it appeared that 480 gallons of urine increased the produce 40 bushels of potatoes more than 5 chaldrons of lime. In another experiment also on potatoes—

	Bushels per acre.
Undressed soil gave	135
Dung 33 $\frac{3}{4}$ yards	168 $\frac{3}{4}$
Compost 33 $\frac{3}{4}$ yards, mixed with farm-yard drainings	270

No other fact need be mentioned to show the great value of this fertilizer; but we will give a more re-

cent experiment, given by Mr. McLean, of Braidwood, on grass, where the difference between the application of urine and no application exhibited a gain of 174 stone of grass—but he applied 2,500 gallons to the acre. Over nothing he gained, by the saturation of moss with 1,600 gallons of urine, 114 stone of hay; and by saturating subsoil with the same he gained 74 stones of hay. The quantities were,

	Stones.
Nothing	125
Urine, alone, 2,500 gallons	300
Moss, saturated, 1,600 gallons	240
Subsoil, saturated, 1,600 gallons	200

Now, had soil been taken instead of subsoil, it is probable that there might have been a more favourable return. For, independently of subsoil being unfavourable generally to the absorption of large quantities of liquid, being generally less porous than the surface soil, subsoils are generally in their character of a sterile nature, and unfitted to assist, but rather to retard the progress of vegetation.

To be immediately useful to the young plants, not only must all the elements necessary to their growth be supplied, but they must be in such a state of freedom or fixation as to be given off to the plants in degrees calculated to build up their structures in the various stages of their development. Now we, as yet, know of no receptacle which can hold those matters in that precise equilibrium which the plants require, and are kept as it were in a store-house, and dealt out piecemeal according to their wants. Chemists can give tables showing degrees of fixation to a fraction, and they may compound constituents with all the art they are masters of; but they are never able to place in the soil these elements in precisely the same state as that in which they exist naturally in the soil. Hence a compost heap is a natural laboratory, in which the best parts of the liquid drainage are elaborated and prepared for the use of vegetation, and our own experience favours the opinion that if well saturated it is equal in its effects to the best town dung.

This brings us to the question of fixation of the ammonia; for it will be constantly generated by the decomposition of the urea; and there are several modes of fixing it, so as to prevent its dissipation. Urea consists of—

Carbon	20.0	per cent.
Hydrogen	6.6	„ do.
Nitrogen	46.7	„ do.
Oxygen	26.7	„ do.
	<u>100.</u>	

The fermentation of the urine converts the urea into carbonate of ammonia, the most volatile of all

substances, and whose pungent odour is so palpable in the smelling bottles. This is small particles flying off the mass and permeating the atmosphere; and the state is conceivable when the whole would so expend itself. Now if this volatile matter be subjected to the action of sulphuric acid in sufficient quantity, the whole smell and taste will cease, and the ammonia will become fixed, and the whole will be completely locked up. And at this stage if quicklime be added to the mass, the alkaline lime will take up the acid, which thus leaves the ammonia; and the lime becomes sulphate of lime, and the ammonia becomes carbonate of ammonia, by attracting the carbonic acid from the atmosphere; and it will volatilize and extend itself again, as before. And thus some parties, wishing to prevent waste, will plunge sulphuric acid into the tank by a carboy at once. Now what is the effect of this? Part of the acid neutralizes, or converts the ammonia into a sulphate; but as there are other matters in the tank, as lime, soda, potash, &c. it does the same for these, and the whole are converted into sulphates. But it is not, perhaps, thus all neutralized; and much free acid remains in the tank. This immediately acts on the cement, if this is used, and on the lime between the bricks, and crumbles down the structure of the tank.

Others use gypsum, or lime which is already charged with sulphuric acid; and this is given off just as the ammonia is generated, or nearly so; and none is given off free to destroy the lime or cement of the tank. Some parties have recommended common salt as a fixer of the ammonia; but there are doubts entertained by practical men as to the efficacy of this article. To all these practices there is the objection apparent of locking up out of the reach of the assimilative powers of the young plants those materials they particularly need; and we have often found our friends spoiling their manure by doctoring and fixing the ammonia.

But are we to allow the ammonia to escape and fly away into the atmosphere to benefit our neighbours' fields as well as our own? This is by no means necessary; nay, it is a sad and unjustifiable waste. But if it cannot be fixed but by too severe chemical affinities, it may be preserved by those which are mechanical. If, therefore, the water drainage can be preserved, and the air excluded, the ammonia may be formed and volatilized; but if it cannot escape, it will be re-absorbed by the water; and thus will be still retained in the drainage. Mr. Dickenson's tanks, of Willesden Green, are so situated as to be perfectly air-tight; and it is remarkable how free his covered sheds are from any escape of ammonia—at least to the senses.

There may appear a difficulty in admitting the drainage, and excluding the egress of ammoniacal

gas; but if the covers of the tank are made air-tight and the grates are trapped, there can be no mistake about its re-absorption, and it can loose but very little in the process of cartage and distribution. Mr. Dickenson is as careful of the one as the other; and conveys the liquid in a covered water-cart to the soil, so that there is no chance of the volatilization of any considerable quantity.

The modes of distributing the liquid manure are various, according to the different localities, and the extent of the liquid to be applied. In Manchester, where the sewage manure company are so eminently successful, the manure is collected and pumped by a steam-engine, and this is carried in a barge for distances sometimes as great as fifteen miles on the Bridgewater canal. From this barge the liquid is conveyed by hose. The main hose is carried through the centre of the field to be irrigated; and from this branch-hoses are disposed so as suitably to distribute the water. These branch-hoses are supplied with tubes about two feet long and two inches in diameter with spouts like a fan, or the flattened rose of a watering-pot. The engine in the barge pumps up the manure, and it is thus distributed through the field. In order to distribute it, men are employed to move these fans to and fro, similar to the operation of sowing, and thus covering the whole field. The field is sometimes a quarter of a mile from the canal, and three tons of the water are applied to the acre; and the time occupied is about three-quarters of an hour to the acre. The hose is made of canvass, and is in lengths of from 40 to 20 yards. The main hose is 4½ inches in diameter; and though they have been subjected for nine months to a pressure of about 80 feet, they appear to bear it without injury. The cost of manure and application is not more than fourteen shillings and sixpence per acre: and the results are the most satisfactory possible. The following is a comparative statement of the effects of the application at Worsley Park, and was taken on the 22nd June, 1848.

	Grass.
Unmanured produce	685 stones per acre.
Solid manure, quantity not given	880 „ do.
Liquid manure 3 tons	1108 „ do.

A second cutting was made the 5th of July—

Solid-manured portion	1034 stones per acre.
Liquid manured	1543 „ do.

showing in the last case an excess of 3 tons 3 cwt. 5 stone of green grass.

Mr. Fletcher, of Reedings-hall, tried the same company's manure with equal success.

Unmanured Italian grass	1383 stones per acre.
Liquid manure	2074 „ do.

Mr. Smith, of Barton, applied it also to a field, and produced of Italian grass

Unmanured 1350 stones per acre.
Manured with liquid 2760 „ do.

The excess produced £8 12s. 6d., being sold at three-halfpence per stone.

Similar to this mode of distribution is that adopted by Mr. Huxtable. From the tank are sunk conduits, made of hollowed larch trees, or double spouts nailed together; and these are supplied at intervals, with plugs, so that the supply can be pumped up and let out at any particular point where a field is to be irrigated or watered; and the cost of laying down this was given at a very small price per yard: we believe little more than twopence per yard. By this mode the cartage over the soil is prevented, and the cost, as well as the injurious influences of carting over a strong soil in winter, is entirely obviated,—objections extremely serious, where soft farm-roads are all that are supplied for carting the liquid.

Mr. Harvey, of Glasgow, who distributes the waste from the byres where 400 to 500 cows are kept, and the stables and refuse from a distillery, employs cast iron pipes for taking out the manure, three inches in diameter, and these are laid through the fields. Taps are placed at convenient points on the pipe, and a hose is applied to these taps when turned. A tin pipe is fitted to the end of this hose, which is guided by a man so as to distribute the liquid evenly over the whole. The process has been some two or three years in operation, and fully answers Mr. Harvey's expectations.

Mr. Henry Thompson, of Clitheroe, in Lancashire, uses the hose for distributing the sewage from his print works; and once fitted up, he can distribute, by means of two men, as many as 2,000 gallons of liquid per hour; and the cost he estimates at 6d. per 2,000 gallons. The same distributed by water-cart would be 5s.; and adding interest for the original outlay of the hose, the entire cost of distribution is not more than 1s. per 2,000 gallons.

It is by no means to be denied that successful distribution may be made by the water-cart. Mr. Dickenson's, of Willesden Green, is of a very unobjectionable kind. The whole is covered up; so there is neither any escape of ammonia, nor any other effluvia; and it is so constructed that the grass can be conveyed back on the top of the same machine. But then his liquid is of so very concentrated a character, that a far less quantity is necessary in this case than in ordinary instances, though as many as 1600 gallons per acre are applied for each cutting; but the expense is so trivial that it hardly amounts to an item, because the grass must be

carted home; and it is only loading both ways; and the great bulk of the road over which it has to be conveyed is the hard turnpike. It is evident, therefore, that there are few persons more favourably situated for carting the liquid than Mr. Dickenson.

The common water-cart, consisting of a cask placed upon wheels, is very generally used in Flanders, whereas great success invariably follows the application of liquid manure, as there are great failures here; because in the one case it is urine saturated with fecal matter in suspension, and in the other it is the rain water from the heavens and the unspouted eaves slightly coloured with the matter of the manure.

The Flemish casks contain from sixty to a hundred gallons; and the mode of distribution is by a slanting board affixed to the hole at the bottom of the cask. This hole is secured by a valve, to which a string is attached on the inner side, and which the driver has the command of either at the horse's head or upon his back, on which he often rides; and thus he possesses the power of at once commanding the disposition of the water.

Mr. Crosskill's liquid manure cart is a very efficient medium of conveying and distributing the liquid, where a broadcast spreading is required, as it seals up and prevents the escape of the gases, and prevents it from washing over by the action of the horses; but where drill distribution is requisite, it will not so well answer the purpose. This, however, is very neatly and cleverly effected by Mr. Chandler's liquid drill—which gained the prize at the Royal Agricultural Society, at York, in 1848—by means of an endless strap set with elevating buckets, precisely similar to those generally in use in a flour mill, and working in a small tank, into which the liquid, intended to be drilled, has to be poured from a funnel situate at the uppermost part of the drill. The implement is adapted for watering as well as manuring ridges, and is fit for the use either of natural liquid drainage or any artificially compounded substance, as dissolved bones, &c., which are often the most advantageously applied in the liquid form; but in that form, it must be admitted, they are very destructive to all kinds of iron work.

Construction of tanks.—This is a question which must be determined more by the relative position of the buildings and farm-yard, the materials available, and the temporary or permanent character of the tank required, as well as the elevation of the premises, relatively to the land to be dressed.

There is also a manifest difference between such premises as are constructed so that the rain-water which falls upon them, and such as are entirely free from such inroads, and indeed others where the

urine only, of the buildings, without any washings from the fermented manure, are permitted to escape.

It would seem to be hardly worth the repetition, that the water from the buildings should, if possible, be turned off the manure. It is idle to say that there are some seasons when water is necessary to make the manure ferment; for it is manifestly absurd to wash away the best part of the manure in four months of the year for the chance of getting some rainwater in the fifth, which may never happen to fall. Then there are few spouted buildings; and there are not always the means or disposition in owners, whether owing or occupying, or both, to put up the necessary spouts to the buildings, because there is often an expense incurred this way, which it is not convenient to meet; but it seldom happens that they are not able to form channels in the pavement to carry away the water; and thus to a certain extent, at least, the manure heap is freed from the drainage of the roofs, though not from the heavens.

Mr. Baker, of Writtle, proposed that the farmyards should be covered over by a roof; but this, it is to be feared, would be incurring a cost by far too great for ordinary persons to incur, though there can be no doubt but they are extremely desirable, apart from that consideration.

The object of securing a freedom from the ingress of the rain-water being accomplished, the next is to provide some central or suitable site for the tank. This should be at a point sufficiently low to admit of laying drains from the whole of the buildings and from the farm-yard. Into it drains, with pipe tiles from one to three inches bore, and with as rapid an inclination as possible, in order that as little sedimentary matter as may be shall be deposited in the tank; but it is more easily cleansed from it than from the drain, and hence the latter should be as free from it as possible. Temporary tanks may be formed in very tenacious clay soils by simply digging out the clay to the depth and of the area required, and a framework of squared larches fitted over the top, so as the inner side of the framework may be flushed with the walls of the tank, and over this a trap-door may be fitted of slabs pitched with oakum; or, where more convenient, with flags or other material capable of being made air-tight or nearly so.

The capacity of the tank must depend upon the extent of the farm, the stock, or the manure. With these data it is clear much difference may be expected to be experienced in erecting tanks of the proper capacity; and it is desirable to have one so large that the liquid may ferment before its application. But how small soever it may be made, there can generally be additions made either at the end or the side; and it is by no means undesirable to have

either two tanks with the means of connecting them—or one tank with the capability of dividing it.

We give an approximation to the size and capacity of tank required for several sizes of farms:—

50 acres	.....	1,000 gallons
100 do.	.....	1,500 —
150 do.	.....	2,500 —
200 do.	.....	3,000 —
300 do.	.....	4,000 —

Taking seven feet as the depth of the tank, we give the necessary lengths and breadths for several capacities of tank in gallons, omitting fractures:—

7 feet long by	5 feet wide	= 1500 gallons.
8 ditto	7 ditto	„ 2500 —
9 ditto	8 ditto	„ 3000 —
12 ditto	9 ditto	„ 4000 —
12 ditto	10 ditto	„ 5000 —

The next least expensive kind of tank which is necessary where a rocky or porous soil exists is one formed of dry brick wall, the whole being packed between the soil and the bricks with puddled clay, and covered either as above, or partially arched with the dry brick and clayed over, or covered with slabs, and made air-tight with turf. But by far the most perfect tank is one which is walled with brick and mortar with a floor, first of grouting, and then two bricks' thickness, arched over with a trap door, and a pump attached, and the whole cemented with Roman cement. This will of course be the most costly; but even the outlay of this for a farm of 200 acres, is by no means so serious as may at first sight appear. Assisted by a competent bricklayer and with the materials at a reasonable distance, the following will be the expense:—

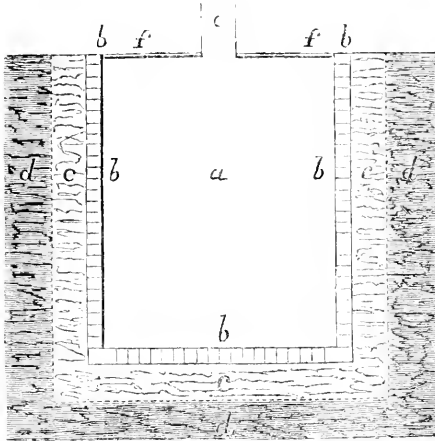
	Feet.	Inches.
Length within.....	13	6
Width	6	6
Depth	6	0
	19½ cubic yards.	
Cutting at 3d. per cubic yard.....	0	7 6
Walling, including brick and mortar	6	8 0
Plastering and cement	0	16 0
Covering and flags.....	2	15 0

* Total cost..... £10 6 6

In order that our remarks may be the better understood, we will give outline plans of the different kinds of tank which have been successfully adopted for the saving of liquid manure. The first is the dry brick and puddled tank, suitable for economical erection on porous soils, or fissured rocks, where the liquid will waste.

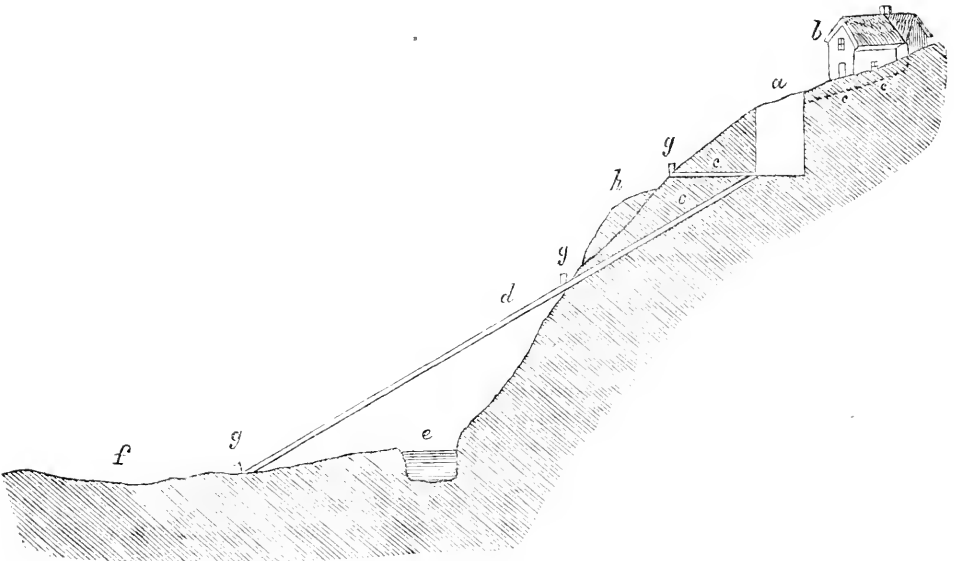
* See Milburn's Prize Essay, (Highland Soc. Trans.)

Fig. 1.



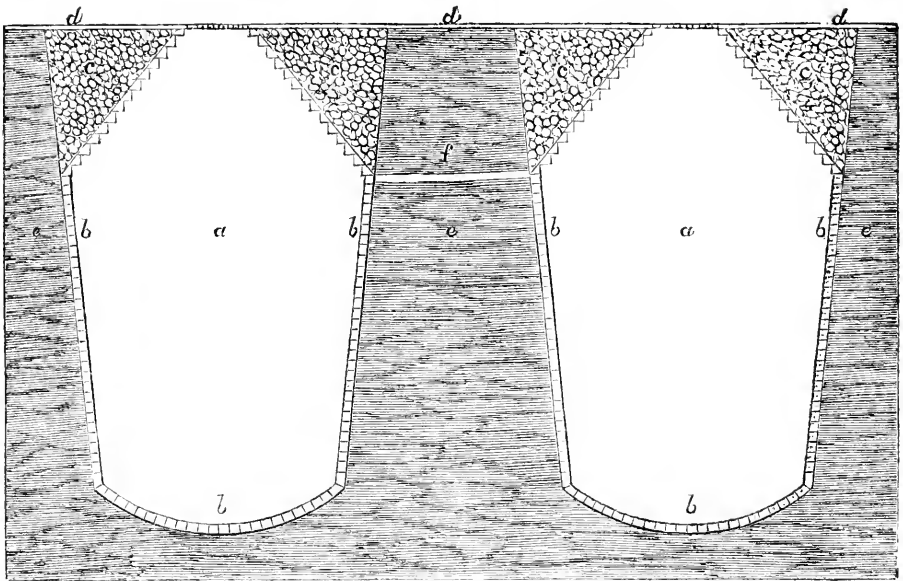
- a.* The body of the tank.
- b, b.* The dry brick walling.
- c, c.* The clay puddling.
- d, d.* The porous soil.
- e.* The opening for the pump.
- f, f.* The covering of the tank, being wood or flag stones, according to cheapness.

Fig. 2.



- a, g, e, f.* Is the supposed section of the ground to be irrigated.
- a.* The tank.
- b.* The farm buildings.
- c, c, c.* Drains.
- d.* Carrier to convey the liquid over the river to the low land to be irrigated.
- e.* The river or brook.
- f.* The land to be watered.
- g.* Taps to let out the liquid, or plugs if preferred.
- h.* An artificially formed ledge of earth.

Fig. 3.



a, a. The tank.
b, b. The walling and cement.
c, c. Rubble.

d, d. The covering flags.
e, e. The soil.
f, f. Connecting drain.

There are some situations where sufficient inclination will admit of the tank being placed so as to get a column of water, and save not only the pump and pumping, but to a certain extent the cartage. There are many farmsteads which are situate by hill-sides; and on these not only can a natural drainage be secured to the tank, but also from it to the several parts of the farm for purposes of irrigation with economy and advantage.

Another advantage attending the site of a farmstead so situated is, that the drains can also be placed with so much fall as to allow the liquid to flow so rapidly as to prevent the residuum from lodging and choking up the drains. The following sketch will give an idea of a locality such as we name.

We cannot close this paper with anything more appropriate than the sound advice of Mr. Wilson, of Eastfield. It is peculiarly appropriate in these times of agricultural difficulty:—

“Let us suppose,” he says, “a farmer entering a dairy farm of the same extent as I have;” (130 acres, one-fifth part always in seed pasture, upon which he keeps 14 cows, 4 horses, and a few calves in summer, and 8 or 10 heifers to consume the straw and turnips in winter); “and allowing that

nearly all his capital is expended in purchasing the necessary stock for the farm, &c.; and finding he has enough to do to satisfy the demands of a rack-rent: the consequence is, that his ability and inclination to purchase fertilizers to enrich his farm will be very limited. Now let us further suppose him falling upon the happy expedient of collecting all the fertilizing liquid that has hitherto been running to waste upon his farm; and reckoning on the very moderate sum of £20 yearly to accrue to him from its application. Were he to lay out this sum in purchasing guano, he would obtain about 2½ tons—a quantity sufficient in connexion with farm-yard dung, for the whole turnip and potato crops of 26 acres, and a profit of at least 30 shillings per acre might reasonably be expected from this outlay, besides increasing the fertility of his farm in a great degree.”

There are, throughout England, and indeed the United Kingdom, several grazing valleys where there is much liquid manure of the richest kind, little straw, and the urine washing out the soluble parts of dung.

There can be little doubt that this is more valuable as manure than almost any mixture short of guano itself; and to allow it to flow away is a degree of folly and hardihood the most reckless

and wasteful. And to give large quantities, as many persons do, of artificial food with the view of improving the manure, and allow the rains of heaven to fall upon it, to wash it away is one of the many inconsistencies we daily see around us.

We have great confidence that the principles we have laid down will be safe and satisfactory data for the application of the liquid manure, and especially the drainage of farm-yards.

Sowerby, Tirk, April 10th, 1850.

DOMESTIC AND CULTURAL ECONOMY.

No. I.

BY J. TOWERS, MEMBER OF ROYAL SOCIETIES OF AGRICULTURE AND HORTICULTURE.

The title now adopted may convey some idea of the purport of a concise series of articles which I offer to the consideration of a certain class of persons (*readers* I hope), who are in a position to attain every essential comfort and convenience that rural life is calculated to afford. The subject stands apart from, though still connected with, agriculture, and thus is usually neglected by the generality of writers; it therefore claims more imperatively the attention of some one whose personal experience in the field and garden has—like the writer's—extended over a period of more than 30 years.

The class I allude to comprises all those who have retired from business-life, and occupy small homesteads, comprising from two or three to about five acres of land, capable of producing good meadow grass, and all the products of an orchard and vegetable garden, to the *exclusion of corn*, which seldom can be made available in small detached plots.

Persons who retire from great towns to seek rural occupation are often warned that, do what they may, "they cannot fail to be losers." The assertion is false in itself; though it must be admitted that, from lack of experience on the one hand, and a natural inaptitude on the other, expensive charges are incurred, and serious losses sustained. Much depends upon individual energy in the head of a family, seconded by that of others of its members, whose wish it is to work in harmony for the common benefit of all.

We must also premise that he who retires is possessed of some available property and income, and at the same time is resolved to obtain all the products, of first-rate quality at the lowest possible expense, which his property can by wise management be made to produce.

Having thus announced the general object of the papers, the first thing which demands particular notice is the condition of the land under permanent pasture, with a view to the management of milch cows and the products of the dairy; and I might here refer to two articles on *grass lands*, which

appeared in the numbers of this magazine for April and May, 1849. It is not, however, my present intention to treat on the formation of meadows, or of the species of grasses which are chiefly in request for that operation; but presuming that the pasture already exists, and to the extent of at least two acres, statute measure—otherwise it will be difficult to keep a sufficient supply of meadow grass for two cows; and two there must be, if the family expects to obtain milk and fresh butter throughout the year. Meadow grass is the main staple of good dairy farming; without it cows may be, and are kept *in milk* by succulent roots, brewers' grains, and dry hay; but what are the products? The milk must be comparatively poor, and the butter void of that exquisite flavour which is justly the delight of all those who know what it is to possess cows which yield milk in abundance (the true Jersey or Alderney, for instance), possessing a peculiar inherent richness, yielding a thick cream, and then managed by a skilful, cleanly dairy-maid, with ample means and a regularly cool dairy at her command. The manipulations of the dairy are, however, too precise and important to be entered upon in this article.

That which immediately claims notice refers exclusively to the grass land; and here I may remark that my own experience in the Isle of Thanet and in Berkshire enables me to examine rather critically the evidence of some able writers, and also to assert that capital milch cows, of breeds differing from each other as essentially as do the soils of the two above-named counties, can be made to yield a superfluity of milk, cream, and butter, at a cost and risk far less than is admitted by those who are accustomed to confide too much in hired labour.

Grass land must be well drained, otherwise it will be liable to become rushy, and what is called *sour*; there ought to be no hedge-row elm-trees near it, because their roots trace horizontally to an amazing distance, and produce suckers in small obtrusive knots over the surface. Mosses must be destroyed by raking and the seasonable application of coal soot—for that contains muriate and sulphate

of ammonia—assisted by a sprinkling of nitrate of soda. This latter salt, by the way, blended with reduced farm-yard manure, to the extent of 28 lbs. of the nitrate to a ton of the manure, carefully applied as top-dressing in October, will be found one of the most effectual top-dressings known.

After winter, or rather in the month of March, the grass should be thoroughly bush-harrowed and rolled, then left to grow either for the hay-crop, or for cutting green as fodder for stall-feeding or "soiling."

The late Mr. Sinclair observed that, "when grasses are suffered to perfect flowers, and a few of them seeds, as is the case in all ordinary crops of hay, the taller-growing species weaken the dwarf or *sole* grasses; and should a field, however rich in grasses of the best quality, be mown for a series of years in succession, the *sole* grasses will be found to disappear altogether, leaving the sward thin and of reduced value for depasturing. Heavy and rich top-dressings every season will do much to keep up the due proportion of sole grasses, and it will effectually do so, provided an occasional sowing of the seeds of *poa trivialis*, *cyenosurus*, *crispatus*, *anthoxanthum odoratum*, *agrostis stolonifera* var., *latifolia*, be given with the "top-dressings."

Every acre of sound pasture ought to produce 1½ tons of excellent meadow-hay each year, with a quantity of green grass, subsequently to be fed off as fodder; but I object to the practice, preferring to depasture and carry to the stall the grass of a meadow one year, and to close and cut it for hay on the

following season, thus alternating the treatment of each field in order to keep it clean, in full heart, and to provide green fodder for the stall, and dry hay for the supply of winter.

In Thanet, where little true meadow-grasses are produced, except it be in the low lands by the Stour, we had to depend mainly upon lucerne (of which more in its place), and upon broad clover, which was grown in great breadths, and let for the season at so much per cwt.; two small quarter-acre pieces of meadow, self-formed after the lucerne plant was worn out, furnished a nibble of very fair grass, the cow being always chained and pinned, so as to prevent her wandering at large. A moderate outlay for clover and rye-grass hay furnished the winter food; and thus we had milk, butter, and cream, for more than a twelvemonth after her calving, in May 1820. In Berkshire a similar treatment kept a beautiful cow, of a mixed breed—to a great degree Alderney—in perfect health, from 1830 to 1835. I invariably found that whenever she was permitted to roam abroad over the thicket (where there was unlimited right of common), we found a great loss of milk. On the contrary, while green food was brought to the open box, or to the deeply littered yard, the supply of rich milk was long maintained. We never consulted a cow-leech, or gave a single drink to this animal, even after calving; and thus it became evident, that with care and cleanliness, health was secured, and injurious expenses avoided.

THE PARASITIC FUNGI OF AGRICULTURE.

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

There are few portions of agricultural science which offer a more interesting field of research than the parasitical fungi which attend the farmer's crops, or are the product of disease in his domestic animals. Since the time of Sir Joseph Banks, who, in 1806, published his valuable work on the cause of the diseases in corn, known to the farmer as the blight, the mildew, and the rust, much attention has been paid to the fungi which occasion or attend these diseases. Botanists, before the time of Banks, had long been aware that the blight in corn, for instance, is occasioned by the growth of a minute parasitic fungus or mushroom on the leaves, stems, and glumes of the living plant. Felice Fontana, indeed, published, in the year 1767, an elaborate account of this mischievous weed, with microscopic figures, giving a tolerable idea of its form. These were improved upon by Sir Joseph Banks, and by the Rev. E. Sidney, who, under

many disadvantages, lectured upon the subject at the Norwich meeting in July 1849. But the subject, however skilfully handled, is hardly adapted for a short lecture, on such an occasion as that to which I have referred. In the *Journal of the Royal Agricultural Society*, vol. x, p. 399, a report of that lecture is given, which, if read in connection with the little volume published by the lecturer some years since, will, I think, well repay the farmer for the time he bestows upon it. Some of my readers, not intimately acquainted with this class of the diseases of corn crops, and as little aware of the ravages they commit, will very naturally ask, what are fungi? This very question Mr. Sidney undertook, some years since, to answer in his little work, "On the Blight of Wheat and their Remedies," published by the Religious Tract Society. Fungi, he therein states, "belong, botanically speaking, to the class of *thallogeens*, of which there are three

alliances well described in Lindley's Vegetable Kingdom. These alliances are *algæ*, *fungi*, and *lichens*. The first live in water, or very moist places: the last two live in air. Between fungi and lichens the chief distinction is, that fungi are never accompanied by any of those curious green *gonidia*, or separated cellules of the medullary layer of the thallus, which, as well as their spores or seeds, form reproductive matter in lichens. Suppose, then, the question asked, What is a fungus? The answer is, it is a cellular, flowerless plant, deriving its nutriment by means of a *thallas*, to which the name has been given of *mycelium*, or *spawn*: it lives in air, and is propagated by *spores*, which are naked, or by *sporidia*, so called when inclosed in *asci*, or little vesicles. The way in which these spores germinate, generally speaking, is by a protrusion of the inner membrane, or an elongation of the outer, thus lengthening out its spawn. This is the usual or *normal* mode: but, as will be hereafter seen, apparently not the only one, for we shall have to describe another method of germination in the case of certain parasitic fungi belonging to our subject. The term *sporule* will also occur, by which we mean the fine contents of the seeds of the fungi. We shall see, in the course of the work, that these fine contents appear to circulate in plants, and grow. Fungi may be said to consist of a mass of little cells, or little threads, or of both combined in various ways. They have no fructification except their spores, or sporidia, of which the methods of attachment are singularly curious and beautiful. In their respiratory functions they approach to the peculiarity of animal rather than vegetable life, for they absorb oxygen and exhale carbonic acid gas. Like flesh, they contain a great quantity of nitrogen; and the substance called *fungine*, extracted from them by the chemist, bears a near resemblance to animal matter. They derive their nourishment from the substances on which they grow, and not, as is the case with the lichens and *algæ*, from the media in which they exist. The juices impregnated with the peculiar principles of the matter to which any particular fungus is attached, form its appropriate food."

The importance of these fungi, and the loss they occasioned to the farmer, some time since attracted the attention of Professor Henslow. His description of those minute yet extensive varieties which too often injure the wheat plant was given with his usual clearness (*Jour. R. A. S.*, vol. ii, p. 1).

"All fungi, he remarked, grow upon some kind of organized matter, none of them deriving their nutriment directly from the soil, water, or atmosphere, like other plants. They are of great importance in the economy of nature, by assisting in the decomposition of decaying or decayed animal

and vegetable substances. A few of them appear to grow upon healthy subjects, but these may possibly most frequently have originated on a part where disease or decay had already effected some alteration in the tissue; and then, by spreading rapidly from thence, they may afterwards occasion the decay of other parts also. None of this tribe of plants attain to any great size, when we compare them with many species of flowering plants, or even with many of those of other neighbouring tribes (as the ferns, &c.) which never flower. Among fungi we find a multitude of extremely minute species, which it needs the skill of an experienced microscopic observer to detect and examine; and it is also among the very lowest of the several groups, into which these minute fungi are classed, that we must search for the few species that produce the fatal diseases in corn we are about to notice. But if these fungi are themselves so exceedingly small, how much more so are those reproductive bodies, analogous to the seeds of flowering plants, by which they are propagated and multiplied! So very minute are those sporules (as botanists term them) that they altogether escape observation by the naked eye, and can only be just distinguished by the highest powers of the microscope. Many of these kind of fungi live beneath the scarf-skin, or epidermis, and within the very substance of certain plants. In the progress of their growth, they raise blisters under the epidermis, and, when arrived at maturity, they burst through it, and then form spots or irregular blotches of various colours, which are frequently orange, brown, or black. These spots (or *sori*) are masses of fructification, and are surrounded by the tattered edges of the ruptured epidermis. A vast number of these fungi are known to botanists. Like parasitic animals, they are restricted in their powers of attack, being able to live on certain species only, and even on particular parts only of particular individuals of these species. There is often a strong general resemblance between many of them; but a naturalist will readily detect such important differences between two fungi which may infest distinct species of plants, that he is compelled to consider them also as species distinct from each other. Thus it happens in the animal kingdom, that different species of flea and different species of lice can exist only on particular species of quadrupeds or birds. The flea which infests dogs is distinct from that which annoys man. So also with these parasitic fungi; some are restricted to one species of plant, some to another; but, generally speaking, most of them are capable of living upon more than one species of the same genus; where, of course, we might expect the resemblance in all points to be very close.

Some fungi confine their attacks to the seed, others to the stem or leaves, and some even to one side only of the leaves. One of those which attack wheat lives only on the grain, another more particularly attacks the short stalk (*pedicel*) on which each flower is seated, whilst three of which we are about to speak are restricted to the straw, chaff, and leaves; but all five live at first beneath the epidermis, and not upon it. In this respect they bear a close analogy to those parasitic animals which live within the bodies of other animals, some immediately beneath the skin, others in the intestines, and others again within the very substance of the muscle. It is the extraordinary minuteness of the sporules (or seed-like bodies) of these fungi, which allows of their being absorbed by the roots, and probably also through the pores of the stem and leaves of plants; and then they are conveyed by the sap to the various parts, were they are enabled to germinate, grow, and fructify. The sporules of fungi appear to be everywhere dispersed through the atmosphere, ready to germinate wherever they may find a dead or living subject in a condition suited to their attack. Common mouldiness, for instance, which so readily forms on many substances in moist situations, is the most familiar example of the inconceivable number in which the sporules of a minute fungus are everywhere diffused. The difficulty of admitting such a universal dispersion of these sporules has induced some modern philosophers to support the old exploded theory of spontaneous generation. Of this theory, however, we may safely assert, in the present state of human knowledge, that it involves difficulties an hundred fold more inexplicable than any which attend on the opposed theory, which teaches us that all living creatures proceed from similarly organized beings, originally called into existence at the fiat of the Almighty. We shall therefore consider these minute fungi to be plants, which have proceeded from, and are capable of reproducing, their kind by means of those minute sporules, with which direct observation has made us well acquainted."

It is only of the *general remarks* of which the lecture was composed, that I have in this paper been able to avail myself. These were valuable and instructive, and, although with the exception of the prevention of the smut in wheat, scientific researches have not yet enabled us to ward off the attacks of these fungi, yet it is very probable that much in this way will be yet accomplished. For as the Professor remarked, when speaking of the *Bunt*, *Smut Balls*, or *Pepperbrand*—"The fungus which occasions this well known and much dreaded disease has hitherto been met with only in the grains of wheat. Its presence is readily

recognized by the peculiarly disgusting odour of the infected ear. It may be detected in the young seed, even in the very earliest states of the flower bud; and when fully ripe it is most frequently occupying the whole interior of the grain, but without bursting the skin, so that the wheat seed retains very nearly the same size and shape that it would have assumed had it been perfectly sound. When examined under the microscope, the Bunt fungus is seen to consist of vast numbers of extremely minute globules, of a dark colour, and which are at first attached to a mass of matted thread-like matter, analogous to what is termed the spawn in mushroom, and other Agarics—and which in those plants spreads underground, and frequently occasions the remarkable appearances called fairy-rings. It is not easy to see this spawn of the Bunt-fungus, but the little dark globules, called spores, may readily be detected. They may be considered analogous to the seed-vessels of flowering plants, and each of them contains a mass of almost inconceivably minute sporules by means of which the plant is propagated.

"The reproductive powers of fungi are quite beyond our comprehension. Fries, one of our greatest authorities, has calculated that a particular fungus may contain 10,000,000 sporida. The terms *spora*, *sporulae*, *sporidia*, &c., have neither been applied synonymously or vaguely by different authors. The more modern practice appears to be, to use *sporulae* for the ultimate granules analogous to seeds; *sporidia* for the cases or vessels containing them, and *spora* for an additional covering, which sometimes includes several *sporidia*. Mr. Bauer has accurately measured the spores of the present species, and finds their diameter is not more than 1-1600th of an inch. A single grain of wheat (estimated at less than the 1-1000th of a cubic inch) would therefore contain more than 4,000,000 such spores; but it is hardly possible to conjecture how many sporules each spore contains, since they are scarcely distinguishable under very high powers of the microscope, and then appear only as a faint cloud or vapour, whilst they are escaping from the ruptured spores.

"When this disease prevails, it greatly deteriorates the value of the sample; imparting its disgusting odour to the flour, it makes it less fit for bread; but I understand that ready purchasers are to be found among the venders of gingerbread, who have discovered that the treacle, and whatever else they mixed up with it, effectually disguises the odour of the fungus: if this in itself is really innocuous, there can be no objection to such a mode of employing the tainted flour; but some are of opinion that it is to a certain extent deleterious. Although the Bunt fungus confines its attacks to a young

seed, it seems to be a condition essential to its propagation, that it should be introduced into the plant during the early stages of its growth, and that its sporules are most readily absorbed by the root during the germination of the seed from which the plant has sprung. It has been clearly proved that wheat-plants may be easily infected and the disease thus propagated, by simply rubbing the seeds before they are sown, with the black powder, or spores, of the fungus. It is also as clearly ascertained, that if seeds thus tainted be thoroughly cleansed, the plants raised from them will not be infected. This fact is now so well established, that the practice of washing or steeping seed-wheat in certain solutions almost universally prevails. Upon simply immersing the grain in water, the infected seeds float, and on the water being poured off, nothing but the sound ones remain in the vessel. This simple process, however, is never perfectly effective, because, in threshing the wheat, many of the infected grains (smut balls) are crushed, and the spores are dispersed in the form of a fine powder, which adheres with considerable obstinacy to the surface of the sound grains, by means of an oily or greasy matter found in the fungi. In order to detach them thoroughly, it has been considered useful to add some alkaline ley to the water in which they are washed; because oil and alkali unite and form a soapy substance, and then the spores will no longer adhere to the surface of the grains of wheat. Lime, possessing alkaline qualities, has been long employed for the purpose. Common potash, and substances containing ammonia, as the liquid portions of stable manure, have also been used. But, as some persons employ brine, sulphate of copper, arsenic, and a variety of other materials which do not possess alkaline properties, it is supposed that all these solutions act rather by destroying the vegetative properties of the fungi, than as a means of removing them from the surface of the grains. It may, therefore, be worth while to institute a set of experiments to determine which supposition is really correct. Perhaps some portion of the effect may be owing to the increased specific gravity of the liquid; or perhaps some portion of the solution may be imbibed by the steeped

corn, sufficient to prevent the sporules of the fungus from germinating within the substance of the plant; just as corrosive sublimate, essential oils, and Russia leather prevent the formation of mouldiness. I may also add, that the temperature at which the solutions are applied may be of some importance."

To a minute fungus then, as I have already remarked on another occasion (*Norfolk News*), is owing the bunt or smut balls, so well known to the farmer; from another arises the smut or dust-brand (often confounded with the last described); to another the rust or red gum; a fourth the mildew. It is of the first importance that the nature of these ravaging diseases amongst the corn plants should be well and generally understood, since it is one great step to their prevention or cure to understand their nature and the laws by which their production is governed. In the case of the smut we all know that the precautions of the farmer, by means of various steeps, have very materially reduced its ravages. And in the case of the mildew in wheat, the late Rev. Edward Cartwright successfully conducted some experiments, which proved that even that formidable disease might be successfully cured by merely sprinkling the diseased plants with a weak solution of common salt. It is, therefore, a very insufficient reason for delaying our examinations of these fungi, that they produce or are the products of diseases which we cannot at present completely cure. It is a subject, truly concludes Mr. Sidney, "well adapted to farmers' clubs, where good botanists and microscopists might be induced to attend with their instruments, and give simple explanations—for let it be remembered that simplicity is the handmaid of all useful science. I can say, by experience, that endeavours to extend a knowledge of useful science will be found good subordinate auxiliaries to the higher aims of men of my own sacred calling; and while we see that there is not a thing so small, or so apparently mean, but that it sparkles with some beam of the skill of its great Maker, I conceive that it befits the office I bear to show that nobler teaching of divine wisdom by things revealed does not tend to deface, but to elevate our conception of God's perfection in things created."

ON THE ERADICATION AND PREVENTION OF ERGOT IN PASTURES.

BY RICHARD J. JONES, CORK, LATE OF WEST BROMPTON.

I have endeavoured, in my former papers on abortion and pleuro-pneumonia in cattle, to point out that these diseases, as I may call both, were solely attributable, either directly or indirectly, to the presence of that morbid excrescence in pasture

grasses known by the name of "ergot," the peculiar properties of which have been before brought under consideration. However, we should be doing only a partial good were we not to point out some remedy for this evil, by which it may be destroyed

where in existence, and its future appearance anticipated. "Prevention is better than cure" is, in this instance, a true saying. Palliative or temporary measures will here be found of little or no avail: we must strike boldly at the primary cause, the root as it were of the evil; and, to do this effectually, we must re-consider the subject, as to the mode and seasons in which it makes its appearance, the description of land, and the circumstances most favourable to its production; to do this, I cannot do better than quote from Mr. Maclean's excellent article, published in *The Farmer's Magazine*, for February. "It, like most of its class, luxuriates in moisture; it is to be found on road sides, commons, low boggy or marshy tracts, higher lands, with clay bottom, if ill-drained, and even on the driest fields, if foggy or wet weather prevails, but more in such situations if closed in with *plantations*, where it will be *very frequently* found, and lastly, more abundant in poor exhausted soil than on well farmed land. Yet this, I believe, is very exceptional. Such are the localities likely to foster this fungus. It will be most abundant in wet seasons, or alternations of wet and close weather, when the sun seems unable to break the clouds and dispel the vapour that broods over the face of nature. It will be mostly found from the month of May, or even earlier, to the beginning of winter." Thus we find that it is the production of moisture and wet, and are led to infer that dry land of a good quality, and a dry warm atmosphere, are inimical to its growth, and it is also a well established fact that it differs in strength according to the seasons and localities on which it is grown, but I cannot imagine that wet and moisture *alone* are sufficient to produce it without certain other conditions of the soil. We do not find it in *all* irrigated lands, even during the wettest seasons; but we are likely to discover where, in consequence of a hard clay bottom, the water cannot permeate deeply through the ground, and from the inequalities of its surface, or want of inclination in its plane, cannot flow off, but remains in stagnant pools here and there. Even this I do not consider a sufficient cause; there is yet another wanting; and I think we will find it in a *scarcity of calcareous matter in the soil*; both which, combined, will be likely to produce it, but it is very doubtful if either will singly. The lands on which ergotized grain or grasses are found are those which have been either impoverished by continued growing of grain crops, which exhaust the portion of lime either naturally or artificially supplied to the ground, or land which, from its extreme moisture, has never been applied to the purposes of tillage; on such the grasses are of so rank and disagreeable a flavour that the cattle will not eat them, except through sheer starvation.

And this, of itself, tends more and more to increase the evil complained of, as the vegetable matter is again, by the process of nature, returned into the ground, which by its decay furnishes, year after year, a large supply of a peculiar kind of acid, termed humic acid, which renders it unable to bear, in the course of time, anything capable of sustaining life in an animal. With regard to this humic acid there are many opinions as to whether it can be taken up by plants in an uncombined state; but I think there cannot be much doubt of it; however, what tends to much the same thing, if this vegetable matter be converted into humic acid—which is allowed by all parties—and if this humic acid be insoluble and incapable of supplying nutriment to the plants, it follows, as a matter of course, that the ground bearing grasses year after year, without being supplied with any renovating matter, must of necessity become exhausted, and furnish grasses of the coarsest and worst quality. Thus the grasses under trees, from the constant fall of the leaves, will be found of a very coarse description, and ergotized, if there be a scarcity of alkaline matter to neutralize the humic acid annually manufactured in nature's laboratory; while, on the other hand, the chemical union between the humic acid and the alkaline carbonates produces a manure of surprisingly fertilizing qualities; thus, by a wise provision of nature, rendering poison itself subservient to her uses. In the species of soil which I have before mentioned—viz., wet land never under tillage—the portion of lime contained must be generally very small, and the crops of grasses yielded every year tend still farther to decrease it, while the very water permeating through its textures becoming saturated with it, and flowing off, if not constantly, yet when heavy rains fall, make the quantity still less, and the humic acid being insoluble remains in the soil to do more and more mischief if left to itself. Thus we have the very elements combining to render land of bad quality still worse, when the farmer, through neglect or otherwise, does not step in and apply the remedies which nature has placed within his reach. On limestone ground such a state of things cannot exist. Now among rye we find this ergot more prevalent than any other species of grain, and why? It is a fact well known to agriculturists, that the ground which will be unable to bear any other kind of grain will produce a very good rye crop; in fact, where wheat would not at all grow. And this wet or impoverished ground would be the most favourable, during a wet season, to the growth of ergot; and again, rye can be grown in land so wet as that almost no other grain would grow in it. Now the rye grown on this land, if deficient in lime, and during a wet season, will be ergotized to a cer-

tainty, more or less, according to such deficiency of lime or excess of moisture; and, as I before remarked, the grasses grown on such land will be sure to be ergotized. That ergot may be easily propagated from itself the experiments of several German botanists fully shew; and though their experiments merely refer to the ergot on the cereal crops, yet I have little doubt they are fully as applicable to ergot on pasture grasses. Quekelt's researches shew that it has the power of so infecting healthy seeds as to cause them to produce ergotized grains; and as the experiment may be found interesting I shall quote it.

"About 12 healthy grains of rye, wheat, and barley, grown in neighbouring fields in Surrey, were placed in a little water on a plate, and a few ergots of wheat added, the spondiæ of the fungus ergotetiæ adhering to the latter, were brushed off with a camel's hair pencil into the plate, and the ergot of wheat subsequently removed. Another set of grains were then treated in the same way, with the spondiæ of the ergotetiæ obtained from the ergot of *Elymus sabulosus*: the two sets of grains were then covered with glass shades, and in a few days germination commenced. Subsequently the young plants were placed in the ground; but only four of rye, three of barley, and four of wheat grew: of these every one of the rye and one of the barley plants were ergotised, but the wheat escaped. This experiment strongly supports the fungoid origin of the disease."

From the facility with which ergot may be propagated, as above exemplified, by its own (if I may so use the word) contagious qualities, if it makes its appearance in one part of a field it will very rapidly extend itself over the entire farm, where the circumstance of much wet, and ground favourable to its production, may be found. Independent of humic acid and scarcity of lime, rendering land unable to produce, there is also another reason: the land, which, as I before said, possesses hard clay bottom, does not permit the water to penetrate deeply into its surface; consequently, all the rain that falls has only a depth of from two to three or four feet to contain it; and taking into account the quantity that annually falls in a humid climate like ours, we have this three or four feet continually saturated like a sponge, while the water has no means of passing off, except in continually overflowing the ground as it falls. Now it is well known that water evaporates at all degrees of temperature from below zero up to the boiling point; and it is equally well known that as evaporation generates cold exceedingly fast, so this spongy land, containing within its textures such a body of fluid, is continually kept at an exceedingly low temperature: so that the very cold itself would prevent the growth

of any plants on it, excepting mosses and coarse grasses. Now how would this same land be, [if it were thoroughly drained and limed? The rank grasses on its surface would be destroyed by the lime, which, combining with the hitherto noxious humic acid, would form a lumate of lime—a salt remarkable for its fertilizing powers (though some assert it to be totally insoluble). The long pent-up force of the water would have an outlet, and would no longer render the ground like a shaking bog, on which cattle, sent to gather the seeds of disease, sank up to their knees. The evaporation so unceasingly kept up would cease, together with the cold generated by it. The rays of the sun, instead of absorbing the water, would then impart a genial warmth; and the land, heretofore a wild, unproductive morass, would become a source of emolument and profit. I recollect somewhere seeing a short quotation which applies to what I have been remarking:—

"In grounds by art laid dry, the aqueous bane
That marr'd the wholesome herbs is turned to
use:
And drains, while drawing noxious moisture off,
Serve also to diffuse a due supply."

To produce this change, it may be said, would be a serious expense. But let me ask, on how many farms would the losses incurred by the epidemic more than doubly pay the outlay necessary for such a purpose? at the same time it would be every year remunerating the agriculturist by the improved condition of his land and stock. Thorough draining, with a due application of lime, is the only means of getting rid at once and for ever of this baneful source of evil. I am an advocate for deep draining; but as almost everybody holds an opinion on this subject, let him try whatever mode he pleases, provided it effects the object intended—that is, to render the land free from wet. If ergot be on the grasses, quicklime, judiciously applied, will destroy it; and by its combination with the humic acid, together with good drainage, will be found to answer the desired end, and prevent the reproduction of this pernicious grain. In Mr. Maclean's paper, to which I have before referred, he remarks the exemption of cattle fed on salt marshes from disease; which fully bears out my remarks: not that I consider the salt has any specific effect on the ergot when produced, but a great deal to do with the prevention of it. To illustrate my subject, every wine pint of sea water surrounding the British coast is calculated to contain 186 grains of muriated soda, or common salt, 51 grains of muriated magnesia, and 6 grains of sulphate of lime. Now be it observed that all these possess very strong alkaline bases; and a wine pint contains somewhat more than a half ounce of them in solu-

tion, all which would combine with the humic acid and render it a neutral salt, suitable for fertilizing and enriching pastures. Beside this action on the soil, the salt possesses antiseptic qualities, which may be a great preservative against disease. The fondness of cattle for it is well known. If a cow, after calving, is not disposed to lick the calf, a small portion of salt shaken over the young animal immediately causes her to do so, in order to lick off the salt. Pliny in his "Natural History," book xxi., chapter 7, tells us "that cattle have an avidity for salt pastures; and that cows fed thereon give more milk, and much better for curding into chesse, than upon ground not of a saline nature."

In different parts of Africa, vast herds of cattle travel over an immense extent of country periodically, to browse on the plants which grow on the sea-coast, and contain a large quantity of salt. The fattening qualities of our own salt marshes is too well known to farmers and graziers to need further remark. Salt given to cattle at pasture makes the flesh exceedingly firm and healthy, and fattens quickly; it also prevents in a great measure those diseases among sheep fed on wet pastures or on turnips, &c.; the origin of many of which lie in the stomach: they become subject to acidity, the stomach loses its tone, and the animal decreases in flesh. If salt, which is stimulant and antacid, be given, it acts as a tonic on the stomach, and neutralizes the acid therein; a marked change will be observed in a fortnight or so; the sheep, hitherto so sickly will be found sprightly and well, with a good appetite. Besides, it improves the fineness and quality of the wool: about one ounce of salt per day, if not wasted, will be found sufficient. The Andalusians ascribe to the quantity of salt which they give their sheep, the fine texture of their wool; but in this we cannot altogether agree with them. It is a beautiful idea, "The Lord tempers the wind to the shorn lamb," and nowhere more perceptible than in the covering with which he supplies the animals of every country according to climate.

The animals in this variable clime of ours require a more dense and coarser covering than those of Andalusia.

ON THE USE OF CHLOROFORM DURING CASTRATION IN HORSES.

The following is extracted from a communication to the *Veterinary Record* of January, by J. Barton, V.S., Ashford, Kent. After acknowledging some information regarding the mode of applying and using chloroform, he says—

"The first subject was a yearling colt for castration. Having adjusted my hobbles, I applied the bladder, containing about one ounce of the chloroform, to the off nostril, my assistant closing the other with his hand; when, in less than one minute, the animal staggered, and I believe would have fallen from the effect of it, but we drew the hobbles together, and secured his legs. I then commenced the operation (you are aware it is not a very long one), which lasted about three minutes, during which time there was not a struggle, and, having finished, we unfastened the ropes, the animal lay for about a minute, and then jumped up all right.

"The next was a two-year-old half-bred colt for the same operation.

"Two ounces of the chloroform were put in the bladder, and on its being applied, as in the former case, the animal shook his head, bounded forward, nearly knocking us down, struck out with his fore legs, and appeared almost like a mad horse for some time (say four or five minutes), but shortly afterwards he stood more quietly, and the effect of the agent became very visible by his reeling about.

"After having cut through the scrotum, and divided the cremaster muscle of the lower testicle, which I did with perfect ease, and without any notice having been taken of it by the patient, I proceeded to take hold of the other for the purpose of removing it, when I found it so withdrawn from my reach, that I was compelled to wait about a minute and a half for its reappearance. Having then secured it as before, and cut into the scrotum, before I could divide the cremaster, he gave a struggle, and continued to do so for some little time, and, in fact, until I finished the operation. I am of opinion the struggles were more violent than if the chloroform had not been used. I therefore am of opinion that there is no certainty in its action, and scarcely any advantage, on the score of humanity, to the patient, especially during the operation of castration; but I will give it another trial upon some animal about to be fired. Should you see any thing in my description of the use of the agent that requires alteration, I should feel obliged by your making me acquainted with it, so that I may adopt it in my next case. Do you not think that the sensation which causes the appearance of madness, must be more painful than even the operation itself?"

The administration of chloroform seems to have been attended by different results in the two cases above described. In the case first operated on the agent had a speedy, and, so far as ensuring quietness and insensibility to pain are concerned, a beneficial action. In the second instance, an increase of excitability in the nervous system preceded the full anæsthetic action of the chloroform. From what we have seen of the employment of this agent, we may remark that our experience corroborates the accounts before given as to the uncertainty or irregularity of its operation. Even provided that its mode of being administered is always the same, there is a great difference in the manner and time of various horses becoming affected with it, and we cannot beforehand tell upon which animals it will produce a favourable or unfavourable influence. And, again, in some cases it will operate so fully and efficaciously as an anæsthetic, that a horse under its action, though subjected to painful operations, may not for a while need the usual securing by ropes and hobbles in order to restrain his struggles; yet, almost as in a moment, and without warning the animal will sometimes begin to writhe and dash about with the greatest violence. If chloroform uniformly produced complete stillness and insensibility, and if it acted with a like certainty in every case when given to the horse, it would be an agent worthy of every dependence; but so long as it remains unequal in its operations, we cannot rely upon it as calculated to supplant the hobbles and ropes usually employed during the performance of operations to ensure safety to the horse, operator, and attendants.

THE LONDON FARMERS' CLUB.—MONTHLY DISCUSSION.

The usual Monthly Meeting was held on Monday evening, April 1, at the Club Rooms, Blackfriars; Mr. Payne, of Felmersham, in the chair. The subject for discussion was introduced by Mr. Shaw, of the Strand, being, "The Principles which should regulate the valuation between the landlord and the in-coming and out-going Tenant under an equitable system of Tenant-right." The occasion was also appropriately selected for the presentation of a testimonial to Mr. Shaw, in acknowledgment of his services as the advocate of Tenant-right.

The CHAIRMAN: Gentlemen, the usual time for commencing our discussion has arrived, and I think I may say, without fear of contradiction, that the subject selected for discussion this evening is one of not less, if it be not even of greater importance than any which has ever been introduced in this room (Hear, hear). I am very happy to find, gentlemen, that it is to be introduced by our friend Mr. Shaw; and I am also happy to find that, in consequence of his indefatigable exertions on behalf of the occupiers of the soil (a voice—"And its owners") something like a testimonial is to be handed over to him this day, on the part of those who entertain similar sentiments to his (cheers). For myself, I can say sincerely that no man entertains a greater respect for Mr. Shaw, on account of his exertions in our cause, than I do. I will not detain you any further, but will leave Mr. Shaw to introduce the subject stated on the card.

Mr. SHAW said: Gentlemen, the branch of the question of Tenant-right which is to be discussed this evening is one of so purely practical a nature—not to use an improper phrase—(laughter)—that I should not have ventured to bring it forward, had I not felt certain that gentlemen who are conversant with it, because they have to make valuations, and therefore to study the principles of valuation, would be present on this occasion, and would express their opinions soundly and clearly on the question under consideration. Although I see around me several gentlemen whom I know to be fully competent to deal with the subject, yet I regret that, owing to the circumstance of the day being one on which a great many persons in the country are engaged in parish and other matters, we have not so large an attendance as we should otherwise have had (Hear, hear). At all events, I trust that the result will be our doing that which we have often done before with great advantage in this Club, namely, placing on record a sound opinion; and I am quite satisfied that the credit and character of the Club stands sufficiently high with the public to render its opinion, when recorded, of considerable value. I will now proceed to deal with the subject which I have undertaken to introduce. Although the question of "Tenant-right," or compensation for unexhausted improvements, had been debated

by the Loughborough Agricultural Association, and in two or three other instances, anterior to its being discussed by this Club, yet as regards the country at large it may truly be said to have been a subject with which persons generally were unacquainted, until a knowledge of the principle was diffused through the reports of the proceedings of the London Farmers' Club. It will be in the recollection of many members of the Club, now present, that the question was first brought before the Club by myself on the 10th December, 1845, upon which occasion there was one of the largest meetings of members we ever had. On that evening I gave the best definition of Tenant-right I was able, and in order to prevent any misconception from confounding "Tenant-right" with the customary "Tenants' Rights" known in several districts, I now beg to repeat it. I understand "Tenant-right" to be "the right of the tenant to require compensation legally for outlay in the improvement of the soil or buildings, when the period of his occupation has not been of sufficient duration to enable him to reimburse himself that outlay." It is essentially necessary to observe the distinction between the subject matter of "Tenant-right" and "Tenants' Rights," inasmuch as the confounding the two together exposes the former to the well-merited obloquy which in most cases attaches to the latter. An especial instance of this will be found in the evidence of a gentleman given before the Agricultural Customs' Committee, in reference to the "Tenants' Rights" of the county of Surrey, which he severely and properly condemned, and which induced many persons who did not distinguish between the two systems, to condemn "Tenant-right." Another instance has just occurred, in which the *Times Commissioner*, in a letter which appeared in that journal on Friday last, confounds the Surrey system with "compensation for unexhausted improvements," or "Tenant-right." The "Tenants' Rights" in Surrey, which form the subject of valuation, consist of labour, rent and taxes, produce, as hay and straw, and, with the exception of lime, the manurings which would be applied in the ordinary course of husbandry annually, and without which crops cannot be produced. The subject matter of "Tenant-right," in respect to which we contend the tenant is entitled to compensation, consists of *extraordinary* outlay in draining, liming, marling, chalking, boning, the use of artificial manures, erection of buildings, &c., &c., &c., the legitimate return for which can only be obtained by a succession of crops and a lengthened occupation. The question of "Tenant-right" was very fully discussed at the meeting of the Club before alluded to, and a resolution was passed, "That in the opinion of this meeting a system of 'Tenant-right' would promote the interest of both landlord and tenant, and most materially conduce to the advancement of practical agriculture." The proceedings at that

meeting attracted very general attention throughout the country, and a feeling was engendered amongst landlords that the "right" which the tenant sought to obtain, although it was nothing more than a fair and proper security for the investment of his capital, involved "wrong" to the owners of the soil. In order, therefore, to prove that such an opinion was without foundation, and to disabuse the minds of those who harboured such a notion, a special meeting of all the members of the Club was held on the 11th January, 1817, when the subject was again discussed in another form, the question proposed being, "How far would a well-regulated system of Tenant-right be beneficial to the landlord?" The chairmen and secretaries of all the local farmers' clubs and of the protection societies were invited to attend the meeting, which was numerous. Upon that occasion the duty of opening the discussion devolved upon me. The debate was long and interesting, and terminated in a resolution, "That a well-regulated system of Tenant-right would be beneficial to the landlords of this country." It is, I think, to that most important branch of the question that we should direct our special attention. We cannot too much impress it on the minds of landlords, nor adduce too many proofs to convince them that they cannot be injured by Tenant-right. I will here venture to read to you a certain number of reasons which I enumerated on the occasion last alluded to, for the purpose of showing that Tenant-right would not prejudice the interests of landlords.

"1st. That the nearer the nature of the tenure or occupation approaches to definite ownership, the more valuable the holding to the occupier. This is especially shown in land let for building, upon which large sums are expended in consideration of the security afforded by the duration of the term.

"2nd. That the undisturbed possession of a farm for the term of (say 20) years, affording opportunity to the tenant to carry out his system of improved cultivation, will enable him to give a higher rent with advantage to himself.

"3rd. That a system of Tenant-right, giving compensation for unexhausted improvements in the event of eviction, affords the tenant the next best security to a lease.

"4th. That there are many tenant farmers who, if they possessed security of tenure by lease with proper covenants, or an agreement securing compensation for unexhausted improvements, would give a higher rent for land capable of improvement, if so secured, than they would on a tenancy from year to year.

"5th. That security of tenure would enable the tenant to increase his capital by loan.

"6th. That such terms being granted, many improvements would be effected, which, at the termination of a lease or occupation where a system of Tenant-right was adopted, would increase the value of the estate to the landlord.

"7th. That as well where leases are granted as where Tenant-right exists, rents are higher than when the tenancy is from year to year.

"8th. That the only sacrifice on the part of the landlord in granting a lease, is the placing his property out of his control for a term of years; but which he is amply compensated for by the absence of change of tenant, which sometimes occasions loss of rent, and always occasions expense.

"9th. That this annoyance, if such it can be called, is avoided by Tenant-right.

"10th. That many expenses which in tenures of year to year fall on the landlord, would in such case be borne by the tenant."

These are the propositions which I submitted to the Club as reasons which ought to induce landlords to

adopt the principle of Tenant-right. So strongly did that meeting feel the importance of the subject that a committee was appointed to carry out the object. The result of these proceedings, coupled with a communication made to the several local farmers' clubs, led to still more general attention being given to the subject, and the bringing a bill into the House of Commons by Mr. Pusey, in the session of 1817, for the purpose of establishing Tenant-right by law. The bill was read a second time, and referred to a select committee, by which it was so materially altered and damaged that Mr. Pusey deemed it most prudent to withdraw it, there being little hope of its passing. In December, 1817, the question was incidentally discussed in another shape, the subject proposed for discussion being "The practical impediments to the development of British Husbandry." Finding that very many persons still entertained mistaken views on the object and meaning of "tenant-right," in December 1818 I submitted the following question to the Club for discussion, "On the pernicious consequences resulting from the payment by the incoming to the outgoing tenant for tillages and manure made on the farm according to the custom of some districts, and commonly called 'tenants' rights,'" the object being to correct the misapprehension resulting from confounding the one system with the other. That discussion ended in a resolution to the effect, "That there are certain customary payments by the incoming to the outgoing tenants, in some districts, which are pernicious in their operation." Mr. Pusey again introduced a bill of an altered, but I can scarcely say of an improved character, in the Session of 1818, and thereupon a select committee of the House of Commons was appointed "to inquire into the agricultural customs of England and Wales in respect to tenant-right." Whereupon a sub-committee was appointed by the managing committee of this club to render any aid which might be required in procuring the best informed and most experienced parties to be examined before the committee. Fifty able and intelligent practical men, farmers and land-valuers, extensively engaged in their respective pursuits in almost as many different counties, were examined before the committee, and furnished a most valuable body of evidence, which has been arranged as a digest under several heads, easy for reference and printed in a readable form. Upon the favourable report of the Agricultural Customs Committee, Mr. Pusey introduced a bill in 1819 (which was merely to enable landed proprietors and others, not at present possessing the power, to grant agreements giving compensation for unexhausted improvements to their tenants which should bind their successors); it passed the House of Commons, but was rejected by the Lords. Nothing daunted, Mr. Pusey has again brought in a bill this Session; and although, if passed into a law, it would only enable landlords who do not possess the power to grant such agreements to their tenants, and hence would be very limited in its operation, still as its passing would be a recognition of the principle of "compensation for unexhausted improvements," and consequently of the justice of giving security to the capital of the tenant-farmer, it

merits support and approval. The effect of this discussion and agitation of the question for now nearly five years is, that landlords and tenants, understanding the principle better, have become alive to its importance as affecting the progress of agricultural improvement. The results of the adoption of the system in Lincolnshire have been adduced as a successful illustration of the benefits to be derived from affording compensation for unexhausted improvements; and such an impression has been made upon the minds of landed proprietors and managers of landed estates, that the system has been introduced in many cases in other parts of the country, and doubtless will be extensively adopted. A new difficulty has, however, recently presented itself, and which I have reason to fear is operating seriously with landlords, in disinclining them to enter into covenants granting compensation for unexhausted improvements to their tenants, and which arises from an apprehension that in case of dispute and a reference to arbitration, the question to be decided might ultimately rest with an umpire, who having the sole power vested in him, might have more regard for the interests of the tenant than of the landlord, and hence unfair advantage might be obtained by the former, and serious loss and inconvenience might be incurred by the latter. It is for the purpose of removing this impression, of obtaining and recording the opinions of the members of this club as to the best means of remedying the evil, if it really exist, that I have brought forward the question for discussion this evening, and I trust that however deficient I may be in that practical knowledge which bears directly upon the making valuations, there will be members present who will give us the benefit of their opinions on that head, and supply the deficiency. I may first observe that, irrespective of the influence of principles of honour and integrity, as a general rule I think that valuers, usually employed as arbitrators and umpires in such cases, are as much interested in maintaining the good opinion of the landowners as they are of the tenantry (Hear, hear), which alone must have a great effect in preventing them from doing injustice. That solitary instances may occur of improper exercise of the powers with which an arbitrator or umpire is invested, is no sound ground for condemning the system. The severest laws are insufficient to prevent breaches of trust; the percentage of such cases is happily, however, but small. The wisest plan is to adopt the best possible precautions, and such course I should venture to recommend in respect to the question under consideration. Now, gentlemen, I am coming to a part of the subject which I feel to be onerous. When it was settled that I should take up this question, a member of the committee observed that practical knowledge was requisite to deal with it properly. Therefore, it was with considerable diffidence that I hazard the expression of some general opinions on the question. I hope you will deal with me, not mercifully, but as unmercifully as you please. (Laughter.) All that I desire is, that if I err I may be set right, and that you will not allow me to be the instrument of sending that forth to the country uncorrected which may be calculated to mislead on so im-

portant a branch of this question. (Cheers.) I should lay it down as a primary rule, that the general improvement of the farm belongs to the landlord; that compensation to the tenant for unexhausted improvements should never be measured by a reference to the rental paid as compared with the value of the farm to let when the tenant is quitting. Various circumstances may occur to improve the value of an estate, irrespective of the outlay of the tenant; and even of that outlay the landlord may be entitled to enjoy a portion at the termination of a long occupation. Compensation should be made to the tenant upon *particular* improvements only, the expense of which, as well as the period when executed, he should be called upon to prove by documentary evidence when practicable. That is conformable, I think, with what was stated before the Agricultural Customs Committee, by gentlemen from Lincolnshire, who had themselves practised as valuers in that county. Indeed, it already amounts to something like a custom in that part of the country. A man may take a farm at the rent of 10s. per acre, and at the expiration of a lease of twenty-one years the land may be improved by his outlay and capital so as to be worth 25s. per acre, and yet he may not in my opinion be entitled to any compensation for unexhausted improvements. I will say a word or two here on the question of what are improvements, and in respect of what improvements the tenant is entitled to compensation. I consider that an estate may alter and improve in value from a great variety of causes, in the benefits of which, I conceive, the tenant will have no right to participate, beyond what he can obtain from the use of the farm during the period of his occupation. I hold that in all cases, whether with or without tenant-right, the general conduct of the farm should come under the ordinary rule of what is called "good husbandry." (Hear, hear.) What I understand by the proposition, that the tenant should be entitled to receive compensation for unexhausted improvements, is, that when he steps beyond what is ordinarily good husbandry, and gets to extraordinary husbandry, making an outlay which requires a longer period to obtain a return than that for which he has agreed, or he is evicted before he has occupied sufficiently long to reimburse himself, he should be entitled to compensation; but I contend that any increase of value which may have arisen in the ordinary course of husbandry belongs to the landlord, and that—to put an extreme case—if at the termination of a twenty-one years' occupation the land have improved, by ordinarily good management, from 10s. to 25s. per acre, the tenant is not entitled to bring it down again from 25s. to 10s., and to say, "I leave it as good as I found it." That is the distinction which I am desirous of drawing in reference to the right of the tenant to compensation. (Hear, hear.) It is well known that draining, liming, marling, and chalking, improvements of a more durable character, will repay the outlay in a certain number of years, according to soil and circumstances. If these operations have been performed sufficiently early in the lease for the period held sufficient in that district to enable the tenant to recover his outlay, he would not be entitled to compensation; but if otherwise, he would have a right to claim for a pro-

portion of the unexpired time. The same principle will of course apply to expenditure in artificial manure, cake, &c., &c. The evidence given before the Agricultural Customs Committee exhibits an extraordinary difference in the length of time deemed sufficient to enable the tenant to reimburse his outlay in the several operations which constitute the improvements in respect to which he may be entitled to compensation. It is most curious to observe, in looking at the evidence on this subject, how much parties connected with different localities differ as to the period during which the tenant should be entitled to some return for his outlay. In the case of draining we shall find that in some places parties talk of 12 years, in others parties speak of seven.

The CHAIRMAN: Do they state at the same time how the draining is to be done?

Mr. SHAW: There is, no doubt, great weight in that question, but I take it for granted that in all cases in which the tenant might claim compensation the landlord would be entitled to see, either at the period when the draining was executed or whenever the valuation might be made, that the work had been done properly (Hear, hear). If the work had been executed in a substantial manner, and according to the practice of the country, supposing the practice to be good and sound, that is all that would be necessary in considering the question of compensation. There is another point on which the question of the Chairman would bear. In some parts of the country there might be a great deal more expense in constructing the drains than in others, and, of course, in that case the outlay ought to be extended over a greater length of time. The variation is, however, so great in the evidence, that one would hardly have supposed it possible. As I before said, some of the witnesses speak of seven years, others of twelve. I observe that, as to Sussex, Mr. Smith, speaking of the draining of hop land—whether there is any peculiarity in that case I do not know—says that, in his opinion, the return should be spread over sixteen years. I find also, with respect to chalking, liming, and other operations of a similar description, the same disparity. Hence I have come to this conclusion, that as in all cases it is desirable to guard against evil rather than to remedy it when it has arisen, in any agreement securing to a tenant compensation it should be specified precisely what allowances are to be made. Inasmuch as, from some cause or other, whether it be variety in the prices of different localities, or from any other cause, the allowances made by the best valuers are greater in one place than in another, I say it is impossible to lay down any general rule, and to prescribe that draining shall extend over so many years, chalking over so many, and so on. I would therefore have a schedule framed for each neighbourhood, and then those circumstances which influence the matter in the particular locality would have their due weight. Whereas in one district the period over which the tenant would be entitled to compensation would be twelve years, and in another seven would be sufficient; by the adoption of a schedule fitted to each locality justice would be done to all parties. In every agreement the items should be specified, and nothing should be

taken upon trust. Not only should there be a specification of the items for which allowance is to be made, but there should also be, as far as practicable, a statement of the nature of the evidence to be given in support of the tenant's claim to compensation, so as to guard against any mischief which might result from misapprehension, or from improper motives on the part of the valuer. I would, in fact, vest in the valuer the least possible amount of discretion, leaving him to decide simply upon what was placed before him, upon the nature of the evidence, and the quality of the work performed. In every case bills should be produced when the articles were purchased, and a statement given in of the places where the articles were obtained, and the distance they were brought, so as to enable the arbitrators or umpire to estimate the correctness and reasonableness of the charges. The arbitrators should not, however, be wholly governed by the outlay, inasmuch as by an injudicious mode of expenditure an unnecessary cost may have been incurred, and the tenant should only be allowed the fair expenses of the operation as it could be executed in the neighbourhood. Now, gentlemen, as I told you before, my object is simply to get an opinion recorded on this question; as the result of a discussion in which practical men will, I trust, express their views; and that what I feel myself unfit to pronounce a judgment upon may with confidence be determined by other gentlemen, who are more competent to deal practically with this important subject. As I said at the outset, I hope we shall adopt some resolution of a practical and tangible character, in order to remove (I am now speaking advisedly) the misapprehension which exists amongst landlords in reference to this question (Hear, hear). I know that a feeling does exist among landed proprietors that they may be suddenly and unexpectedly called upon to make large allowances, for which they may not be able to provide, and that undue advantage may be taken of them. I know there is such a feeling, for the fact has been communicated to me; and, though I myself consider it entirely unfounded, we must not omit to do what we can to remove it. Now I trust that the principles with which the minds of valuers generally throughout the country are imbued are such, that, although there may be some few black sheep amongst the number—as there will be in almost all classes of society (Hear, hear)—they are, as a body, well fitted to deal with this subject, and to do justice between the parties. The cream of the agricultural class, men who stand high in their class, are generally selected to fill the office of valuers; and if I had to rely solely on the integrity and character of the men whom I find constituting the class of valuers, I should feel considerably at ease as to misconduct on their part (Hear, hear). But, further, it should, I think, be remembered that the interest of such men is, as I before observed, almost as much bound up with the landlords as with the tenantry of the country (Hear, hear). If there are valuations on the one side, there must necessarily be valuations on the other. Having said this much, I leave the subject in your hands, with a perfect conviction that good results will

arise from the conclusion to which you will come at the close of the discussion (cheers).

Mr. R. BAKER said: Mr. Chairman, I did not come here with the intention of thrusting myself on your notice on this occasion. I have, as this club is well aware, paid some attention to the subject in conjunction with Mr. Shaw, and on several occasions have spoken upon it in this room. I approach it this evening with more reserve than on any previous occasion, seeing that the discussion has been so widely extended throughout the country, and that so many objections have been started, that the subject is now surrounded with more difficulties than it appeared to be in the outset. One objection which has been very general amongst landlords is that which has been alluded to by Mr. Shaw, namely, that if tenant-right were established tenants might throw charges upon estates which the owners would perhaps be unable to meet. It has been said that a charge of this nature is, in fact, another mortgage. To a certain extent it is so, as regards the money consideration; but then, should we not also consider the benefit which the estate has derived, and the opportunity which the landlord has of re-letting the estate with greater advantage to himself? (Hear, hear). That, I conceive, does away with the objection, which I have found to be strongest in the minds of landlords. It has been said by some landlords, that whenever they accept a tenant it is with the expectation that he will to a certain extent be an improving tenant; that if they did not suppose that he would be so, they would not accept him; and that when a tenant has occupied a farm for a certain number of years, and has had the benefit of good cultivation, they naturally imagine that the estate will retain some of the benefit after the expiration of his term. But there are a number of instances in which tenants have not leases; and where that is the case there cannot be sufficient time for the tenant to reimburse himself. It is, I think, the interest of such tenants especially which is involved in this question. Whenever tenants enter into leases, there is of course a mutual agreement between them and the landlord. The covenants under which the farmer undertakes to cultivate, as well as those under which the landlord lets for cultivation, are defined in writing; and it is with this mode of making the bargain that the tenant is principally concerned. If the tenant makes a bad bargain it is his own fault; if the landlord makes a bad bargain it is the landlord's fault: and therefore an arrangement should be made which is likely to prove beneficial to both. It is not, then, the case of tenants with leases that this question chiefly applies, but rather to that of those who have no agreements at all, or at least no leases. In the county in which I reside (Essex) the larger number of tenants have no agreements whatever, and there are very few leases for extended terms; and it is for the sake of persons so situated that an alteration is most required. I hold, as I have stated before, that some alteration is required in the notices—that it is not sufficient to give the tenant notice on the 25th of March, after all the accounts of husbandry have been made up (Hear, hear). In that respect there is, I conceive, a great necessity for alteration. As regards

permanent improvements, or those improvements which I term permanent, namely, those of which the tenant cannot receive the benefit under some years, I would instance draining. Draining may, as was observed by Mr. Shaw, be estimated to continue seven years, twelve years, or longer. As I execute it on my land, under present circumstances, it lasts only six years. In some cases it has, I believe, lasted twelve, eighteen, and even twenty-four years; but I have been compelled to resort to a cheaper mode of execution. (Hear, hear.) Now it is quite obvious, that if the cultivation of the land is to go on prosperously, or if the labourers are to be employed advantageously to the farmers or to themselves, the legislature should step forward and say that the tenant should have compensation for any improvements which he may have effected in the land, to the extent to which they were unexhausted at the time of his quitting it. I do contend that the tenant should be reimbursed by valuation for such permanent improvements as have been enumerated by Mr. Shaw, such as draining, chalking, marling, and manuring—when the manure of animals is brought to the land in the shape of articles purchased. Unfortunately, in the county in which I reside, compensation does not extend to any improvement; unless, indeed, you consider the making fallows an improvement. It is there provided that fallows are to be allowed for as rent. It amounts only to this, that the capital thus employed is locked up for the whole term of the lease, and at the expiration of the lease the amount is deducted from the rent. Various customs exist in different counties, all of which go to this one point, that the tenant pays a certain price for the straw which is left, for the turnips which are left, and for the fallows which are left, and for the manure. I hold that the manure made from year to year ought to belong to the landlord. I hold, with respect to straw and turnips, that the tenant should pay what they are absolutely worth, and no more; that the same principle should be carried out with respect to fallows; and that, as regards all improvements, brought as it were upon the farm, in the shape of oilcake, and consumed on the farm, the tenant should be paid in proportion to the amount which is unexhausted at the time of his quitting. I also add, that he should be paid on the same principle for improvements in draining, whether he is draining with tile or pipe, with common wood or straw. I consider that draining should be calculated in arithmetical progression. It is the converse of a growth of underwood. (Hear, hear.) Every valuer knows that the growth of an acre of underwood for one year is calculated at a certain amount, that in the second year there is an additional allowance, and that it goes on accumulating for fourteen years. Now, draining must be calculated by the reverse mode, when we would ascertain how much of the improvement is unexhausted (Hear, hear). It will keep losing a portion of its value for seven, twelve, or eighteen successive years, according to the nature of the soil (Hear, hear). It is impossible to lay down any general rule, seeing that draining is performed in such different modes in different counties and in different soils. In some instances it will last as long again as in others. As regards chalking and marling,

for the first two years there is with us no perceptible benefit arising from their use. Every tenant who uses chalk or marl has to remember that it is not till the fifth or sixth year that the benefit comes into full operation, while it will generally continue to operate down to the twentieth year. It is quite absurd in such a case to suppose that the tenant can be fairly dealt with if he be evicted from the farm before he has had an opportunity of deriving any benefit whatever. I hold, therefore, that compensation for all improvements of a permanent character, and of which the full benefit cannot be derived during the occupation, should be secured to the tenant, either by agreement or legislative enactment, and that where agreements are not made the legislature should step in to secure the tenant. With respect to farm buildings, it is quite clear that for the proper cultivation of a farm, buildings are absolutely necessary. Some tenants are so convinced of this, that, like myself, they erect such buildings at their own cost rather than be without them. I myself am in this position, and I feel it to be a very great hardship that, having spent about £500 in this way, if I were evicted to-morrow, I could neither recover a shilling nor take down the buildings which I have erected. The tenant ought, I think, to be allowed to take buildings down when the landlord refuses to take them at a valuation; and if the landlord takes to them, it should be at such a price as they would be worth to remove. These are the points which suggest themselves to me in reference to this question of tenant-right. I have had practical experience in all these matters for a great length of time. I have been practically engaged as a tenant on a particular estate for a great number of years, and that estate having changed hands, I now find myself in a very different position from what I ought to have been. Last year I continued in a farm which I had occupied for seventeen years under a lease, and on which I was then carrying on farming operations, on the supposition that I should continue in the occupation—I received notice however from the landlord to give up the farm in accordance with my lease. In the last year I had manured a large portion of the farm with manure which I had purchased at considerable expense. I had drained some of the land in the winter. I was in that position when I received the notice. I was obliged to confess that I had been wrong in the course I had pursued, and to yield to the notice. I was compelled to transfer the farm; and, in transferring the farm, to transfer all the improvements which I had made upon it; and I can assure the club that there is not an acre of that land which has not been thoroughly drained within the last ten or twelve years. I mention this to show what a strong necessity exists for securing remuneration in case of eviction (Hear, hear).

Mr. BENNETT said: There was a remark made by Mr. Shaw, in his introductory address, which suggests to me that I ought to set myself right on the point both with that gentleman and with the meeting. I said to my friend on one occasion, in a rather jocose manner, in reference to the discussion which took place last Christmas twelvemonth, that I thought it would have been more fortunate if a man who had been actually engaged

in agriculture had introduced the subject. The topic was the customs of certain counties; and though I said that I thought my friend was a little wide of the mark, yet, barring that one circumstance, I must say that I entertain no other feeling towards Mr. Shaw than one of great respect for the services which he has rendered to us on all occasions at these meetings (Hear, hear). Allow me to take this opportunity of observing, that I rather regretted to see in the report some remarks were made in reference to my absence from a recent meeting. I can assure the meeting that that absence was perfectly unavoidable. It was owing to a family affliction over which I could exercise no control. It was utterly impossible that I could be here; and I did hope that my friends in the Farmers' Club would attribute my absence to the best, and not to any unworthy motive. You will, I think, all admit that I do not generally shrink from the performance of any duty, however irksome.

The CHAIRMAN: I am sure our friend Mr. Bennett will forgive my remarking that it was simply thought that he should have informed us of his position.

Mr. BENNETT: I certainly did not write to the Secretary, but I wrote to Mr. Shaw, begging him to introduce the subject for me; and I had imagined that the meeting would be informed of the circumstance. I am certainly a little chagrined at being hauled before the public on account of my absence—(laughter)—feeling that I am not in the habit of shrinking from the discharge of any duty I may have undertaken. Having said thus much in reference to this personal matter, I will now proceed to say a few words with regard to the question which Mr. Shaw has introduced this evening. One important question to which I wish first to direct your attention is, whether a farmer has a right to claim compensation for anything beyond his own outlay if some improvements in the farm remain at the end of his term. Gentlemen, that point was alluded to by Mr. Shaw, and I confess it appears to me a rather difficult one (Hear, hear). I am not one of those who think that the question of Tenant-right should be argued in a way to frighten landlords, or to frighten any reasonable men. I think it is utterly impossible that we can have any legislative enactment on the subject which is not designed to secure justice to all parties (Hear, hear). There does appear to me to be a difficulty, I honestly confess, as to how far the tenant ought to claim compensation for improvements made on the farm, after he has been reimbursed by obtaining a fair rate of interest for the money which he has advanced, although these may have been effected—in many instances a decided improvement in the farm—since the commencement of his occupancy. All practical men will see the difficulty at once. With regard to drainage, if Mr. Shaw had gone closely into the evidence given before the Agricultural Customs' Committee on that subject, he would have found that the parties examined gave their opinions with reference to the more or less expensive mode followed in the different localities in which they themselves resided, when asked to state for how long a period the tenant should claim compensation for draining improvements. If a man, for example, drains with tiles found by himself, and if the

work be done in a masterly and substantial manner, it is quite clear that compensation ought to be claimed for a much longer time than it would be where the draining was performed in a far inferior manner. It is not easy to say how far the tenant would be barred by the answer that he had received full and entire compensation for any outlay which he had made during his occupation, and due interest for the money which he had expended. I confess I do see some little difficulty in that point of the question. I am not disposed to give a hasty answer to the question, whether the tenant should claim after he has had time to get back the full value of his outlay; how far he should in that case substantiate a claim upon the landlord on account of the use of artificial manure, his mode of feeding stock, and so on. There are, I know, some gentlemen who think—and Mr. Shaw has fallen into the view—that a claim should be allowed for expensive artificial dressings on a farm. Gentlemen, I cannot admit the idea of merely paying a man for artificial dressings which he has used during the last three or four years. When a man has taken a farm in a very impoverished state, the whole character of that farm is altered by his feeding stock upon it year after year. By his artificial dressings for wheat crops, I say, he entirely alters the quality of the land; and it would be grossly unjust merely to say to him, "You expended so much for artificial dressings in 1810, and so much more in 1817, and so much more in 1849, for which you must be compensated." When a man has systematically adopted an outlay on his farm, which is equivalent to his rent, I must say that it would be paltry to make an allowance of two or three years' dressings as compensation under such circumstances. I would leave it to any practical man to say whether a tenant can pursue a system of high farming for a number of years without entirely changing the character of the farm. A man who takes a farm out of condition should have a schedule for every artificial improvement. Let everything be entered in a book, whether it be ditching, draining, or artificial manuring; and then, if anything should occur to shorten the term, there will be something which men of business can refer to. It may then be said, "Mr. A. has had this farm for a certain number of years; let us see what he has spent upon it, and what amount he is entitled to as compensation on leaving." Under such regulations practical men would have very little difficulty in coming to a just conclusion. I admit, however, that the question is on the whole a difficult one to deal with, and I do not wonder that landlords should feel some little hesitation in consenting to the passing of a measure of tenant-right without fully and clearly understanding its bearing on themselves. No man would be willing to place his estate at the mercy of any party who might go and do this thing and that thing, and, for everything that he did, claim compensation (Hear, hear). But when landlords really understand this question in all those aspects in which practical farmers can place it before them, when they come to perceive that the interest, not only of the tenantry but of the great body of the agricultural poor, is involved in its settlement, they would not hesitate to assent to a parliamentary enactment which

should secure the object. It is not only those who have agreements who are interested in the matter. I contend that there is as much reason for making allowances at the latter end of a lease as under a stricter tenancy. A man who has a twenty-one years' lease will perhaps improve to a considerable extent in the first seven years; in the second seven years his cultivation will be about an average cultivation; and in the last seven years he will almost feel justified in pulling out of the farm, as it were, all that he had before put into it. Therefore, in fact, the community at large, as well as labourers, have a great interest in this question (Hear, hear). Hence, then, the importance of having some parliamentary enactment which shall provide for the necessities of the case, though without giving undue advantages to the tenant. It is, I say, due to the poor, due to those who wish to obtain their food at a moderate and reasonable rate, that every improvement should be made which is practicable, and this cannot be done until tenants have obtained some greater security than is now possessed by them (Hear, hear). There is one other point to which I wish shortly to allude. My friend, Mr. Baker, says the manure should belong to the landlord. I quite agree with him. In three counties out of four it does already belong to the landlord (Hear, hear). The reverse is almost peculiar, I believe, to the districts south of London, and to Essex on the east. In all the midland counties, and in the northern parts of England, the manure is the property of the land. In Lincolnshire if manure had been made in an expensive mode the tenant has a claim; but, generally speaking, the straw and manure on the farm are considered to belong to the landlord, and the incoming tenant has a right to it. It is, I think, very desirable that that should extend throughout the country. But the exception is not all loss to the landlord and damage to the public, because it secures a man of capital to take the farm. Under the evil complained of, the man who applies for a farm is required to pay down at first a considerable sum of money; and it is a protection to the landlord, as well as an advantage to the public, that a man should not go wriggling on a farm when he has, in fact, nothing to lose (Hear, Hear). In conclusion let me say, that I think we are greatly indebted to Mr. Shaw for so ably introducing the subject. The matter is one which cannot too frequently be brought under the attention of the Government. I am quite certain that if we had discussed no other subject in this room we should have done great good by discussing that of tenant-right. There are many ways in which we now hear of compensation to tenants where we never heard of it formerly. Honourable and upright men are now beginning to have some qualms as to the propriety of encouraging a man to farm well, and then coming down upon his improvements.

Mr. ACROX said: I feel very great pleasure in following such practical men as Mr. Baker and Mr. Bennett, succeeding, as they did, the gentleman by whom the subject was so ably introduced. I should not venture to touch on any practical question directly involving the cultivation of the land; but, I think, this is a question

in which the law is a good deal concerned. A great deal depends on the proper framing tenant-right agreements, and I have no doubt that the principle which has been advocated this evening will be carried out by such means to a great extent, and with great benefit to agriculturists generally. The *Times* commissioners, after visiting some of the worst farmed districts—for it is to them that they go, and not to such districts as Bedfordshire—report that they found the farming there better than they had expected to find it; but they state that the buildings are in many cases mere hovels, and are, in fact, in a most deplorable condition. I think we must agree with the Chancellor of the Exchequer, that in such districts the remission of the duty on bricks will be a great benefit. On the subject of tenant-right agreements I have held communication with men of property in different parts of the country. Mr. Seymer, the member for Dorsetshire, has adopted tenant-right agreements in the county which he represents, and it is well known that Mr. Sturt has done the same. Then there is a form of agreement which was drawn up by Mr. Beadel, and submitted by him to the Club last December. There are in that rules of a most useful nature. I hardly remember having ever met with a better form. We next come to Lord Lyttelton, who has lately established a sort of model tenant-right agreement, which has been carried out on his estates in Shropshire and Staffordshire, which I know very well, having in fact been over them. Now I have great fault to find with Lord Lyttelton's agreement, viz., that it is what is called a home-made agreement (laughter).

The CHAIRMAN: I suppose no lawyer was employed (laughter).

Mr. ACTON: It begins—"An agreement for the tenancy of farm, made this day of between the Right Hon. Lord Lyttelton," and so on. It is, in my opinion, a great deal too verbose. Why not have simply said—"An agreement between the landlord on the one part and the tenant on the other"? It then goes on to say—"The tenant for his heirs, executors, &c.," until it comes to the word "hereditaments," which is used throughout the whole agreement. I am aware that the word "tenements" includes outhouses and other similar buildings, but I am not aware that the word "hereditaments" includes them.

Mr. BENNETT: Yes, it does.

Mr. ACTON: At all events this agreement is drawn in a very loose way, and I should advise Lord Lyttelton to alter it before he adopts it for his tenantry. The question arises whether tenant-right agreements ought not to be less stringent than they are at present—whether they should not, in fact, be re-modelled, having regard to the very useful information given before the Agricultural Customs Committee, which has been so often referred to here, and so well digested by Messrs. Shaw and Corbet. I think if an agreement were drawn up founded on those particular customs, allowing for the case of heavy soils in one place and light soils in another, much good might be effected. I have drawn up a few rules, which, with the permission of the chairman, I will read to the meeting.

The CHAIRMAN: If they bear upon the subject, it is of course perfectly competent for you to read them.

Mr. ACTON: They are

RULES FOR THE IMPROVEMENT OF FARMING LEASES AND AGREEMENTS.

I. It would be a great improvement upon the usual mode of letting land if the tenant had a year's notice, and were required to quit the land intended for fallow in the spring, so that the in-coming tenant might drain the soil himself instead of paying for the badly-executed work of a person not interested in the success of the operation.

II. The landlord to pay for by valuation, or allow the tenant any buildings that he may have erected, or allow the tenant to take away the buildings on his returning the premises to their original state.

III. Trees and hedges planted by tenant with consent of landlord to be paid for by valuation, according to their unexpired value up to the 12th year; after that time to be the property of the landlord, and the tenant to have the power of grubbing up hedgerows.

IV. Oilcake, linseed, and bone manure, to extend over three or four years: if the tenant has had three crops to receive nothing, if two crops one-third, if one crop two-thirds of the amount.

V. Lime to extend in heavy soils over	7 years.
In light soils	3
Chalk	6
Marl and clay in light soils	10
Drainage on heavy soils	14
Do, in light soils	7
Where the landlord finds the tiles and the tenant the labour, to extend over	5

Or where the landlord does the work, to charge the tenant 5 per cent. If the tenant quits on the landlord's notice, to receive back the original cost of such drainage and manuring in proportion as it might be then unexhausted, it being but right and fair that the landlord should take on himself the risk of the outlay when he takes the land out of the tenant's hands. The tenant to hand in to the landlord or his agent once in every year an account of what he has expended in improving the land over and above what he stipulated to do by his agreement; but if he quits at his own desire it may be unfair that the landlord should take to his perhaps injudicious entering; in that case, therefore, the tenant only to be entitled to such part as in the judgment of the arbitrator shall have been judiciously applied to the land.

VI. That for the conversion of all pasture land into arable, the tenant to pay 15s. in the pound before the first corn crop, if without the consent of the landlord.

VII. The less restriction there is in cropping the better, provided it be not in contravention of the established rules of good husbandry in the district in which the farm is situate. No away-going crop should be allowed for, and all stubbles intended for tillage the succeeding spring should be entered on by paying for the herbage. The manure to be left free of charge, and all hay and straw at a consuming price; but when the out-going tenant has not the away-going crop, then he should be paid for acts of husbandry till the time of leaving; and that if, at the expiration of the tenancy, the land be not left in a proper and husbandlike manner, the out-going tenant to be assessed for such neglect and dilapidation, to be set off against any tenant-right he may have or think himself entitled to—such amount to be settled by arbitration.

If some agreement founded very nearly on those rules were adopted, I feel persuaded that the result would be beneficial. I have no hesitation in asserting that tenant-right will become the law of the land. It is for the interest of all parties that it should. With reference to the employment of labour, more especially in the western districts of the country, the question is one of vital importance (Hear, hear).

Mr. TRETHEWY said: The principle involved in the

question which Mr. Shaw has brought before us this evening is, I think, now pretty generally acknowledged to be correct; but the details are so mixed up with the principle, that it is very difficult to disentangle them. If I understand the matter, it is with a view to an explanation of some of the details that the subject was introduced. I fully coincide in the views which have been expressed by Mr. Shaw. I also feel, with the last speaker, that a scale of compensation should be agreed upon, and embodied in our agreement. We must come to that at last; and, that being so, I think we had better do at once that which must be done ultimately. When valuers come to consider the period over which compensation is to extend, they naturally ask for some sort of evidence; and in the absence of evidence, they themselves are compelled to bring down and to act upon a scale of their own. Draining, oilcake, artificial manures, and other matters of a similar nature, have been referred to, this evening. Now we must bear in mind that draining is naturally the subject of agreement. Everything resolves itself into matter of agreement at last. If a tenant take a farm too high, or a landlord let one too low, each must abide the consequences. It is very difficult—in fact it is impossible—to lay down one rule which shall be applicable to all parts of England. It will, however, be sufficient, I presume, for Mr. Shaw's object if he conceded this evening that some such principle as has been indicated is necessary. With regard to the evidence given before the House of Commons, twelve years was, I think, the longest period stated. Much must, of course, depend on the manner in which the work is done. Supposing it to have been agreed in a particular case that the draining should extend over ten years, and supposing the tenant to leave before he had received the full benefit of the draining, he should be allowed a tenth of the original cost, including tiles, labour, and carting, for every entire period of twelve months that he had not received the benefits. A similar rule might be applied in the case of oilcake and manures. It has been argued by some that although there might be a difficulty in ascertaining what quantity of oilcake had been used, still, if the tenant were allowed compensation for the use of oilcake, and none for the consumption of corn the produce of the estate, that would operate against the landlord, inasmuch as the tenant, instead of consuming his own produce, would buy oilcake. I admit that this is a point of some difficulty, and one which must be taken into account in drawing up a tenant-right agreement. With regard to the subject of straw and manure, I can confirm the remark made by Mr. Bennett, that, except in the south of England, they are the property of the landlord. With respect to buildings, they should, I think, always be erected by the landlord; but if they are erected by the tenant, there should be something like the same scale as in respect to other improvements. It would save a great deal of difficulty if all such matters were agreed upon beforehand, instead of being left as the subjects of subsequent valuation.

Mr. TATTERSALL said: I quite agree that this is one of the most important subjects that could possibly be mooted in any society, whether of landlords, of tenants,

or of persons in any way connected with the soil. I am very glad, too, that it has been brought forward by Mr. Shaw, because of all men in the present day he is the most capable, perhaps, from the time which he has bestowed upon it, of treating the subject in a proper manner. I am very much pleased to find that he drew a distinction which I had not been able to draw myself, though I have amused myself by writing a letter on the subject: I refer to the distinction between tenant-right and tenants' rights (Hear, hear). That was in my own mind rather a fine point, and I could hardly see through the difficulty. This question has been justly termed the Tenant-right question; but I look upon it broadly as a question of justice between landlord, tenant, and labourer; and I wish particularly that it may be viewed in this light, because I am quite sure that landlords cannot be brought to entertain this question, unless they are led to see that tenant-right would lead to the employment of a much larger amount of labour by the tenant, and that therefore their property must eventually be much improved by the outlay. When once tenant-right comes to be regarded in that light, it will not be looked upon, on account of its name, with a suspicious eye; but it will be seen to be that which is for the benefit of every member of the community at large (Hear, hear). I am one of those who fancy that a system of tenant-right, properly understood, is even preferable to a lease. That is a bold observation to make, but I regard the matter in very much the same light in which it has been viewed by Mr. Bennett. Supposing you take a twelve years' lease; in the first four years you would be making up loss occasioned by the previous tenant: the full benefit would only be reaped in the middle four years: in the last four you would be taking out of the soil the extra produce which you had put into it. It would therefore only be in the middle period of four years that the soil would yield all that it was capable of yielding; whereas, if the tenant had a claim to compensation for unexhausted improvements, the land, instead of being deteriorated in the last four years, would be kept up to the mark, and consequently a much larger amount of labour would be constantly employed (Hear, hear). I believe that more than half the land of England is at present held by tenants at will or by tenants from year to year. It has appeared to me that this question only applies generally to leases, but it applies to tenants-at-will most directly and decidedly. We all know, as practical men, that in whatever part of the country we travel we see for a few miles land which is exceedingly well farmed; and then, again, we see land which is farmed very badly. There must be a cause for this difference; and I believe that if we were to inquire into the matter, we should generally find that in the one case there were leases, while in the other the farms were held by tenants-at-will. In fact, this is human nature. Under such a system it is impossible that a farmer can expend money with advantage either to himself or to the community at large. Considering, indeed, that more than half the land of this country is held by tenants-at-will, the wonder is that it is farmed so well. I could not refrain from expressing my feelings

on this question; and I trust that what I have said will elicit observations from gentlemen who are better acquainted with it.

Mr. MERRI said: I feel very great hesitation in rising to make a few remarks on this subject in the presence of those whom I see around me. We have heard so much of the necessity for a man's being practised in agriculture, if he is to attempt to offer any opinions upon it, that, although I have erected new buildings, drained my land, removed the fences, and performed a great variety of other agricultural operations, and although I have lived on a farm and superintended the management of it, nevertheless I suspect that some of my friends here will not be disposed to admit that I am a practical man (laughter). It would appear that in order to be considered a practical man you must have been born at the plough-tail, and have remained at it until you have attained your majority. I entirely concur in the observations which have been made as to the necessity of affording to the tenant every inducement to invest his capital, and placing his capital in a fair and just position at the termination of his tenancy, whether it be a lease or an annual holding (Hear, hear). We hear a good deal in the present day respecting the want of capital in agriculture; and we know perfectly well that the complaint is a just one. But then the object of the legislature, as well as the tendency of all customs, should be to offer inducements for capital to be invested in the soil. Capital is a very sensitive commodity, and soon finds out where it is likely to be at once safe and remunerative; and it is quite clear that many of the old customs of the country have a tendency to frighten away capital from agriculture (Hear, hear). I speak feelingly on this subject; and, though some may not consider me a farmer's friend, my sentiments have always been clear in reference to the question which we are discussing. I speak feelingly, because I was myself a tenant, instead of being the proprietor of the soil which I occupy; and I can quite enter into the case of one who, having expended money on improvements is not able to obtain any compensation. It is quite clear that the draining of land, the formation of good roads, the removal of fences, and so on, must exercise a permanent influence on the character of a farm. I am of opinion that deep cultivation lasts for a great many years, and also that corn-made manure lasts for a considerable period. I know instances in which land having been dressed twelve or sixteen years ago, has shown to enormous advantage as compared with other land which had not been dressed in the same manner, though the two portions of land had been equally well farmed. As regards the immediate question under consideration, no doubt there are difficulties, as there must be in all similar cases, in affording a just and satisfactory arrangement between the parties; but I am quite sure that the general principle of a valuation for improvements being once admitted, honest practical valuers would not find much difficulty in arriving at fair and just conclusions (Hear, hear). The same principle would apply in these cases as in all other cases of valuation. If the account of the details were not kept, the party to whose neglect that

was owing would most properly suffer; and if the effect of valuations on tenants' improvements were merely to cause farmers generally to become correct book-keepers, that would be one most beneficial result. There can be no doubt, however, that the land would be much improved in quality, that the landlords would benefit, that the labouring population would be better employed, and that the people would be better fed; all these results would arise from that fair and just valuation for tenant's improvements which I hope to see ultimately become the law of the land. There is, indeed, this difficulty attending the change, namely, that as the custom would be entirely new in certain districts, the landlords in those districts would have to go to other parts of the country to seek for new tenants having sufficient capital to enter upon their farms. It might be that when a district became a high farming district, there would in some cases be a difficulty in finding tenants; but a reference to another county, and a more extended advertisement, would secure a sufficient investment of capital; and though there might be a partial cost, it would not be sufficient to prevent the realization of a great and extensive good. I trust that, for the sake of the whole community, tenant-right will soon be carried out in the most ample and satisfactory manner (cheers).

Mr. W. FISHER HOBBS said: I am happy to bear my testimony to the soundness of the principles of tenant-right which Mr. Shaw laid down this evening; and I have no doubt that they will have their due weight throughout the country. For my part, I cannot see—although some difficulties have arisen—why the principles of tenant-right should not be admitted by the legislature. Although at the present time many landlords are opposed to those principles, I think their opposition is attributable to a want of acquaintance with the subject, and I am sure there has been sufficient experience in the case of many landlords in the kingdom who have derived vast benefit in the increase of their rent-rolls from the carrying out of tenant-right to justify an expectation, that if the subject were well understood, the opposition would speedily cease (Hear, hear). You all doubtless recollect the nature of the evidence which was given in the House of Commons before that committee, which was alluded to by Mr. Shaw. Our lamented friend, Mr. Harvey, of Norfolk, mentioned to the committee two large estates in that county, upon one of which security had been given for the investment of capital, while upon the other there had been no security whatever; and he stated that in the one case the rent-roll had, during the last fifty years, quadrupled in amount, while in the other there had, during that period, been no increase at all (Hear, hear). Most of you have heard of the Brocklesby estate, belonging to Lord Yarborough. His lordship has told me himself that within twenty-eight or thirty years the rent-roll of that estate trebled in value, as the result of the practical recognition of tenant-right (Hear); now I wish to make a few remarks on some observations which have been made this evening. I was rather surprised to hear Mr. Bennett say that he, for one, would not give a hasty decision as to whether security should be given for the ample remuneration of the investment of capital by the

tenant in unexhausted improvements, or whether, at the termination of the holding, the improvements made upon the land—

The CHAIRMAN (Mr. Bennett having retired from the room): I beg your pardon. I am afraid that you did not rightly understand Mr. Bennett. I understood him to say that he was not quite sure whether the tenant could claim anything beyond his own actual outlay; whether supposing the land to be in a better state than it had been before he took possession, he could claim beyond the outlay which he had made upon it (Hear, hear).

Mr. SHAW: That is not exactly the case.

The CHAIRMAN: The tenant having had the benefit of the improved state of the farm to a certain extent, Mr. Bennett said he had not quite made up his mind whether he could claim beyond the actual cost incurred by himself.

Mr. HOBBS: From the remarks made by Mr. Bennett I was led to suppose that he meant that however much the fee-fund of the soil might have been improved by the investment of the tenant's capital, if he had lived on the farm ten, fifteen, or twenty years, and had reaped an ample return, yet he (Mr. B.) would not come to a hasty decision as to whether he was entitled to compensation.

The CHAIRMAN: I think you have now defined his meaning.

Mr. HOBBS: I cannot but regret that Mr. Bennett left that point undecided, for few men have had more experience or advantage in the matter. I think a man who has taken such an active part in the question of tenant-right ought to come to some decision on that point; and I also think it will be an advantage to the country if the club comes to some decision to-night. I am well aware that landlords, as well as tenant-farmers, look to this club for advice on this important question. I am ready to admit that one of the great difficulties of agriculturists at the present time is the obtaining sufficient capital for the cultivation of the soil; but still I must express my opinion that if sufficient security be given by the landlord for the investment of the tenant's capital in the soil, capital may be expected to flow in. Whilst the tenant has, I conceive, a right to expect remuneration for real improvements, beyond that I contend that the landlord has no right to be called upon for the value of those improvements; and I hope that before we leave the room this evening we shall, so far as we are able, settle that important division of the question; because whilst we are undecided we can hardly ask the legislature to assist us. I know very well that it is the feeling of many valuers that tenants ought to have more security: no one can be more strongly of that opinion than myself. Ten or fifteen years ago leases were more general than they are at present. In my own county leases are now the exception, and not the rule. In fact, since the passing of the Reform Bill, since the legislature gave landlords a political influence over their tenants, leases have not been so common as they were previously; and that clause constitutes a great reason why we should ask the legislature to give the tenant security for the investment of his capital. Many have said that a lease being a contract between a landlord and a tenant, the

legislature has no right to interfere: I must beg to differ from those who hold that opinion. Ten or fifteen years ago those great improvements which have been recently made—improvements in respect of drainage, subsoil ploughing, the application of artificial manures, and in other matters connected with agriculture—such improvements were, I say, not at all common at that period; and I do think that if we are to carry out the modern improvements of agriculture, the legislature ought to render us some assistance. (Hear, hear.) I am happy to see several land-agents in this room. The view taken by those gentlemen generally is correct; but I did expect to hear some individual of that class say something with regard to a list of improvements and the investment of capital which the tenant may make yearly in a farm. I think that if the tenant lives upon a farm for a lengthened period, to give a list of the improvements which he has made at the termination of his tenancy is not sufficient to guide the valuer. It appears to me no more than what the landlord has a right to require, if remuneration is to be claimed for unexhausted improvements, that the tenant should yearly, when he pays his rent, give a statement of his outlay, and also a detail of the specific improvements which he has made. From the evidence given before the committee, it appears that there was great difference of opinion on the question how many years should be allowed for permanent and other improvements. My opinion is, that landlords will soon find to their cost that the system which they are pursuing of allowing the draining of their estates to be done in so loose a manner, will fall heavily both upon themselves and upon the country generally. I am one of those who think draining ought to be done as effectually as possible, and that if it be done as it is sometimes, it would almost be better not to have it done at all. We have heard from Mr. Baker this evening, that the consequence of his not having a lease is that the draining of the land which he occupied is done only in a temporary manner. I myself know land which has been drained five times in a temporary manner during the last twenty-five years, and it has been so cut about in different directions that it is now like a sponge. This is a question which well deserves the attention of land agents. Let them look into this matter. I hope the time will soon arrive when all improvements will be made properly, and when the capital of the tenant will be invested in the most advantageous manner for all parties. I cannot quite agree with Mr. Tattersall, that at the present time an equitable system of tenant-right is the best tenure the tenant can have. I contend that a lease, with tenant-right attached to it, carries out the true principle. I have no doubt we shall find landlords more ready to give leases, with tenant-right, than they have been. There are many tenants living in districts where leases are granted, who have not advocated tenant-right as they would have done, from the feeling that landlords might introduce tenant-right, and give up leases, and hold them as yearly tenants, with the mere principle of tenant-right attached to the occupation. I agree with Mr. Mechi, that the more improvements are made in the soil the more capable

will it be of affording employment advantageously to the people. But, first of all, the tenantry of the country must look to their own interest, and claim of the legislature, as well as of the landlords, security for the investment of their capital. I concur fully in the remarks on that subject which fell from my friend Mr. Shaw. I hope he will persevere in all those great questions which affect both the occupier and the owner of the soil; and, so doing, he will continue to deserve, as he does this evening, the approbation of the agricultural interest at large.

Mr. TATTERSALL explained that he had simply meant that tenant-right, without leases, was preferable to leases as they existed without tenant-right. A lease with tenant-right would, he knew very well, be the best.

Mr. AICHESON said: Often as the subject of tenant-right had been discussed in this room, it does not appear to me that we have advanced as far or as fast as we ought to have done. We have discussed the question now for four or five years, and I think we are just at the same point as we were at first. ("No"). Four years ago it was proposed that a committee of landlords, farmers, and land-agents should be formed, to draw up a code of rules with respect to unexhausted improvements. Have we advanced a step beyond that? We have just heard Mr. Hobbs express his regret that no one should have come prepared with a list of prices as regards unexhausted improvements. I contend that we have not advanced at all in the matter. The club should, I think, offer a reward for the best essay on that point. With what has been done, we shall still have in every county a different opinion on the subject, and shall not be able to arrive at a satisfactory conclusion. Let a reward be offered for the best essay; let the subject undergo the fullest and closest consideration; and then, perhaps, we should be on some tangible ground to proceed upon; but up to the present moment, I must repeat, I do not think we have advanced further than we had done four years ago.

The CHAIRMAN: Before Mr. Shaw replies, I wish again to allude to the remarks of Mr. Bennett, who is not here to defend himself. It struck me very forcibly, and I noticed his remarks particularly, that what he meant was, that he had not made up his mind as to whether, when the tenant had been paid all his just claims on the land, supposing the farm to be in a better state than when he took it, he would, on leaving, be entitled to further compensation. I, for one, do not hesitate to say, that it would be monstrous if the tenant, after being fairly paid the amount of his outlay, is to be allowed for something in addition (Hear, hear).

Mr. SHAW then replied. He said it was exceedingly gratifying to him that the principle which he had had the pleasure of advocating that evening, and the remarks which he had made upon it, had met with so much approbation. The task of replying had thus been rendered an easy one, but still he wished to make two or three remarks. As soon as he began to examine the question, he became sensibly impressed with the importance of the point which had been introduced by Mr. Bennett, and upon which the chairman had expressed himself in such

clear and positive terms. He felt the importance of that point, because he knew that English tenant-right had been frequently prejudiced by being confounded with Irish tenant-right. In Ireland tenants were not contented with claiming proper remuneration for permanent improvements, but actually put in a claim to a *bonâ fide* portion of interest in the soil itself (Hear, hear). Within a day or two he had seen an Irish paper advocating a species of tenant-right which amounted, in fact, to copyhold tenure, and which, in his opinion, was not at all consistent with justice to the landlord. He agreed with Mr. Hobbs that it was very desirable that it should be put forth to the landowning portion of the community, in a plain and unmistakeable manner, what were the views of the club in reference to that question. There was one remark of Mr. Hobbs which, as he had generally the satisfaction of agreeing with that gentleman, he regretted that he could not concur in, namely, that it was desirable that the tenant should give the landlord annually a list of the improvements which he had effected. That really went so far beyond his view, that he could not concur with him. He thought it should be defined as nearly as possible in the agreement what the tenant should do, and in respect of what improvements he should receive remuneration. The suggestion of Mr. Hobbs appeared to savour much of a very doubtful clause in the agreement of Lord Lyttelton, which had been commented upon this evening. The most objectionable part of that agreement was that in which he proposed that an annual statement should be made to the landlord of the improvements which had been made. With respect to the remarks made by Mr. Bennett as to drainage, since opening the discussion he had taken the opportunity of looking at the evidence of the several parties who gave their testimony before the Agricultural Customs Committee; being the more induced to do so by the remark of the Chairman that the variation in the period over which the allowance extended must depend greatly on the manner in which the work was executed. He found one gentleman from Somersetshire, where the land was very fat (laughter), declaring his conviction that the tenant might be reimbursed in two years. That showed how utterly impracticable it was to lay down any rule. One word with regard to Mr. Bennett's remarks on artificial manures. He (Mr. Shaw) took it for granted that if a man made an outlay for artificial manure, he did so in the expectation that within a given period he would be able to obtain a remunerative return. For argument's sake, he would suppose the period to be three years; when that period had expired he was bound to consider that the tenant had got his return; and if he continued holding three years afterwards, and three years again, for a series of years, he would not call him a prudent man if he did not take care to repay himself, so that if suddenly called upon to leave the estate he would have to do so without requiring compensation except for what he had last laid out. His friend Mr. Mechi had a little slap at low farming (laughter, and "He likes it"). He said that if high farming should become the rule, in some low farm districts it might in some cases be necessary to

go into a new district in search of tenants. Now though he had a personal knowledge of some of the worst-farmed districts in the kingdom, he did really believe that on the whole, under favourable circumstances, there was no difficulty whatever in letting land farmed up to the mark. These were all the remarks which had occurred to him as necessary to be made in reply. He would venture to submit to the meeting a resolution on this complicated question, and he repeated his belief that the result of that evening's discussion would be to forward the object.

The CHAIRMAN said he wished to be distinctly understood in reference to drainage. On that subject he entertained a view somewhat different from one which had been expressed. He thought that in many cases if tile drainage were done in a proper manner, from 25 to 40 inches deep, it would be as good at the end of a twenty-one years' lease as it had been at the beginning. He could easily imagine, therefore, why some persons should speak of sixteen years. He did not say, however, that a man should be twenty-one years in obtaining the benefit of his outlay. Mr. Baker had told them that, not being a permanent tenant, he had been performing draining in a different mode. He (the Chairman) knew very well that with bush draining, and so forth, four or five years was about the period; but if leases and tenant-right were established, the case would be different. He repeated that when the tenant had got his outlay back, the landlord ought to have what remained.

Mr. SHAW then proposed the following resolution:—

“That in case of valuations between the landlord or the incoming tenant and the outgoing tenant, justice to the parties may be amply secured by defining in the agreement the period over which the claim for compensation should extend; the operations or articles for which the tenant should be entitled to claim; and, as far as possible, the nature of the evidence which should be furnished to the valuers in case of reference to arbitration.”

Mr. ACTON: How, in the case of agreements, are we to get a scale?

Mr. MECHI: Valuers will do whatever is necessary.

Mr. TRETHERY believed it would tend greatly to remove the dislike felt by landlords to tenant-right if the principle on which compensation was to be made were distinctly laid down in an agreement, so that they might know what they would have to pay for. At present landlords were almost entirely in the hands of valuers or referees. If compensation were made under agreement, much prejudice would be removed.

Mr. ACTON: You must adopt some scale.

Mr. OWEN thought it essential to the object that landlords should select as their tenants men of capital and principle. There would then be very little difficulty in acting upon tenant-right, and determining on what accounts compensation should be made.

The resolution was then agreed to unanimously.

On the motion of Mr. MECHI, seconded by Mr. CHEFFINS, a vote of thanks was awarded to Mr. Shaw for the very able manner in which he had opened the discussion.

Mr. SHAW thanked the meeting most cordially for this renewed assurance of the approbation of the club.

Though the words might appear to be uttered as a matter of course, he could assure them that such an expression of approval would stimulate him to endeavour to promote more vigorously than heretofore what he believed to be the best and greatest interest in the country—namely, that of practical farming (cheers). He would take that opportunity of proposing a vote of thanks to the Chairman for the kind and able manner in which he had again performed the duties of his office. He, for one, felt much indebted to him for his allusion to what he might call the *revata questio* of the evening; and he was glad that such an authoritative declaration of opinion should go forth to the meeting from so practical a man (Hear, hear).

The motion having been seconded and agreed to,

The CHAIRMAN thanked the meeting for the expression of its approval, and declared that so long as he had health he should attend the discussions; while, during his tenure of the chair he should continue to act with independence and impartiality.

PRESENTATION OF TESTIMONIAL TO WILLIAM SHAW, ESQ.

The chair was then taken by Mr. Hughes, of Belle Vue, near Hythe, for the purpose of presenting to Mr. Shaw a Testimonial subscribed for by tenant farmers, in acknowledgment of his services as the advocate of tenant-right. It consisted of a handsome salver and a silver tea and coffee service, more remarkable for solidity and massiveness than for anything like ornamental display.

The following inscription was engraved on the salver:—

TENANT RIGHT.

To William Shaw, Esq.,

A mark of esteem and admiration

FOR THE MANNER IN WHICH HE HAS SO LONG AND
ABLY ADVOCATED

The Tenant Farmers' Rights,

This token is offered by some of those friends who appreciate

THE CONDUCT OF THE MAN AND THE JUSTICE
OF THE CAUSE.

LONDON FARMERS' CLUB,
April, 1850.

Mr. HUGHES said: Gentlemen, I have been selected this evening for the purpose of presenting to Mr. Shaw the testimonial which is now before me (cheers). Of the origin of this testimonial you are all aware. Would that the presentation of it had fallen to the lot of a more able person than myself, for I feel that I am quite inadequate to do justice to the merits of so deserving an individual. If I mistake not, gentlemen, about seven years have elapsed since Mr. Shaw was instrumental to the printing, for the first time, of the term “tenant-right;” a term which at the present day appears to be

somewhat objectionable to certain parties. For myself, I quite admit that I have never felt disposed to compromise that term. I thought it most applicable to the case; and, having once nailed my colours to the mast, my motto has ever since been—"No surrender" (cheers). Mr. Shaw came forward, gentlemen, about seven years ago in a most intrepid manner, and under circumstances which I think the agriculturists of this kingdom should never forget; he came forward at a time when, I might almost say, it was considered a piece of impertinence to allude to the question which we have been discussing this evening (Hear, hear). Gentlemen, Mr. Shaw was, I believe, the first man, he was certainly the first journalist, who ever treated the question in that bold, uncompromising, determined, but at the same time discreet manner, and which has won for him—deservedly won for him—the approbation of the agricultural public. (Cheers). Gentlemen, I have for some years paid considerable attention to what Mr. Shaw has written on the subject, and I think I am quite warranted in saying that the same bold, consistent, and honest course has been pursued by him throughout. He has not leant unjustly to the side of either party; but he has pursued that *via medii*, if I may use the expression, between landlord and tenant which justice, discretion, and honesty of purpose alike demand. (Cheers). Gentlemen, I need not eulogize my friend. That must be totally unnecessary, when I can remind you that on a recent occasion he was selected as a candidate for the honourable and important post of Member of Parliament for a division of Hampshire. (Loud cheers). By such a fact it is loudly declared to the British public that he is fully competent to assume a position which he has not yet had an opportunity of filling. It will not be long before Mr. Shaw will take the position for which he is fitted, and become the Cobden of agriculture (Hear, hear). Gentlemen, we have had the pleasure of engraving Mr. Shaw's merits in silver. I am sure that the subscribers generally would feel fifty per cent. prouder, had they engraved those merits in gold. But, gentlemen, modest and almost valueless as this testimonial is, in a pecuniary point of view, I am convinced from the estimation in which the subscribers hold the man, that Mr. Shaw's reputation will last as long as—I trust it will even last longer than—the testimonial itself. When I think of posterity, I am reminded of an expression used in reference to Sir Christopher Wren—"If you would seek for his monument, look around"—an expression which may hereafter be used in reference to our friend. I feel the greatest possible pleasure in presenting to Mr. Shaw this testimonial from the grateful agriculturists of the United Kingdom (much cheering).

Mr. SHAW said: Gentlemen, I feel very deeply how much I am indebted to my friend Mr. Hughes, for the kind manner in which he has been pleased to speak of me on this occasion, and also to those present for the manner in which his remarks have been received, and to all those who have been so liberally disposed as to subscribe towards the presentation of this testimonial. I value this mark of esteem most highly; but I would fain hope that I may be enabled to

do something more than I have done; that I may even go beyond the kind expressions of my friend Mr. Hughes, and that if at some future day a question should be asked as to my monumentum, that monumentum may be the establishment of tenant-right (cheers). If there be one thing more than another calculated to gratify the vanity—I trust the honest and honourable vanity—that I possess in common with my fellow-men, it would be the seeing established as a first law of the land the principle of tenant-right—a principle to the advocacy of which I regret that the cloquence which has been absorbed in much less important subjects has not been devoted—(Hear, hear)—for I feel persuaded that the landlords themselves would be benefited by the establishment of that principle, and that it would work more advantageously for those whom I hold to be the sinews of this country—namely, the working classes—than any other measure which could possibly be adopted. I believe we take a comparatively mean and narrow view of the subject, when we consider tenant-right solely with reference to the interests of the landlord and the increase of the tenant's profits: that is, I repeat, a mean and narrow view, as compared with the blessings which would by tenant-right be poured down upon those whom God has destined to earn their bread by the sweat of their brow. I may be too enthusiastic, but I certainly believe that the time will come, and that ere long, when the philanthropist will regard this as almost the greatest question in a country which is overflowing with labour, and which cannot find that wherewith industry may adequately employ itself (Hear, hear). It has been said, by a nobleman who feels strongly for the situation of the working classes, that he knows no more melancholy spectacle than that of a number of agricultural labourers, strong, hearty, and able to work, begging for employment, and unable to obtain it (Hear, hear). Gentlemen, I believe that tenant-right would in a great degree remedy that evil. Let me here say, in the exercise of that discretion for which Mr. Hughes has given me credit, that if the term "tenant-right" is objectionable I would abandon the term, if I could but secure to the tenant farmer proper security for the investment of his capital (Hear, hear). If the term "tenant-right" be obnoxious to those who have not yet properly learnt, but who will by-and-bye learn to appreciate the rights of others as well as their own—if, I say, that term be obnoxious, I am prepared to forego it for the sake of the good which would ensue to my fellow-men (cheers). Now, gentlemen, I feel that the best proof I can give you of my gratitude for this second and brilliant reward of my humble services is to exercise that perseverance and industry with which, I thank God, I am in a certain degree blessed. Though I am not a glutton of labour, I feel that the best exhibition of gratitude will be the continued pursuit of the same onward course that I have now pursued for more than five-and-twenty years; and I trust that I shall yet live to enjoy in private as well as in public the satisfaction of knowing and feeling that I possess the kindly friendship and the warm sympathy of a large portion of that class who, whatever may be said of any other class, are, as I am always pre-

pared to assert, unrivalled for honest independence, for honesty of purpose, and for a determination to uphold those who surround them, and who make the greatest amount of sacrifices to preserve and support their neighbours and fellow-creatures. (Hear, hear.) Gentlemen, I would that I could express myself in warmer and better terms. I would that I could give expression to my real feelings; but as I cannot do so, I must ask you to accept these remarks, not as the expression, but as evidence of my feelings. In conclusion, I promise you, that so long as health, and strength, and intellect remain to me, your cause will be to me what it always has been—my cause; and I will never flinch from any exertions which I can make on your behalf. (Loud cheers.)

On the motion of Mr. SHAW, a vote of thanks was given to Mr. Hughes, for presenting the memorial.

After the presentation of the testimonial, a number of gentlemen sat down to a supper provided in the lower room of the club.

The chair was taken by Mr. Hughes; Mr. W. F. Hobbs acting as vice-president.

After the usual loyal toasts had been proposed from the chair, and duly responded to by the company,

The CHAIRMAN rose to propose the health of Mr. Shaw. To that gentleman, he said, farmers had been greatly indebted for his exertions for many years. No man had done more than he to rescue them from the remnants of feudalism (Hear, hear). In the promotion of his efforts on their behalf he had evinced great talent and honesty of purpose, and his perseverance was also very remarkable. He proposed the "Health of Mr. Shaw;" expressing a hope that he might live long in the enjoyment of the popularity which he so justly possessed.

The toast was very cordially received.

Mr. SHAW said: He had so often returned thanks for their manifold kindnesses that it was difficult to avoid monotony; but his friend, the Chairman, had on that occasion touched a fresh string. Kent was distinguished among the counties of England in many respects. The Chairman had talked of feudalism; and had declared that he (Mr. Shaw) had assisted in rescuing the farmers of England from its influence. He hoped he did not wound the sensitive feelings of any gentleman present by remarking that by feudalism he supposed to be meant, that relic of an indescribable and mysterious union, under which landlord and tenant were depicted as always sailing in the same boat, and possessing the same interest; though, unfortunately, in his opinion, they were not doing the same work. He had ever felt that, however the two parties might be embarked in the same boat, the one was there in the capacity of owner and commander at the same time, while he made the lieutenant do all the work (laughter). He would rather see them both in the capacity of part-owners up to a certain point; and if they could not go so far as that, at all events he would like to see the tenant in the possession of a certain interest, and not a mere assistant in the working (Hear,

hear). He trusted greatly in the development of sounder opinions with regard to the relative position of landlord and tenant, without any disturbance of that happy and united feeling which ought always to exist between parties who were so intimately connected. It was probable that under such an arrangement as he advocated landlord and tenant would pull together much more happily than they had done heretofore; for although the commercial view, to use a common phrase of the day, was not quite so acceptable in the case of landlord and tenant as in some others, still he held that in whatever situation in life men might be placed their relations towards each other would, in the end, prove satisfactory in proportion as pains were taken in the first instance to place them on such a relative footing that there could be no mistake or misapprehension calling for correction or creating difficulty (Hear, hear). He had, in his humble way, endeavoured to place the tenant farmer in a position of independence by working out the principle of tenant-right—a position which the farmers of England were entitled to hold, and which he trusted would be secured to them for the protection of their capital. It was rather difficult to trench upon that subject without descending into other topics which were unsuited to the occasion. Without occupying their time unnecessarily he begged to reassure them that it had been his honest ambition and endeavour to work out for the farmers of England what he would rather indeed have seen them work out for themselves—their own salvation. There were gentlemen—Mr. Mechi amongst the number—who might tell him that he had patted prejudice on the back. Should that be the case, he would say in reply that if he had patted prejudice on the back it was for the purpose of encouraging it to go on, and with the view of ultimately overcoming prejudice; but he had also been actuated in a slight degree by a desire to give a slight slap in the face to presumption (laughter). He hoped that while presumption was endeavouring to proceed onward prejudice would not be so treated that the result would be injurious to both (Hear, hear). He thanked the company for this renewed expression of kindly feeling, which would stimulate him to continue in the performance of the duties of that sphere in which it had pleased Providence to place him. He could assure them that they owed him less than they had expressed, since the pleasure which he derived from pursuing the course in which he was labouring amply repaid him for his feeble efforts, and he trusted that he would always enjoy their good opinion (cheers).

Mr. MECHE proposed the health of the Chairman, and in doing so eulogized him as an advocate of tenant-right.

The CHAIRMAN, in reply, said he happened to be a farmer of the county of Kent—a county which was distinguished from the other counties of England by the operation of the law of gavelkind. The farmers of that county were to a certain extent a distinct race from the farmers of other counties. By the operation of the law of gavelkind they are more dispersed and subdivided there than elsewhere, and a great number of them were what are called *bene uati*; in other words, their ancestors occupied a better position than themselves. Some of them felt that the taint of feudalism which remotely attached to the tenantry of the day ill-befitted them at the present time—that the education possessed by many farmers in the present day ought alone to dis sever them from anything like the idea of servitude which formerly attached to "Farmer This" and "Farmer That." He was one of those who thought that if a man were a man of education, independence, and character, it ought not to reflect any discredit on him that he was a tenant (Hear, hear). He also felt that the contract between landlord and tenant

should be as much as possible of a commercial nature at all times, and more especially in the present day. The landlord was as much indebted to a good, substantial, intelligent tenant as the tenant was to a just and fair landlord. There was not an iota of difference. In the nineteenth century, feudalism in the relations of landlord and tenant ought to have utterly passed away; and if the tenantry of England possessed the independence which they ought to possess, they would scorn to be spoken of and treated as they were in some counties that he had heard of. (Hear, hear). For himself, he declared that he would never consent to be placed in the position of a vassal. If ever there were an age in which the farmers of England were called upon to shake off the remnant of feudalism, the present was such an age. Some time ago he had prophesied that before the expiration of the year 1851 the value of a good tenant would be known in England. He had never altered from that opinion. He still thought that before the ending of 1851 the man of intelligence, property, and education would probably be a *rara avis* in this country. In conclusion, he thanked the company for the kind manner in which they had drunk his health.

The CHAIRMAN said, that if there was an individual who was more distinguished than another for the service which he had rendered to agriculture, whether as a member of the Royal Agricultural Society, or as an advocate of Tenant-right, that individual was Mr. Fisher Hobbs. At all events, on no occasion in which the interests of agriculturists generally were involved did that gentleman refuse his aid (cheers). It was now some years ago since he saw that gentleman act as judge at the Kent and Canterbury Cattle Show. He was then a comparative beginner, if he would allow that expression. He had ever since been expanding, and he (the Chairman) trusted that he was quite satisfied with the progress which he had made in the general estimation of all connected with agriculture. He felt great pleasure in proposing—"The Treasurer of the day—Mr. Hobbs."

The toast having been well received,

Mr. W. F. HOBBS said, the flattering terms in which the Chairman had proposed his health made it very difficult for him to reply. If he had at all merited the compliment which had been paid him by Mr. Hughes in connection with agriculture, it was solely because he had exerted himself with the greatest sincerity and with an upright and honest heart. He believed that so long as he continued to have health and strength he would always be found pursuing the same course. Although he had not the talent and ability of his friend on his right (Mr. Mechi), he would not give place to him or to any man in that room, as regarded a sincere desire for the advancement of British agriculture (cheers). He took no credit to himself for standing in the position of treasurer on that occasion, for he was sorry to say that his labours in that capacity had not been so onerous as he could have wished them to be. The credit was due to his friend in the chair as the originator of the testimonial. Still the appeal had been responded to from all parts of the kingdom; and though the response had not been so unanimous as he could have desired, he was persuaded that there was no cause and no individual that at the present day could obtain more cordial support from the practical farmers of England (cheers). As regarded the mark of respect which had been presented to Mr. Shaw that evening, he must say that there was no man who better deserved such a testimonial. Men of all grades and of all political opinions must admit that the agriculture of this country owed that gentleman a great debt of gratitude. He trusted that they should meet him there for many years to come, for the loss of him would indeed be a great loss. He

knew no man who could replace him; none whose removal would be a greater loss to agriculture, more especially to the tenant farmers of this country. The better he was known by the tenant farmers generally, the greater would be their appreciation of his worth. Mr. Hughes had alluded to his (Mr. Hobbs) connection with the Royal Agricultural Society. Not only were they indebted to Mr. Shaw with regard to tenant right, but they were especially indebted to him in relation to the society which he had just named. Mr. Shaw was the propounder of that great institution (Hear, hear), and had laboured as much for the promotion of its objects as in advocating the principle of tenant-right. When the great principle of agricultural union was but little understood in this country, Mr. Shaw did everything in his power to bring landowners and occupiers together, for the founding of that great institution which he had mentioned, an institution which he (Mr. Hobbs) believed had done very great service to the country. From the formation of the society down to that time, he (Mr. Hobbs) had had the honour of working with him in the council, and he might safely say that there was not a man in that council who was more desirous, or, he would add, more able, to promote the success and practice of agriculture; and he felt convinced that so long as he had health and strength, to use his own words, he would continue to pursue the course which he had done: that whether with regard to the occupiers of the soil, the owners of the soil, or the science and practice of agriculture, he would always be found at his post. Mr. Shaw had observed that evening that although he generally agreed with him (Mr. Hobbs) on the great questions connected with agriculture; yet he (Mr. Hobbs) had introduced one point that evening, with regard to which he did not concur with him. He would only say that if he had erred on the subject he had done so with the best intentions. His views with regard to the question of tenant-right were, he believed, pretty well known. There were some who thought, perhaps, that he went too fast on that question; but having been a tenant-farmer himself for some years, and being one in fact at that time, he fancied that he knew what tenant-farmers required in order to obtain security for their capital; at the same time he thought the landlords of England placed confidence enough in him to believe that he would not advocate a measure which would be adverse to their interests. He was quite persuaded that nothing would tend so much to the improvement of agriculture, nothing would tend so much to advance the interest and social condition of agricultural labourers, and to secure to them constant employment, as the establishment of tenant-right (Hear, hear). During the last autumn a means of affording employment in his own neighbourhood occurred to him. Intermixed, as it were, with his own property lay a farm which he would not purchase; it was offered to him two or three times at different periods, and he refused to take it. On reflection he thought it advisable to have it; he therefore made a proposition to take the farm for twenty-one years, to be allowed to sub-let if he should let his own farm, which adjoined, and to have a liberal tenant-right. Two years before, the party would have scorned the idea of tenant-right; but he well knew that this question was at last beginning to make way in the country, while his (Mr. Hobbs's) proposition was such that had he been the agent for the property he would have said at once that it was such as ought to be satisfactory to both parties. His proposal was that he should lease the farm for twenty-one years, that tenant-right should be a *sine qua non*, that he should remove all pollard-trees and all timber which was injurious as regarded agricultural improvements. He was also to find all the tiles for draining and for other purposes, and all the bricks and rough material except timber

and to be allowed the benefit of tenant right at the termination of the lease. The consequence was, that he was laying out something like £8 per acre—it was not unlikely that he would, in the end, have laid out £10 per acre—on a farm which, without tenant-right, even with a lease of twenty-one years, would probably have remained neglected. (Hear, hear.) He was employing labourers in the neighbourhood, and he was happy to be able to state, that in the four parishes in which he occupied land he did not allow a single labourer to be out of employment. (Cheers.) He regretted to see the best labourers emigrating daily, for want of employment. (Hear, hear.) The labourers who emigrated were generally the sines, the wealth, and strength of the country (Hear, hear), not the worst characters. (Hear, hear.) He felt convinced, that if the tenant-farmers had security for the investment of capital, if fairly were given to the cultivators of the soil, there would not be labourers enough in the kingdom to obtain from the land what it was capable of producing. He had always been a sincere friend to the improvement of agriculture; and though Mr. Shaw and himself might differ on little points as they had differed on one point that evening, it was only because one of them was desirous of showing the landlords of this country that what was proposed in the case of tenant-right, would, if established, be beneficial to them as well as to tenants. In conclusion, he thanked the company for drinking his health, and could assure them that they would ever find him a working man in the cause of tenant-right (cheers).

Mr. HOBBS said there was a gentleman present to whom not only they, but the tenantry of England were indebted, more especially for his able essay on tenant-right (cheers); as well on account of the manner in which he conducted the business of the club as on account of that essay; for his services in the Malt Tax Association, and for his conduct on every occasion in which agriculture was concerned, Mr. Corbet must now be held by them in the greatest respect. He begged, therefore, with the permission of the Chairman, to propose Mr. Corbet's health.

The toast was drunk with the greatest cordiality.

Mr. CORBET, in reply, said that his exertions in the present cause had been to him a "labour of love." He had endeavoured to carry out the wishes of the committee to the best of his ability, and if he had failed, his intention was not at fault (cheers). There was one point in connection with that occasion which he desired to mention, namely, that Mr. Quartermaine, having lent a room on several occasions for the purposes of the testimonial, on being applied to for his bill, had replied that he should not think of making any charge (cheers).

Mr. SHAW said that, while he was anxious to assist in elevating as much as possible the tenantry of the country, he

trusted they would never be so one-sided as to forget those who, filling high stations and rank, had it in their power, by devoting their energies in the proper course, to assist the cause. He had not forgotten, and he never could forget, that in a meeting of the Smithfield Club, immediately after, he believed, the first discussion on the question of tenant-right in that (the London Farmers') Club, two individuals filling a high position in society took occasion to express themselves strongly and warmly, if they did not come quite up to their mark, with respect to the great question which had this evening been discussed. On that occasion his Grace the Duke of Richmond said that, although perhaps the term "tenant-right" was not quite an agreeable one, it involved the principle of justice to the farmer, and he hoped to see the principle established. Mr. Pusey, too, though then only just an adherent in the cause, also gave his support to the principle. Since that time he had won their praise by his persevering endeavours to secure the establishment of a tenant right; and though he had hitherto failed in his object, this club would not, on that account, feel the less grateful to him. His first bill was referred to a select committee of the House of Commons; he had been instrumental in the appointment of the Agricultural Customs Committee; in short, no man had done more to extend a knowledge of the principles of tenant right. When they knew and felt the value of such men in furthering their cause, it would be keeping too much within their own narrow circle to omit to acknowledge their services. He would therefore propose "The Duke of Richmond and Mr. Pusey, and may they continue to be animated by a desire for the establishment of tenant-right."

The toast was warmly responded to.

The CHAIRMAN proposed the health of Mr. Rogerson, the proprietor of the *Mark Lane Express*, who had, it was stated, executed the printing for the testimonial free of charge; with which was coupled the name of Mr. Quartermaine.

The toast met with a fitting reception.

On the motion of the Chairman, the company drank "Manufactures and Commerce, in connection with Mr. Mechi."

Mr. MECHE replied.

The CHAIRMAN then gave "Mr. Hornsby and the Subscribers to the Shaw Testimonial."

Mr. HORNSBY, jun., replied.

The toast of "Mrs. Shaw and the Ladies," was responded to by Mr. Shaw; that of "The Committee of Management" by Mr. Carter.

At the instance of Mr. Hobbs, the company drank "The Earl of Yarborough."

On the motion of the Chairman, "The Agricultural Labourers of the United Kingdom."

The evening was on the whole one of extreme good humour and great interest.

CHEMISTRY APPLIED TO AGRICULTURE.

THE CYCLOPÆDIA OF AGRICULTURE ON "ARTIFICIAL MANURES."

BY A FARMER.

An article on "Artificial Manures" has just appeared in this new Cyclopædia; and as it is from the united pens of Mr. Hannam, the author of a very excellent work on "Waste Manures," and Dr. Playfair, we were prepared to expect something good on this important subject. Nor are we

disappointed, as it is decidedly the best summary of what is known on artificial manures which has yet appeared. At the first outset of this cyclopædia we were not a little startled by the opinion expressed in the introductory essay, "that farming has been committed to the rudest and most

illiterate of the human community." This was certainly not a very flattering opinion of the capabilities of our brother farmers, and had prepared us for forming but an indifferent opinion of the cyclopaedia. The appearance of several very excellent scientific articles from both Lindley and Curtis in the first number, and of this article on Artificial Manures, a practical subject, in the second, has, however, satisfied us that such at least was not the opinion of all the writers for the Cyclopaedia of Agriculture.

The want of fertility in any field may result, from *first*, the want of all or nearly all the mineral ingredients required by a certain crop—or, *secondly*, the want of even one important ingredient.

It is not, therefore, merely necessary to know by the analysis of the ashes of a plant what mineral ingredients it requires, and to compound an artificial manure containing all these substances. If these substances are to be economically and profitably employed, we must also know what are the peculiar wants of the field we cultivate. "For example:—A sandy soil may be very deficient in magnesia; and in this case an addition of that substance might be indispensable to fertility, while it would be wholly superfluous in a manure applied to a soil formed from magnesian limestone. For the economical application of a manure, a knowledge of the composition and character of soils is as necessary as an acquaintance with the mineral food of the crops growing upon them." The importance of this last sentence cannot be too strongly insisted on; as it shows that there may be two reasons either for the failure or the success of a manure. A manure, containing all the ingredients requisite for the crop, has, of course, more chances of success than a manure containing only one or two. The latter have, however, often been successful in their action: and, as in the case of nitrate of soda, both farmers and scientific men (who should have known better) hastened to assert, from the value in isolated instances, that they would be universally acceptable. Further experiments have so completely disproved this opinion, that we now run some risk of being converts to the very opposite estimate of its value. It is the same with common salt, lime, and even bones—any one of which may, produce a good crop in certain cases, because the land happens to be especially deficient in the particular substance applied, and yet completely fail in others, because it did not supply all that the plants required.

No greater error and no more serious injury can be committed in this important branch of agriculture, than the attempts which have been made to lay down rules for the farmer's guidance, either

from a limited number of experiments, or from the possession of the utmost possible extent of theoretical knowledge. We are, perhaps, sufficiently advanced in the knowledge of the constituents of the ashes of plants to be able to say what a manure ought to contain to supply all these substances. For the particular instances in which a manure, containing only one or two of these ingredients, may be useful, no certain rules can be laid down.

If even these difficulties are overcome, there may yet be another cause for the want of fertility in a soil even after a manure has been applied: it is, *thirdly*, that the various substances applied may not be in a proper state of chemical combination, or in a proper state of solubility.

"We must bear distinctly in mind how nature supplies these materials from her magazines of nutriment, and how she stores them up to prevent unnecessary waste. If the soil contained these nutritious matters in a soluble state, they would be washed away by the rains, and it would become quickly impoverished. Again, if they were insoluble in water the plants could not avail themselves of their mineral food. Nature has, therefore, placed the mineral food of plants in the soil in an insoluble state, but endowed with such properties that the action of the air, rain, and frost renders it soluble in water and fable to administer to the wants of plants." Here there is another source of difficulty in the preparation and use of artificial manures, and gives us another reason for the contradictory results following their use. A manure which may be only sufficiently soluble in a wet season or rainy situation will obviously be unsuited to a dry season and a dry situation.

An artificial manure which professes to be useful to all crops must therefore be made (1) of mineral ingredients soluble in water, and of (2) mineral ingredients insoluble, or only very slightly soluble in water, but which gradually become soluble.

The writer of this article "On Artificial Manures" has well described the action of such substances as lime and nitrate of soda to be that of simply enabling the mineral ingredients already present in the soil to become useful, and the very reverse of a manure which restores the already abstracted materials. On this point all practical men are now perfectly agreed; and we quite coincide with the writers in advocating that *all the ingredients removed by the crops should be returned in the manure*. This is exactly what we have advocated in the whole course of these papers, and has more than once brought down the severest rebukes from various quarters. It is, therefore, somewhat encouraging to see this important rule so strongly insisted on.

Unlike some other writers on this subject, the inability to supply special receipts is honestly confessed, few of those already given being thoroughly warranted by existing knowledge, and, at the best, must be considered as probabilities, which may either fail or succeed in future trials.

Though it is going over the ground so often insisted on in these papers, the mineral constituents of a manure are generally recommended to be as follows :

1. Sil cate of potash, derived from fieldspar.
2. Sulphate ditto.
3. Common salt.
4. Gypsum, to supply lime.
5. Epsom salts, to supply magnesia.
6. The phosphates, derived from bones or coprolites.

The latter substance has been in use too short a time to enable us to speak positively as to its value, though its almost perfect resemblance to bones in chemical constitution is a very strong argument in its favour.

With regard to the organic portion of artificial manures, in opposition to the opinions of Liebig and Professor Johnston, Dr. Playfair says that "with these as with the mineral substances we must act on the same principles, so that the evolution of carbonic acid and ammonia may be gradual." It is not our part here to enter upon an inquiry into the truth or practical trustworthiness of Liebig's theory, that, if we supply the inorganic materials of the crop, the atmosphere, especially under the green crop system, will furnish the organic food of vegetation in sufficient quantity. But it may safely be asserted as the result of many experiments that in the case of the supply of the vegetable part of his crops, as well as the mineral, the farmer best consults his own interest by furnishing a supply of that ingredient as well as the now, universally acknowledged to be necessary one, namely, the mineral part.

When the farmer is *sure* that his soil contains a great preponderance of organic manure his mineral dressings are highly useful, and may perhaps be all that is required, as they will enable the plant to consume the organic matter more liberally than it otherwise could. We are aware that on the best turnip soils excellent green crops have been grown by means of bones or guano alone; but we fancy these instances are becoming more rare than formerly, more especially as farmers now almost universally use a portion of farm-yard manure along with their artificial manures; and it is to the action of the azotized carbonaceous matter present in the former that we are disposed to attribute much of the benefit produced.

Notwithstanding all that has been said and

written on the subject of artificial manures, it will be seen by the above remarks that but few assured steps have as yet been made towards the perfect elucidation of this important question. Perhaps the utmost extent of our progress may be stated to be, that we know the points on which we want information.

Indeed the only portion of agriculture to which the application of artificial manures can now be said to be perfectly understood is the growth of turnips, and in this case our knowledge has been of such slow growth as to prevent us from despairing at the small progress we make in other branches of the subject. Bones were first used for this purpose, and we are old enough to remember how much old farmers laughed at the idea. The bones were followed by guano, next came superphosphate, and finally has sprung up the earnest desire amongst farmers to prepare guano for themselves. To such a degree have they now been successful in the latter attempt, that the complete want of any future supplies of guano would not now be of serious moment. As far as it goes, this is encouraging. The farmer of strong clays, on which turnips must be, to say the least, the exception to the rule, has not yet reaped any advantage from the progress of scientific research on artificial manures. We have not yet seen any manure which enabled him to dispense with farm-yard manure for his wheat crop after a bare fallow. This is very much to be regretted; for, whilst we have seen turnip husbandry reach a degree of perfection that leaves little to be desired, the farming of strong clays has hardly taken a step in advance since the days of our grandfathers. The application of artificial manures of every kind to the cereals has hitherto been a complete failure, so far as superseding farm-yard manure on strong clay lands is concerned.

We are quite at a loss to assign a reason for this, as the artificial manure has in the latter case been as carefully manufactured in accordance with the results of analysis as in that used for the growth of turnips; its success in the latter case is admitted, and its failure in the former, we think, is equally clear.

For several years we have been making every possible research as to a manure for grass lands, but hitherto without success. We venture to hazard a conjecture as to the cause of this failure: the plants which compose the grass of our pastures and our cereals are closely allied, in botanical phraseology, and diametrically opposed to the turnip crop in many important particulars. In the rotation upon strong clays the clover is the only plant bearing a botanical relation to the turnip. It is to the clover that we would, therefore, direct the attention of future experimentalists, as being the

most probable part of the rotation on strong clay which is likely to be benefited by the use of artificial manures. This is, of course, little more than a conjecture on our part, and its correctness will be either proved or disproved by future researches.

To return from this long digression to the article whose title we have placed at the head of this paper. Besides the above remarks on artificial manures, it also contains a summary, in a tabular form, of the principal experiments which have been published. This must have been a work requiring the utmost

patience, especially as the results of the experiments have hitherto been so unsatisfactory.

That the writers of this very sensible article on artificial manures have so plainly advocated the truths so often laid down in these papers is an encouragement for which we feel obliged. And as they have also acknowledged the want of information wherever it existed, any little criticism in which we might be disposed to indulge is silenced. To those who take any interest in this important subject we recommend the article on artificial manures for more serious consideration.

AGRICULTURAL USES OF STEAM POWER.

It is worth while, however, to ask, what is the specific impediment that forbids the banms between the steam-engine and the plough-share? What is it that prevents the versatility (that peculiarly marked attribute of steam power) which can drive a vessel of several thousand tons across the Atlantic, against a head-wind and sea, or spin the finest thread with a touch more delicate than the human thumb and finger—what prevents it from being applied to the clumsy performance of the plough?

Because it is a clumsy performance: and that noble power will have nothing to do with it. It is a law to which the annals of invention have given repeated proof, that late-discovered powers of nature will not “gear on” to those means and appliances which they have antiquated. They refuse to waste themselves. From the natural sympathy, so to speak, which exists between the “best of its kind” in every department of matter may be deduced the perception of a corresponding law of antipathy between things separate and incongruous in their nature and degrees of excellence, and remote in the order of invention. It is not the inapplicability of steam power, but the incongruity with it of the plough (an instrument employed for the purpose of applying *animal traction* to the act of cultivation, and belonging only to that secondary class of powers) that forbids the union. The plough does not *cultivate*. It must be followed by the harrow, the scuffler, the roller, the scarifier, to complete, by many and repeated processes, the work which, after all, is not so well done as it is accomplished in one good digging by—the spade. Is there nothing in this to furnish a suggestion as to the mode in which steam power must be applied, if ever, to the problem of cultivation? We estimate the expense of a summer's fallow, on stiff land (five ploughings, with harrowing, &c., to correspond, and loss by rent), at £5 per acre. It could be well dug for less money at one operation. Why is it not? Because

our horses and implements would be lying idle, which are rendered necessary by the whole economy of the farm-arrangements as at present constituted, and which prevent the possibility of adapting hand-work on the scale required to get the fields ready at the proper periods; and also because cultivation by hand requires a peculiar co-operation of the will (well understood by employers of spade-labour), demanding either an inward impulse, which nothing but direct self-interest can give, or a lynx-eyed superintendence, the expense of which destroys the balance of profit from spade cultivation over the clumsy honesty of such animal power as we have long substituted for it. Set a man to dig two acres of land, one for your wheat crop and the other for his own, and you will see quickly the operation—almost unconscious to the labourer himself—of that law which limits spade-work of his own plot, and denies it to your average. The plough, and all the instruments that follow it, are only the “animal power” substitute for that more perfect process accomplished in brief by the spade, when worked by the foot, held by the hand, and directed by the skill and purpose of manual labour. This is what mechanical power must imitate: not the sluggish cleaving of the ploughshare, which only splits up an unbroken seam of surface, making a *fulerum* of that which lies below, and thus pressing and polishing the subsoil year after year into barren and impermeable induration, which the roots of no annual can penetrate. This is but the first of a whole series of imperfect processes, not one of which is even desirable to imitate; not one of which is necessary where the spade can be used. Why then should we wish that ploughing should ever be done by steam-power, stationary or locomotive? What we want is not ploughing, but cultivation: that process which the farmer by necessity performs in three, four, or five acts, not half so well as the gardener accomplishes it in one. As well might we

expect to apply successfully the boiler and cylinder of a locomotive to the pole of a four-horse coach, or the shafts of a waggon, or the lever of a common pump, or the distaff and spindle of a cottage spinning-wheel, as attempt to gear on the power of steam to the elaborate clumsiness of a plough. In every case where steam has superseded animal labour (as it is its mission to do), it has demanded to be harnessed to the work with a harness of its own; it has rejected old-fashioned tools and their appearances, and has seized at once the shortest means to its object. Instead of the leverage of the horse's leg, pulling at the axletree, it seizes at once upon the wheel and drives it round; and instantly (by that law of occult affinities above alluded to) a demand is raised for the most perfect surface for the wheel-tire to run on: the iron rail is supplied, and Mr. M'Adam, though a very good dog in his day, is discarded. So, again, instead of working at the pumphandle, it seizes at once upon the sucker rod, and drives it up and down. Instead of wasting time and labour in the back-and-forward action of the oar, it drives along the vessel by the continuous stroke of the paddle-wheel, or, still more simply by the screw. But of all its triumphs, the greatest and the most astounding was when the puzzling problem of the spinning-wheel presented itself. Here was the foot, the thumb and finger, the directing will—all at work at once, and all to be imitated and superseded: the very moisture of the skin requisite to the rolling and hardening of the twist, as it was pressed between the fingers. What an operation to attempt by the dead rollers of machinery! Under the full glare of such a precedent, what upon the same earth, it may be surely asked, declares that the act of inverting and crushing a clod of soil should present insurmountable or an unprofitable task to steam-driven machinery? I say "inverting and crushing," for in those two acts lie the problems of cultivation. In a dry climate it is simpler than under our moist atmosphere, for we are obliged to chop the soil instead of crushing it. If we analyze the act of cultivation as performed by the spade, it is as follows:—The blade is pressed to the requisite depth into the soil, the handle is then bent down, as a lever to lift the slice, which is turned over, and dropped into the trench top downwards; the under surface thus exposed is then chopped and cut in order to admit the atmosphere, which is in fact the real fertilizer after all, and to expose the soil to which as fully as possible is the whole object of cultivation. It is hardly necessary to point out how imperfectly this is done by the plough. Instead of inverting, it turns the soil only half or three-quarters over: it goes through it like a wedge, *squeezing* it from it instead of raising and loosening it. It is true it breaks the soil if light, but it is the heavy

soils that most need breaking; and in proportion as the furrow-slice is broken, it often drops back, and the inversion is less complete. It leaves the surface weeds either actually peeping at the edge of the furrow-slice, or if concealed, yet seldom sufficiently buried to be destroyed: but what is worse, it does all its work at the expense of the subsoil, which year after year is worn, and sometimes polished to a case-hardened surface by the repeated pressure of the share, and the stamping of the iron shod hoofs that drag it. What can offer a more forbidding and impenetrable barrier to the descending roots than such a pavement as this meeting the sponge-like fibres that are destined to find nourishment for the stem, and which begin to seek it at the greatest depths, just when the plant is in the latter stages of its growth, forming the grain in the ear? This evil the spade entirely avoids: it neither hardens nor loosens the subsoil, it leaves it precisely in its natural state, moderately stiff, a condition perhaps the safest for plants of the grain tribe, which require a firm footing to carry their long stems, though for the more succulent tribes of root-crops a subsoil broken to a greater depth is desirable. The plough is certainly a better cultivator upon a light than upon a stiff soil. It is upon heavy and retentive clays that the superiority of the spade is pre-eminent. Here, therefore is the great field for improvement: what we want upon the clays (which embrace so large a portion of Great Britain) is a mode of cultivation which may be accomplished without the treading of animals or any *traction* at all of the implements of tillage across the worked land. In pursuing, therefore, the subject of cultivation by steam, the idea of the plough is a misleader. What we want is not to plough the land, but to cultivate it; and if, as I have endeavoured to show, the plough and all its subsidiary implements are a mere substitute for the spade, and on stiff soils in a moist climate, a very expensive, cumbrous, and imperfect one, the object of the inventive machinist will be better directed as well as simplified by discarding it altogether from his thoughts, and concentrating his attention on the action of the spade. The gardener scarcely permits a dog to walk over a bed that has been newly worked; yet the farmer is obliged to let his whole team of horses with all his heavy implements pass over his land many times after the cultivation is finished; and even after the sowing is done the seed harrows do but skim and film over the dismal work made in damp weather by the tread of horses that draw them, and the previous implement. On heavy land in a moist season this is most pernicious: in fact it limits the cultivation of such soils to seven months out of the twelve. Now all attempts at cultivation by steam seemed to have failed, chiefly for this rea-

son, that the experimentalist has set out with the idea of an instrument that is to be drawn backwards and forwards across the field, like a plough, either by a locomotive or a stationary engine. No such necessity exists. The spade is not drawn across the field; it acts perpendicularly upon the spot it is applied to; separating, lifting, and inverting each spadeful in succession, neither damaging by any farther pressure the soil it has once moved, nor hardening the subsoil underneath, in the act of moving it. In references to the economy of steam power, Sir John Herschel has well observed, that in reaching the summit of Mont Blanc, a man must toil for four or five days in succession, while two pounds, avoirdupois, of coals in a steam-engine would be able to lift him to that height in a few minutes: in the same manner it has been calculated, that one ton of coals have virtue in them to perform the horse-power required to plough a hundred acres of land, could we but discover the proper mode of applying steam to cultivation. To plough a hundred

acres of land by horse power costs about £40. We can form a kind of judgment, therefore, in advance of its realization, of the comparative cost of the production of food by animal power and by steam power. In the days of Alfred, when the purchase of a book made a serious gap in the income of a prince, the price of a volume of the "Penny Cyclopaedia" would have afforded matter of more just incredulity than can prudently be entertained in the present day of the possible application of that power to the production of food which has already been applied to that of clothing. The mechanical production of articles of physical want, is a department of human labour, in which all experience warrants us in anticipating the greatest economical improvements; and true philanthropy can hardly devote itself more wisely than to the furtherance of such inventions, as well as the suppression of that distrust of their accomplishment which often delays the progress its incredulity discourages.—Mr. Hoskyn's Inquiry into the History of Agriculture.

A LECTURE ON THE ANATOMY, PHYSIOLOGY, AND PATHOLOGY OF THE ORGANS OF RESPIRATION AND CIRCULATION; WITH ESPECIAL REFERENCE TO THE NATURE AND TREATMENT OF PLEURO-PNEUMONIA IN THE OX.

BY JAMES BEART SIMONDS, LECTURER ON CATTLE PATHOLOGY IN THE ROYAL VETERINARY COLLEGE; HONORARY MEMBER OF THE ROYAL AGRICULTURAL SOCIETY, AND ITS VETERINARY INSPECTOR; CORRESPONDING MEMBER OF THE SOCIÉTÉ NATIONALE ET CENTRALE DE MÉDECINE VÉTÉRINAIRE, ETC.

MY LORD,—Pursuing the course which I have heretofore adopted in addressing the members of this society at their annual meetings, I shall not venture to trespass upon your time by a lengthy exordium. To speak of the great and rapidly increasing benefits which arise from these periodic meetings, however inviting the theme, is but a work of supererogation, for all are ready to admit, from the prince of royal blood to the humble plebeian, that they exercise an important influence, both socially and morally, over our rural population, and contribute in no small degree to our national welfare and independence. The subject which has been selected for this lecture is one of considerable importance to the agriculturist, as it relates to "The Anatomy, Physiology, and Diseases of the Organs of Respiration of Domesticated Animals," and to an investigation, in particular, of the nature of that destructive malady affecting the ox tribe, termed pleuro-pneumonia.

In directing your attention to the general structure and functions of these important parts of the animal organism, it will be necessary, first, to take a somewhat rapid glance at the processes of diges-

tion and assimilation, for the purpose of placing the office of the lungs in a clearer view. The propriety of this course will doubtless be admitted when we state that here are to be traced the various changes which the nutritious part of the food passes through, prior to entering the circulating fluid, the blood, to contribute to the support of the frame. During life the repeated demand for new materials to supply the constant waste of the tissues, which arises from a multiplicity of causes, gives origin to those sensations which are designated *hunger* and *thirst*. The former of these shows the requirement of solid, and the latter of fluid alimentary matters; and they only yield to the proper amount of food and drink being received. Notwithstanding that both the quantity and the quality of the food which is partaken of, will depend on the habits and conformation of each particular animal, still in all it undergoes a successive and similar series of changes before it ministers to the wants of the system. In the mouth it is masticated, or divided by the operation of the teeth into smaller masses; and while this reduction in size is being accomplished, it is mixed with the saliva, a fluid abundantly furnished by the

ducts of the contiguous glandular structures. This insalivation of the food produces both a chemical and mechanical effect; by the former the mass is fitted for digestion by the alkaline action of the saliva, and by the latter for deglutition by being rendered soft or pulpy. Thus prepared, the food descends the gullet and enters the stomach, where, uniting with the gastric juice, it is subjected to a second chemical change, in which lactic and hydrochloric acid are chiefly concerned. This process, commonly called the digestive, is effected, as we have seen, by the *succus gastricus*; a fluid which is secreted within the follicles of the stomach, whence it is poured on the reception of alimentary or other matters.

Digestion thus converts the aliment into a *chymous* mass, and portions of this are alternately passed out of the stomach into the intestinal canal, where they are mingled with the hepatic and pancreatic secretions furnished by the liver and pancreas. The result of the commingling of these fluids with the chyme is the speedy separation into its nutritious and non-nutritious parts, to which is given the name of *chylification*; and, like the other changes we have described, this separation is most probably produced by chemical agency.* The chyle thus formed is next precipitated upon the *villous* coat of the intestines, to be absorbed or conveyed into the general circulation, while the effete matter is passed onwards in the canal to be expelled from the system.

The vessels which transmit the chyle are designated the lacteals; and as its entrance into them is one of the most interesting and instructive phenomena in the animal economy, we shall describe it somewhat at length. The absorption of chyle taking place in the small intestines, the lacteals are freely distributed here, and consequently a different development of their internal lining membrane exists compared with that of the large intestines. In the former it is thickly studded with shaggy projections, *villi*; hence the name, the villous or velvety tunic. Each *villus* is plentifully supplied with blood-vessels, besides which it contains nerves and the radicles of the lacteal absorbents. The minuteness of these tubes, added to other physical causes, has however prevented their precise arrangement being demonstrated; but it is generally believed that they are formed into loops more or less perfect, as shown in the annexed diagram.† The several component

Fig 1.



parts of a villus are united together by areolar tissue, and are protected by a scaly epithelial covering. This epithelium is a membranous covering analogous to the cuticle of the true skin, and is formed after a like manner, and performs a similar office by defending the sensible structures beneath it from injury. By some physiologists the epithelium is supposed to be cast off from the surface of the *villi* during the activity of chylification and absorption, and to be reproduced in the intervals of their suspension; by others, however, this shedding is not regarded as an essential step in either process. Immediately beneath the epithelial scales lies a great number of cells, varying in size from the 1-1000th to the 1-2000th, of an inch, whose office is to imbibe the chyle, and transmit it to the radicles of the lacteals. The transmission of the chyle to these minute tubes is effected by the bursting or deliquescence of the cells after acquiring their full size; but its entrance into them is due to the law of *endosmose* and *exosmose*. The imbibition, however, of chyle alone by the cells, as they are surrounded by other matters, some of which are even necessary to the well-being of the various organs, shows a power of selection by them, which doubtless is an act of vitality.

We cannot now speak of the means provided for a constant development of new cells; but it is right to add a few words on *endosmose* and *exosmose*, and which we prefer to do in the appropriate language of Dr. Carpenter. He says, that "when two fluids differing in density are separated by a thin animal or vegetable membrane, there is a tendency to mutual admixture through the pores of the membrane; but the less dense fluid will transude with much greater facility than the more dense; and consequently there will be an increase on the side of the denser fluid; whilst very little of this, in comparison, will have passed towards the less dense. When one of the fluids is contained in a sac or cavity, the flow of the other towards it is termed *Endosmose* or *flow-inwards*; whilst the contrary current is termed *Exosmose*, or *flow-outwards*. Thus, if the cæcum of a fowl filled with syrup or gum-water be tied to the end of a tube, and be immersed in pure water, the latter will penetrate the cæcum by endosmose, and will so increase the volume of its contents as to cause the fluid to rise to a considerable height in the attached tube. On the other hand, a small proportion of the gum or syrup will find its way into the surrounding fluid by exosmose. But if the cæcum were filled with water, and were

* For fuller particulars of these various processes, see "Lecture on the Digestive Organs," *Society's Journal*, vol. ix. part 1.

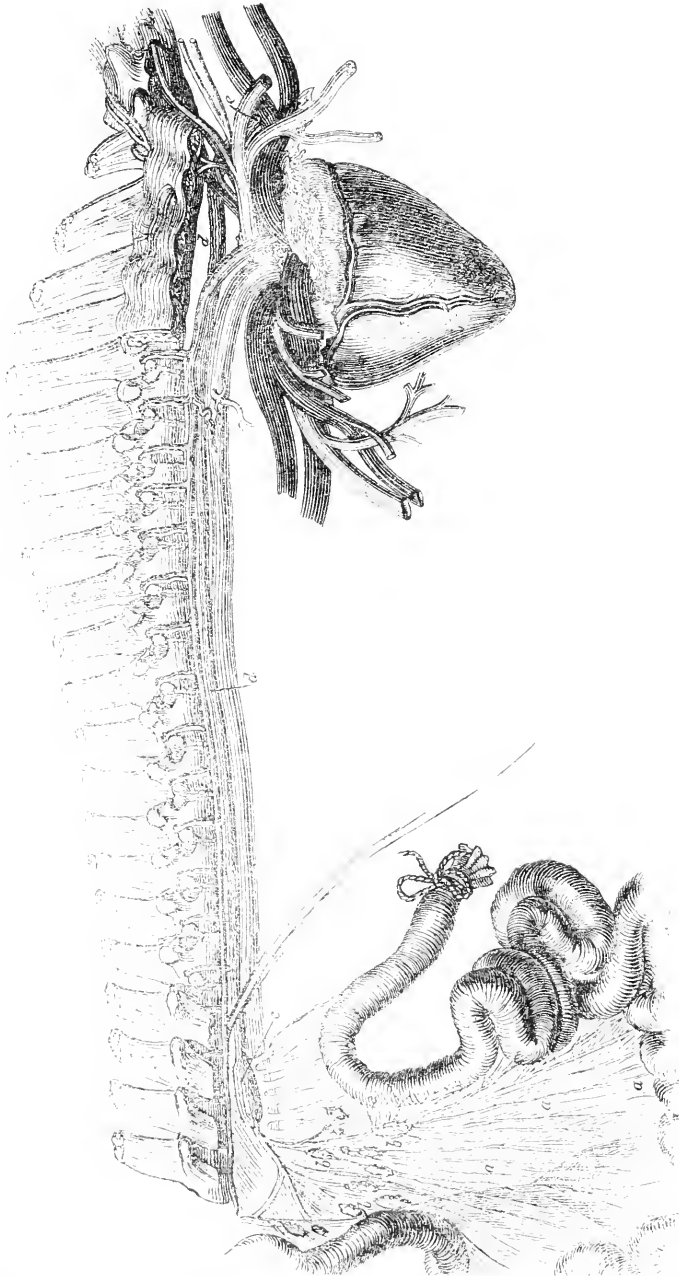
† From Kirkes and Paget's "Handbook of Physiology."

immersed in a solution of gum or syrup, it would soon be nearly emptied—the exosmose being much stronger than the endosmose.”⁴

The chyle, by the operation of this law being conveyed into the lacteals, is carried by them into a receptacle marked *c* in fig. 2, situated near to the lumbar vertebrae, and in its course it passes through

the mesenteric glands, where it is further elaborated and fitted for its conversion into blood. For the purpose of making this better understood, it is necessary to state that the intestines are attached to the spine, by a double reflection of the serous membrane which lines the abdomen, termed the mesentery, and that the lacteals travel upon this to reach

Fig. 2.



⁴ “Carpenter’s “Manual of Physiology,” p. 284.

the *receptaculum chyli*. These several parts are depicted in fig. 2, where the *lacteals* are marked *a*, the *mesenteric glands* *b*, and the *chyle-receptacle* *c*.

To enter into a description of the particular changes which are wrought in the chyle by passing through the mesenteric glands would encroach too much on the subject of this lecture, and it will be sufficient to observe that, quitting the glands, it is found to contain a large number of spherical corpuscles, and to possess a power of clotting, like the fibrine of the blood. These corpuscles are formed from the lining membrane of the chyle-conveying tubes; they average in size about the 4600th of an inch, and are probably identical with the white corpuscles of the blood, as these latter are well known to be chiefly concerned in nutrition. The lacteals form frequent unions with each other, by which their size is increased, but their number diminished, so that they ultimately enter the receptacle by a very few trunks (see fig. 2). The mesenteric glands are composed of coils of these tubes, ramifying among a minute network of blood-vessels; they are likewise dilated or enlarged within the glands, and make their exit from them in fewer numbers than they entered. Thus the *vasa afferentia* are more numerous than the *vasa efferentia*.

Within the receptacle the chyle unites with the lymph, a fluid which is carried there by the *lymphatic* absorbents which are freely distributed throughout the body. The lymph is chiefly composed of the excess of the materials of the blood which had been exuded by the capillary blood-vessels proper to each organ for its nutrition, and which is thus conveyed back to the general circulation. This fluid in its passage undergoes a series of changes, like the chyle, by traversing the *lymphatic* glands in its course; and the vessels carrying it make frequent unions with each other, so as to end, like the lacteals, in very few trunks. It is thus seen that the supply of new blood takes place from two sources, the chyle and the lymph, and which in health is sufficient to compensate for its continued waste. The contents of the *receptaculum chyli* are conducted into the circulation through a canal, called the *thoracic duct* (See *d*, fig. 2). This duct passes through the chest (hence its name) very near to the spine, and empties itself into the left jugular or auxiliary vein: in the accompanying sketch it is represented as joining the former at the point marked *e*. The new materials are thus mingled with venous blood, which of itself is unfitted for the support of life until it receives fresh elements of nutrition, and is re-oxygenated by its transmission through the lungs. It is also probable that the chyle and lymph, being almost immediately after their entrance into the circulation exposed to the action of the atmospheric air in the

lungs, thus pass through the last stage in the process of converting them into pure blood.

We proceed to speak of the blood, the changes which it undergoes during its circulation, the constituents of which it is composed, and the vessels by which it is conducted throughout the system, as without this we cannot explain the functions of the lungs. Blood may be defined to be a fluid circulating through the heart, arteries, and veins, carrying the materials necessary for the support of vitality, nutrition, and secretion, to every organ of the body; building up the frame of the young, and supporting that of the old animal. It not only circulates for the purposes of nutrition or renovation, but also to maintain the heat of the frame; all animals possessing a power of keeping up a heat within themselves, independent of the temperature of the atmosphere they inhabit, be it higher or lower than their own. This is designated animal heat; and its *modus operandi* will hereafter be explained. The heart may be viewed as the central pump from which the system derives the fluid; the arteries the transmitting, and the veins the returning conduits.

In vertebrated animals the blood is of a red colour, but it is colourless in the invertebrated. While circulating, it not only appears to be red, but of a homogeneous character; however, on investigating it after being removed from the vessels, it is found to be composed of dissimilar parts. Its chief components are four—fibrine, albumen or serum, corpuscles, and salts; and each of these contributes to the maintenance of the varied functions of the body. The redness of the blood is owing to the presence of red particles or corpuscles, a fact which is demonstrated by their removal, when a colourless fluid, the *liquor sanguinis*, remains behind. Thousands of these bodies exist in a few drops of blood, and consequently they are so minute as to require the aid of the microscope to detect them. It was formerly supposed that the vessels in many parts of the system, of which those of the eye were adduced as an example, did not contain red corpuscles; modern research has, however, disproved this position; and the true explanation of the white appearance of the eye is, that its vessels are so small as not to transmit a sufficient number of these corpuscles at one time, to give colour to the circulating fluid. We have frequent means of ascertaining this, for when inflammation of this organ takes place, these minute vessels are then enlarged, and consequently the red particles, entering in greater numbers, colour the fluid. Hence the cause of the "blood-shot eye."

The microscope, as before stated, is necessary to develop the existence of the red particles, and when thus examined they are found to be flattened discs,

of a round form (see fig. 3), varying in size from the 4500th to the 2800th of an inch. We may state their average size as being near to the 3000th of an inch. Bulk of animal seems not to influence their dimensions, and they differ but little in this respect if taken from the elephant or the mouse. As a rule, they may be said to be small in the herbivorous mammal, larger in the carnivorous, and largest in omnivorous. They are of greater specific gravity than the other constituents of the blood, and hence, when blood is kept in a fluid state, after being drawn, they will be found to sink towards the bottom of the vessel, and thus tend to give that peculiar appearance which is called its buffy coat or inflammatory crust, for the blood in general is longer in clotting when inflammation exists. The red particles are intimately connected with the health, strength, and vigour of an animal; and are found in fewer numbers in ill-health. Wild animals are said to possess a greater quantity than domesticated, and those which are fat less than those which are lean. The redness of these corpuscles is due to the presence of a red pigment, *hæmotosin*, which is diffused in the fluid which distends their walls; and it is in consequence of this pigment being chemically acted upon in the minute vessels of the system by the carbonic acid, and in those of the lungs by the oxygen, that the difference in the colour of arterial and venous blood is observed. The change in the colour of the blood is likewise connected with the process which generates animal heat—facts which we shall again advert to.

Fig. 3



These figures represent the blood-discs of the ox, highly magnified, and placed in different positions to show their forms.

We pass onwards to speak of the fibrine of the blood. It is generally known that very shortly after the withdrawal of blood it clots or coagulates into a tolerably firm mass; this is owing to its fibrine, and in no way depends on any other of its constituents. This peculiar quality of the fibrine has led to its being called self-coagulating lymph—a term very rarely employed in the present day. It is only by abstracting blood that we are enabled to obtain this material, and to investigate its properties.

Various means are had recourse to for this purpose, such as filtering the blood while it is fluid, washing the crassamentum or clot, or stirring the blood while it is undergoing coagulation. The latter is the plan usually adopted; and if a small bundle of twigs are used for the purpose, it will be observed that the fibrine will adhere to them more or less in a colourless condition, leaving behind the serum and red particles.* Washing the mass thus obtained renders it white by removing the colouring matter from the few red particles which were entangled in its meshes while coagulating. An examination of the fibrine shows not only that it is white, but also that it is very tough and elastic, and, when viewed by a magnifying lens, it is found to be made up of fibres which intersect each other in every possible direction. The fibrillating or self-coagulating power of this material serves most important purposes in the animal economy. It forms the temporary bond of union between broken bones, and plugs to arrest the flow of blood from vessels which have been lacerated or torn asunder: and were it not for this, death would frequently result from causes which are now nearly inoperative. Fibrine may justly be described as the basis of the animal machine; and as its appropriation takes place during its circulation through the capillary blood-vessels, and as these form the connecting link between the arteries and the veins, so it will be apparent that venous blood must contain a smaller portion of it than the arterial. The relative quantity in these vessels is calculated by Müller to be in the proportion of 29 to 24. In health, about three parts of fibrine exist in every 1000 of blood; but it becomes increased in inflammatory affections, and often rises to 8 or 10 parts in the same quantity. This fact explains why a larger amount of blood can be abstracted during the acute stage of inflammation than in health, without the system suffering to an equal extent.

We pass on to consider the serum. After the coagulum of blood has stood at rest for a short time, a fluid of a pale straw-colour appears on its surface: this is the serum. The separation of the serum from the clot is due to the contraction of the fibrine, which continues long after the blood has coagulated. The fluid therefore is forcibly expelled; being, prior to its separation, mechanically retained in the coagulum, as water may be said to be in a sponge. Serum holds in solution the albumen and salts of the blood, and it is chiefly composed of these matters with the addition of water. Its viscosity will depend on the relative amount of albumen, which in health has been estimated at about 8 per cent. An alteration in the specific

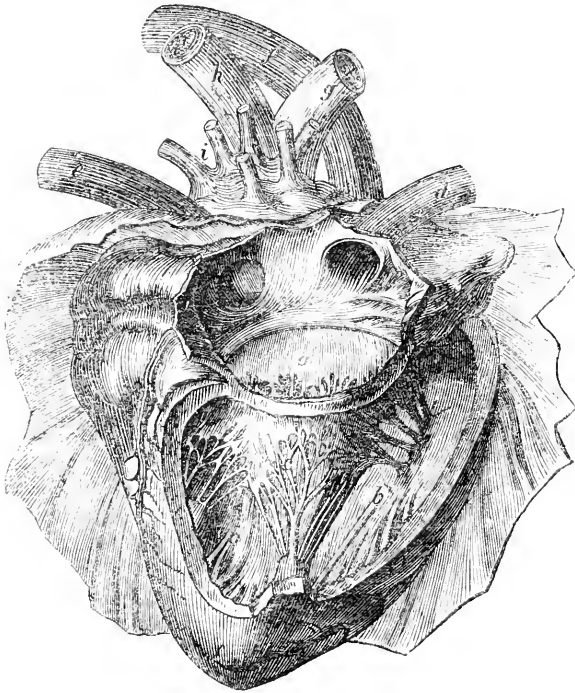
* Some fibrine thus obtained was exhibited at the lecture.

gravity of serum will likewise indicate the proportion of its albumen; as in healthy subjects its specific gravity is about 1030. Under disease, and more especially when of a debilitating nature, such as dropsy, the watery parts of the serum are increased, and become effused into various cavities of the body, as the chest, abdomen, or ventricles of the brain. Ordinary serum is also quickly transuded through the thin coats of the capillary vessels, of which we have daily proofs in local inflammation of the external structures, where the swelling is referable to that cause. Unlike fibrine, serum, whether in or out of the body, remains fluid; but, as it contains albumen, this is capable of being solidified by heat, and likewise by the admixture of mineral acids, or alcohol.* The heat required to accomplish this is 162 degrees of Fahrenheit—a temperature the body never attains to. Albumen is believed to be converted into fibrine, and thus to minister to nutrition; and it is also thought that the white corpuscles of the blood, of which the limits of this lecture will not allow of a further

mention, are the agents which effect the conversion. The salts can be only incidentally alluded to; they amount to between 6 and 7 parts in 1000, and are chiefly composed of the chlorides of sodium and potassium, and the phosphates of lime, magnesia, and soda.

Having now described the constituents of the blood, we pass on to explain its circulation, and the changes which take place during its passage from one part of the system to another. We have before likened the heart to a central pump, as it is by the contraction of the muscular walls of this organ that the blood is driven into the arteries, that arise from two of its cavities, to be conveyed throughout the body. The heart is a double organ, and usually described as having two sides, a right and left. It is also divided into four cavities; the right auricle and ventricle, and the left auricle and ventricle. The two auricles, and also the ventricles, are separated from each other by a muscular partition, so that the right side has no direct communication with the left. In the accompanying sketch, fig. 4.

Fig. 4.



a. The auricle. *b, b.* The ventricle. *c.* The valves which prevent the return of the blood from the ventricle to the auricle. *d.* The anterior vena cava. *e.* The posterior vena cava. *f.* The pulmonary artery. *g.* The anterior aorta. *h.* The posterior aorta. *i.* The pulmonary veins.

* The solidification of the albumen of serum was demonstrated in the lecture by the employment of hydrochloric acid.

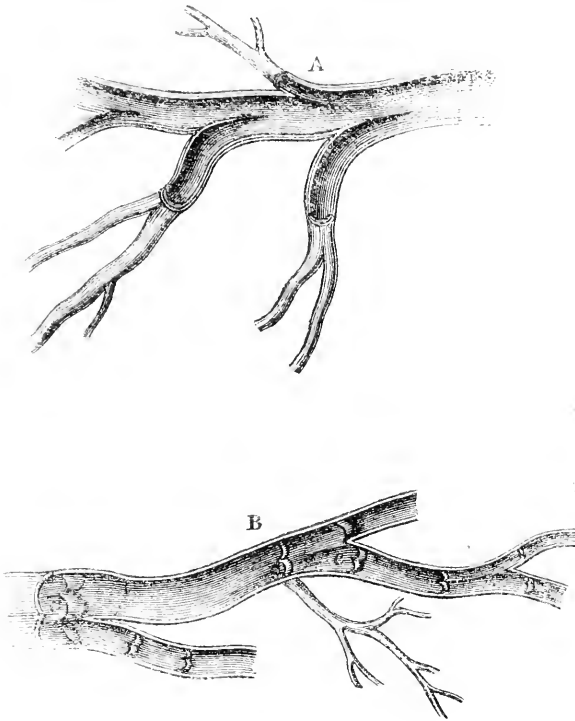
the cavities of the right side are laid open to illustrate the course of the blood. The two venæ cavæ, marked *d* and *e*, receive the blood from the veins of the system which unite to form these vessels, and they empty themselves into *a*, the auricle. From this cavity, by the contraction of its muscular sides, the blood is driven into *b*, the ventricle. The filling of this second cavity leads likewise to the contraction of its walls, by which the blood is propelled into *f*, the pulmonary artery; as the rising of the valve *c* prevents the blood passing back into the auricle by closing the auriculo-ventricular opening. This valve is called the *valvula tricuspis*, being divided into three portions, each of which tends from its base which is attached to the sides of the ventricle towards a loose or floating apex. From the pulmonary artery the blood enters the capillaries of the lungs, where it undergoes a peculiar change, hereafter to be explained, and is thence conducted back again to the heart by the pulmonary veins. The action of the artery in assisting the onward course of the blood would drive a portion of it into the ventricle, but this is prevented by three valves of a semilunar form which guard the mouth of the vessel. The pulmonary veins, *i*, empty themselves into the left auricle, and this into the left ventricle; a similar valve to that of the right side, the *valvula bicuspis*, preventing any retrograde motion of the fluid into the auricle. From the left ventricle the blood passes into the aorta, which, bifurcating into *g*, the anterior, and *h*, the posterior aorta, conducts it through the medium of the arteries branching off from these vessels to all parts of the body. Semilunar valves are also placed at the origin of the aorta from the heart, and serve a like purpose to those existing in the pulmonary artery. The arteries of the system in their course give off many branches, all of which end in hair-like vessels, *capillaries* (see Figs. 6 and 7), by which the blood is appropriated to the maintenance of the several tissues; here it likewise undergoes a chemical change (which we shall presently describe), and is afterwards returned to the heart by the veins which unite and form the two cavæ before spoken of. This circulation of the blood is divided into *the pulmonic*, or that which conveys it from the right to the left side of the heart through the lungs, and *the systemic*, or that which takes it from the left to the right side, through the arteries and veins of the system. The contraction of each auricle is simultaneous, and precedes a little that of the ventricles, which likewise contract together. This action of the heart produces a pulse, and the number of its pulsations within a given time materially assists the surgeon in arriving at a correct diagnosis when an animal is suffering from disease.

Having explained "the general round of circula-

tion," we shall add some further remarks on the arteries and veins, and afterwards speak of the chemical changes of blood. These vessels are represented in fig. 5, the artery being marked *A*, and the vein *B*: it will also be seen that their inner structure is exposed by a section being carried through their coats.

It has already been stated that the arteries arising from the heart are two, namely, the aorta and the pulmonary, and that valves are placed at their origin to prevent a retrograde movement of the blood; from which it will be inferred that these vessels are not mere passive conduits for the fluid. The amount of their action in assisting the circulation is a vexed question among physiologists, but no doubt it is very considerable. The simple fact of these vessels being found empty after death, goes very far to prove their importance as active auxiliaries to the heart; for were they passive tubes merely, they would then be in the opposite condition, viz., full. The early anatomists were acquainted with the circumstance of these vessels being void of blood after death, and consequently they were led to suppose that the "animal spirits, being of an æriform nature," were conveyed by them; hence the name *artery*, or air-carrying tube. At their origin these vessels are large, but they gradually decrease in size as they proceed from the heart, which is produced in part by the number of the branches they give off in their course. It has been rightly said that the capacity of the arterial system is rather increased than diminished by this sub-division, and therefore no mechanical obstruction from that cause can interfere with the flow of the blood in the small arteries. The rapid splitting up of these vessels into smaller ones is in proportion to the nearness of the organ they are going to, and in every part, as before stated, they end in tubes so minute as to be named capillaries. As the blood which traverses the arteries is destined to supply the system with the materials necessary for the support of life and development, so do we find that they usually take the most direct course to each particular organ. They also run in parts which are most protected from injury, such as the inner side of limbs and bend of joints. Occasionally also they gain security by passing through canals formed in bones—a fact which can be demonstrated in the skull and the feet of several of our domesticated animals. In number the arteries are considerably less than the veins, it being necessary that due provision for the return of blood should be made to balance the circulation, as from the situation of the veins the current through them is frequently obstructed. The section of an artery (see fig. 5) shows that its inner coat, which is an epithelial membrane, is, unlike that of a vein, perfectly smooth. Besides this

Fig. 5.



A. An artery partly cut open to show its inner coat.

B. A vein also opened, and showing *c*, its valves.

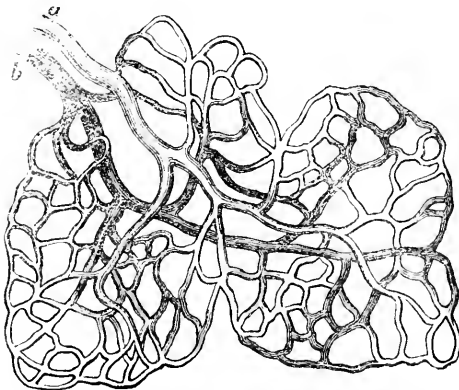
coat, these vessels have four others—a serous, a muscular, an elastic, and a cellular. These tunics are not of equal thickness throughout the course of the artery; and especially do we find that the elastic is increased in substance the nearer the vessel approaches the heart; but, on the contrary, that the muscular is most developed at a distance from that organ. The elastic coat gives strength to the vessel, and yields to the distending force of the blood at each stroke of the heart; but as soon as the volume of the blood has passed, it returns by its inherent property to its former condition. The expansion and recoil of the elastic coat converts these jets of blood into a continuous stream; but this stream is still augmented in volume at each contraction of the heart. Hence we observe that, when an artery is divided, the flow of blood from its cut end is alternately increased both in quantity and force, synchronously with the heart's action. Under these circumstances we likewise perceive that the vessel rises in its bed with a peculiar vermiform action, which proves that the elastic coat is not simply distended, but also elongated by the passing current. The elongation is always greater

than the expansion, and the two actions combined produce the arterial pulse. Thus we feel the pulse of the artery when its calibre and length are increasing, and that of the heart when its ventricular cavities are contracting. In the language of the anatomist, the heart is in a state of *systole*, and the artery of *diastole*, during their respective pulsations. It is not to be inferred from the foregoing remarks that the elastic coat exerts any propulsive power on the passage of the blood, as this can only be effected by lessening the area of the arterial tube, and must consequently depend on its muscular or contractile coat. It is right that I should state that the muscularity of arteries, although strongly insisted upon by the immortal John Hunter, has since his time not been generally admitted. I could adduce a multiplicity of facts, were it necessary, to prove the correctness of Hunter's views, but content myself by stating that I am of the number of his disciples.*

* Since this lecture was delivered, an opportunity has been afforded the author, by the death of the rhinoceros in the gardens of the Zoological Society,

As the arteries everywhere terminate in capillaries, so do we find that the veins arise from them. A vein (see B, fig. 5) differs materially from an artery, first in the thickness of its coats, and secondly in having its internal lining thrown into folds here and there, forming thereby its valves, marked c, fig. 5. These valves perform the office of such structures in general, namely, that of allowing a fluid to pass but in one direction; and as their free edges are directed towards the heart, it follows that they prevent any retrograde motion in the blood by rising and closing the canal. This arrangement is rendered the more necessary in consequence of veins not exerting any power *per se* in the return of the blood, this being chiefly effected by their being pressed upon by the various muscular movements of the body. Veins are also non-pulsatory, and the stream of the blood through them is continuous and even. They are far more numerous than arteries, and are divisible into a superficial and deep-seated set, which freely communicate by anastomosing branches. They likewise increase in size, but diminish in number as they approach the heart, near to which those of the system ultimately terminate in the two cavæ. The blood which they carry is dark in colour, unlike that of the arteries, in which vessels it is of a scarlet hue. This change in the colour of the fluid is produced in the capillaries; the cause and the consequence of which we shall now consider. Fig. 6 shows an artery, *a*, terminating in a capillary rete of vessels, and a vein, *b*, arising therefrom: it will also be observed that,

Fig. 6.



Capillaries of fat. *a*. The terminal artery.
b. The primitive vein.

(From Todd and Bowman's 'Physiological Anatomy.')

of confirming these opinions. He examined a portion of the carotid artery, and found its muscular coat extensively developed. The fibres were arranged more or less in a circular order.

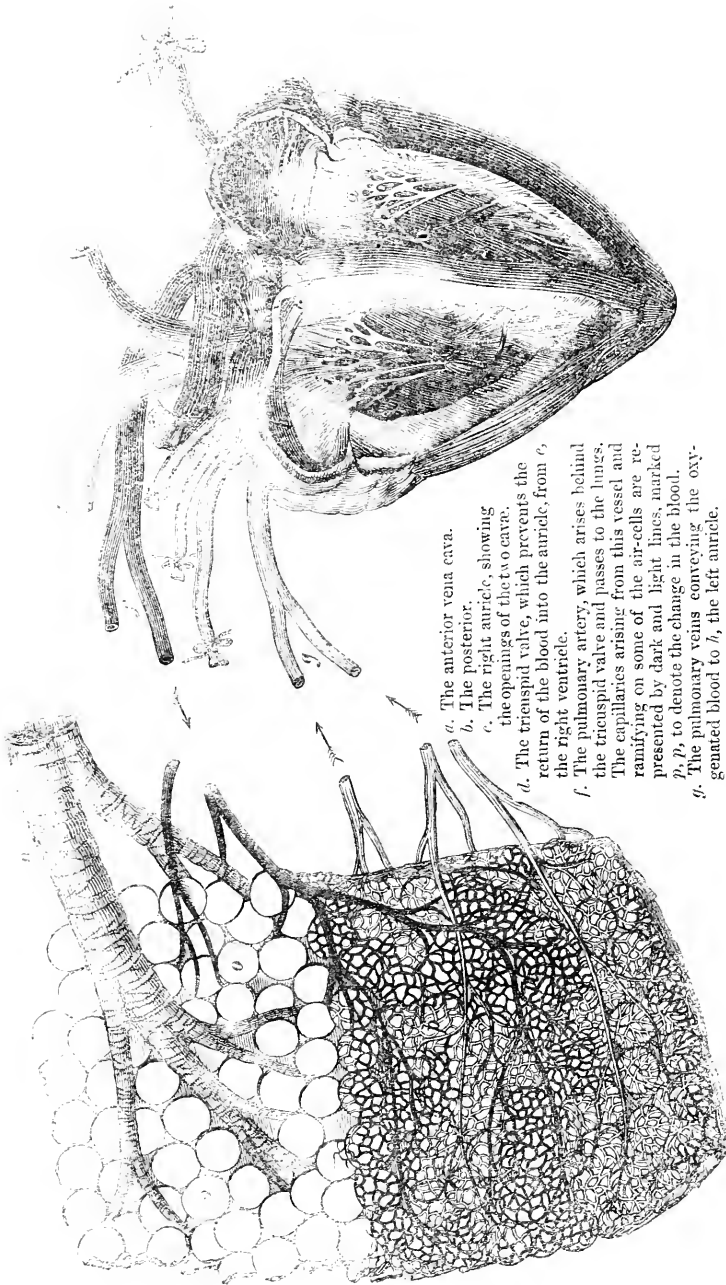
in accordance with the facts we have described, the former is represented light, and the latter dark in colour.

The brightness of the arterial blood is due to the presence of the oxygen of the air acting on its coloured corpuscles, and which it receives by its passage through the lungs; and the darkness of the venous blood, to the influence of the carbonic acid of the system on the same bodies. These gases, however, affect only the pigment of the red corpuscles to produce this altered appearance of the circulating fluid; and consequently the corpuscles can only be viewed as the indirect carriers of the oxygen into, and the carbonic acid out of the body.

I have before stated that the various tissues of the frame are undergoing a continual waste or change, and therefore they need a constant reparation, which is provided for by the appropriation of the blood by the capillaries. The thinness of the walls of these vessels allows of a transudation of the liquid fibrine, which being imbibed by the surrounding structures administers to their support; while any excess is carried back into the circulation by the lymphatic absorbents. The metamorphosis, however, of the tissues furnishes both carbon and hydrogen; and with these the oxygen, which has been conveyed into the capillaries by the red corpuscles, unites, forming thereby carbonic acid and watery vapour. In this process heat is evolved; and as it takes place in every part of the system, so it follows that the temperature of the body is everywhere kept up to its standard, viz., about 99° Fahrenheit, independent of external causes. An animal may thus be said to carry with him a self-supplying furnace, which continues in active operation so long as health and vigour of constitution remain. It is this generation of heat by chemical union which is designated animal heat. By the loss of some of its fibrine, and by the presence of carbonic acid, the blood is now rendered unfit for the purposes of life, and in this condition it returns to the heart by the veins (see fig. 6). Near to this organ it receives a fresh supply of nutritive matter through the medium of the thoracic duct (see fig. 2), and passing from the heart to the lungs it again obtains the required oxygen, and parts with the carbonic acid and watery vapour (see fig. 7).

The function thus performed by the lungs, of which we must speak more at length, will be better understood by again referring to the diagram, fig. 7. One portion of this diagram represents the four cavities of the heart laid open, and the vessels which are going to and from them; and the other a branch of the windpipe terminating in the air-cells of the lungs, which are surrounded by a network of capillaries indicating the change in the colour of the

Fig. 7.



- a.* The anterior vena cava.
- b.* The posterior.
- c.* The right auricle, showing the openings of the two cavæ.
- d.* The tricuspid valve, which prevents the return of the blood into the auricle, from *c*, the right ventricle.
- e.* The pulmonary artery, which arises behind the tricuspid valve and passes to the lungs. The capillaries arising from this vessel and ramifying on some of the air-cells are represented by dark and light lines, marked *p*, *p*, to denote the change in the blood.
- f.* The pulmonary veins conveying the oxygenated blood to *h*, the left auricle.
- g.* The bicuspid valve.
- h.* The left ventricle.
- i.* The aorta, which divides into *l*, the anterior, and *m*, the posterior aorta, to conduct the blood throughout the body.
- n.* A bronchial tube, surrounded by *o*, the air-cells of the lungs.

blood. The intervening arrows show the course of the blood to and from the lungs to the heart. The atmospheric air which enters the lungs at each inspiration through the medium of the windpipe, contains by weight 77 parts of nitrogen and 23 of oxygen; but the expired air is deficient of oxygen,

its place being supplied by carbonic acid gas.* An interchange of the oxygen of the air and the car-

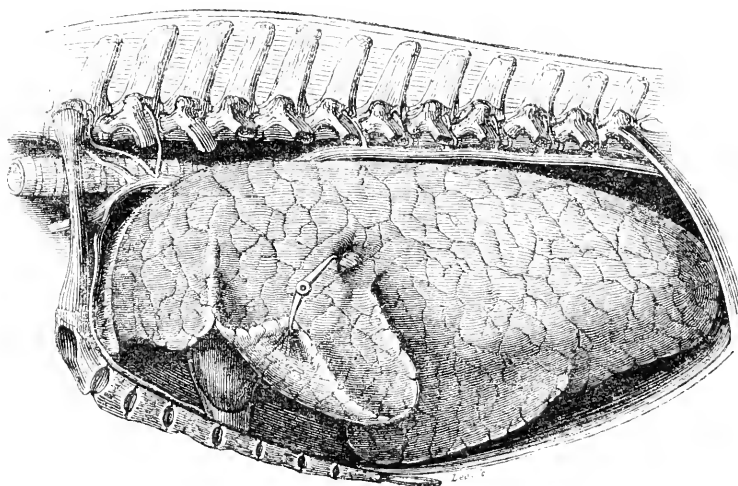
* This fact was illustrated by breathing into some pellucid lime-water, by which it was rendered turbid; the carbonic acid uniting with the lime, and forming thereby an insoluble carbonate of lime.

bonic acid of the system is thus effluated, these gases displacing each other by permeating the thin walls of the capillaries, which are everywhere spread out as a minute network on the surface of the air-cells. The immediate result of this change is the conversion of the blood from a dark Modena red to a bright scarlet colour, and the fitting of it again for the chief purposes of life.* Thus we see that the blood in circulating through the system becomes unsuited to life, and that it is re-invigorated by its passage through the lungs. The function of respiration is therefore no less important than that of circulation. Many operations of the animal system may be suspended for a considerable time with but little ill consequence, but respiration must be continued, or life quickly ceases. It is true that respiration may be increased or diminished even at pleasure, but it cannot be altogether arrested; for if we attempt to hold the breath for a long time, we ex-

perience so much inconvenience, that irresistibly we are compelled to resume the act of breathing. This without doubt depends on the circumstance that during its suspension there is an accumulation of carbonic acid in the system, the continuance of which would produce asphyxia or suffocation. We have here another proof of the wisdom and design of the omnipotent Creator in making respiration, like the circulation, independent of our will.

As the circulation has its central organ, the heart, so has respiration—namely, the lungs: and both these are situated within the same cavity, where they are secure from external injury or impediment to their function. We may in this place observe that the osseous portion of the body of an animal forms three important cavities: an anterior, called the skull, which contains the brain and the nerves of special sense; a middle, the thorax, in which is lodged the heart and lungs (see fig. 8); and a pos-

Fig. 8.

Represents the heart and left lung in *situ*, the side of the chest being cut away.

terior, the pelvis, holding the uterus and its appendages, the chief of the female organs of generation. The thorax, however, is constructed on a different plan from the other cavities, for there is an all-important necessity that its area should be capable of being enlarged and diminished, in accordance with the altered volume of the lungs during respiration. Such not being needed in the skull or pelvis, the bones forming these cavities are firmly

* The experiment of pouring some dark, or carbonized, blood into a vessel of oxygen gas was introduced, and immediately it became of a bright red colour.

and immovably united together. The thorax is bounded above by the spine, on the sides by the ribs, below by the breast-bone, or *sternum*, and behind by the *diaphragm*; a muscular tendinous partition separating it from the abdomen.

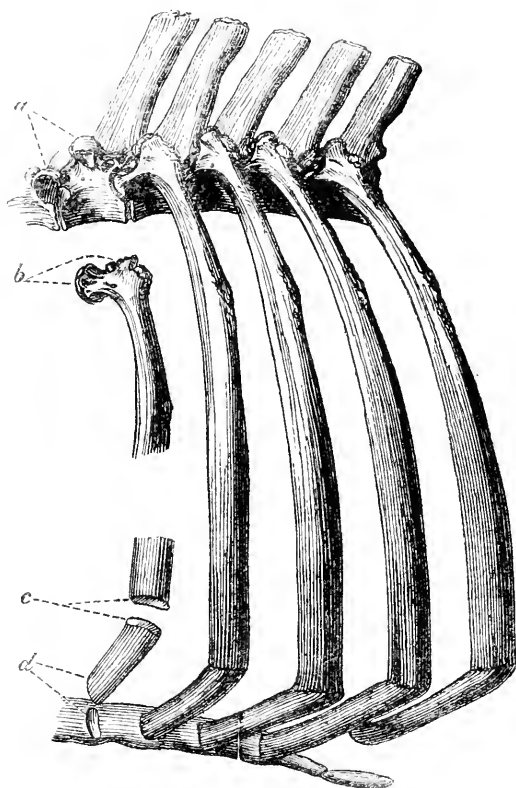
The form of the thorax is that of a truncated cone placed horizontally, having its apex formed by the near approximation and shortness of the first pair of ribs, and its base by the diaphragm. The dimensions of the cavity are consequently increased from before backwards; while the hinder part, or base of the cone, is cut off obliquely from above downwards and forwards. The first pair of ribs are

situated nearly perpendicular; and more especially in the ox, where they form a right angle with the spine. One of these is represented *in situ* in fig. 8. The ribs of the horse number eighteen on either side, but in the ox and sheep they are only thirteen. They increase in length from the first to the eighth, and likewise in their curve obliquely backwards from the spine, from the first to the thirteenth; but they gradually diminish in length from the

eighth to the last. Their interspaces are filled up by muscular fibres, the *intercostal* muscles, which are active agents in inspiration. The ribs, therefore, with the diaphragm form the moveable boundaries of the chest; the spine and the sternum being more or less the fixed point from which they act.

As seen in the annexed figure, No. 9, the ribs are united to the spine above by moveable joints,

Fig. 9.

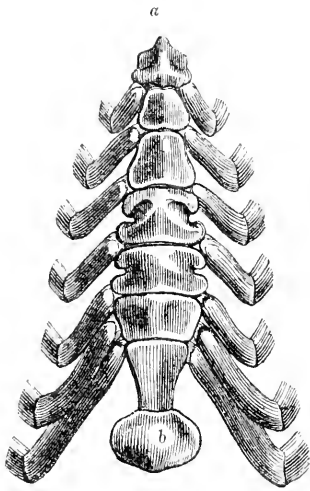


a. The cavities in the vertebra which receive *b.* The head and tubercle of the rib. *c.* The surfaces of the synovial joint uniting the rib to the cartilage. *d.* The joint formed by the cartilage and sternum.

and to the sternum below by means of their cartilages. The inferior attachment is not, however, in all of them directly to the sternum, some being joined by their cartilages to each other, and thus indirectly to that bone; hence their division into *sternal*, or true, and *asternal*, or false ribs (in the sketch the hindermost rib is a false one). Each rib articulates by its rounded head and tubercle, marked *b*, with corresponding hollows in the vertebrae, marked *a*, forming the moveable joints alluded to; these distinct articulations by the head and

tubercle are, however, less perfect as we proceed from before backwards. That every facility may be given to the movements of the chest while the ox is recumbent—a position, as is well known, he frequently assumes during rumination—the attachment of the ribs to the sternum, as well as the development of that bone, differ considerably from the horse. These peculiarities, which we are about to describe, will be at once recognized by a reference to the annexed figures 10 to 13. In the first-named figure the under surface of the sternum of the ox is

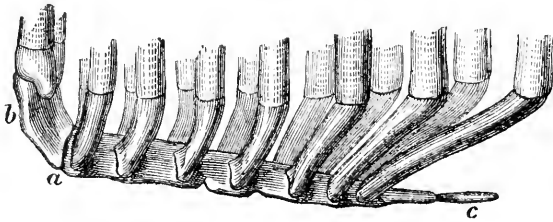
Fig. 10.



Sternum of ox, inferior view. *a*. The manubrium.
b. The ensiform cartilage.

depicted, and it will be observed that it is perfectly flat, consequently it can be subjected to pressure without inconvenience to the animal when he is resting on the ground. On the contrary, this part of the sternum of the horse has a thin cartilaginous edge, similar in appearance as well as in position to the keel of a boat (see fig. 12), which ill adapts it to receive a similar pressure. In both animals the sternum is originally composed of several bony pieces, which as age advances are more or less perfectly united together: these pieces are, however, very differently arranged, so that in the ox *bone* supplies the place of cartilage in the horse, and forms the flat surface before mentioned. The loss of elasticity, and consequently of motion, cartilage being highly elastic, is, however, more than compensated for by the manner the first bone is united to the second in the ox. In this animal, the first bone, *manubrium*, is attached by a synovial joint, which allows of a free motion in various directions, but more particularly from side to side (see *a*, fig. 11). The cariniform cartilage in the horse (*a*, fig.

Fig. 11.



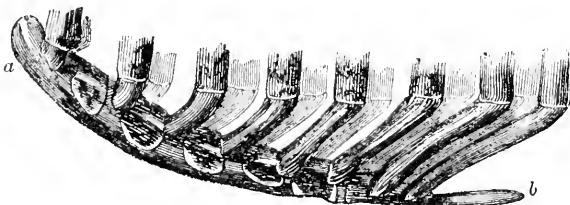
Lateral representation of the sternum of the ox.

a. The joint formed by the union of the first bone, *manubrium*; the cartilage of the rib being partly removed to bring it into view. *b*. The manubrium. *c*. The ensiform cartilage.

12) is substituted for the manubrium with its synovial joint. The arrangement here spoken of allows the anterior portion of the thorax of the ox to yield the more readily to the respiratory movements, and likewise facilitates the curving of the lower part of the neck upon the front of the chest when the ani-

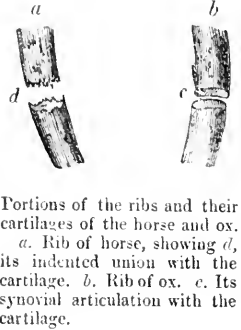
mal's head is directed towards his side. The posterior portion of the sternum in both animals presents fewer differences for observation, being terminated by a cartilage called the ensiform, lettered *c*, fig. 11, and *b*, fig. 12. The attachments of the ribs to their cartilages also varies considerably,

Fig. 12.



Lateral view of the sternum of the horse, showing its keel-like shape.
a. The cariniform cartilage. *b*. The ensiform cartilage.

as seen in the subjoined sketch (fig. 13), where *a* represents a portion of the rib of the horse, with its cartilage, and *b* the same parts of the ox. In the former the lower end of the rib is received into a cup-like cavity in the upper part of the cartilage; a union which is further strengthened by indentations of their edges, locking into each other, but greatly limiting the extent of the motion between them (*d*, fig. 13). In the latter, however, we meet with a true synovial articulation in this place, marked *c*, in figs. 9 and 13. The nature of this attachment was several years since pointed out by Mr. Varnell, Demonstrator of Anatomy in the Royal Veterinary College. Besides the facilities for motion hereby obtained, the cartilages at their lower extremities are united to the sternum, as in the horse, by synovial joints (see *d*, fig. 9).

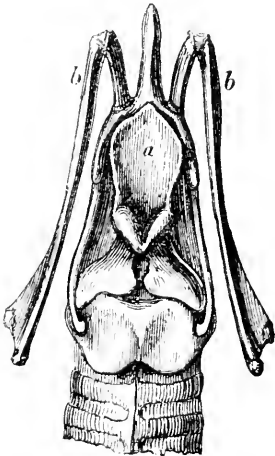


with its branches, and the lungs. At the upper part of the windpipe, which, as its name implies, is the conduit of the air to the lungs, we observe a peculiarly constructed organ, called the larynx. It differs in many particulars in nearly every variety of animal, and is more complicated in man than in any of the inferior creatures. The larynx discharges a double office, being the organ of voice, as well as the conduit for the air in breathing; and in proportion as the voice is incapable of modification, so do we find simplicity in its structure. It presents the same general appearance in all animals, being slightly altered to suit the tones uttered by each: this will be observed on comparing figs. 14 and 15, which represent the larynx of the horse and the ox.

The larynx is composed of a number of cartilages which are united to each other more or less firmly. One of these, the epiglottis (*a*, figs. 14 and 15), defends the entrance into the windpipe, and in the act of swallowing it rises and closes over the opening of that tube, thereby preventing the passage of the food into it. Except in deglutition the epiglottis is always depressed to preserve a free and open conduit for the air to and from the lungs. The larynx is held in its situation through the medium of a singularly shaped bone, the os hyoides (*b*, figs. 14 and 15), which is united to the under

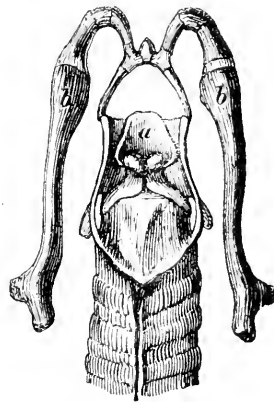
Having described the mechanical arrangements of the walls of the thoracic cavity, we proceed to speak of the principal organs which are concerned in respiration: they are the larynx, the windpipe

Fig. 14.



The larynx of the horse.
a. The epiglottis. *b*. The os hyoides.

Fig. 15.



The larynx of the ox.
The references are the same as in Fig. 14.

and back part of the skull. The os hyoides gives attachment also to the muscles of the tongue, and as this organ possesses a great freedom of action in ruminants, we find the bone to be composed of

more pieces in these animals than in many others: these pieces are likewise connected to each other by synovial joints. (Compare the os hyoides in the horse and ox). The necessity for a modification of

the cartilages of the larynx is apparent when we reflect on the varieties of the voice of our domesticated animals. We recognise the horse by neighing, the ox by bellowing, the dog by barking, the sheep by bleating, the pig by grunting, &c. Many of these sounds are influenced by the existence of folds in the lining membrane of the larynx, called vocal cords. In the ox and the sheep we have the simplest form of the organ, for bellowing and bleating are little more than long-continued expiratory acts.

The ingress and egress of the air in respiration also differ. In the horse each is carried on through the nasal passages, except in coughing, when a portion of the air is expelled by the mouth. But in the ox and sheep the air enters and escapes both by the mouth and nostrils. This variation in part depends on the situation of the larynx with reference to the *velum palati*, and also on the length and position of the *velum*; peculiarities which can only be alluded to.

The lower part of the larynx is continuous with the windpipe, which is likewise composed of a series of cartilages arranged in a circular order. The windpipe, in common with the other portions of the respiratory passages, is lined with a mucous membrane, the secretion of which defends these parts from the irritation of the atmospheric air. This membrane not unfrequently suffers from a change of temperature, &c., and is the seat of those diseases recognised as catarrh, laryngitis, bronchitis, &c. The number of the rings of the windpipe will of course be governed by the length of neck: in the ox we usually find from 55 to 60. These rings are greater in substance at their front, being here more exposed to external injuries, than at their hinder part. They are united to each other by elastic tissue, which allows the windpipe without inconvenience to accommodate itself to the various movements of the neck. On the inner and back part of the rings, lying between them and the mucous membrane, is a thin layer of muscular fibres, the use of which is one of the vexed questions of physiology. The late Mr. Youatt denied the existence of this muscle in the ox;* I have satisfied myself, however, that it not only exists in this animal, but in every other which hitherto I have examined. It is a singular fact, and one which I am desirous of naming in this place, that in the dog the muscle is situated on the outer, and not on the inner, part of the windpipe. Mr. Percivall is of opinion that the muscle resists the tendency of the elastic cartilaginous rings to form an elliptical-shaped canal; and, by converting the ellipsis into a circle, may thus tend to expand and not to contract the calibre of

the tube.* Whether it be so in moderate action of the muscle or not, it is clear that when its fibres are contracting with energy, or are unduly stimulated, it must diminish the area of the canal. I would ask if it be not specially employed in the lower animals, in whom the vocal apparatus is exceedingly simple, compared with man, for producing the voice, by regulating the volume of the exhaled air, entering the larynx from the lungs; and also whether some of their intonations do not depend on the amount of its action.

The windpipe, passing down the neck, enters the chest between the first pair of ribs (see fig. 8); and, in the ox and sheep, it almost immediately afterwards sends a branch to the anterior part of the right lung (*b*, fig. 16): this is called the *third bronchus*, and does not exist in the horse. A little below this the windpipe divides into the two main bronchial tubes: one of which penetrates the substance of each lung, dividing and re-dividing into smaller and innumerable branches, which ultimately communicate with the air-cells (figs. 16 and 17).

It may here be mentioned that the chest is divided into two cavities by a membranous partition, the *mediastinum*, extending from before backwards, by which the right and left lung are separated from each other. Hence an explanation in part of the fact that pleuro-pneumonia, as well as other diseases, are frequently confined to one lung. The air-cells are clustered around each terminal bronchus, somewhat after the manner of grapes upon their stalk (fig. 17); and "it has been calculated by M. Rochaux, that in the human subject about 18,000 surround each bronchus, and that the total number in the lungs amounts to *six hundred millions*." "If this estimate," says Dr. Carpenter, "be even a remote approximation to the truth, it is evident that the amount of surface exposed by the walls of those minute cavities must be many times greater than that of the exterior of the body."† The air-cells follow no definite shape: they are for the most part flattened against each other, and are said to vary in size in the human subject from about the 200th to the 70th of an inch. In the ox the air-cells are many times smaller than in man, and even more minute than those of the horse; and injected preparations of their capillaries show that the rete formed by these vessels is likewise finer, or more closely woven. This circumstance throws some light on the peculiar appearance met with in pleuro-pneumonia, and will hereafter be alluded to.

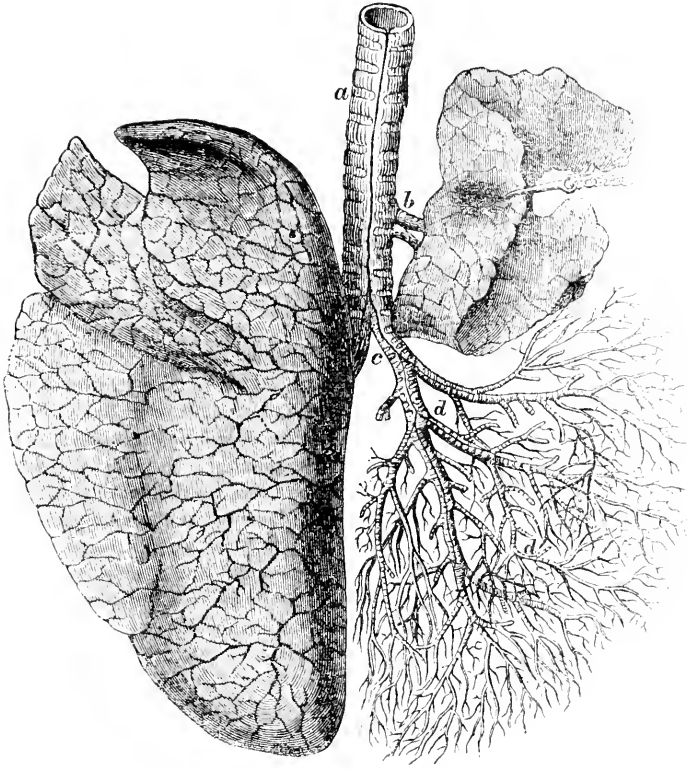
From the foregoing remarks it is apparent that the chief bulk of the lungs is made up of air-cells, surrounded by their network of vessels, and com-

* See "Cattle," p. 374, Society for the Diffusion of Useful Knowledge.

* Anatomy of the Horse, p. 225.

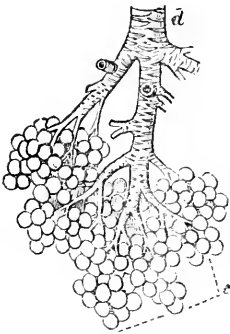
† Manual of Physiology, p. 389.

Fig. 16.



a. The windpipe. b. The third bronchus. c. The two principal bronchi. d d. The ramification of the bronchial tubes throughout the lung.

Fig. 17.



d. Terminal bronchus, communicating with e, the air-cells. The parts are highly magnified.

municating with the minute ramifications of these bronchial tubes. Through the medium of these structures both elastic and contractile tissue enter into the composition of the lungs, by which they

possess a certain amount of action independent of the expansion and contraction of the boundaries of the chest, and are thus enabled of themselves to assist in the process of respiration. The various structures forming the lungs are united together by areolar tissue, and they are also collected into small masses, termed lobules, which are joined to each other by the same material. Hence the expressions *interstitial* and *interlobular* areolar tissue: the former being applied to the bond of union between the different structures, and the latter to that collecting the lobules to each other. In the ox the lobules are very distinct, and the amount of areolar tissue is proportionably large (see fig. 19); thus again accounting for the appearances produced by pleuro-pneumonia.

Each lung is divided into lobes by a deep fissure: the number of these lobes varies, although not to great extent, in different classes of animals. In the ox and sheep the right lung consists of four, and

the left of three lobes. The lungs are held in their situation principally by the large vessels which are going to and from them, and also by the windpipe: they are covered externally with a serous membrane, the pleura, which is reflected upon the sides of the thoracic cavity, and forms also the mediastinum before spoken of. The lungs are everywhere free in the chest, except along their middle and upper surface, which is connected by the large vessels, &c., before mentioned, to the spine. They may be said to completely fill the cavity, their external covering of pleura being in contact with the reflection of the membrane which lines the chest.

Respiration consists of inspiration and expiration, and the bulk of the lungs will accord with the dilatation or contraction of the cavity; nevertheless they are not, as elsewhere stated, mere passive agents in the process. Many of the muscles which lie externally to the ribs, as well as those filling the spaces between them, the musculo-tendinous partition between the thorax and the abdomen, the *diaphragm*, and the abdominal muscles, are concerned in breathing. In expiration a portion only of the air contained in the air-cells is forced out by the pressing forwards of the viscera of the abdomen upon the thoracic cavity, through the contraction of the abdominal muscles, the diaphragm being at that time in a relaxed condition; the sides are also compressed at the same instant by the fall of the ribs, which is aided in part by their cartilages. This action ceasing, the diaphragm contracts, and assumes a flatter aspect; the viscera of the abdomen recede, and the ribs, the motion being assisted by their synovial joints, are drawn forwards and outwards, thus enlarging the cavity. To fill the vacuum which would thus be occasioned, a rush of fresh atmospheric air down the windpipe takes place: this equalises the density of that portion of the air which had not been expelled, and which by its retention had become rarefied, and thereby assists the expansion of the lungs; the pressure to which they were subjected in expiration being now removed. As the chief use of this function is to eject carbonic acid gas from the system and produce oxygenated blood, so the quantity of air respired in a given time will be regulated accordingly. In a state of quietude and in health, the number of respirations in the ox are about 12 in the minute; being in proportion of 1 to $4\frac{1}{2}$ pulsations. The quantity of carbonic acid evolved varies from four to even eight per cent.; the rapidity of its production depending, amongst other causes, on the amount of exertion an animal undergoes. To supply the necessary quantity of oxygen to combine with the carbon, an increase of breathing must take place, otherwise death will quickly ensue. This rapid combustion of the carbon would, however,

raise the temperature of the body far too high compatible with the maintenance of its functions; and consequently, as the circulation is increased, so will be the secretion from the follicles of the skin, bedewing the surface with a copious perspiration, which, by its evaporation, tends to regulate the amount of heat by depriving the system of its excess of caloric.

I might dwell at far greater length on this part of our subject; but having to speak of an important disease to which the respiratory organs are subject, I pass now to its consideration. The name given to this affection by almost universal consent is PLEURO-PNEUMONIA. I object, however, to the malady being thus designated; and if my view of its nature be correct, a less appropriate name could scarcely have been selected. The term *pleuro-pneumonia*, *pneumo-pleuritis*, which has been proposed by some who consider the pleura more especially implicated, would immediately convey to the mind of the medical man that the disease was an inflammatory one, involving the substance of the lungs, with their investing membranes. Although there may not be much in a name, nevertheless it were to be wished that a better one had been adopted for this disease; as inflammation is not its essential feature, especially at its commencement. An incorrect nomenclature is sure to lead to false conclusions with regard to treatment, and thus the life of the patient will be greatly endangered.

Prior to our discussing the question of the true nature of this malady, I shall take a rapid view of the epizootics which have visited Europe from the earliest history to the present time. Mention is frequently made in the pages of Holy Writ of these diseases, and we read that among the plagues of Egypt a grievous murrain swept off the cattle. Homer frequently alludes to their ravages in Greece; and Virgil, Ovid, and other Roman authors, speak of their destructive effects among the cattle of Italy, &c. Of late years these maladies appear to have been on the increase, and within a short period England has been visited by *eczema-epizootica*, *pleuro-pneumonia*, and *variola-ovina*. The prevalence in this country of these particular diseases may certainly be said to be new to the present generation; but whether they have existed here at a remote period is somewhat doubtful. Believing this matter to be of some importance, we are induced to look into the history of these outbreaks; and should it appear that there is a reasonable ground for the supposition that pleuro-pneumonia is not altogether new, but that it has long since both visited and quitted our shores, we have thereby a strong reason to hope that it may again disappear from among us.

About the commencement of the Christian era

diseases of this class are mentioned by Columella, who considered that they spread by means of their contagious properties. In the fourth century they are again noticed by Vegetius, who described some of their symptoms, and entertained similar views to Columella with regard to their extension.

In 810 it is recorded that all the cattle in Charlemagne's dominions, France, Italy, and Germany, were destroyed by one of these pests, the nature of which can only be conjectured, for the term "murrain" seems to have been of general application, and consequently its adoption throws but little light on the inquiry. From this period to the revival of the arts and sciences, nothing satisfactory can be learned respecting these epizootics; but in the sixteenth century we have detailed accounts of their progress and devastating effects. According to Ramazini, in 1514, and again in 1599, the Council of Venice forbade the use of beef and veal, and even milk, on account of the diseased condition of the cattle. The same author likewise states, that in 1691 sheep were swept off by thousands—puscular eruptions covering their bodies, which he unhesitatingly affirms were of the nature of small-pox. In 1693 the cattle in Hesse fell victims to "pulmonary phthisis:" it may, however, be reasonably doubted whether the disease was properly named; and it is probable that it was identical with the modern pleuro-pneumonia. Both cattle and sheep in Lower Hungary suffered severely at the commencement of the eighteenth century, the former from an epizootic, which is undefined, and the latter from small-pox: the maladies made their appearance early in 1712, and continued with great virulence throughout the year. About the same period the cattle in England were likewise attacked with a disease which bore a great resemblance to eczema epizootica.

During nine months in the year 1713, no less than 30,000 cattle are said to have died in Rome and its environs, of malignant dysentery, accompanied with tumours and ulcers on various parts of their bodies. And in 1730-31, Bohemia, Saxony, France, &c., experienced a heavy loss from the outbreak of a similar disease. In 1745 thousands of the cattle of Italy, France, Germany, and England, again fell victims to one of these pests. The malady seems to have been accompanied with many symptoms akin to those of pleuro-pneumonia, and to have been equally destructive. The lungs are described as its seat, and the *post-mortem* appearances, as recorded by Dr. Barker, bear a strong resemblance to those observed at the present day. Whether this disease extended hither through the medium of a vitiated condition of the atmosphere, or owed its origin to a more direct introduction, has not been satisfactorily proved.

"Some authors assert that it was brought from Holland by certain calves, imported into the neighbourhood of London by a farmer for the purpose of crossing the breed; while others state that the lucrative views of an English tanner, who bought a parcel of distempered hides in Zealand which were forbidden to be sold, was the origin of the affection."*

In a pamphlet written in 1745, by Dr. Barker, it is stated that the malady was centred in the lungs; and its acute symptoms were preceded by a dry and husky cough, lasting from "a fortnight to three weeks." In the second stage, he says—

"They begin to forsake their food, and if they be milk-cows their milk dries up—the fever, which was before obscure, begins now to be very perceptible: the cough increases, they breathe with great difficulty, and the eyes and nostrils of many of them begin to run with a thick and sometimes fetid rheum; the body grows hot, and the pulse is very full and hard. In three or four days after their milk is gone off, and they have ceased to eat and chew the cud, a purging most commonly comes on. The stools are at first thin and watery, soon afterwards they grow slimy and fetid, and sometimes they are mixed with blood. The purging continues for a week or more, if the cattle live so long; but if at the end of six or seven days it begins to abate, and the excrements grow more solid, it is a token of their recovery. The difficulty of breathing does not seem to be relieved by this discharge. When the disease has been of long continuance, the body has sometimes swelled extremely, either before or immediately after death, and even to such a degree as to burst the paunch; but in those which have died early in the disease, the body has seldom or never been known to swell. If the cattle begin to swell, and their flesh grow cold towards the end of the disease, it is a certain sign of approaching death. The continuance of the disease is very uncertain and precarious, for many have died in two or three days after the fever has appeared, others have lived six or seven, and some even twelve or fourteen days."

This graphic account of the symptoms of the epizootic observed by Dr. Barker, agrees in many essential particulars with those of pleuro-pneumonia; as is likewise the case with the *post-mortem* appearances, which he describes as follows:—

"Upon opening the bodies of several which have died of this disease, I have constantly found the blood-vessels of the lungs stuffed up and distended with grumous or coagulated blood, and the bronchia or air-vessels so much inflated as to make the bulk of the lungs appear much larger than usual. And though some of these cattle were opened before the body was cold or the blood congealed in the other vessels, yet in those of the lungs it was constantly found to be coagulated to such a degree

* Simonds on Variola Ovina.

as not to flow out of the vessels upon cutting them.”*

The lesions here spoken of, as well as the symptoms, bear so striking an analogy to those of the present malady, that I am most strongly inclined to believe it to have been pleuro-pneumonia which thinned the herds of the British agriculturist rather more than 100 years since; and it follows that it had so long disappeared from among us, as not to be recognized in its recent outbreak. If, therefore, I am right in the conjecture that the disease is not in reality new, it is evident that certain causes, of which we are now ignorant, came into operation and produced its withdrawal; and we are thereby encouraged to hope that ere long it will assume a milder type, and ultimately cease altogether.

It has already been stated that pleuro-pneumonia was preceded by the affection vulgarly called “the old epidemic,” in which vesicles arise on the tongue, lips, feet, &c.: by some this malady is regarded as its cause. In my opinion they are perfectly distinct diseases, and neither of them can be viewed as a necessary sequela of the other. It is true that animals which have been affected with eczema are occasionally the victims of pleuro-pneumonia; but it is equally true that many of those which have died of pleuro-pneumonia have not been attacked with eczema. The two maladies are often seen on the same farm at the same time, and run their course perfectly independent of each other; besides which, eczema, unlike pleuro-pneumonia, shows no preference for the ox tribe; but extends to sheep, pigs, and even poultry. These facts are sufficient to prove their separate independence, without looking to the special characters of either affection.

The origin of pleuro-pneumonia, like all other epizootics and epidemics, cannot be traced to any positive cause:—

“Exposure to the changeable state of the weather, the partaking of bad provender or stagnant water, are viewed by many as the chief causes of epizootics, while others trace them to a vitiated condition of the atmosphere: but whether such state consists of a mingling of mephitic vapours, or deleterious gases arising from either animal or vegetable decomposition, or from an excess of humidity or dryness, affecting the electrical condition of the air, they scarcely venture to conjecture.”†

Pleuro-pneumonia undoubtedly existed on the continent for several years before showing itself in England. Its extension here did not, however, depend, like *variola ovina*, on the direct importation of infected cattle, but the destructive poison

was wafted hither through the medium of the air, as has been the case with that of Asiatic cholera and similar pests. The atmosphere is, consequently, to be looked to as the source of the disease; but in the present state of science we are compelled to admit that the precise nature of the poison is as little understood as it was centuries since. Experience proves that a vitiated condition of the air gives rise to diseases which speedily destroy both animal and vegetable life; but we fail by analysis to detect the deleterious matter. The true cause of the potato disease has engaged the attention of our scientific investigators, but both it and the laws which govern the extension of the affection have hitherto remained undiscovered. Nor is this a matter of surprise; for chemistry equally fails in demonstrating such substances as our senses quickly recognise. The perfume of a bouquet, and the most offensive odour, are alike undetectable by chemical means. We often judge, therefore, by the effects which we observe to follow the inhalation of an atmosphere which is thus charged, and of this we have a striking illustration in the deleterious results of the *malaria* engendered by the rays of the sun on stagnant water in marshy districts.

The mingling of noxious matters will occasionally produce a physical change in the air; a remarkable instance of which is thus described by Dr. Prout, in his “Bridgewater Treatise.”* He says that—

“He had for some years been occupied in investigations regarding the atmosphere; and for more than six weeks previously to the appearance of cholera in London had almost every day been engaged in endeavouring to determine, with the utmost accuracy, the weight of a given quantity of air under precisely the same circumstances of temperature and pressure. On a particular day, the 9th of February, 1832, the weight of the air suddenly appeared to rise above the usual standard. As the rise was at the time supposed to be the result of some accidental error, or of some derangement in the apparatus employed, in order to discover the cause the succeeding observations were made with the most rigid scrutiny; but no error or derangement whatever could be detected. On the days immediately following the weight of the air still continued above the standard, though not quite so high as on the 9th of February, when the change was first noticed. The air retained its augmented weight during the whole time these experiments were carried on; namely, about six weeks longer. The increase of the weight of the air observed in these experiments was small, but still decided and real. The method of conducting the experiments was such as not to allow of an error,

* An Account of the present Epidemical Distemper amongst Black Cattle. London, 1715.

† Simonds on *Variola Ovina*.

* Chemistry, Meteorology, and the Functions of Digestion considered with reference to Natural Theology, by William Prout, M.D., F.R.S., &c., p. 353 *et seq.*

at least to an amount so great as the additional weight, without the cause of that error having become apparent. There seems, therefore, to be only one mode of rationally explaining this increased weight of the air at London, February, 1832; which is, by admitting the diffusion of some gaseous body through the lower regions of the atmosphere of this city considerably heavier than the air it displaced. About the 9th of February the wind, which had previously been west, veered round to the east, and remained chiefly in that quarter to the end of the month. Now, precisely on the change of the wind the first cases of cholera were reported in London; and from that time the disease continued to spread. That the epidemic cholera was the effect of the peculiar condition of the atmosphere is more perhaps than can be safely maintained; but reasons, which have been advanced elsewhere, lead the writer of this treatise to believe that the virulent disease termed cholera was owing to the same matter which produced the additional weight of the air."

I am not aware if any physical alterations of the atmosphere have accompanied the present outbreak of Asiatic cholera; but the foregoing statements, together with the quotation I have just made, are sufficient to establish the point that the air may be vitiated by an admixture of various matters.

By a careful investigation of epizootic diseases we become acquainted with certain laws which govern their spread, as well as with the secondary causes which predispose animals to their attack. Some of these maladies are contagious or infectious, as is the case with the small-pox of sheep, and may be also with pleuro-pneumonia. Many an outbreak can be clearly traced to diseased animals being brought upon the farm; nevertheless this is not a necessary consequence of such a procedure; and very often the malady breaks out independent of any such cause. The very existence of a doubt on the contagious nature of pleuro-pneumonia should put the purchaser of cattle on the alert, and prevent his obtaining them from an infected district. Having been led to make the following remarks in my work on "Variola Ovina," with reference to infection, and they having a practical bearing on this subject, I trust I shall be excused for introducing them here:—

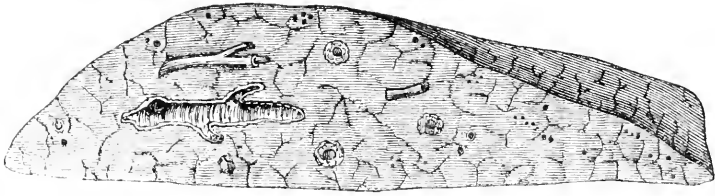
"Whatever the combination of causes may be which produce these maladies, certain it is that very many of them assume an infectious nature, otherwise we could not account for animals separated and kept apart from those which are diseased, frequently, and sometimes altogether escaping; while those are sure to become early victims that are allowed to pasture or live with the affected; besides, we can often succeed in producing the malady by inoculating healthy cattle; thus showing how closely the spread of the disorder depends upon contagion or infection. The fact, however, of animals when in health, if placed with affected ones, con-

tracting a disease of the same kind as that which the latter are suffering from, is the best proof of the infectious or contagious nature of a complaint. An animal escaping an attack, when such affections are raging in the locality in which it is placed, may arise from a variety of causes, as non-susceptibility, and also the possibility of the exciting agents never having been brought within its sphere of inhalation."

Whether an epizootic be or not a contagious disease, its victims are rendered susceptible of receiving the malady by the operation of secondary causes. This predisposition, as it is called, may be induced from a variety of circumstances, and a mere alteration in the food will be occasionally sufficient to produce it. A want, however, of nutritious diet—exposure to the changes of the weather—pasturing on wet and cold soils—neglect of a proper ventilation of the building the animals occupy—inhalation of offensive gases from accumulated manure—the fatigue of being removed from one locality to another—are the general predisposing causes of pleuro-pneumonia and similar diseases. Care should, therefore, be always taken by a better system of management, feeding, &c., to avoid everything which tends to bring the system into a condition favourable for the reception of the special cause of an epizootic, and more especially when such is raging in the neighbourhood. All these means will, however, fail when the disease is purely an infectious one, from a neglect of isolation, or the removal of the healthy from the diseased. It is a well established fact that infection has its limits; and although these may ever remain undefined as to their extent, still daily experience proves that the removal of animals but a short distance from each other, and the prevention also of indirect communication between them, will at once put a stop to the spread of the malady.

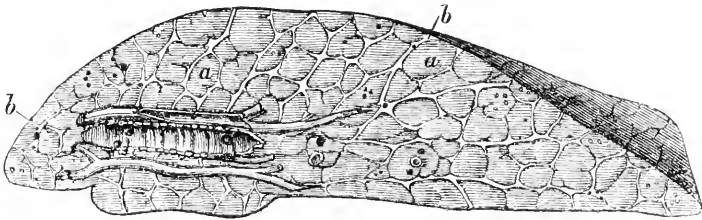
From the preceding remarks, it is evident that I look chiefly to a vitiated state of the atmosphere as being the cause of pleuro-pneumonia, and hence the greater necessity for the avoidance of all predisposing causes. If this be the case, it may be asked how the empoisoned air produces its morbid results? I answer, not by its direct irritation on the membrane, lining the air-passages, but by its specific action on the blood, which fluid, thus acted on, does virtually by its changed condition subsequently affect the pulmonary tissues. I have before stated my conviction that pleuro-pneumonia is not an inflammatory disease in the strict and legitimate meaning of the term. In order more distinctly to explain my view of the manner in which the abnormal condition of the lungs is produced, I beg to direct attention to the annexed sketches, which exhibit sections of the lung of the horse and ox. Fig. 18 represents the lung of the horse, which on

Fig. 18.



A section of the lung of the horse, showing its condensed structure, and relative deficiency of the interlobular areolar tissue, which is represented by the irregular dark lines scattered on its cut surface.

Fig. 19.



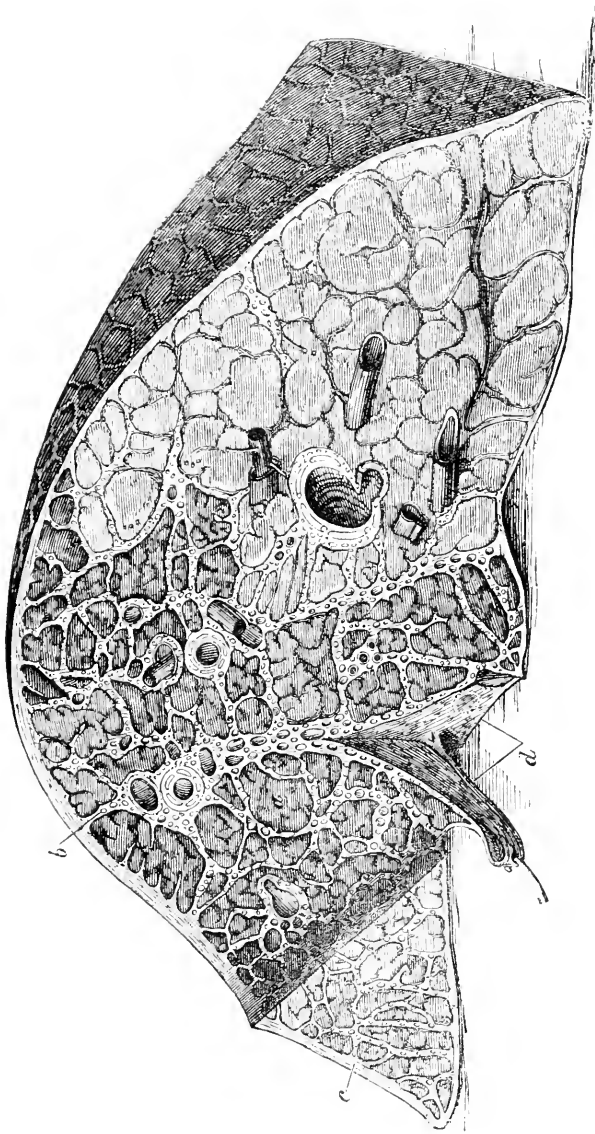
A section of the healthy lung of the ox, with its lobules and interlobular or connecting areolar tissue. *a, a.* The lobules. *b, b.* The interlobular areolar tissue.

being compared with fig. 19 (a similar portion of the lung of the ox) shows its structure to be more condensed, and a less amount of areolar tissue to enter into its composition. In the anatomical portion of this lecture, mention has been made of the *lobules* of the lungs and their connexion to each other by areolar tissue, designated the *interlobular tissue*. The lobules in the ox are much more distinct, and they are also very loosely joined together, consequently a much larger proportion of the interlobular tissue exists here than in the horse. This excess of the connecting medium, when infiltrated with the colourless portions of the blood, gives rise to those light-coloured or yellowish bands which intersect the lungs in all directions in pleuro-pneumonia (see figs. 20 and 21). These appearances, therefore, are to be referred to original structure as well as to the character of the disease; and the reason the lungs of the horse, when loaded with the serous parts of the blood, do not show a similar condition, is their deficiency of the interlobular tissue. Besides the union of the lobules here spoken of, I have also stated that the various component parts of the lungs are held together by *interstitial* areolar tissue. The network of this tissue is very minute; and when in this disease the red corpuscles of the blood escape from the capillaries by a rupture of their coats, it retains these bodies in its meshes, and assists in producing the

dark colour of the isolated patches. This colour likewise depends in part on many of the capillaries being distended almost to bursting by the red corpuscles. The united pressure of the overloaded vessels, and of the infiltrated interlobular and interstitial tissues, compresses the air-cells of the lungs, and prevents the entrance of the atmospheric air into them; hence the absence, in the advanced stages of pleuro-pneumonia, of the respiratory sound in the affected parts. The great depth in the colour of some of the patches is also produced by the same cause; for the pigment of the accumulated corpuscles cannot be decarbonized, from the non-entrance of the oxygen of the air into the cells.

I have already remarked that the vitiated atmosphere does not act as a direct irritant to the pulmonary tissues or mucous membrane of the air-passages; a fact which is proved by the absence of all the usual symptoms of catarrh, laryngitis, or bronchitis, as precursors of pleuro-pneumonia. Besides, if such were the case, both lungs would be equally affected; whereas, it is well known that the disease is very partial, and that the right lung is principally involved (see fig. 21). The aerial poison, whatever may be its nature, being carried by the ordinary process of respiration into the air-cells of the lungs, exerts its baneful influence upon the blood in its circulation through the capillaries.

Fig. 20.



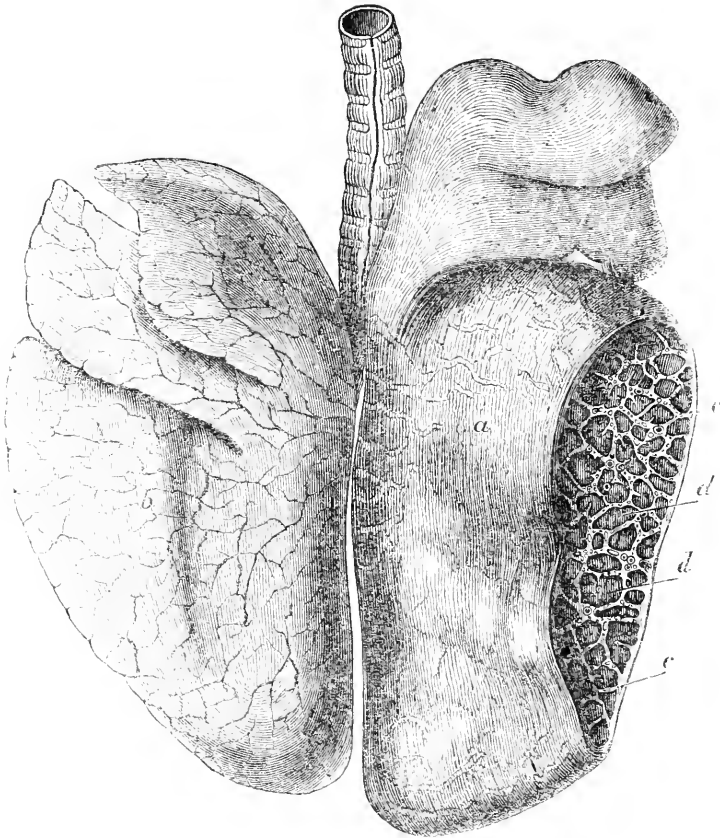
Section of a diseased lung, showing the nature of the changes its structure has undergone. *a, a.* The dark patches produced by the retained red corpuscles of the blood in the meshes of the interstitial tissue, and also in the capillaries of the air-cells. *b.* The interlobular areolar tissue, distended with the fibrino-albuminous portions of the blood. *c.* The sub-pleural tissue, similarly distended. *d.* A section of the interlobular tissue, exhibiting its great increase in thickness.

The blood, thus impregnated with something detrimental to its healthy condition, undergoes changes similar to the solids when diseased, and these changes are figured forth in the pulmonary tissues.

Each organ of the body seems susceptible of being acted upon in a special manner by deleterious matters entering the circulation: thus the poison of small-pox reacts on the skin—that of glanders on the mucous membranes of the nasal cavities—of rabies on the nerves—of eezema on the lips, tongue, and feet—and of pleuro-pneumonia on the lungs. The amount of the deleterious matter re-

ceived at each inspiration appears to be insufficient to interrupt at once the functions of the lungs; for, were this the case, death would speedily occur from asphyxia; whereas we have constant proofs that the disease we are considering is partial in its attack and insidious in its nature, making its way stealthily, being very often unobserved until it has made great inroads on the constitution. This character of the affection is alone sufficient to create a doubt of its being inflammatory; for inflammation of the lungs, even at its commencement, is marked by unmistakable indications of ill-health.

Fig. 21.



a. The right lung of the ox, considerably increased in size, and covered here and there with effusions of fibrine. *b.* The left lung, still retaining its healthy condition. *c, c.* The yellowish bands which intersect the diseased lungs in various directions, being produced by the interlobular tissue surcharged with the fibrino-albuminous portions of the blood. *d, d.* The dark-coloured patches, arising from a retention of the red corpuscles, &c.

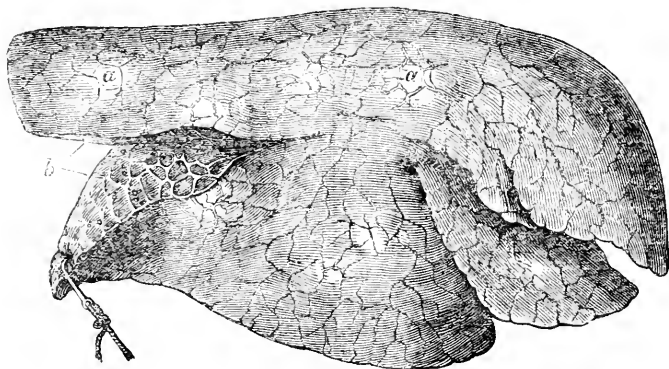
The absence of the ordinary symptoms of *pneumonia*, together with the peculiar changes observed in the lungs, have satisfied me that pleuro-pneumonia is not of an inflammatory nature at its outset, and that inflammation is rather the result than a cause of the disease. It is difficult to explain the precise change which takes place in the blood from the operation of the aerial poison; but it appears to me that the vitality of the fibrine is interfered with, and that it, with the albuminous constituents of the fluid, also altered in quantity, is transuded from the capillary vessels, and finds its way into the areolar tissue of the lungs, accumulating where this tissue exists in greater abundance, namely, in the interlobular spaces. This inordinate transudation seems to depend on a tendency in the blood to separate into its several constituents, arising most likely from the diminished vital force of the fibrine,

and an arrestation to the conversion of the albumen of the serua into fibrine. The fibrino-albuminous portions of the fluid are thus changed, and probably also augmented, and their exudation is a natural consequence of such condition. The red corpuscles, being in part deprived of the liquor sanguinis in which they float, are retained in the capillaries, where they accumulate in unlimited numbers, obliterate their passage, and compress the air-cells they surround so as to stay the entrance of the air, and produce, as elsewhere stated, the dark-coloured spots which stud the lungs. It is these effusions and the obliterated condition of the vessels which give bulk, increased weight, and solidity to the lungs, and destroy their function as aëriifying organs.

From this explanation it is evident that I regard pleuro-pneumonia to approach nearer to a *dropsical* than to an *inflammatory* disease. The lungs, if

examined at the commencement of the affection, these remarks in animals which have died in the advanced stages of the malady, from the circumstance that one lung is principally affected, the other exhibiting the beginning of the disease. Fig. 22 is inserted for the purpose of rendering this description

Fig. 22.



Lung, showing the commencement of pleuro-pneumonia.
a. Elevated spots produced by effusion. *b.* A cut carried through one of the spots, to demonstrate the nature of the change producing it.

more evident. The spots marked *a a* represent the tumified portions of the lung, which the cut *b* discloses to be referrible to effusion into its substance.

The exudation of the altered liquor sanguinis is not limited to the lungs themselves, but extends to their investing membrane, the pleura; thus accounting for the depositions of semi-solid fibrine on their exterior, and the existence of serous effusions in the cavity of the thorax. That these results are not produced by inflammation is clear from the circumstance that in innumerable cases no redness of either the pleura covering the lungs or lining the chest can be detected; both the fibrine and the serum being likewise perfectly colourless. Dropsy of the chest may be said to be now associated with dropsy of the lungs. Although inflammation takes no part in the original production of these morbid lesions, still, as previously remarked, it may arise as a consequence, and this I believe is generally the case with those animals which recover. The blocking up of the air-cells, vessels, &c., produces death of these structures; and when this is partial and of little extent, portions of the lung will ultimately become detached and be enclosed in sacs formed by the adhesive stage of the subsequent inflammation. This will also explain how it is that collections of pus and other morbid products are occasionally met with in our *post mortem* examinations of long-existing cases of pleuro-pneumonia. It ought, therefore, to be no matter of surprise, nor

to be viewed as an opprobrium of the veterinary art, that an affection which depends on an empoisoned atmosphere, and is associated with such extensive lesions of organs so essential to health, and which stealthily but securely wends its way and saps the very vitals, should prove so destructive to life, and likewise resist the most vigorous and scientific treatment.

Having given my view of the nature of the malady, I proceed to narrate the symptoms which accompany it. The disturbance of the animal's health is rarely observed until the disease is fully established, and effusion into the lung has made some progress. Proprietors of cattle should, therefore, be early and late with their stock, narrowly watching the slightest indication of ill-health. It will often be observed that oxen at pasture, when the disease is commencing, will early in the morning be separated from the herd, standing under the hedge with their backs arched, coats staring, and refusing to eat; while as the day advances they will join the rest and appear in their usual health. A slight but husky cough will be occasionally recognized, and now and then the breathing will be increased, as if the animal had undergone some extra exertion; while in milch-cows there will be a diminished amount of milk in addition to the above symptoms. As the disease progresses, the cough becomes more frequent and husky, the respiration is hurried, the pulse increased and some-

what oppressed, the appetite diminished, rumination suspended, bowels constipated, surface of the body chilly, &c. In the more advanced stages the respiration is difficult, laboured, and painful; the patient is frequently lying; or, if standing, the head is protruded, the mouth is covered with a frothy saliva, the muzzle is cold, rigors occasionally come on, and the pulse is rapid and often indistinct. An enlargement of the right side of the chest can generally be detected in this stage of the malady; percussion gives a dull sound, and auscultation detects an increased bronchial respiration, with a crepitating r le in some parts, but a total absence of sound in others. Approaching death is shown by frequent moaning, grinding of teeth, total loathing of food, cold extremities, wavering pulse, distressed breathing, liquid stools, and distension of the rumen by the disengagement of the gaseous compounds from the ingesta. This deranged condition of the digestive organs is probably owing to the high carbonization of the blood, as the elimination of the carbonic acid is prevented by the obliteration of the air cells of the lungs.

The length of this lecture forbids a more minute detail as well as a separate analyzation of the symptoms, and therefore I pass on to speak of the principles which should govern our treatment of the disease. The first remedy to which I shall allude is bloodletting. The propriety of abstracting blood will depend on the stage of the malady and the amount of symptomatic fever which is present. It must be done early, or not at all; for in proportion to the extent of the effusion, so will be the debility of the patient. To bleed late is to hasten a fatal termination; but if we attend to the animal at the very commencement of the disease, much good will be done by a bold bloodletting. No rule, however, can be laid down as to quantity to be abstracted; but the pulse must be carefully watched, and as soon as its character is altered the bleeding must be suspended. I do not recommend an early bloodletting for the single purpose of allaying the febrile condition of the system, but to withdraw a portion of the vitiated fluid which has laid the foundation for, and is quickly building up, the disease.

Another remedy of frequent adoption is the exhibition of purgative medicine. In most disorders it is of the first importance to clear out the *primae vi *, as thereby we not only remove offensive and offending matters from the system, but subdue the excitation which is present by the nauseating effects of the medicine, which is further assisted by the agent increasing the intestinal and other secretions. If constipation is present, even in the advanced stages of pleuro-pneumonia, a gentle aperient may be given, but cathartics should be avoided. I have already stated that diarrh a often comes on as the

case approaches its end; and it should be remembered that this morbid condition of the bowels is very easily excited by purgative medicine. Cathartics, like bloodletting, must be used cautiously; they are admissible at the beginning of the affection, but rarely afterwards. The ordinary saline mixtures are as good as any, but they ought to be given without the large doses of ginger, &c., with which they are too generally blended.

Diuretic agents stand next in the list. Medicines of this class stimulate the kidneys to increased action, and their employment is found to be associated with far less weakening effects on the lower animals than is the case with purgatives. They may, therefore, be frequently and quickly repeated. Diuretics carry off a considerable portion of the watery parts of the blood, and hence their great use in affections of a dropsical nature. The nitrate of potash is one of the safest and best of our diuretic agents, and I especially recommend it in the treatment of pleuro-pneumonia. I do this for several reasons; among which is the established fact that the alkaline carbonates and nitrates are of the greatest benefit when the blood itself is in an abnormal condition. One of the best ways of using the nitrate of potash is to add it to the water which is given to the animal to drink.

Sedative medicines have been extensively employed by some persons in treating this disease, but in my experience they have rarely proved of service; nevertheless, their occasional administration will be needed, especially when the circulation is much excited: pulvis Doveri; opium; and ext. belladonna are the most valuable agents of this class. Calomel in combination with opium has also its advocates, and in certain cases I have given it with advantage.

Diaphoretics, or medicines which promote the secretions of the skin, are beneficial; but their action should always be assisted by warm clothing, without which they are nearly useless. Antim. tart. is one of our chief diaphoretics; I have found it, however, to act too freely on the mucous membrane of the intestinal canal, and to produce thereby considerable mischief; as a rule, I do not employ it, and more especially in protracted cases of the malady. The other preparations of antimony are not open to the same objection, and these, with the pulvis Jacobi, should be selected. To effect a copious secretion of perspiration the skin of a recently killed sheep, applied while yet warm to the back and sides, surpasses everything we have as yet tried.

Diffusible stimulants and tonics are, in my opinion, the most valuable of all remedies, and invariably I have recourse to them as early as circumstances will permit. Of late we have heard much

of the beneficial effects of brandy as a diffusible stimulant, and doubtless in the second stage of the malady it has proved of service. I prefer, however, the *spt. æther nitr.* and the *liq. ammo. acct.* in combination, the ammonia being in excess. In the advanced stages, however, even these agents fail to support the system against the debilitating effects of the disease, and we must now employ both vegetable and mineral tonics; the sulphates of iron, and quinine, gentian, ginger, columba, and the barks are the best. Before concluding these remarks on the treatment, which are of necessity very much condensed, I shall allude to another remedy which has many advocates, and properly so, in my opinion, namely, counter-irritation, or the application of stimulating ointments and liniments to the sides of the chest. This class of remedies is generally adopted when active inflammation pervades some internal organ, and with the happiest results; and although I do not view pleuro-pneumonia as essentially an inflammatory affection, still we can easily understand that benefit will

follow the use of a counter-irritant. By the long-continued action of an agent of this kind the inflammation which it excites in the skin will be attended with effusion of the albuminous parts of the blood into subcutaneous tissue, and thus we artificially produce a disease here analogous to that of the lungs, and thereby give relief to those organs.

I might add many observations to the foregoing on the nature and treatment of this disease, but hope to have said sufficient in explanation of the principles which should govern our proceedings both with a view to its prevention as well as cure. It is evident that no specific can exist for such a malady; and it is likewise equally so that he who undertakes its treatment without a knowledge of its nature, and of the structure and functions of the organs it affects, is acting like an ordinary artisan who sets about the repair of a machine the wheels and levers of which he has never investigated.—
Journal of the Royal Agricultural Society.

S P R O T B R O ' F A R M E R S ' C L U B .

A meeting of the members of this club was held on Thursday, March 28, at the Copley Arms, Sprotbro,' for the purpose of hearing a lecture by Mr. Haywood, of Sheffield, on the following subject, viz. :—"The Elementary Constituents of Plants, the sources from which they are naturally derived, and the means of restoring them to a soil when exhausted by the growth of crops."

The chair was taken by the Rev. J. G. Fardell, who stated that it was in accordance with a resolution at a former meeting that Mr. Haywood was now here to give a lecture on the above large and comprehensive subject. He hoped when he had concluded, or during the time of delivering the lecture, he would give an opportunity to the members to ask any questions on the subject, in order that they might derive that benefit which it was intended they should derive, and which was required by the nature of the times. He had now great pleasure in introducing Mr. Haywood to the meeting.

Mr. HAYWOOD proceeded with his lecture, of which the following is a brief outline. The subject which they had requested him to treat upon was one which comprehended nearly the whole matter of agricultural chemistry. There were certain matters contained in tillages which were useful for the growth of plants. It was necessary first to know what really were the elements which entered into the composition of plants. The whole of the substances they saw around them were made up of

those simple elementary matters. Chemists told them there were about sixty of those substances in nature, but that vegetable substances contained not more than four, whilst five or six others entered into their composition in certain proportions. The elements extracted from the air were called volatile; those from the soil the fixed elements. The elements were seldom found in a pure state in nature. Two or more were generally combined together. Stones and earthy substances were composed of two of those elementary substances; whereas they had iron, which was an element in a pure state; but the rust of iron was a compound of two elements in combination. Plants contained elements in combination; and these combinations assumed the varieties of leaf, flowers, stem, &c. Carbon, hydrogen, oxygen, and nitrogen were the elements which entered into the combination of plants. They formed the woody fibre, the sugar, starch, gum, and all the constituents found in plants. When they took a plant and burnt it, a very small portion remained in the shape of ashes. The elements he had named entered then into a new combination, and passed off in the form of invisible gases. Those four elements, which were found so large in all vegetable substances, passed off in this way when the plants were burnt. Those which remained in the form of ashes were called fixed elements. Carbon was considered one of the most important elements of plants, as it entered so largely into their

composition. They had carbon in the simple form of charcoal; and 1600lbs. of carbon would be assimilated on each acre of cultivated land in twelve months. The decomposing carbon which plants get from the soil was called humus; and the larger the quantity of humus, the more fertile was the soil. But that was not the case when applied to peat land. And it was evident that the carbon was not derived from the soil, but from the air. The compound of charcoal existing in the air was called carbonic acid. They were burning charcoal continually in all kinds of combustion, candles, coal, wood, &c., and it passed into the air in the form of carbonic acid gas; and 10,000 cubic feet of atmospheric air contained 5,000 cubic feet of carbonic acid gas. That gas was absorbed during the day. But although carbon was considered to be derived from the air, it was possible that a small portion might be derived from the soil. The falling leaves of plants decayed, and the process of decay was like that of combustion; and the presence of a vegetable matter in the soil was a constant source of carbonic acid. In the night time no carbon was deposited in the plant. Carbonic acid in the night time was given off from the leaf of the plant instead of oxygen. When they burnt charcoal in the fire, it produced a high temperature; but when it was in the system it produced only a moderate warmth. But the same product was given off in both cases. Oxygen and hydrogen were found combined together in water. Oxygen was the great supporter of life. They had generally sufficient water to supply the plants with the necessary amount of these elements. The water which fell in the shape of rain in this country would cover about thirty-three inches if the whole were retained—2,500 tons of water per acre. The wet surface of the ground gave off the water to the air like water from a wet cloth; and if they left a vessel full of water exposed to the dry air, it would evaporate in time. Of 2,500 tons in the form of rain, 1,500 tons went back again, but the remaining 1,000 tons found its way, by the drainage of the soil, to the rivers and seas. The effect of this filtering of the water from the surface of the earth to the rivers and seas was very important to agriculturists; because it was necessary that certain fixed ingredients should be dissolved in water—dissolved in such a way that it could not be removed by filtering; and whatever plants required as food must be dissolved in water. But in drainage they must expect a certain loss. The estimated loss of soluble matters in a year was one-fourth of what was put on—one-fourth of the soluble matter was lost by the process of drainage. This filtering downwards went on to a greater extent in winter than summer. And the washing away of soluble matter was so great, that they must apply a greater

amount of manure in order to keep up the demand which the plants required. He next adverted to the element called nitrogen, and referred in connexion therewith to the use of shoddy, which, though not pure wool, was capable of yielding at least 10 per cent. of ammonia; if perfectly pure, it would yield 20 per cent. Another substance containing ammonia was soot, which contained a quarter of its weight of salt of ammonia, or one-twelfth of its weight of pure ammonia. Bones contained 30 per cent. of animal matter, which yielded ammonia in the same proportion as the hoofs, horns, and wool, about 17 or 20 per cent. He referred to the great importance of ammonia, which should be given off in farms, and the decomposition of the excrements of animals. It was highly necessary that in the preparation of yard manure the ammonia should be retained, and not allowed to form into salts at all until it is put into the soil, where it may do so slowly and gradually, and thus be appropriated to the formation of plants. Much more ammonia than was generally preserved might be preserved by the use of a small quantity of sulphuric acid. Gypsum had been recommended for preserving it; but it only prevented its escaping when passing off in a particular state. The only way to prevent its escape from a manure heap was to cover it over by a layer of gypsum; so that when the ammonia got up and came into contact with the moist gypsum, it would be retained. He had referred before to fixed ingredients in the soil, amongst which were potash and soda, which were called alkalis. Silicic acid or common sand would unite with those, and such a compound was found in all fertile soils. The soil of the limestone districts contained much less than those of the sand or clay districts, or any other except peat soils. There were several minerals in other districts which acted in a crystallized state; one of these was called felspar, and silica was another. Glass was a compound of silica with potash and soda. Glass was insoluble in water even if ground to a fine powder, and would sink to the bottom; but still it was acted upon and would corrode by certain agents. They would perceive that glass of stable windows was in time made dim. That which had dissolved it, was the ammonia from the urine of the horses, which had a tendency to corrode and dissolve it. In the examination of the soil on which clover was grown they would find scarcely any potash in it; and the only means to prevent the failure of that crop would be to add a quantity of potash in the form of manure. Two other elementary substances in plants were lime and magnesia. These were found in the green crops particularly, but both in all crops, and were generally contained in sufficient quantity in all fertile soils. He might here observe that wherever lime

was employed it should be in as caustic a state as possible. When slaked with water it contained its causticity. But when put on the soil in an unslaked state, it began to act chemically upon it. Another important element in these fixed substances was phosphorus, a very combustible substance, which when burnt united with oxygen of the air, and formed phosphoric acid. That acid unites with potash and soda, and other things, so as to form phosphates. This compound was found in the soil in the state of phosphate of lime. The limestone itself contained phosphate of lime in the proportion of about two parts in a thousand, little more than four pounds in a ton. The seed of wheat, barley, and oats contained phosphate of lime in large quantities. That seed was taken away and consumed, and was therefore not brought back upon the land. And another diminution of the phosphate of lime from the land was the production of the bones of animals. There was therefore a continual loss every year; and unless some artificial supply could be had recourse to, the land would soon become so far exhausted as that the plants would not grow at all. In the production of milk a large quantity of phosphate was also carried away. But there was a variety of ways of supplying the land with a fresh supply, of which the application of bones was the most important. Fresh bones contained 60 per cent. of phosphate of lime. Another form to supply phosphate was by the application of guano. But they must bear in mind that bones dissolved by sulphuric acid would do more good than twice the quantity of bones not so dissolved. He next referred to chlorine, or common salt, which was necessary in cases where the land was deficient of that substance. These fixed elements were continually being exported from the land; and on these grounds it was that there was no such thing as a self-supporting farm. It was impossible to grow crops unless they could restore the whole back again, without exhausting the soil. If they would have what they might call a self-supporting farm, they must have for 160 acres as much meadow land as would produce two tons of hay per annum, to supply the arable land. On this subject the lecturer read several calculations which he had made, in order to bear out his statements, and concluded by observing that if any gentleman wished for information, he should be glad to answer any question they might put to him.

During the lecture and at its close a few questions were asked by some of the members, and replied to by Mr. Haywood.

The Rev. C. THOMAS, of Warmsworth, on the subject of the roots drawing up moisture, inquired as to the best time for putting manure upon the land?

Mr. HAYWOOD said that was a matter of very great importance. If soluble manures were put on in winter, when the plants took up very little moisture, they would lose a great part of their nature before spring, on account of their drainage.

Mr. NEWHAM: In speaking of the failure of clover from want of potash, he would like to know why it was that after eight years they could grow clover, and at the fourth year they could not?

Mr. HAYWOOD: In the intermediate four years you grow seeds instead.

Mr. NEWHAM: No; peas and beans.

Mr. HAYWOOD: He believed that was the prevailing opinion. But if it were so, he could not account for it. He knew that on soil which contained plenty of potash mineral, clover could be grown after four years. He concluded that the failure of the red clover crop was, after all, mainly attributable to the absence of potash.

Mr. NEWHAM: A four years' red clover crop would fail; but in eight years we should have a crop.

Mr. HAYWOOD: I am aware that is the opinion.

Mr. NEWHAM: Nay, it is the practice.

Mr. HAYWOOD: I am inclined to believe there is some mistake; and I believe that where clover is grown every eight years, it is capable of being grown every four.

Mr. NEWHAM next observed, with respect to dissolved bones, that the quality of the turnips was not so good as those which had been grown with bones in the usual manner. In fact, though he had got larger crops with dissolved bones, the quality was so inferior that the sheep would not feed upon them.

Mr. HAYWOOD: Those turnips would contain less nutriment. But had Mr. Newham put on some soot or shoddy, to yield ammonia at the same time, the turnips would have been equally nutritive with the others.

Mr. DUNWELL: Would you prefer fresh or dried bones—should the bones be full of grease?

Mr. HAYWOOD: No; grease prevents decomposition; and it is very important that the bones should decompose quickly.

Mr. WOOD wished to know whether it was judicious to put a portion of sulphuric acid at the top of the manure when they got it out, in order to affix the ammonia which was in the manure.

Mr. HAYWOOD: No doubt; but it should be mixed with some water—four or six times its bulk of water, and put on from an earthen jug.

Mr. DYSON: Then you think sulphuric acid is better for preserving ammonia than gypsum?

Mr. HAYWOOD: Much better; because if the heated matter ferments, it has not the power of fixing the ammonia. Put a small jug-full of the

acid down a drain, and it will find its way into the tank.

Mr. WOOD: Would you use it generally in a farm-yard, before the manure is in a fermented state?

Mr. HAYWOOD: Yes; but it is not so important then, because the fermentation is then very slight.

Mr. DYSON: Would not the hoofs of the cattle be injured by the sulphuric acid on farm-yard manure?

Mr. HAYWOOD: Not if it be sufficiently diluted.

Mr. WOOD: Would you advocate soot as a top-dressing?

Mr. HAYWOOD: By way of supplying ammonia no doubt it would be valuable, and most likely increase the amount of the seed. It produces a greater quantity of fluid, which can extract the carbonic acid from the atmosphere, so as to cause an increase of the crop.

Mr. DYSON: For the same reason, where turnips get larger tops, they get more carbonic acid from the air.

Mr. HAYWOOD: Yes; and providing the other elements which turnips require are present, they will form larger bulk.

Mr. NATION made an inquiry respecting the oil in shoddy; to which

Mr. HAYWOOD replied that shoddy would be better without the oil.

Mr. WOOD: In applying farm-yard manure, should it be in a decomposed state, or in a state of fermentation?

Mr. HAYWOOD: If you want to produce a crop in a short time with a short supply of manure, in a decomposed state as possible; but if a great deal of manure, then it should not be decomposed.

Mr. F. W. FISHER, of Doncaster, in reference to some calculations of the lecturer as to the inmates of the Sheffield Union, said he had assumed that that portion of food which went to make the bone of human beings would go in the same proportion as in the production of animal bone. Was that a correct assumption? He should say that the

bone of human beings would take twenty years to grow the same quantity of bone as any other animal in four.

Mr. HAYWOOD: That made his argument so much the better. Mr. Fisher's remark was quite correct. Besides a human being took more phosphate than any other animal would, and did not form phosphate so quickly.

In reply to Mr. Wood, Mr. HAYWOOD said there was much less taken from the land by old than by young animals.

The Rev. C. THOMAS: What is the case with respect to ewes in lamb?

Mr. HAYWOOD: They of course take away a larger amount from the soil. It all comes from the soil.

To Mr. WOOD: There would be a difference in a field being occupied by a certain number of bullocks and the same number of milch cows.

Mr. F. W. FISHER: What would be the best manure for grass land?

Mr. HAYWOOD: Phosphate of lime in the shape of bones. Perhaps guano is the nicest form of applying phosphate to grass lands, because it gets into the land so quickly.

Mr. F. W. FISHER said he thought they would shew a want of appreciation to Mr. Haywood if they did not present him with a vote of thanks for the very efficient manner in which he had discharged his duty. He might also say, without any fear of flattery to the members of this club, that as practical men they were not to be surpassed by any farmers in the kingdom; and they had shown their good sense by asking Mr. Haywood to give a lecture on this occasion. He had now to propose that they should record as a resolution a vote of thanks to Mr. Haywood for his valuable services.

Mr. WOOD seconded the motion.—Carried unanimously.

The next subject for discussion was agreed to be—"On the Sowing and Culture of the Turnip, with a due regard to economy."

CULTIVATION OF CLOVER.

The clover plant is one which cannot be dispensed with in good cultivation: it is, next after the turnip, the polar star of all good systems of agriculture, and its failure involves in its consequences a train of evils very serious to the farmer anxious to improve his soil. We are, as yet, acquainted with no crop which will fully answer the purpose of clover, either as a summer green crop,

or as a consolidator and refresher of a worn-out or loose soil; and on light lands it is, next to the turnip crop, the real source of their intrinsic value; while on strong and more untractable land it is as essential to give to it that rest, which it so often and so much needs.

And valuable as is the crop, its failure is an evil almost co-extensive with its natural usefulness.

Where one plant fails another will grow: when the clover goes off, the weeds will spring; and these will not afford food for the stock which ought to depasture upon them, but will exhaust the soil, and defeat the natural object of clover; viz., the amelioration and restoration of the powers of the soil. Nor can any crop be very efficiently substituted. As a fodder-crop we have tried the tares; but they are so much inferior as a dried crop, so difficult to secure, and in that securing so much of their foliage is lost, and they so exhaust and enfeeble the soil, that they are of no other use than driving the clover crop some four years further from its like, and so far enabling it to produce a crop at some subsequent period. Nor can the bean be at all considered, as a fodder-crop, calculated to replace the clover, though as a change it may be, and is, adopted with success; while the sainfoin or the lucerne are too peculiar in their habits, and too circumscribed in their range of usefulness, to be adopted to any considerable extent; hence the many nostrums which have at different times been recommended to remedy this strange tendency to failure in the clover plant, to which we last week alluded; and amongst the most popular is that ill-understood application—gypsum. Of the character of this mineral we really know very little. Its use in America, as a fertilizer, seems to be well understood, and generally admitted; and its partial introduction into France has not been unattended with success; but in England nothing has been so varying, uncertain, and unsteady as its results. For though this was a favourite nostrum for clover in the days even of Sir Humphrey Davy, we have still little data respecting it, and that of a most unsatisfactory character. Davy says, "It is possible that lands which have ceased to bear good crops of clover or artificial grasses may be restored by being manured with gypsum." Still, we imagine that if it had been at all successful, we should have heard of it in some other quarters since his time. We have ourselves applied it to spots where, from experience, we have known the clover to fail; and we must say it never had any tendency, that we could see, to prevent it; for we lost the crop as usual after the application. There are, however, remarkable instances where it has succeeded as a manure for clover. Mr. Smith, of Tunstall, near Sittingbourne, dressed his clover at the rate of 4 cwt. per acre, and in his two cuttings of clover hay, he obtained the following results:

	cwt.	cwt.	cwt.
First cutting of gypsumed	60 ..	second 22 $\frac{3}{4}$..	Total 82 $\frac{3}{4}$
„ unmanured	20 ..	second 5 ..	Total 25
			Increase 57 $\frac{3}{4}$

or nearly 3 tons per acre more by the application.

These results are by no means either uniform or even common. A series of experiments were made, and which are collected by Professor Johnston, and the following gentlemen had the results given below, with an application of 2 cwt. per acre of gypsun on mixed red clover and rye-grass:—

	Unmanured. stones.	Gypsumed. stones.
Mr. James Turriff, Aberdeen ..	208	213
Mr. Strachan, Gamerie, Aberdeen	434	436
Mr. Strachan, Rothie Brisbane, Aberdeen	281	287
Mr. Strachan, Mill of Lathiers, Aberdeen	353	373

Now, while these give increases so very small, Mr. Melvin, of Ratho, Midlothian, applied 4 cwts., and on the unmanured part had 306 stones; while on that manured he had only 269 stones!—leaving us to infer, in fact, that the application had done absolute injury. This may not have been so. Might it not occur that the application had happened to be given to a part with a tendency to sickness, which it had not prevented? And so, on this spot, the crop had been lighter.

It appears pretty clear, however, that gypsum will not alone prevent the sickness in clover, nor always be for it a very advantageous manure: but we imagine it cannot be doubted that any plan or process which tends to enfeeble the natural powers of the plant, will so far assist the malign influences which injure the crop, as to render its success more doubtful; and we imagine that especial care should be taken at sowing-time to avert as much as possible, these adverse consequences.

There are three modes of sowing clover: either at the same time as the crop with which it is sown, a little later before the crop comes up, or after the corn-plants have grown up and extended themselves, so as to be able to bear the action of the bush-harrow, the roller, or the common harrow. Against the first plan there is the chance of frost operating injuriously on the plants in their normal state, which is increased by this early sowing; there is the probability of the clover becoming very high in the corn, and so exhausting its powers; and there is also the chance of its being buried too deep, at a period when the soil is peculiarly open and friable. For it, however, is the certainty of all being covered—of the soil being dry and sound, and of getting a full plant. Against the second mode, there is the uncertainty of the weather being equally favourable exactly between the sowing-time and the germination of the corn, as regards wind, rain, and frost—the uncertainty of getting a fine and friable seed-bed, and the possibility of not getting it in at all until the corn is above-ground. Against the third pro-

cess, it may be urged that much of the seed never gets covered—that it is too late in the season, generally, for so much moisture as is especially necessary to seeds so lightly covered—that the corn is so far above the clover, as to run great risks of entirely smothering the latter; and that at harvest-time, when it gets the stimulus of air, it is so extremely attenuated, as to be a feeble plant to resist the winter frosts—nay, that so slight is its hold of the soil, that it is more easily thrown out by the winter frosts, and in all respects the least calculated to overcome the tendencies to failure.

On the whole, the evils of the second process appear to us to be by far the fewest; and we cannot

help agreeing with Mr. Thorpe, that too little care is exercised in the sowing of the clover-plant; for there is not the slightest doubt that the seed-time has more to do with the general health and status of crops than is generally admitted. If we take a turnip-crop, for instance, how often does it happen that a day, nay, an hour or two, or a shower of rain, will completely alter the character of a crop!

Our own experience decides us to apply the cow-grass as a crop, instead of the red clover; and as it has a decidedly perennial tendency, it has more vital power and more hold of the soil. We strongly advise its substitution for clover, on all clover-sick soils.—Gardeners' and Farmers' Journal.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A Weekly Council was held at the Society's House in Hanover-square on Wednesday, the 27th of March; present, Mr. Raymond Barker, V.P., in the Chair; Sir Robert Price, Bart., M.P.; Mr. B. Almack, Mr. Wyrley Birch, Mr. Bosanquet, Mr. Burke, Mr. Clavering, Mr. H. Dixon, Mr. Dyer, Mr. W. Hutley, Mr. Majendie, Mr. W. Marshall, M.P.; Mr. C. Overman, Mr. Parkins, Prof. Sewell, Mr. C. Hampden Turner, and Prof. Way.

The Earl of Falmouth, of Tregothnan, Cornwall, and St. James's-square, London, was elected a Governor of the Society.

Asphaltic Manure.—The Earl Grey, H.M. Principal Secretary of State for the Colonial Department, favoured the Council with a statement of the satisfactory results, obtained by Vice-Admiral the Earl of Dundonald, in command of H.M. Naval Forces on the West Indian Station, from manure prepared from the asphaltum of the great Pitch Lake in the Island of Trinidad, and tried in the Government gardens at Bermuda. His lordship further stated to the Council, that Lord Dundonald had sent to the Colonial Office a box containing three specimens of the manure in question, and which would be forwarded to the Society for the information of its members. The Council ordered their best thanks to be transmitted to Earl Grey for the favour of this communication, and gave directions that the specimens referred to by his lordship should, on their arrival, be placed in the hands of Prof. Way, the Consulting Chemist of the Society, with a request that he would make a chemical examination of the new manure, and report to the Council his opinion of its value in an agricultural point of view.

Miscellaneous Communications.—Letter from Sir John Tylden, suggesting that Locomotive Steam Engines for agricultural purposes should be made of smaller size, so as to be capable of being drawn by a single horse from barn to barn on farms of moderate size; that thrashing-machines of a more portable character should be constructed, to be attached to the steam-engine, and capable of thrashing and cleaning about ten or twelve quarters a day; and that a fixed mill for grinding corn and breaking

oil-cake should be more generally adopted in homesteads. A report from Mr. R. W. Baker, of his further trial of the Australian Barley furnished to him by the Society. A copy of the Farm Account Book, prepared for the use of the National Agricultural Schools in Ireland, and transmitted to the Society by the Board of Education in Dublin. Impressions of the Dies of the Prize Medals of the Birmingham and Midland Counties Exhibition of Live Stock, Poultry, &c., from Mr. Ottley, of Birmingham, the artist to whom their execution was entrusted. Statement by Mr. Wyrley Birch, of the working of a model he had seen, of a plan for ploughing by steam power. For all which communications and presents the Council ordered thanks to be returned.

The Council then adjourned to their Monthly Meeting on Wednesday the 3rd of April.

A MONTHLY COUNCIL was held at the Society's House in Hanover-square, on Wednesday, the 3rd of April: present, The Marquis of Downshire, President, in the Chair; Colonel Austen, Mr. Raymond Barker, Mr. Blanshard, Mr. Bramston, M.P., Mr. Brandreth, Mr. French Burke, Colonel Challoner, Mr. Garrett, Mr. Brandreth Gibbs, Mr. Fisher Hobbs, Mr. Jonas, Mr. Milward, Mr. Pusey, M.P., Professor Sewell, Mr. Shaw, of London, Mr. Simpson, Mr. Jonas Webb, and Mr. Wilbraham.

Finances.—Colonel Challoner, Chairman of the Finance Committee, presented to the Council the Report of the Committee on the accounts of the Society, from which it appeared that, at the end of the previous month, the current cash-balance in the hands of the Society's Bankers was £2,285. He explained that this general balance included £1,260 on the Exeter subscription account, and £110 as the amount of life compositions to be invested, leaving £915 as the balance available for current purposes. The Report stated that agreeably with the order of Council, proceedings were about to commence in the county-courts for the recovery of the arrears of subscription remaining still unpaid, and the

Committee hoped to be able to report at the next meeting of the Council the full particulars connected with the legal decisions about to be obtained in each of the courts of law where the first actions were about to be brought. Colonel Challoner then entered into a detailed statement of the financial condition of the Society, and concluded by congratulating the Council on its healthy and flourishing condition: all debts had been paid, a large current cash-balance was in hand, and a considerable addition had been made to the invested capital in the public funds.—The Report of the Committee was adopted and confirmed.

Exeter Meeting.—Mr. Raymond Barker (in the absence of Lord Portman) presented the Report of the General Exeter Committee, in which was detailed the progress made in the preparations for the ensuing Country Meeting of the Society, to be held in that city in the middle of July next, in reference to the plan and erection of the Show-yards and Dining Pavilion, the transit of implements and live stock by railway, the inspection and explanation of the water-meadows in Devonshire, the exhibition of South Hams cattle for the prizes of the South Devon Association, and the insertion of the name of Mr. John Gould, of Poltimore, in the list of the General Exeter Committee to fill the vacancy occasioned by the decease of Mr. Stafford Northcote.—This report was adopted and confirmed by the Council.

Country Meeting Districts.—On the motion of Mr. Raymond Barker, seconded by Col. Challoner, the Council rescinded their resolution of May 5, 1847, by which the South-Eastern counties of England constituted the district for the Country Meeting in 1851; and then proceeded to decide that the county of Middlesex should comprise the metropolitan district for that year; the counties of Kent, Surrey, and Sussex the south-eastern district for 1852; the whole of South Wales, with the addition of the counties of Monmouth, Gloucester, Hereford, and Worcester, the South Wales district for 1853; and the counties of Leicester, Lincoln, Nottingham, and Rutland, the East Midland district for 1854.

Inspection Committee.—On the motion of Colonel Challoner, seconded by Mr. Brandreth, the following Committee was appointed "to inspect any site or sites of ground proposed for the Show-yard in 1851, and to report to the Council their suitability or otherwise for the purposes of the Society," namely, the Stewards of the Cattle and Implement Departments, with the members of the Yard Committees, and the addition of Lord Portman, Mr. Pusey, M.P., Mr. Raymond Barker, Mr. Fisher Hobbs, and Mr. Shaw, of London.

The Council then adjourned to their weekly meeting on Wednesday, the 10th of April.

A Weekly Council was held at the Society's-house, in Hanover-square, on Wednesday, the 10th of April. Present:—Mr. Raymond Barker, V.P., in the chair; Mr. Alcock, M.P.; Mr. Barugh Almack; Mr. Bastard; Mr. Burke; Col. Challoner; Mr. Clarke; Mr. Dyer; Col. Le Couteur; Mr. C. E. Overman; Mr. Parkins; Prof. Sewell; Mr. Reynolds Solly; and Prof. Way.

Prize Essay.—Mr. Pusey, M.P., Chairman of the Journal Committee, reported to the Council the decision of the Judges appointed to adjudicate on the Essays sent in to compete for the Society's Prize of £30 for the best Report on the Prevention of Abortion in Cows, including a statement of the extent and causes of its prevalence. The sealed motto-paper being opened by the Chairman of the Council, it was found that the winner of the Prize in question was Mr. John Barlow, Veterinary-Surgeon, of Stone House, Wilmslow, near Manchester. Mr. Pusey also reported that the Judges had "commended" the Essay, on the same subject, bearing the motto, "Prevention is better than cure: (A.)" The sealed motto-paper corresponding with this commended essay was ordered by the Council to be transmitted to Mr. Pusey, in order that, in his capacity of Chairman of the Journal Committee, he might open it or not, at his discretion, agreeably with the 5th Regulation of competition for Essay Prizes, and communicate, if he thought proper, with the author, with a view of consulting him confidentially as to his willingness to place such essay at the disposal of the Journal Committee for publication.

Irrigation.—Sir Thomas Dyke Acland, Bart., M.P., favoured the Council by transmitting to them the following statement, addressed to him by Mr. John Tyrrell, of Exeter, on the probable cause of the fertilizing power of the water employed in irrigating meadows.

"I see from the proceedings of the Royal Agricultural Society, that you take a considerable interest in watered meadows. I fancy I have lately discovered that the benefit derived from the water on such land is principally the result of the animals the water calls into existence. The microscope shows us countless millions of these animals, where irrigation is going forward; while they are found 'few and far between' upon fields that have not been watered. They are principally of the same family that are frequently found fossil in some of our oldest deposits. It strikes me they may assist vegetation during their lives by supplying carbon to the roots of plants, or by disintegrating and converting into manure the decaying vegetable matter around them. When dead they must furnish not only animal but mineral manure, for the shells with which most of them are covered consist of silica."

Jersey Cattle.—Colonel Le Couteur, Aide-de-Camp to the Queen and Viscount of the Island of Jersey, presented to the Council lithographic impressions from two beautiful drawings, made by himself, of a bull and a cow of the Jersey breed, on which were marked the "scale of points," approved by the Royal Agricultural Society of Jersey at their general annual meeting in January last, as constituting perfection in their peculiar and well-known breed of dairy cattle, and as furnishing to their judges a simple and definite process for arriving at satisfactory conclusions in making their awards. Col. Le Couteur entered into a detailed and very interesting statement of the character of animals in which any one or more points specified in this scale were more than usually developed. The drawings then laid before the Council were not portraits of any particular bull or cow of the Jersey breed, but represented an ideal assemblage of individual excellencies occurring in different animals,

and selected from the finest cattle on the island, collected together at Col. Le Couteur's farm for the express purpose in view, and carefully submitted to the inspection and comparison of the gentlemen who formed the special committee appointed by the Jersey Society to revise the "points" of their stock. Col. Le Couteur, in detailing the points thus agreed to by the committee, called the particular attention of the Council to some of those points found to be most intimately connected with the natural excellence of the animals and the characteristic peculiarities of the Jersey breed, of which the island, in Col. Le Couteur's opinion, at that time contained some of as perfect specimens as could well be conceived. He remarked that the cows which had the inside of the ear tinged with a deep yellow colour were invariably found to yield butter of a rich orange colour, while those with ears of a lighter tint furnished butter of a correspondingly inferior quality, and of a paler hue. In the finest stock, too, the eye of the cow was soft and placid, while that of the bull was lively and full of fire. The "action" of Jersey cattle also indicated, not only their muscular power and their mode of employing it, but that general conformation and adaptation of parts which constituted excellence: a finely-bred Jersey animal, Col. Le Couteur remarked, ought to walk off the ground like a race-horse. By means of this determination of a standard scale of points, the labour and responsibility of the judges were much reduced, while their decisions almost invariably gave satisfaction; as, in the case of any difference of opinion, a third party being called in, the award was at once decided. During the 10 years that he had acted as Secretary to the Royal Jersey Agricultural Society, he had never known the occurrence of an absolute case of dissatisfaction. In reply to inquiries made by the Chairman and Colonel Challoner, he proceeded to state, that no animal received approval excepting through the Society, the members being allowed a free exhibition, while strangers were required to pay an entrance fee; the number of points assigned by the judges being duly stamped on the horn of each animal. Colonel Le Couteur, in reply to further inquiries, admitted that this guarantee of merit might, by unprincipled dealers, be imitated for the purpose of deception. At the present time, many animals were easily passed off as of the true Jersey breed, especially those of black, or black and white colour, from Normandy, and others from Brittany, which were very inferior, as dairy stock, to the genuine animals of that breed.—The Chairman wished to know how the term "Alderney" had been generally applied in England to the Channel Islands' cattle, and whether the animals of that island possessed advantages over those of Jersey or Guernsey.—Colonel Le Couteur said that, on the contrary, there was at the present time scarcely an animal in Alderney that he would think worth purchasing. He explained that that island had belonged to his great grandfather, who introduced into it a great number of the Jersey cattle, which, however, from the inferiority of the pasture, soon deteriorated from the original stock. Colonel Le Couteur, Mr. Parkins, and Mr. French Burke, then cited particular

instances of the great amount of butter yielded by dairy cows, during the flush of grass in May and June, or throughout the year, if fed in a particular way, and tended with great care, namely, 16lbs. a week in those months, or 1 lb. a day in other cases during the year.—Colonel Challoner then stated the case of a finely-bred handsome Jersey bull of his own, which, though perfectly healthy and fat, had his skin constantly affected with a yellow powder or scurf of a deep orange colour, especially within his ears and on his tail, a result he could only attribute to an abuse made of him by parties to whom he had been good-naturedly lent.—Colonel Le Couteur then expressed the great pleasure it would at all times give to himself, as one of the Governors of the Royal Agricultural Society of England (or to his successor in the office of Secretary to the Royal Agricultural Society of Jersey), to receive applications from any of its members who required advice and aid in obtaining the best dairy animals which that island could produce. He had had last year the satisfaction of freighting a vessel with 33 head of such stock, to a gentleman residing in Scotland, which arrived in perfect safety, and maintained the high character of the Jersey breed.—The Chairman referred to a challenge given by Mr. Villebois, one of the Governors of the Society, to the county of Bucks, in which he resided, in favour of two of his dairy cows of the Channel Islands' breed, which had produced him both milk and butter of almost unexampled quantity and quality.—Mr. Alcock, M.P., remarked that it would be highly desirable, if, in the case of other breeds of cattle, a similar scale of points could be established, in order that the doubt and difficulty of the judges, and the frequent dissatisfaction of competitors, might be removed by the adoption of such a defined standard of adjudication as would have the effect of limiting and defining the conditions of merit in the competing animals.—Colonel Le Couteur stated, that when some years ago he had shown to the late Earl Spencer the scale of points for the Jersey cattle, his lordship expressed to him the desire he felt that such a step should be taken in reference to other breeds.—Colonel Challoner said that he could fully corroborate that statement, for he had the pleasure of being present with Lord Spencer and Colonel Le Couteur at the time it was made.—Mr. Burke remarked that he was also fully aware of Lord Spencer's wishes on that point.—The Chairman felt how highly desirable the adoption of so definite a system would prove; but at the same time he feared that our judges would have great difficulty in defining the required points, and unanimously agreeing to them.—On the motion of Mr. Parkins, the best thanks of the Council were expressed to Colonel Le Couteur for this kind offer on his part, and for the interesting documents and statements with which he had favoured them.

Miscellaneous Communications.—M. von Bechtold, Ministerial Councillor, and President of the Central Board of the Agricultural Societies of Hesse, transmitted to the Council a communication on the part of Count Salms-Laubach, President of the Agricultural Society of Upper Hesse, in the grand Duchy of Hesse, on the subject of the different breeds of Sheep. Mr. Henry

Clayton addressed a further communication to the Council, on the conditions under which, in his opinion, the trial of Draining Pipe and Tile Machines ought to be made, in order to obtain results which subsequent trial and the ordinary working of the machines would be found to confirm. Mr. Beale Brown transmitted an average sample of the Flax Seed grown by him in Gloucestershire.

The Council then adjourned to Wednesday fortnight, the 24th inst. (Prof. Way's Lecture being fixed for that day week, the 17th inst.)

Professor Way, Consulting-Chemist to the Society, delivered a lecture on the Chemical Principles of Cheese and Butter-making, before the members of the Society, at their house in Hanover-square, on Wednesday, the 17th of April; the Earl of Ducie, Vice-President, in the chair.

Lecture on the Chemical Principles of Butter and Cheese-making.—Mr. Way commenced his lecture by stating that on two different previous occasions he had had the pleasure of bringing before the Society subjects upon which he had been personally engaged, and to which, he hoped, his investigations had brought some additional knowledge. The lectures he alluded to were those on guano, and on the absorptive powers of soils. But it was not in the nature of things, however desirable it might be, that he should be able to bring before them on each occasion some subject new to the agricultural world. In the present lecture he should merely embody in a condensed form that information which his hearers could, if they sought it, find equally well, or better, given in books. There was, however, good reason to believe that truths, when orally enunciated, possessed ten times more penetrative power (if he might so say) than any power of written language could infuse into them. To this circumstance, and to the obvious importance of recalling to our minds from time to time the great principles involved in the practice of agriculture, he must trust for the success of the present lecture. He must be excused for once more remarking that a fundamental part of the plan of these monthly lectures was, in his mind, the opportunity for subsequent remarks by the members present, and he hoped they would freely offer such observations as might occur to them. The lecturer went on to say that, to understand the circumstances affecting cheese and butter, they must first of all examine the composition of milk. The popular knowledge of milk was that it consisted of butter, cheese, and whey—at least, these were the three parts into which it was usually seen to be capable of separation; but this division of the ingredients of milk left out of the question a substance of whose existence in milk many people were entirely ignorant, but to which, in a philosophical point of view, the greatest amount of attention was due—he meant the sugar of milk. In a chemical point of view, milk consisted of five parts, butter, curd, milk, sugar, water, and saline matter. The diagram on the wall gave the relative quantities of these ingredients in different kinds of milk.

COMPOSITION OF MILK :

	Woman.	Cow.	Ass.	Goat.
Casein (pure curd) ..	1.52	4.48	1.82	4.08
Butter.....	3.55	3.13	0.11	3.32
Milk sugar	6.50	4.77	6.08	5.28
Saline matter	0.45	0.60	0.34	0.58
Water.....	87.98	87.02	91.65	88.60
	100.00	100.00	100.00	100.00

The sugar of milk, it would seem, existed in considerable quantity in it, equalling in the cow the weight of the curd. In England, he believed it was never prepared for domestic or other purposes; but in Switzerland, it formed a considerable article of commerce. Mr. Way exhibited a specimen of milk sugar, and observed that it would be found to possess only a slightly sweet taste, which was due to its very limited solubility. This circumstance prevented its extensive use as a substitute for ordinary sugar, because it could only be employed in the form of a syrup, and required so much water to dissolve it as greatly to reduce the strength of any liquid to which it was added. Now, milk sugar, although by itself, or in solution in pure water, it would keep well, was very liable to change when in contact with bodies having the nature of ferments. Milk was, when drawn from the cow, slightly alkaline to test-paper; but in a short time it became sour and curdled. This souring was due to the production of an acid from the sugar, which had, from this circumstance, been called the *lactic acid*, or the acid of milk. The same compound was formed in many other circumstances, and its production was not confined to milk sugar, but occurred in the other forms of sugar. Thus lactic acid was produced when cabbage is cut up and allowed to become sour, forming the sour-kraut of the Continent. The sourness of brewers' grains is due to the same acid. Mr. Way exhibited a diagram which showed how easily the sugars could pass into lactic acid.

RELATION OF SUGAR TO LACTIC ACID.

	Carbon.	Hydrogen,	Oxygen.
Cane Sugar	12 equiv.	12 equiv.	12 equiv.
Grape Sugar.....	12	14	14
Milk Sugar	24	24	24
Lactic Acid	6	6	6

Thus milk sugar was in relation to the acid in question of such composition that one equivalent or combining proportion of it could, without adding to or subtracting from its component parts, produce four equivalents of lactic acid. Now in the natural souring of milk this transformation occurs; but the question arises, how is it brought about? Mr. Way had before stated that ferments in general had this power of acidifying milk sugar. It was an axiom with chemists that ferments are substances in a state of decay, and in virtue of that state capable of imparting it to other substances. The difference between a ferment and a fermentable substance was in general this:—The body producing a ferment was liable to change by simple exposure to air. The body in which the fermenting process can be induced is

not liable to change by exposure to the air, but in the presence of the ferment is capable of ready conversion. The class of ferments generally contain nitrogen; the bodies liable to fermentation do not. Mr. Way had collected in a table some of the more important of the proximate principles containing nitrogen, and also some of those which do not contain this element.—

NITROGENOUS PROXIMATE PRINCIPLES (MULDER).

	Gluten	Casein	Fibrin	Albumen	
	of Wheat.	from Milk.	from Blood.	From Eggs.	From Blood.
Carbon ..	51.75	54.96	54.56	54.48	54.84
Hydrogen	6.99	7.15	6.90	7.01	7.09
Nitrogen	15.71	15.80	15.72	15.70	15.83
Oxygen ..	21.93	21.73	22.13	22.00	21.23
Phosphorus	—	—	0.33	0.43	0.33
Sulphur ..	0.62	0.36	0.36	0.38	0.68
	100.00	100.00	100.00	100.00	100.00

NON-NITROGENOUS PROXIMATE PRINCIPLES.

	Starch.	Gum.	Cane and beet-root sugar.	Grape sugar.	Milk sugar.
	Carbon ..	44.47	45.10	44.92	40.47	42.57
Hydrogen..	6.28	6.10	6.11	6.59	6.44
Oxygen ..	49.25	48.80	48.97	52.94	50.99
	100.00	100.00	100.00	100.00	100.00

Amongst the former would be found casein, the name given by chemists to the principle which is found in the curd or cheese of milk. Casein, as it existed in milk, was in a fluid or semi-fluid state, but most people were familiar with it in the form of curd. If the curd of milk, carefully separated by pressure from the whey, was exposed to the air, it soon began to acquire a putrid smell; in this state it would, if mixed with sweet milk, rapidly cause it to turn sour. The same thing happened in the case of the natural souring of milk; by the exposure of the casein to the air it underwent a change which enabled it to act upon the milk sugar, converting it into lactic acid. This souring of milk was influenced by a variety of circumstances, to some of which Mr. Way would allude presently; but his present object was to explain and to enforce upon their attention the consecutive changes occurring—first, by the action of the air on the curd, and secondly by the influence of the ferment so produced upon the sugar of the milk. A right understanding of these changes would simplify and explain the greater part of the phenomena which presented themselves in the operations of the dairy.

It was well known that the most minute precautions were necessary in the management of a dairy. One of the most important of these was temperature. The action of the air upon nitrogenous substances was, in all cases, favoured by a moderate elevation of temperature. Practically this circumstance was well understood and applied in the construction of dairies, which were usually sunk below the level of the earth, and were as far as possible shaded from the direct rays of the summer's sun. The use of water as a means of regulating tempe-

ture was also known; the plentiful sprinkling of the walls, the floor, and the benches, being intended to reduce the temperature by the cold produced in evaporation. But Mr. Way thought that, by a little ingenuity, much greater advantage might be taken of this well-known law of evaporation; thus, for instance, it seemed to him perfectly practicable to imitate in dairies the methods of producing cold which were practised in hot climates. One of these was to cover the openings of communication with the external air by mats kept constantly wet, which insured a cool and refreshing breeze. In many instances where the command of water existed, this practice might be worthy of imitation in dairies. The colour of the walls was another not unimportant circumstance in the formation of dairies. In one instance he had known of a large dairy constructed of wood, being painted black, or rather being covered with tar. As black is the colour of all others the most absorbent of heat, the results may be guessed. Scrupulous cleanliness is another of the essentials of dairy management—the scalding, and cleansing, and airing of the milk-pans and other utensils being of the first consequence. The reason of this was also obvious; any minute portion of milk left from one operation would necessarily become so changed by the next as greatly to hasten the internal chemical changes in the milk. Another class of phenomena was connected with the extraordinary power of minute and inappreciable quantities of animal effluvia to produce change in such a delicately compounded fluid as milk. Thus, it was a rule never to have a dairy near a stable or other bad smell; there must be no drain near it, no meat kept in it, and the cheese itself should, where possible, be separated as far as possible. In these cases, as indeed in all cases of noxious effluvia, it was believed that excessively minute quantities of decomposing animal matter were carried in the air, rapidly inducing changes of a chemical nature in substances susceptible of such changes. In the case of milk, the phenomena were all referrible to the tendency of casein to undergo change, which was much enhanced by exposure to impure air.

Mr. Way said that he had now shortly to call attention to the curdling of milk. It was seen that the natural souring was due to production of lactic acid; but in what way did this bring about a separation of the curd? This question was best answered by examining the properties of casein. Casein, or the curd of milk, was but slightly soluble in water, but very soluble in a weak solution of an alkali. In milk casein was kept in solution by a small quantity of soda, which accounted for the alkalinity of the milk when fresh drawn. Upon the formation of the acid this latter seizes the soda, thus depriving the curd of its solvents, and the consequence was that the curd was immediately set free. The separation of the curd from the whey was assisted by warming the milk; this was the reason why milk, slightly sour, but not curdled, became so when added to hot tea. If this explanation of the curdling of milk was correct, the same result would be obtained by the use of vinegar or muriatic acid; and Mr. Way showed that these acids would cur-

dle fresh milk. The lecturer then went on to say that he would make a very short sketch of the different operations of butter and cheese-making.

CREAM.—Cream, he stated, was merely a concentration of milk; the butter, by its lightness, rising and carrying with it a certain quantity of casein; it was therefore merely a mechanical separation. Clouted or Devonshire cream was butter with a larger quantity of cheesy matter, and therefore less wholesome than ordinary cream. Cream cheese was one step further than Devonshire cream, being a mixture of casein and butter with a considerable quantity of whey not pressed out. To this circumstance was attributable the impossibility of keeping cream cheese sweet more than a few days. There was a method of preserving cream and milk sweet for some time, which was interesting in a chemical point of view. It consisted in the periodical heating of the milk or cream to the boiling point. If this were done every morning or second morning the milk may be preserved for several weeks. In the same way if fresh cream be bottled and well corked, the bottles then placed in cold water gradually raised to the boiling point, it will be preserved for months. The explanation in these cases is that, by a temperature of 212° Fahrenheit, the quantity of ferment produced by the action of the air on the casein is destroyed; if no further contact of air takes place, the change of milk sugar into lactic acid is suspended; but if the milk be exposed to the air after boiling, a further quantity of ferment is produced, to destroy which, before it greatly accumulates, recourse must be again had to the process of heating.

Mr. Way thought it possible that the bisulphate of lime, the use of which had excited so much attention lately as a means of retarding the fermentation of the juice of the cane, and the Beet-root, in the preparation of sugar, might be advantageously employed in the preservation of milk; but possibly the inventor had contemplated this application of his process.

BUTTER.—The separation of butter in churning was considered a mechanical process, but there were one or two circumstances which seemed to favour the notion that chemical action of some kind occurred during the operation. The circumstances affecting the butter were the same as those affecting the milk. Butter was never entirely free from casein and milk sugar. The casein, although it did not exceed one-half per cent. of the weight of the butter, yet was sufficient to make the preservation of butter difficult. The method of preserving by salting and pressure were intended to meet this tendency of butter to become rancid—here, again, possibly the bisulphate of lime might be useful. There was a method of preserving butter for domestic purposes described in Mr. Rham's "Dictionary of the Farm" (p. 113), and which was founded on the separation of the casein and buttermilk. It consisted in melting the butter, and allowing the casein and water to separate and fall to the bottom. The solid butter thus obtained was less finely flavoured; but it kept better, and was much preferable to salt butter for pastry and other such purposes. To remove the turnipy taste in butter, Mr. Way recommended either stirring the milk as it is drawn, or the

addition of a little saltpetre; or the adoption of the Rev. Mr. Huxtable's plan, namely, adding to each gallon of the milk a table-spoonful of the clear solution of half an ounce of chloride of lime or (bleaching powder), in a gallon of water. In respect to the theory of the formation of butter in the cow, Mr. Way remarked that it was believed that although fat (and by parity of reasoning butter) could be formed from the starch and mucilage of the food, that in the presence of sufficient oily matter it was not likely that such production of fat should take place; then came the question how far oily foods would increase the yield of butter? It must not be lost sight of, however, that butter consisted of two fats—a solid and a liquid; and that, according as the one or the other predominate the butter was firm or soft; the oils might possibly increase the quantity, but would the quality be good? He would suggest as an experiment of physiological interest an attempt to feed a cow with a mash in which suet as a solid fat should be introduced. By proper measures, best known to dairy-farmers, a cow might be made to eat this perhaps, and it would be interesting to know the results on the quantity and quality of butter.

CHEESE.—Mr. Way remarked that the curdling of milk was due as before explained to acids, which combined with the soda of the soluble curd. In general the production of acid in the milk was brought about by the use of rennet, which was a ferment produced by the exposure of the lining membrane of the stomach of a calf to the air. The use of rennet presupposed of course the destruction of the milk sugar, and therefore the whey was sour. In Germany and Switzerland, and particularly in Holland, the acetic and muriatic acids were used to curdle milk for cheese. Mr. Way exhibited a diagram of the composition of cheese, which would show that, although we believed cheese to be dry, it still retained a large quantity of water.

COMPOSITION OF CHEESE (JOHNSTON.)

	Skim Milk Cheese.	Double Gloucester.	Cheddar.	North Wilts.	North Wilts, 2nd Specimen.	Dunlop.
Water	43.82	35.81	36.04	35.58	44.80	38.46
Casein	45.04	37.96	28.98	25.00	28.16	25.87
Butter	5.98	21.97	30.40	30.11	23.04	31.86
Saline matter	5.18	4.25	4.58	6.29	3.09	8.81
	100.02	99.99	100.00	99.98	99.99	100.00

The relative richness of cheeses was due to the quantity of butter in them. The rich cheeses were those which it was most difficult to keep. The thorough salting and perfect washing of the curd also rendered cheese liable to change, although, as in the case of butter, every precaution in this direction was unfortunately opposed to the production of cheese of good flavour; those cheeses that keep best, as the Dutch and Suffolk cheeses, being far less agreeable to eat.

Before he sat down, Mr. Way wished to make one or two observations upon the effect of dairy cultivation on the land. Obviously by exporting butter and cheese from a farm, we export the same elements as in ordinary wheat, beef, and mutton farming. In addition,

however, to the carbonaceous and nitrogenous elements so exported, a quantity of mineral matter, chiefly phosphate of lime, is removed by the cheese and in the bones of the calves. In old pastures this was never replaced, until the practice of manuring with bones came into use. Bones, as exhibited in the diagram, contain 50 per cent. of phosphate of lime.

COMPOSITION OF BONES.

	THOMSON.			VALENTIN.		
	Lieum of a Sheep.	Lieum of an Ox.	Vertebre of a Haddock.	Outer part of Tibia of Man.	Inner part of Tibia of Man.	Head of Tibia.
Organic matter } combustibile.. }	43.3	48.5	39.5	38.02	41.16	48.56
Phosphate of lime.	50.6	45.2	56.1	52.93	49.02	41.77
Carbonate of lime.	4.5	6.1	3.6	7.66	7.76	7.11
Magnesia.....	0.9	0.2	0.8	*0.25	1.54	0.88
Salts of soda.....	0.3	0.2	0.8	1.19	0.51	1.67
Potash.....	0.2	0.1	0.0	0.00	0.00	0.00
	99.8	100.3	100.8	100.05	99.99	99.99

The organic part was composed of oil and gelatin, the latter of which was a nitrogenous substance, as shown in the diagram below.

CARTILAGE OF BONES (GELATIN).

Carbon	50.50
Hydrogen	6.90
Nitrogen	18.47
Sulphur	0.56
Oxygen	23.57
Total	100.00

Now it had been found that 1,000 lbs. of milk contain phosphoric acid equal to about 3 lbs. of phosphate of lime. Mr. Curwen found that in a mixed dairy of long and short-horns, on an average of four years, 3,700 quarts of milk were annually produced by each cow. Upon this calculation about 27 lbs. of phosphate of lime would be annually carried off, and that without taking into account the bones of the calf removed. To replace the phosphate of lime $\frac{1}{2}$ cwt. of bones must annually be added for each cow that was kept. By a further calculation Mr. Way showed that if the use of bones were to replace the nitrogen carried off in the milk, about fifteen times the quantity would be requisite that was needed for the replacement of the phosphate of lime.

It must be believed, then, that although the nitrogenous matter of the bones was highly useful to pasture-lands, the phosphate of lime was the principal advantage in their application. If a contrary creed were maintained, it was plain that the application of the nitrogenous matter was attended with an unnecessary waste of phosphate of lime. To the one class of believers the mineral phosphate of lime, or coprolite, and the African and other phosphatic guanos, were open; to the other, the employment of ammoniacal manures like the sulphate of ammonia. Under any circumstances Mr. Way thought that Peruvian guano would act with the same kind of benefit as bones.

At the conclusion of the lecture, the noble Chairman detailed to the meeting the immediate and permanent effect of bones applied at the rate of $2\frac{1}{2}$ qrs. or 20 bushels per acre, on some of his dairy land on the sandstone in Gloucestershire, where the largest dressing of the richest manure had produced no appreciable result. He had accordingly become a purchaser of bones to a great extent.—Prof. Way alluded to the advantages to be derived from employing dissolved coprolites for the Turnip crop, on land deficient in phosphate of lime, of which that mineral contained a large proportion. He had received from Cheshire a specimen of what was there called, from its external appearance, a grey “marl,” but which, on chemical examination, was found to be no marl at all, as it contained no chalk; but it contained, instead, a large proportion of phosphate of lime, and it was to such substance that the value of the marl in question for dairy land was due.—Col. Challoner made some remarks on the different modes employed for the separation of curd, either artificially by the direct application of acidity, or naturally by the conversion of a part of the sugar of milk into lactic acid.—Mr. John Bethell having observed that he doubted whether the dissolved coprolites would be found cheaper than bones, inquired of Prof. Way whether there was any mode of preventing the small quantity of milk left in dairy utensils from contaminating the fresh milk added to it.—Professor Way thought that carbonate of soda would be the simplest corrective for that evil, neutralizing, as it would, by its alkaline properties the acid generated in the old milk by exposure to the atmosphere, and consequent decomposition.—Mr. Fisher Hobbs, during his visits to the counties of Leicester and Suffolk, had found that in the Leicestershire dairies the cheese was obtained before the butter, while in those on the poorer pastures of Suffolk, the butter was obtained first. He was desirous of ascertaining whether this practice was followed simply from local custom, or whether it was connected with the different animals employed in those counties respectively for dairy purposes, and a different mode of feeding them. The domesticated ox was now chiefly regarded as an animal machine for the production of milk, or the laying-on of flesh, and experience had proved the tendency of different breeds of cattle to the one or other of these results. The late Lord Spencer had short-horned cattle and Alderneys fed and tended precisely in the same way, and under the same circumstances, but the result was quite different in each case, according to the characteristic tendency of the respective breeds; the short-horns developing their resources in the formation of flesh, and maintaining their high condition, while the Alderneys yielded to the dairy the assimilated store of their high feeding in an abundant supply of the richest cream, without gaining flesh to themselves, or improving their condition. On the motion of Sir Robert Price, Bart., M.P., seconded by Colonel Challoner, the best thanks of the meeting were then voted to Professor Way for his kindness in delivering before them so interesting a lecture on that occasion.

American Churn.—At the request of Colonel Challoner, the Secretary laid before the meeting the corres-

* Phosphate of magnesia

pondence in which he had been engaged on the subject of the American air-churn, which had recently attracted much public attention; from which correspondence it appeared that the operation of the churn in question would be exhibited by the patentee at the weekly meeting of the Council on Wednesday, the 24th April, at 12 o'clock, when all members of the Society, who wished to be present, would have the privilege of admission.

NEW MEMBERS.

The following new members were elected:—

Anson, Sir John, Bart., Avisford, near Arnudel, Sussex
 Beckett, Richard, Doncaster, Yorkshire
 Bennett, Luke, Dimsdale Hall, Newcastle, Staffordshire
 Blackburn, Rev. Thomas, Clothall Rectory, Baldock, Herts
 Carmichael, John, Tilmouth Park, Coldstream, Berwickshire
 Creed, William, Abbotskerswell, Devon
 Darby, Joseph, Martock, Somerset

Diuc, Bradley, Gore Court, Sittlingbourne, Kent
 Dixon, J. Thomas, Dunterley, Bellingham, Northumberland
 Du Chatelet, M. Le Ronx, Reux, near Arras, Normandy
 Edwards, Joseph Priestley, Darcy Hey, Halifax, Yorkshire.
 Franklin, Thomas, Poltimore, Exeter
 Giradot, Rev. J. Chancourt, Car-Colston Vicarage, Bingham, Notts.
 Hallett, Frederick Francis, Sussex-square, Brighton
 Hole, William, The Park, Chudleigh, Devon
 Maskelyne, A. M. Story, M.A., Basset Down House, Swindon, Wilts
 Middleton, Charles, Branthill, Holkham, Norfolk
 Oliver, James, Hulton Park, Lancaster
 Parrott, Edward, Buckingham
 Pinsent, Thomas, Greenhill, Kingsteignton
 Praed, Wm. Mackworth, Delamere, Ivy-bridge, Devon
 Stevenson, John N., Hayne Manor, Moreton-Hampstead
 Vidal, Edward Ureh, Comborough, Bideford, Devon
 Watts, Henry, Teigumouth, Devon
 Wood, John, Thedden Grange, Alton, Hants
 Wreford, John, Cleaveangter, Lapford, Devon.

STORRINGTON FARMERS' CLUB.

This club held its annual meeting on Tuesday, February 26, when the members, with several friends, dined together at the White Horse Inn. There were present—Mr. E. F. Upperton (chairman), Mr. R. Chatfield (vice-chairman), Messrs. Lear, Stanford, W. Botting, Emery, W. Battcock, James Dumbrell, C. Challen, H. Clement, Gorringer, T. Float, Penfold, and H. Hardwick; the visitors comprised Mr. B. Stent, Mr. W. B. Boxall, Mr. W. Wyatt, Dr. Bachhoffner, Mr. G. Stanford, and Mr. J. Tribe. Towards the evening—Mr. A. Michell and Mr. Mudd (members), and Dr. Dennett, Rev. — Hamilton, Mr. J. Challen, Mr. Battcock, jun., Mr. West, Mr. Mant, jun., and others joined the party.

After the usual loyal toasts,

The CHAIRMAN said—We will now proceed to business, and I therefore call upon the secretary (Mr. Lear) to read the minutes of the last meeting, after which Mr. Botting will be quite ready, I have no doubt, to introduce the subject of discussion for to-day, viz.—“The Best Mode of Feeding and Fattening Sheep” (Hear, hear).

The SECRETARY having read the minutes, as requested, Mr. Bridger Stent, and Mr. J. Tribe, jun., were nominated and admitted members of the club.

Mr. BOTTING (Thakenham Place) then rose, and said it was in accordance with their wish at their last meeting, that he now stood up to introduce to them the subject of feeding and fattening sheep. It was with reluctance he did it, seeing so good an attendance, as he was well aware that there were many in the room better able to handle the subject

than himself (No, no); but he considered when a member was asked to bring a subject forward, it was only common courtesy to the other members to comply with it (applause). It was for this reason that he now made the attempt (Hear, hear). The subject to be considered was, the best mode of feeding and fattening sheep. He should first beg to offer his observations on the best methods of keeping and feeding, and then as to the fattening of the animal. Now, then, as to feeding. There were two systems of feeding sheep on land: one was, to feed with the turnip on the ground; the other, to cut the food and feed from troughs. In the first system it was usual to put them into the turnips the first week in September. The best sorts are the white and red tankard swede, and the Pomeranian; but of all sorts of turnip for early feeding he recommended the tankard. [Mr. Botting showed specimens of this root at a former meeting]. He was quite satisfied that this was the very best turnip that could be used; the sheep were very fond of it; it came earlier than any other sorts, and there was as much food in them. It was necessary in feeding by this system to pitch off twice a-day, allowing the sheep to go to the “back” feed. This should be continued till about the last week in November, when the sheep should be removed to swedes, and be there continued till they are fit for market. The other method of feeding was in troughs; this method was to keep his sheep as in the former system, to feed off the land till the last week in November, and then begin to cut the food. He considered it was not necessary to cut earlier, as the turnips were younger. He

generally pulled his turnips, topped them, and then laid them up in heaps of about 30 bushels, taking care to get up by Christmas a sufficient quantity to last. He used a "Gardner's" turnip cutter, which was in a box 7 ft. 4 in. long, 5 ft. 4 in. wide, and 2 ft. 4 in. in depth; he cut and put into troughs 9 ft. 3 in. long, 6 in. wide at bottom, 14 in. at top, and 8 in. in depth. It took about nine or ten troughs for one hundred sheep. He fed his flock early in the morning, then again at ten o'clock, again at one, then at half-past three, when he gave them some hay, and then again at night, when he took care, if possible, not to give them more than they could eat, as he emptied his troughs in the morning. He considered it was better to give them hay in the afternoon than in the morning. Of these two systems of feeding he decidedly gave preference to that of cutting. The advantages were these. Say, for the sake of argument, that you have 100 sheep which you feed on the ground. You do this when the days are short and the nights long. In the short days, nearly the whole time would be employed by the animal in getting his food, and it would have no time to take any rest; then again, the food in wet weather got trod into the ground, and a great deal of it was wasted; but on the cutting plan the food was always clean, and if frozen could be eaten—no food was wasted, and under this treatment the sheep would get four or five hours a-day to rest themselves, which was a very essential thing for their fattening (Hear, hear). He would now come to the age and description of sheep. He had tried several ages in fattening sheep, but he had found the best for the purpose was the two-tooth, and he preferred the West Country Down to the Southdown; the breed was heavier, and paid better than the Southdown. He would not offer any further remarks; he did not wish the observations he had made to be taken as being the best. He considered it was their duty to impart to each other the beneficial results of any system they employed (Hear, hear); he had merely done this, and having thanked them for their kind attention, he would sit down and leave it to others to enlarge upon the subject (applause).

Mr. LEAR wished to ask Mr. Botting if he meant by "two-tooth," sheep only one year old?

Mr. BOTTING explained that he bought his lambs in June or July, and then went on on the plan he had stated.

Some desultory conversation then took place, when the chairman rose to order. He said he hoped gentlemen would not all get talking together, but if any one had any remarks to make he would get on his legs and give all present the benefit of his observations (Hear, hear). Before he sat down he would convey to Mr. Botting what he was sure

they would award him, the thanks of the meeting for the manner in which he had responded to their wish (applause).

Mr. BOTTING said he was happy if his remarks had met their approbation, and felt obliged by the compliment just paid him.

Mr. W. B. BOXALL (Stopham) said he did not know whether, being a stranger, he was allowed to make any remarks on the subject.

Mr. UPPERTON.—Most certainly, we are happy to hear the remarks of any one present.

Mr. BOXALL said he only wished to say a few words on feeding in troughs. He considered this a far preferable system of feeding to the ground; and if it would assist them, he would recommend a far better trough than that named by Mr. Battcock. He saw it on paying a visit to Mr. Turvil, in Surrey. It perhaps was more of a cage or rack, than a trough, although it contained both. It is eleven feet long, and stands two feet six inches high, and is capable of feeding twenty-two sheep without their jostling each other. There was a bottom board, and on each side about 14 inches high. This formed the trough, which was capable of holding nine or ten bushels of swedes, and above this was a rack for hay. He found these troughs excellent in feeding off tares. He used 12 of them to take the place of "head wattles." He cut his tares, and put it into them, and shifted the cages two or three times a day. He would be most happy to show them to any gentleman calling. The cost of one was from 17s. 6d. to £1. With everything else Mr. Botting had said he fully concurred (Hear, hear).

Mr. STENT (Fittleworth) said he was using the troughs Mr. Boxall spoke of; he had seen them at Mr. Drewitt's, at St. Catherine-hill. He had this day sent his team for timber to make some of them, although he must acknowledge that his shepherd did not like them so well as the old sort, as they were, he said, so heavy, he could not carry them.

Mr. BOXALL said he had experienced the same complaint when first using these troughs. He went up into his field one morning where a boy was feeding off, and there he saw him amusing himself with lifting the end of one of the cages on to his shoulder, and then letting it drop again on the ground ready to break it to pieces. He went up to him and said, "Well, Harry, how do you get on moving the troughs?" He replied, "Why, Measter, I can't move 'em, they be so heavy." I said, "Let me show you how to do it?" I took one up on my shoulder, and he did the same, and carried it very well, and I never heard any more complaint from him, and I have now another lad, aged 18, in his place, who does all the moving without complaining; there is more in the notion of doing a thing than many imagine.

Mr. B. STENT.—I can only say I cannot carry them.

A VOICE.—Perhaps you have not got the ‘notion’ (a laugh).

Mr. W. BATTCKOCK (treasurer) said he would say a few words on one part which fell from Mr. Botting, who had laid the subject before them so uncommonly well. He (Mr. Battcock) was only a breeder in a very small way; he bred Southdowns, and he must beg to differ from Mr. Botting as to the qualities of the two breeds; he considered the Southdown far preferable to the West Country Down (Hear, hear, and a laugh). He would own that the West Down came to a greater weight, but would they not make a greater hole in the pocket to purchase them? Would they not make a greater hole in the turnip field than the Southdown? (Hear, hear, and laughter). The Southdown had better clothes, more aptness to fatten, and was sweeter in its mutton than the West Down (applause and laughter).

Dr. BACHHOFFNER said, as a resident in London, he could only say that Southdown mutton was always preferred there to any other (Hear, hear).

Mr. PENFOLD (Steining) had lived in London three years, and did not find any difference in the taste of Leicestershire or Southdown.

Dr. BACHHOFFNER was sorry for his want of discrimination (Hear, hear).

Mr. Boxall said he had bought 100 of good east country Down, and 100 of the west country crossed with the Southdown, and he had no doubt this was the sort Mr. Botting meant when he recommended the west country sheep.

Mr. BOTTING.—Yes, it is.

Mr. BOXALL.—He drew 50 of each, put them together in turnips, and kept them together. In the spring he fully expected to find the east country Down the fattest; but, when shorn, the west country Down had the advantage by three or four weeks.

Mr. BOXALL, in answer to questions, said he did not now recollect the difference in the cost of the two breeds, or whether the west country Downs were in better condition when put with the others. He did not know what the subject matter of discussion was to-day, or else he would have come prepared to answer; but he thought very likely the West Downs might have a little advantage, as they would have been lambed earlier.

Mr. STENT said he had also tried the two breeds together. He bought some west country sheep, for which he gave 23s. 6d. per head; he also bought some Southdowns in the parish of Fittleworth last May. He had wintered them together, and he found on killing them off that the west country breed paid him 6s. a head more than the other.

There was another fact; he had not lost one of the west country sheep, but of the Southdown he had lost 20.

Mr. CHATFIELD said there was an old saying, “that the weakest always goes to the wall.” No doubt this had been the case in the experiments tried by Mr. Boxall and Mr. Stent; the west country sheep being the heavier, would drive the lighter sheep from the best food. Now, what he should like for some person to try, and give the result of, would be, to shut the sheep up and give them both the same weight of food; they should then know which would produce the most mutton from the same weight of food (Hear, hear). Put them out in the field together, and he was certain a six-tooth ewe would drive a four-tooth one. He would give in to the assertion that the west country sheep had more weight, but he could not but think that the Southdown had the most aptitude to fatten (Hear, hear).

Mr. BOXALL was afraid they would think him troublesome, but he wished to make one observation with regard to what had fallen from Mr. Chatfield. They were all well aware that some turnips in a field were better than others, and that the strongest sheep would always knock the weakest away from these; but this did not apply to his experiment, except as to as long as they were feeding on the ground together from the first week in September to about the latter end of November, as after that the turnips were all cut, mixed, and put into a trough, so that all shared alike, for with the troughs he had introduced to their notice the stronger could not interfere with the weaker.

Dr. BACHHOFFNER wished to ask Mr. Stent whether, in calculating the 6s. per head advantage on the side of the West Country Down, he had taken into account the 20 lost of the Southdown.

Mr. STENT answered in the negative.

Mr. BATTCKOCK said he should consider it very bad luck to lose 20 sheep out of 100: he very seldom lost more than three or four; this year he was happy to say he had lost none. He was surprised, therefore, when he heard Mr. Stent say he had lost 20. Now, he did not doubt Mr. Stent's judgment in general, but he was afraid in this instance that he (Mr. Stent) had been “taken in” in his purchase (Hear, and laughter). He fancied he had bought them cheap, but they must have been rotten (renewed laughter).

Mr. STENT.—I can show a 9½ stone one hung up this morning. He did not contend that the Westdown sheep had such an aptitude to fatten as the Southdown, but he did not think the latter had got the constitution the others had (Hear, hear).

The CHAIRMAN said they all knew he did not like speechifying, but he could not help saying a

few words. They all knew he fattened a great many sheep, perhaps more than any other farmer in the neighbourhood, and he could only say he was sorry he had got out of a system of buying of his friend Emery and Oliver. He would say, fearless of contradiction, that a good Southdown sheep always gave more satisfaction than any other; they fattened quite as well, and it was only necessary to buy them of the best quality (Hear, hear). He did not like to see the Southdown sheep quashed in this manner (laughter and applause). He was a Southdown man and he liked Southdown mutton, and he meant to go back to it again (Hear, hear). He meant again to buy of Mr. Emery and Mr. Oliver, and was only sorry he had ever left them (applause).

Mr. LEAR said perhaps after so many practical men had spoken it would be best for him to remain quiet, but the discussion had taken two different lines, like two foxes. They had begun with feeding sheep, and then they had gone off like a fresh fox on to a fresh scent—they had gone from feeding to breeding (Hear, hear). Mr. Botting had told them of the best method of feeding sheep; he (Mr. Lear) would now come out of the shed, and speak of the feeding off land. His own opinion was that the system adopted of feeding off the land was a bad one. He was speaking now of light land, with the four-team system, and land in good condition; of course, no farmer would have his land otherwise. They all knew that in this climate the winter was generally a very wet or a very dry one. If wet, it was mild; but if dry, then very cold, with frosts. If the weather was wet, no one could say that it was a very comfortable sight to see sheep in a turnip field. He had seen lambs up to their knuckles in dirt, looking most wretched. Now they all knew no animal did so well as when it was comfortable, and in wet land the sheep were anything but that. But he would go further, for it must be recollected that sheep were fed only in relation to land; could it be thought possible that land was at all improved by being pouched all over by sheep? (Hear, hear). Now, for a dry winter, the sheep go on pretty well till a frost comes; the root then gets frozen in the ground, and it could not be thought that a sheep would be benefited so much by it, for a frozen turnip loses much of its virtue. We were not so situated here as in some countries, where a frost set in and never broke again till the return of spring; but with us, we had a week's frost, then a week's thaw, then another week's frost, then another week's thaw, and so it kept on till the poor turnip was worth but little more than so much water (Hear, hear). But then comes the question, how is all this to be obviated? (Hear, hear). Why he would, if there was a good wheat earsh handy, say some-

thing like 10 or 12 acres, in the month of November have the whole of his turnips pulled, carry them into the field, and lay them in a heap and cover them well up with the dirt. He would cut the stubble, which he would carry into the centre of the field, pile it up in the shape of a cross, pen it all round with wattles or hurdles, and the sheep would then have a snug corner to lie in. It would again be asked, how about the expense? He thought this would be quite done away with by the advantages. He would advise them to plough in their turnip tops, when they would get a rattling good piece of wheat. The advantages offered by this system would be, the sheep would always be on a dry firm ground, the turnips would be clean and wholesome from not being exposed to the frost or dirt, and in rough weather there would be the stubble walls for shelter.

The CHAIRMAN.—How about it if you had not a wheat earsh handy?

Mr. LEAR.—Most probably there would be.

A VOICE.—But we should want to plough the earsh, to get a better crop of turnips.

Mr. LEAR.—Better cover your ground all over, then lying it fallow at all. But now for the breed. He (Mr. L.) recollected once, when in Hampshire, he went to Alresford fair (the October fair), and having naturally a great taste for all sorts of stock, he went out early in the morning to look about him, when he saw a gentleman waiting for his sheep. When they came in, he was surprised to see they were all East Country sheep. I naturally asked him why he preferred them to the West Down? He assured me that he farmed 600 acres of land, and on that he kept 600 sheep. He pointed out some bigger ewes of a neighbour's, and said, "That man farms 1,200 acres, but only brings up 900 sheep" (hear, hear). Seeing this gentleman acting in defiance to the opinion of his neighbours, I determined to ask somebody else about it. In answer to my inquiries, I was told, that though the sheep were very good, they would not do for their (the west country) system. Their system was to get the sheep to lamb down very early, so as to get rid of them earlier—as this paid best. We sell ours in July, but those as you see (pointing to the Southdowns) are kept to this, the October fair. He (Mr. L.) did not like the look of a West Country sheep so well as a Southdown, but he considered they were hardier; and he thought the reason why they were bigger was because there was much more pains taken with them when younger.

The health of "The Visitors" was then drunk. This was followed by "The health of Dr. Bach-
hoffer."

That gentleman, in returning thanks, said he had been highly delighted with the proceedings of the

meeting. He thought great advantages were to be derived from meeting and discussing topics in the manner they had done to-day. He should not have responded before the other visitors, only that he saw none were rising. He would wish "Long life and prosperity to the Farmers of England" (applause).

Mr. BONALL.—I had hoped that Mr. Wyatt—

Mr. WYATT.—Oh, I'll do it! (laughter.) I really thank you all very much for drinking to the "Strangers." I have felt very much interested, and am, no doubt with the rest of you, very much benefited by the discussion that has been held (Hear, and laughter).

[A general conversation took place for some little time, when the Chairman remarked that it would be advisable to close the business of the day before getting into any other topics, and asked if any one else had anything to say upon the subject? There being no response, the secretary said that this was the day on which their officers were chosen. It was unanimously resolved that the whole of the executive should be re-elected.]

The different officers returned thanks on their re-election.

Mr. BATTCKOCK (the treasurer) laid open the state of the exchequer, which seemed to be in a flourishing condition.

Thursday, the 23rd of April, was then appointed as the day for holding the next meeting, when the subject for discussion will be—"On the merits of the Sussex breed of horn cattle, compared with other breeds;" to be introduced by Mr. Bridger Stent.

The CHAIRMAN said he could not close the meeting without congratulating the club upon the very agreeable meeting they had had to-day. Mr. Chatfield had with him a friend, who had kindly offered to give them a lecture on Agricultural Chemistry after tea. He was sure all would be highly delighted with the subject, and he did not doubt for a moment but that all would pay the greatest attention.

In the evening, Dr. Bachhoffner (the well known and talented lecturer of the Polytechnic Institution, London,) gave the promised lecture, which was of a highly interesting character. We do not intend to give the lecture *in extenso*, having already occupied so much space in reporting the business more peculiarly connected with the club, but briefly follow the lecturer through the subject. In commencing Dr. B. adverted to the low ebb at which agriculture was at present. He was not come there, he said, to advocate the cause of free-trade or of protection: he must leave them to fight the battle with the advocates of free-trade, and all he hoped was that the right man would gain the cause

(cheers); but when he saw it stated in the paper (*Mark Lane Express*) which he held in his hand, that a gentleman signing himself "E. C. Hughes," asserted that he had lost £4 11s. 8½d. per acre on his land, he could not but think that the English farmer was competing unequally with the foreigner (great applause). With regard to the subject of chemistry, he was not going to lay before them any new system of facts, but merely a few statements, which were not so generally known as they ought to be. Farmers generally knew but little of the chemical properties of the soil. He strongly repudiated the idea of using chemical manures that they knew nothing of. He did not want them to become chemists, for he thought it was better for the farmers of the present day to follow the steps of their forefathers with regard to their manures, than to set themselves about knowing what this or that manure was composed of (Hear, hear). To know agricultural chemistry well, it was necessary to have what is called a "liberal" education—to be made well acquainted with the laws that govern the operations of nature. Dr. B. then went on to speak of vegetable matter. A vegetable was more than it was generally supposed to be. It is not an animal, but it is very like one, inasmuch as it had lungs to breathe; but although there was a similarity in their wants, there was dissimilarity of means of obtaining that which is necessary to the life of both, namely, food. An animal was able to roam about for food, and to find that which is beneficial for it; but not so the vegetable, that must have its food brought to it, and here was the difficulty, here was the great question, What is the best food for the plant? The lecturer then went on by explaining the difference of organic and inorganic matter, giving a table of contents of each in wheat, oats, turnips, red clover, &c., to show what was necessary for the vitality of the plant. In speaking of the three gases, hydrogen, oxygen, and nitrogen, he surprised many by stating that they emitted or breathed out 11 ounces of solid charcoal, combined with oxygen gas, every 24 hours, and made that surprise the greater when he converted a basin full of lump sugar into a mass of blackened charcoal. From this he passed on to a table compiled by a great German chemist, printed on a large piece of linen, and which Dr. B. said he would leave, with another containing the component parts of soil, with the Storrington Club. This table shewed the "average quantity of matter removed from an acre English in pounds," by wheat, rye, barley, oats, white turnips, potatoes, and red clover; the matters removed being potash, soda, lime, magnesia, phosphoric acid, sulphuric acid, silica, chlorine, azotised matter, and carbonated ditto; and then stated what chemical manures, and in what quantities and costs it would

be necessary to put into the earth after a four lain system, to bring it back into that state it was in at first. Not that he said that all these could be huddled together, mixed up, and then put into the earth. As well might a physician prescribe medicine for a person about whose complaint he knew nothing, as to attempt to put chemical manures into land without knowing what it wanted. He strongly deprecated the use of artificial manures. It was all very well to talk about the success, but did they ever hear of the many failures? If they knew as much about artificial manures as he did (and he had been called upon to analyze a good many), he thought they would never use it again; scarcely one ton in 1,000 was genuine manure. In speaking of the inorganic part of soils, he (Dr. B.) showed the difference of soluble and insoluble matter, exemplifying the effects of soluble matter by showing that if a nail was torn off a finger, the blood would deposit a cartilaginous matter at the end of the finger to form another nail; so if a leg was broken, the body would deposit so much phosphate of lime in that part to mend the bone or replace any portion broken off. It was all very well for farmers to like their long pipes and their tankard of ale (he dare say he should do the same if he was a farmer), but he thought it would be better if they would think over a few of these things a little more than they did. Solomon says, "There is a time for all things," and there certainly was no use in being like the man who got his cart wheels into the dirt and then cried out for Jupiter to come and help him; not that he wanted farmers to be surrounded with pestles and mortars and such like things, but they must learn to think a little for themselves, and not trust too much to what every advertiser of manure choose to say. The lecturer then dilated on the great advantages of liquid manures, and expressed his surprise that more care was not taken to secure this valuable article. In nine farms out of ten, he said, the ammonia was lost from the manure. Every person, if he could not build regular tanks, might make a tank, brick or clay it round, and cover it up with boughs and dirt so as to make it air-tight. It was calculated that a cow made from 2,000 to 3,000 gallons of liquid manure in a year. In Flanders, where they were very particular in saving this article, they value a cow's urine at £2 per annum, and with the solid excremental matter it was worth from £7 to £10 a year. Night soil, bones, and ashes were invaluable as manures. In France and Berlin the former is dried into powder and sold as *poudrette*. The lecturer concluded his very able lecture by advising them to lay hold of, and use all the advantages offered them by science, and he hoped yet to see them able to defy all the free-traders' exertions to ruin them. He was most warmly applauded, and

an unanimous vote of thanks was passed to him. The experiments shown were on a trifling scale, as Dr. Bachhoffner was not prepared with much of his paraphernalia, being only on a visit to Mr. Chatfield. After the lecture, the "pipe and grog" were brought forward, and when put into full requisition, the healths of the chairman, vice-chairman, and secretary, were drunk in succession, and severally responded to by those gentleman.

A good deal of conversation ensued respecting the club just established at Petworth, whether it was better to amalgamate, to hold the meetings alternately at Storrington, Pulborough, Petworth, and Midhurst, or what was the best plan to cooperate together. After Mr. W. B. Boxall, Mr. Stent, Mr. Death, and Mr. Penfold had spoken upon the subject,

Mr. LEAR proposed that both clubs should be distinct, but that members of each should have the *entrée* into the other the same as the *bona fide* members, and that the secretaries should communicate with each other before a meeting of either club. This being thought the most desirable plan, it was carried unanimously. It being now past ten o'clock, we made our exit just as the song was passing merrily round to wind up the proceedings of a very interesting, social, and pleasant meeting. May the Storrington Farmers' Club have many such.

LEICESTER DISTRICT FARMERS' SOCIETY.
—At a meeting of farmers and others interested in the welfare of agriculture, held at the Bell Hotel, Leicester, on Saturday, April the 13th, 1850, the following resolutions were unanimously agreed to:—That we, the undersigned, are desirous of establishing a society for the purpose of discussing any subjects which interests the occupiers of land, to be called 'The Leicester District Farmers' Society.'—“That a subscription of 2s. 6d. per annum be entered into for the purpose of carrying the objects of the society into effect, and to defray any expenses which may be incurred.” Moved by Mr. H. Paget, and seconded by Mr. W. Hind, “That Mr. G. Kirby be requested to act as Honorary Secretary.” Moved by Mr. Gamble, and seconded by Mr. G. Kirby, “That Mr. B. Kirby be requested to take the office of Treasurer and that Mr. A. Perkins, Mr. H. Paget, Mr. T. Gamble, Mr. L. Wilmore, Mr. T. Allen, Mr. B. Kirby, Mr. W. Carver, Mr. T. Moore, Mr. James Sykes, Mr. J. Draycott, Mr. C. Bassett, Mr. Johnson, Mr. Wilson, Mr. Hunt, Mr. Ivens, and Mr. G. Kirby form a Provisional Committee, with power to add to their number; and that they draw up rules for the regulation of the society, and submit the same to a general meeting.”

THE PROPER TIME OF APPLYING MANURE.

The proper times of applying manure are by no means so well understood or definitively settled as they might and should be; and, especially with artificial manures, it is often a question whether it is best to apply the whole directly to the crop, or to apply a part at the time of sowing, and a part during the subsequent progress of the plant.

There are some cases where a "top dressing" is manifestly and clearly requisite. Take a season like the present, for instance, when a wheat crop becomes yellow and sickly, and when some appliance must be given to it, either as a necessary aliment, or for at least a kind of medicine. The plant is sickly from the effects of the attacks of wireworm; from the frost having exposed the roots too much to the action of oxygen; or from the dry weather of the last two months not admitting of a requisite quantity of salts being dissolved to enable the plant to prosper. There is a clear indication of a want of the nitrates of soda and potash, or of sulphate of ammonia, of soot or of guano; and unless this is done immediately, there is every probability of the crop suffering permanently, and to a great extent. On a point like this, the state of the crop is the only index from which to indicate the time and circumstances of the application; but in a question, for instance, where a corn crop has to be raised by guano alone, as is often the case on farms much exhausted in the course of reclamation, there are grave doubts as to whether it is best to sow the whole of the manure at the same period as the grain, or to defer one-half of the application to some period in the spring.

In favour of the first mode is the acknowledged fact that guano always answers best when it is intimately mixed with the soil; on the other hand, its highly soluble parts can, we might imagine, ill bear the continual washings of the autumnal rains; and much, we can well conceive, will be lost in the very period when the plants are slumbering. We are now speaking especially in reference to wheat. Again, it may be well conceived that it is not possible better to apply the residue to the soils than when the re-animated powers of the plant require immediate and abundant supplies; and therefore to apply half the quantity at seed time, and half in the spring, appears to be a mode as desirable and unexceptionable as we are well capable to conceive. But the question assumes a variety of aspects. It refers to the general inquiry as to whether all manures ought to be applied at once? or whether

they should be applied frequently, and in smaller quantities?

The four-course rotation appears to settle the question only to a certain extent. It is true, under it they only manure the crop once in the four years—the turnips; but the consumption of the turnips on the land is a second manuring of the barley. The seeds eaten on are a manure for the wheat; and it is a grave and unsettled question, if the wheat crop may not on all hungry sands pay by far the best for a dressing of manure or ammonia. But that one period of the year is more favourable than another for the application of any artificial manure, is a truism which we cannot for one moment doubt.

An interesting experiment was made by Mr. M'Lintock, of Harley Works, near Glasgow, so long ago as 1843, upon a wheat crop, to which he applied saltpetre. One lot had 84 lbs. of saltpetre applied on the 17th of April; and on another field the saltpetre was applied one-half on the 17th of April, and the other on the 6th of May. The result was very striking.

In the first field:—

The unmanured corn	lbs.	lbs.
weighed	2689	straw, 3372
Saltpetre	2664	„ 3136
	25	136

In the second instance, where the saltpetre was applied at twice, it gave as follows—the quantity being the same in both cases:

The unmanured corn	lbs.	lbs.
weighed	2552	straw, 3148
Saltpetre	3068	„ 4500
Difference	516	1352

The difficulty of weather again steps in; for, if it were a dry season in April, and a wet one in May, it is possible that the 56 lbs. applied at the last-named date had more real effect than the 84 lbs. applied at the earlier period.

Just so, when the weather is so dry as it has been in the major part of March, the greatest part of the top dressings would be absolutely thrown away. Nay, there is doubt if a succession of very dry weather follows, if any artificial manure produces the same effect as the same would have done if sown in the autumn.

There are seasons, however, when rain cannot be waited for—cases of emergency, such as we indicated, and in these cases it should invariably be hoed in; the harrows should then be liberally applied, and after them the bush-harrow and roller, so that the particles of the manure may, at least,

get as intimately as possible mixed with the soil. But the surface soil becomes generally so porous, that the volatile parts of the manure will more or less evaporate, and hence the barometer must be watched in applying top dressings.

SPADE HUSBANDRY AND MANUAL LABOUR.

The difficulties of Ireland are amongst the practical questions of the day which excite the most thrilling and painful interest; and how soon the same question—in kind, if not in degree—shall press upon those interested in English cultivation, we are not at present prepared to state; but in the general unsettled state of things, and of men's minds respecting them, advice and assistance of a substantial kind are most worthy of attention.

An Irish writer suggests *manual labour* and low farming—in other words, hand labour employed to the soil—as a remedy for want of employment and consequent pauperism; and substitutes the cost of this for the other great outlays recommended by some. He thus states “the outlines of the theory on which his recommendations are based:”

“The best natural soils are those whence the materials have been derived from the breaking up and decomposition, not of one stratum or layer, but of many, divided minutely by air and water, and minutely blended together.

“Science has taught us how to improve soils—to counteract a predominance of one substance or supply a deficiency of another; but in all cases it is of the utmost importance for the materials to be well blended, that the plants may make their way, and those chemical changes found necessary to supply food be not obstructed. It is a well-known fact that the size of a plant is always proportioned to the surface of the organs which are destined to convey food to it, and that every fibre of root is an additional mouth to the plant; so that, in proportion as the soil is loosened and pulverized that the roots may spread and travel for the sustenance they require, so much larger will be the produce. Now, by the manual system only can this mixing or blending of the soil be properly performed. The plough may turn up the ground indeed, but can never pulverize and expose it like the spade; beside, the trampling of the horses' feet, and the weight and pressure of the machine itself, counteract the very object intended.”

We fear the writer has adopted an unpopular title;* but the great amount of common sense in

the pamphlet will be found to remove any prejudices which the title might raise, if once the reader can be induced to dip into his pages.

Of the value of subsoiling we have always felt perfectly certain, nor does the writer at all undervalue the process; but he stands up manfully for the superiority of the spade over the subsoil-plough in every case, thus substituting human for brute labour. By a process of reasoning, and an appeal to facts not very easy to get over, he sifts the peculiarities of each operation, and brings very clearly before the reader's mind those conclusions to which he has arrived, and with what amount of weight we must leave our readers to settle. He thus reasons on the superiority of the spade over the common plough, of which we think there will be few doubters:

“The spade (the long, narrow one, which is superior to any other I know, being a cheap, light, strong, clean-working tool) cuts the ground at once into pieces five inches by four, and twelve inches deep, which in stubble-ground will cost £1. Thus, for the same expense, I have the ground cut into pieces of twenty inches, twelve inches deep, by the spade, instead of squares four times the size, and only half the depth, by the plough. To reduce this latter (the cutting by the plough) to the same size as by the spade, and, after all, only half the depth, and the virgin soil (turned up by the spade) is never touched. By the above calculations it would appear that one digging, twelve inches, is equal to eight ploughings, six inches. It will be said that this is all theory, and that the breaking by the plough, harrow, and roller comes in. I admit it does, but not free of expense, and injury to the land by trampling of the horses' feet; but for heavy or wet land one good drill-digging, I say most decidedly, from experience, is superior to any number of ploughings, because, as I said before, the trampling of the horses' feet and the weight and pressure of the machine are counteracting the very object intended. The plough, in sliding along the subsoil, has a tendency to close it;

* Spade Husbandry and Manual Labour, with Low or Cheap Farming, a certain Means of removing Irish

Distress, applicable to England and Scotland. By Alexander Yule. Second Edition. Dublin: Curry and Co. London: Blackwoods. Pp. 93.

£ s. d.

the spade leaves it rough and open. The plough comparatively excludes the frost; the spade lays the land completely open, and being in drills all winter, after the spade, it is sooner ready to get in the crops than it would be dry enough for cross-ploughing, if ploughed into ridges in autumn. This is one advantage equal to the full expense of digging. Therefore ploughing may be truly said to be very inconsistent, inasmuch as, while the plough is partially pulverizing the soil, the horses' feet are consolidating; and, in consequence, the whole should at once be abandoned, and give place to the poor, cheap, neglected spade, which is superior in every respect."

The question of cost, however, is an element always so serious in farming matters that it is the great foundation of all enquiries of this nature; and that the principles laid down in the writer's production are based on a low rate of labour, his own words will abundantly prove. This, at present, will not apply strictly to this island with the same force as Ireland. He says:

"In different parts of Ireland I have had labourers at 6d., 8d. 10d., 1s., and 1s. 2d. per day; and I do assert that the labourers paid 1s. 2d. are the cheapest."

This scale—so low—enables him doubtless to place human labour in a favourable position as regards horse-work; and his comparative items show that he has taken a somewhat high view of the latter. Indeed, the case he has selected for comparison is that the most unfavourable for subsoiling, because the most expensive—for the stoppages and the interposition of human labour render it so—we mean stony ground. He states that he has to pay one-third higher rates per acre for his cultivation, owing to his soil being heavy and difficult to labour. His rates he thus gives:

Subsoiling 20 inches deep, raising stones, and leaving the surface spading in drills 30 inches wide, per perch, 6d.; per statute acre	4	0	0
Drill-subsoiling 17 inches deep, and raising stones, at 4½d. per perch	3	0	0
Drill-subsoiling 14 inches deep, and raising stones, at 3d. per perch	2	0	0
Drill-digging 14 inches deep (the spades being 18 inches long), and raising stones, at 2½d. per perch, per statute acre	1	13	4
Digging lea ground 12 inches deep, at 2d. per perch	1	6	8
Drill-digging stubble ground 12 inches deep, at 1½d.	1	0	0
Drill-digging, after green crops, 9 inches deep, at 1d.	0	13	4
Plain digging, after green crops, 7 inches deep, at 0¾d.	0	10	0
Digging and shovelling trenches between beds 9 feet wide, and trenches 13 inches deep by 14 inches wide	0	7	0
Shovelling furrows between 9-foot ridges, if ploughed, sowed, and harrowed	0	1	6

The increased value of the estate he lays down in the increased produce at £2 per acre, the difference in expenditure between horse and manual labour at a gain of £2 more per acre; but he can also, beyond this, grow a far more valuable crop—a produce of a higher character: and so the advantages of the system are stated to be threefold; and he thus sums up these advantages, which, with a very great reduction per cent., would place both Ireland and these countries in positions extremely favourable. There is, as gain, in his own words:

Saved in expenditure per statute acre of	£2	0	0
Increased produce	1	0	0
By superior kinds of crop	2	0	0

Total gain by spade husbandry, per acre.. £5 0 0

Now, though we are not prepared to go the whole length of the writer, who is warm and enthusiastic, the general *animus* of his work is highly valuable, and deserves a very patient and serious investigation.—Gardeners' and Farmers' Journal.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR APRIL.

Compared with that experienced at many corresponding periods of the year, the weather has been fine during the greater portion of this month. In its early part the temperature was mild and vegetative, and the fine rains had a most favourable effect upon the crops. Towards the close, however, vegetation, from the wind having chiefly blown from the north and east, made but little progress; nevertheless, our accounts from nearly all parts of England, as respects the appearance of the wheat plants, are very satisfactory. The sowing of all

spring corn, including wheat, was brought to a close, from the land being dry and friable, much earlier than usual; and, at the present time, all outdoor labours are in a very forward state.

Owing to the immense quantities of foreign flour pressing for sale in London and elsewhere, and the want of any country demand at the leading outports, the corn trade has ruled exceedingly heavy, and the prices of home-grown wheat have given way quite 4s. per quarter; foreign qualities have receded to nearly the same extent. Barley has likewise been lower to purchase; while oats and flour have fallen in value, all other articles being very inactive.

Notwithstanding that the total sales of English wheat have increased during the present year compared with those of 1848 and 1849, the stocks still held by the principal growers are large. Not a few of the farmers have refrained from forwarding supplies for some time past, under the impression that prices will shortly rally. How far their judgment is correct we must leave others to determine; for it appears to us, that with superabundant supplies of English grain on hand, the prospect of increasing imports from abroad, and the continuous decline in the quotations in most of the continental shipping ports, any rise in value will be only temporary. From the best authority we learn that the quantity of wheat still on hand in nearly the whole of the French departments is extremely large, and of excellent quality. Further importations of flour from that quarter may, therefore, be reasonably expected, although prices here would appear to offer no inducement to ship largely.

It will be recollected that for some months past we have contended that the quantity of potatoes produced last year in the United Kingdom, especially in England, was unusually large, and that the losses from disease were trifling. In confirmation of the accuracy of our information, we may observe that the whole of our markets have been heavily supplied with all kinds in the best possible condition; and further, that the stocks on hand are still extensive. On the continent, last year's produce must have been immense, as we find that 81,000 tons have arrived thence into London alone from the 1st of August, 1849, up to the present time; and it is calculated that nearly 40,000 tons have reached the outports. Potato-planting has rapidly increased this year, particularly in Ireland; indeed, we are credibly informed that larger breadths of land are under the culture of potatoes than have ever been recollected. In London, foreign parcels have sold as low as 40s. per ton, but prime English have produced 120s.

A very large number of lambs has been dropped this season, and the losses from the severity of the weather have been trifling. On most farms the supply of stock is large, and we may venture to observe that the actual losses from disease have been less than in the generality of years. The quantity of grass is still small, even in the most forward districts; yet, as there is still a great abundance of hay of last year's growth on hand, the stock has fared extremely well.

From the official returns it appears that the total imports of grain into the United Kingdom, during the month ending on the 5th inst., were 562,669 qrs., and of flour and meal 206,750 cwts. The whole passed the Customs for home consumption.

The stocks in bond were 568,616 qrs. of grain, and 207,275 cwts. of flour and meal.

The use of Indian corn in Ireland appears to be on the increase. During the month large quantities have been shipped from Liverpool, for Dublin, Cork, and Waterford; and it is understood that this article is paying the importers much better than any other grain, even though prices in the United States are somewhat high.

The corn trade in Scotland has ruled very inactive, and prices have had a downward tendency. The fall, however, has not been equal to that experienced in England. It is generally expected that the supplies of fat stock about to be forwarded to London this season will be considerably in excess of those of last. The beasts are represented as in the finest possible condition.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

The supplies of beasts and calves offering in Smithfield Cattle market, since we last wrote, have been large for the time of year, as will be seen on reference to our comparative returns: but those of sheep, lambs, and pigs have fallen off. The general condition of the stock has, however, proved exceedingly good, and the butchers admit that it has carried a much greater quantity of internal fat than usual. This circumstance is, by some persons, attributed to the system of stall-feeding so much in vogue in different localities; but we are inclined to the opinion, that the increased numbers of stock in the country, and the necessity of retaining upon most farms as much natural manure as possible, under the present state of things, have had much to do with *age*; consequently, the beasts and sheep have come to hand much riper than on some previous occasions. Certain it is, that the use of artificial manure, as well as of linseed and rape-cake, has fallen off to a very great extent; and, as far as we can see, it is likely to decrease considerably during the present season. Prices of those articles are ruinously low—lower than for many years past; and yet a much greater fall *must* take place in them to induce the graziers and others to purchase them. The beef trade has continued extremely inactive in the Metropolitan markets, and the quotations have again declined from 2d. to 4d. per 8lbs. In calves next to nothing has been doing, at a similar reduction in value; but sheep and lambs have sold steadily, on rather higher terms. The annexed supplies have been brought forward:—

Beasts	16,765 Head.
Cows	414
Sheep and Lambs	97,920
Calves	1,299
Pigs	1,900

CORRESPONDING PERIODS.

April, 1847. April, 1848. April, 1849.

Beasts.....	17,810 ..	15,322 ..	16,678
Cows	461 ..	577 ..	520
Sheep & Lambs	103,620 ..	82,310 ..	110,070
Calves	1,049 ..	1,375 ..	1,178
Pigs	2,570 ..	2,818 ..	1,840

The bullock droves have been derived as follows:—

Norfolk, Suffolk, &c.	7,920
Other parts of England.....	2,500
Scotland	1,330
Ireland	116

COMPARATIVE PRICES IN SMITHFIELD.

Per 8lbs., to sink the offals.

	April, 1847.		April, 1848.	
	s. d.	s. d.	s. d.	s. d.
Beef from ..	3 4	to 4 6	.. 3 2	to 4 8
Mutton	3 10	to 5 8	.. 3 6	to 5 6
Lamb.....	5 4	to 6 4	.. 5 8	to 7 0
Veal.....	4 2	to 5 4	.. 4 0	to 5 2
Pork	3 10	to 5 0	.. 4 0	to 5 0

	April, 1849.		April, 1850.	
	s. d.	s. d.	s. d.	s. d.
Beef from ..	2 0	to 3 6	.. 2 4	to 3 6
Mutton	2 4	to 4 2	.. 3 0	to 4 6
Lamb	5 0	to 6 4	.. 4 8	to 5 8
Veal	3 2	to 4 2	.. 3 0	to 3 8
Pork	3 0	to 4 2	.. 3 2	to 4 0

The total imports of foreign stock into London have amounted to 4,667 head. In April, 1847, they amounted to 5,826; in April, 1848, 5,391; in April, 1849, 3,810 head. The arrivals were thus divided:—

Beasts.....	1,483
Sheep.....	2,497
Calves.....	687

Newgate and Leadenhall markets have been seasonably well supplied with meat, the demand for which has been far from active, at but little variation in prices.

Per 8lbs. by the carcass.

	s. d.	to	s. d.
Beef, from	1 10	to	3 2
Mutton	2 4	to	3 6
Lamb	4 6	to	5 6
Veal	2 10	to	3 6
Pork	2 10	to	4 0

CORNWALL.

The fine weather in March was taken the full advantage of, and a large portion of spring corn was sown, and fortunately it was so, as the immense quantity of rain we lately have had has completely put a stop to all fieldwork; indeed, the springs are as high and the land as wet as we have ever known it. In the clay soils, scarcely any barley is sown, and it would be folly to attempt doing so until the land gets dryer; this will cause the barley tillage to be late. The autumn wheat plant is generally looking well, but it is too early to say what this crop may be. The grass has grown much during the last ten days, and the country is looking pleasing to the eye. Swedes and hay hold out well, and the stock is in fair condition and perfectly healthy. The lambing season being now over, it is

gratifying to state that the crop of lambs is above the average in quantity and of good quality. The universal depression in all agricultural produce is severely felt here, much uneasiness and dissatisfaction is apparent with all classes. Our corn markets are still well supplied, wheat at 36s. per quarter. Barley quite unsaleable, and oats at 15s. per qr.; with these prices, a very considerable portion of the land in this country is valueless. A vast number of the labouring classes from this county have been emigrating for some years past, which is now on the increase; not only labourers, but farmers and others that have capital and abilities are about to seek in a foreign country what is denied them in their native land.—April 19.

THE NORTH EAST OF SCOTLAND.

After a winter of greater severity than we have experienced for a considerable number of years, the spring opened with remarkably fine weather, exactly at the proper time for sowing our oats. The soil was brought into fine condition for the harrow about the 11th of March; and the business of sowing became general throughout this district in a few days after that date. The work was prosecuted with so much vigour and activity that in the course of eight or ten days a great proportion of the seed had been put into the ground; and very little indeed remained to sow, except the turnip fields, and in a great many cases in the earlier parts of the district a considerable extent even of these had been sown. The weather continued remarkably fine, and the ground was in the best condition during the period now referred to. The greater part of the seed has, therefore, been put into the soil under the most favourable circumstances. We had subsequently a very sharp snow-storm, by which all field operations were entirely interrupted; and the weather continued so wet that for a period of three weeks—up to about Thursday last—the ground was scarcely for a single day in a condition to allow a harrow to be put upon it. Such is a specimen of the proverbial uncertainty of our climate. We had one or two dry days lately, and the opportunity has been seized to complete the sowing of turnip fields—so far as the removing of the roots permits this to be done; and considerable portions of the grass seeds have also been sown down—in some cases upon land into which the corn had been sown some three weeks previously. Throughout the earlier parts of the district, sowing may be regarded as now nearly completed; but in the upland and later parts of the country, there is yet, we understand, a good deal to sow. We have again had a heavy rain, and the soil is at present thoroughly drenched. The last crop has turned out tolerably well as to grain; though, of course, far inferior in that respect to the crop of the previous year. As to the price at which it has been sold, we need say nothing. It is needless to reiterate the complaints—not, in this district, loud, but deep and earnest—which have been made in all parts of the country. Cattle, however, are here our mainstay; but the price of these also has, in the mean time, given way to an almost unprecedented extent. While every source of the farmer's income is largely diminished, the three principal departments of his expenditure—namely, rent, manures, and servants' wages—remain the same. It is

evident that this state of matters cannot continue for any length of time. As to the wages of labour, these, there can be no doubt, will speedily adjust themselves to the altered state of matters. Bone manure and guano—which are now selling, the former at 2s. 6d. and 2s. 8d. per bushel, and the latter at £10 10s. and £11 per ton—we must have at cheaper rates, if we are to continue to use them to the extent that we have hitherto done. As to rents, we forbear in the mean time to remark on this subject, further than to say, that if circumstances continue such as to force them down, such reduction of them will take place only after a considerable portion of tenant farmers have been ruined; and to say, further, that the evil effects of such a state of things, will not, as many short-sighted men seem to suppose, be confined to landed proprietors only. We have to notice the highly important fact, that railway communication has been completed to Aberdeen since we wrote our last report. This will certainly mark an era in the history of the industry, agricultural as well as commercial, of the north-east of Scotland. The following numbers of cattle were sent south by this railway during the months of February and March:—To London, 1,205; to Edinburgh, 505; to Glasgow, 184; with a few to Liverpool and Newcastle. During the same period there were sent by sea from Aberdeen to London, 2,400; to Newcastle, 530. And during these two months, 1,950 head of cattle were also shipped from the ports of Fraserburgh, Banff, and Burchhead.—April 16.

CARSE OF GOWRIE.

The weather, which is an all absorbing topic, especially to the agriculturist, was never more favourable to the corn farmer in the month of March than it has been this year. We have had no lack of *dust*, we may say during the whole month, which old men say is beyond value. In the Carse of Gowrie we have had no rain nor fall of any kind from the 3rd to the 30th, with the exception of about an inch of snow on the 26th, which disappeared before midday. Another old saying, “that March growth never did good,” likewise speaks favourably, as, owing to the low temperature and little moisture, vegetation has made very little progress, and has only begun with the beginning of April; and with the copious rains and mild days we are now enjoying, we will in all likelihood have an early spring. The mean temperature for the month, at 6 A.M., is 38 deg. 42 min. Height of barometer, 29 in. 6 tenths. Bean sowing commenced about the beginning of the month, and was comparatively a light process, the land having been dry and firm for carting on manure, which is in general not spared on this crop. It is generally spread on the surface, about 16 to 20 loads per acre, and ploughed in along with the beans, which are for the most part sown broadcast, at

the rate of about eight bushels per Scotch acre, but from various experiments, I am of opinion that much less seed produces a much better crop. For several years I have not sown more than six bushels of the common Carse beans and peas, and about four and a half bushels of English cluster beans, which are much smaller, per Scotch acre, with the addition of about one peck of tares. Beans sown in drills appear only to do well in deep loamy clays; on the thin hard portions of the Carse, although well manured, they do not grow luxuriantly enough to keep out the drought in summer, and although there may be about the same number of quarters per acre, there is generally a great deficiency of straw, and in general the ground will be as clean after broadcast as after drilled beans. Owing to the wet state of the soil when the greater part of the lea was ploughed, and the want of frost while it was in a moist state to pulverize it, the oat division got so hard by the time the beans were got sown, that in general it was thought advisable to suspend the sowing of that crop until softening showers should make it more pliable; consequently few oats have been sown until the present week, when, if it keep fair for a few days, they are getting a very favourable season. For the last two weeks the order of the day has been preparing for potato crops, and steering and breaking down lands for barley, which has all got a very favourable turn. Now is a very good season for applying special manures on wheats and young grass,—the moist state of the ground and the passing showers being very subservient for washing it into the pores of the soil, and fixing the ammonia and other volatile ingredients. Fallow wheats in general look very sickly, being greatly thrown out and weathered on the surface. In some cases it has been re-sown in the spring, and in many others it is scarcely observed to be green. However it may revive yet, and prove a very bulky crop, although in general it often turns out a little coarse in quality when it gets so thin. When fallows are sown in a dry state, it will be found advantageous to roll well and leave it rolled. I have seldom seen the wheat thrown out if this is done; if it is sown in narrow drills and harrowed a little damp, it generally has the same effect. Wheat sown after crop is universally looking well, and that sown in spring is making a fine braird. Young clovers continue to look well, and with the present weather will afford a good bite to cattle by the first of May. Turnips have about all disappeared off the fields; and fat stock must be pretty well cleared out. Orchards are presenting plenty of blossom, and fruit will in all likelihood be abundant this year. Markets of all description have remained in the same low inactive state throughout the month, with little or no prospect of any improvement. Whitsunday rents will be somewhat difficult to get up, even when these are regulated by the fiars of the county.—April 6.

CALENDAR OF HORTICULTURE.—MAY.

The retrospect is advisedly postponed till the calendar is closed, for the obvious reason that the condition of the garden at the very day when the great change of the weather took place, which promises no ordinary results, should be recorded.

After the last report went to press (March 21) the temperature declined far below the average of the month. Snow fell on the 23rd, 24th, and 27th; but the fluctuations of the wind, and rapid descent

of the barometer, indicated a coming change. Frost ceased on the 30th, the wind blew forcibly from south-east, and the average temperature rose to 42° less a mere fraction. The gardens remained at a complete stand-still; but so far as I can judge, without any injury to either fruit-blossoms or vegetables. On the 31st we had a shower of rain, the first of any moment since February 21. The ground was dry, and the dust had covered every

shrub in all the exposed gardens. April has come in with a genial, mild atmosphere, and more gentle rain, and wind south-easterly, but having all the character of a zephyr. The ground, strange to say, has been warmer, at a foot and two feet below the surface, than usual; and nature is prepared to start into unwonted activity. Such a season, by the concurrent testimony of all, has rarely been witnessed; and if the promise be fulfilled, the greatest abundance may be expected.

VEGETABLE DEPARTMENT.

The *kidney bean*—the *French bean* or *haricot*—(*Phaseolus* of botany)—claims the earliest notice. Its organic analysis has not, perhaps, been effected with sufficient accuracy: one by Boussingault is to the following purport. The proportion of ash in the seed, per cent. is stated to be 3.50; and in 100 parts of such ash were found—

Potash	49.10
Lime	5.80
Magnesia	11.50
Peroxide of iron.....	trace
Silica	1.00
Sulphuric acid	1.30
Phosphoric acid.....	26.08
Carbonic acid.....	3.30
Chlorine.....	.10
Carbon and sand	1.10
Deficiency .....	.72

100.

Here we find a great excess of potass—the entire absence of soda, of common salt, and nearly so of phosphate of lime; whereas in the seed of some legumes, as peas and broad beans, there was always more or less of soda (from 2 or 3 to 30 per cent.), and lime in very varying quantities. Potash appears to be the predominant element in the pulse tribes. A good and fresh loam, therefore, appears to be the soil naturally indicated, as a staple. The analysis evidently requires a critical repetition.

OPERATIONS.

The seed of French and runner beans must be sown early, if the ground be dry and warm, in drills over a layer of sound well-wrought manure placed 10 or 12 inches deep: a little guano or superphosphate of lime (vitriolised bones) would assist the earth. But all conjectures tend to show how slight are the approaches yet made toward a scientific knowledge of soils and plants.

French and runner beans will prosper when transplanted; and therefore may be always forwarded by being sown early in April, in glazed frames, or in pots covered by a hand-glass; thus, also, the dry condition of the open ground may be waited for without loss of time.

Asparagus beds and rows must be kept free from

weeds; and if the spring be warm and gently showery, the cutting, by a long saw-edged knife, will perhaps commence in May.

Lettuce.—Sow and transplant any favourite sorts: rich soil, loam in good heart, and free irrigation are the requisite essentials. I have frequently recommended the black-seeded *Gotte* and *Tennis-ball*, because they generally succeed and heart well in ordinary soils, seldom running to seed. Sow early, but mistrust transplanting at this season. Tie up any *cos* plants that become large, to induce hearting.

Sow *peas* and *spinach*, as wanted—mustard, cress, rape, radish and lamb's-lettuce, carrots for drawing young: celery in the first week for the chief latter crops. Prick out a supply of young celery plants raised over leaf-beds or in frames. Plant them in small beds of rich, light earth, four inches apart: give water directly, and shade by a mat or spare frame till they grow: then give air in the frame, freely. Such removals produce full, stocky roots, and those mat into balls that assist the safe, final, removal.

After the middle of May sow *cauliflower seed* (for Michaelmas) in a small square plot of fine light loam, two or three feet wide, where the seedlings can be easily covered. *Broccoli*, purple and white, for winter and early spring—always sow these tribes in open ground; otherwise the plants will grow up spindling. Transplant all the above, also *savoys*, *red cabbage*, and *borecole* for autumn and winter.

Parsley is of difficult management, if it be an object to obtain it perfectly well curled. The seed should have been sown in spring; and now, or when the plants have five or six leaves, those most closely curled should be taken up, their roots trimmed to three or four inches long, and transferred to an open bed, so as to stand nine or ten inches asunder; or they may be placed a yard apart in a long border equally far removed from a wall or fence. Water them occasionally with weak liquid manure, and keep the ground clear of weeds.

Plant offsets or rooted cuttings of *mint* and other pot-herbs in moist weather. The ordinary manipulations must never be over-looked. Hoeing in dry weather creates moisture, and rapidly exterminates weeds. Hand-weeding is particularly required in wet seasons; but then the surface should not be disturbed by any tool; for it is well known that a binding land becomes hard and ill-conditioned if moved while in a wet state.

At the end of May sow *cucumber* seed over a bed of warm manure; or, indeed, in plain ground. If on a warm, gentle, slope facing the south, the plants will bear well in August.

Melons, cucumbers, and pine-apples, in heated pits, now come on rapidly, and will demand as-

siduous attention to support a lively growing heat, and to give due air and water. No direct local rules can be written down, as the soil, exposure, and peculiar circumstances will, or should, guide the cultivator. As to melons, it is probable that impregnation by the male farina should not be attempted till the plants are strong and far extended, each supporting several *fruitful* expanded blossoms; and then all of these should be artificially impregnated *at once*, when perhaps two or three fruits may set on one strong plant; whereas, if by early fertilizing one single fruit set on a young plant, the chance will be that it will attract all the energy of the herb, and prevent the setting of every forthcoming female blossom.

HARDY FRUIT TREES.

The *apricot* will fairly exhibit its crop. If it be plentiful thin out in proportion, still leaving twice the quantity intended to ripen, because many failures must be expected.

Vines.—Carefully select and support the fruit-bearing shoots: it will be best to leave only one strong cluster on each; and never cut away any of the main leaves, but remove useless and barren young wood.

Strawberry beds and rows should have some covering, two or three inches deep, of grass, straw-litter, or old tan; the object being to keep in moisture, and to preserve the fruit from being splashed. Flat tiles are expensive, otherwise they would be a good defence. The leaves of peach and nectarine trees are apt to become bloated and disfigured by what is called the bladder blight. Its cause, I suspect, is a collapse of the sap vessels or cells, by which the return, or due distribution of the fluid, is checked and retained till the leaves become gorged: night cold must in that case be the agent. Such leaves frequently become the abode of *aphides* in myriads, and hence the resort of ants: every one of those leaves should be pulled off and burned, to destroy the green flies.

Disbudding is a main work of the month: it consists in the removal from all fruit trees, excepting the fig, of useless fore-right and side shoots, nipping them off with the thumb and finger while tender. However, it has its limits; for in peach, nectarine, and apricot trees, the finest fruit is frequently borne on spurs or suaggs, which are produced by nipping back young spring shoots to two or three eyes, after they have developed four or five leaves. Figure may thus be somewhat injured; but the hint merits notice, if fertility be the main object.

So much has been written from time to time, at all seasons, on the management of the forcing department, that we prefer to come at once to the subject of—

THE FLOWER GARDEN AND SHRUBBERY.

May is a season which tasks all the foresight and vigilance of the skilful gardener. In it the parterres ought to be furnished, and all the processes of symmetrical "bedding out" completed. Every prospect *is as yet* favourable, and the plants in pots and frames, hardy, semi-hardy, and tender, ought to be in a forward healthy condition, and supplied with air at every favourable opportunity to the utmost extent that safety will warrant. Thus it is that the beautiful new annuals raised from seed (too much preferred to the exclusion of some of most deserving older favourites), numbers of herbaceous subjects, the *verbenas*, scarlet and variegated-leaved *pelargoniums*, and the whole of the extensive parterre families, are propagated and fully prepared to be transferred to their several appropriate quarters.

The 15th of May is considered the Rubicon of the flower garden, when, if it be passed without frost, few will hesitate to plant out with all dispatch. But as time urges, if the work be heavy and stock very considerable, some have been tempted, even constrained, to commence with the first day of the month. We have witnessed many serious results even beyond the 15th, but can never forget the loss sustained at Dropmore on the 7th or 8th, anno 1831. The foreman of the department had the lights of all the pits open to harden the geraniums as much as possible (by the way, this said hardening is a process of *trial* not of *effect*, for the constitution of a tender exotic *cannot* be rendered hardy). He sat up till three o'clock, morning—no frost, though the air and sky were clear: he retired to rest; a strong rime followed before or at sun-rise, and above 500 plants were either destroyed or mutilated. Ten days later, in 1837, my vine shoots on a S.E. wall were cut back fully six inches by frost and heavy snow, and all the crop perished.

April 20.—I close *retrospectively* by merely observing that finer and more plentiful showers and propitious weather have seldom been witnessed. Nature has steadily progressed: the gardens are beautiful, vegetables abundant and fine, white broccoli superlatively so. Perhaps the apricot bloom was injured by the cold of March, for I perceive that much has fallen off without expanding.

Croydon.

JOHN TOWERS.

METEOROLOGICAL DIARY.

BAROMETER.			THERMOMETER.			WIND AND STATE.		ATMOSPHERE.			WEATH.
Day.	s	a.m 10p.m.	Min.	Max.	10p.m.	Direction.	Force.	s a. m.	2 p.m.	10 p.m.	
Mar.22	in. cts.	in. cts.	29	44	42	W. by North	rising	fine	fine	cloudy	rain
23	29.50	29.50	34	40	33	W., N. by W.	brisk	cloudy	fine	cloudy	rn. & snow
24	29.50	29.69	30	36	32	Northerly	lively	cloudy	cloudy	cloudy	snow
25	29.69	29.70	28	40	30	N. Westerly	gentle	fine	sun	fine	dry
26	29.71	29.77	25	39	33	Westerly, var.	calm	fine	cloudy	cloudy	dry
27	29.79	29.90	27	50	35	N. East	calm	fine	sun	fine	dry
28	29.98	30.09	25	46	34	Var., W.N.W.	gentle	fine	sun	fine	dry
29	30.09	30.05	29	47	37	S.E., var.	brisk	fine	sun	fine	dry
30	29.96	29.75	34	48	43	S. Easterly	forcible	fine	cloudy	cloudy	dry
31	29.67	29.74	40	54	47	S. by E., S.	gentle	cloudy	fine	fine	shower
April 1	29.65	29.35	45	59	51	S. by East	lively	cloudy	sun	fine	shower
2	29.26	29.21	45	62	48	Southerly	lively	cloudy	sun	fine	rain
3	29.40	29.25	47	54	48	S. West	rising	fine	sun	cloudy	rain
4	29.05	29.30	46	55	50	S. West	high	cloudy	cloudy	cloudy	rain
5	29.61	29.84	46	57	46	Westerly	lively	fine	sun	fine	dry
6	29.77	29.70	42	54	40	W. S. W.	rising	cloudy	cloudy	cloudy	rain
7	29.70	29.65	47	63	53	W. by South	gentle	cloudy	sun	cloudy	dry
8	29.49	29.35	48	58	50	S. by E. by W.	gentle	cloudy	fine	cloudy	shower
9	29.35	29.40	45	53	47	S. Westerly	v. brisk	cloudy	fine	cloudy	rain
10	29.40	29.40	40	60	46	Sly., N. by E.	gentle	cloudy	sun	fine	dry
11	29.36	29.42	45	62	53	S. by East	gentle	cloudy	sun	fine	rain
12	29.60	29.80	47	56	50	Northerly, var.	gentle	cloudy	sun	fine	shower
13	29.86	29.77	48	53	48	S. West	gentle	cloudy	fine	cloudy	showers
14	29.84	29.80	45	52	46	N.W., S.W.	calm	cloudy	cloudy	cloudy	dry
15	29.54	29.30	45	57	46	S. West	gentle	cloudy	cloudy	fine	showers
16	29.20	29.20	44	50	47	S. West	forcible	cloudy	cloudy	cloudy	showers
17	29.46	29.70	45	57	47	W., W. by S.	lively	fine	sun	fine	showers
18	29.90	30.03	43	59	50	S. West	var.	fine	sun	fine	dry
19	30.04	29.84	44	50	50	S. West	lively	cloudy	cloudy	cloudy	wet
20	29.66	29.50	46	56	46	W. by S.	lively	fine	cloudy	fine	sh. & hail

ESTIMATED AVERAGES OF APRIL.

Barometer.		Thermometer.		
High.	Low.	High.	Low.	Mean.
30.54	29.20	74	29	49.2

REAL AVERAGE TEMPERATURE OF THE PERIOD.

Highest.	Lowest.	Mean.
52.36	40.2	46.18

WEATHER AND PHENOMENA.

March 22—Changeable. 23—Rain and snow. 24—Scuds of snow; piercing. 25—Keen and fine. 26—Partly overcast. 27—Masses of clouds; snowy evening. 28—Gradual thaw. 29—Beautiful morning; cirrus clouds. 30—Dark cirro-cumuli. 31—Much warmer; showery; changeable.

LUNATION.—Full moon, 27th day, 11h. 26m. at night.

April 1 and 2—Fine genial warmth; showers. 3—Spring morning; wet night. 4—Rainy night and wind. 5—Fine and dry. 6—Changeable. 7 and 8—Warm sun; growing weather. 9—Overcast; rain and wind. 10—Much finer. 11—Massy

clouds. 12—Some thunder at a distance. 13—Showery evening. 14—Gloom; lofty haze. 15—Wet forenoon; bright evening; no spots on the sun observed till this day, when one was seen. 16—Showers. 17—Fine till midday; showers; hail shower. 18—Spring day throughout. 19—Generally wet. 20—Fine forenoon; then thunder showers, and some hail.

LUNATIONS.—Last quarter, 6th day, 3 h. 44 m., afternoon; new moon, 12th day, 47 m. afternoon; first quarter, 19th day, 10 h. 7 min. morn.

REMARKS REFERRING TO AGRICULTURE.—

March towards the close meliorated, and April has been most genial; so far the seasons are all we could hope. The pastures are clothed with verdure, and the cereals and fodder crops in fine progress. The promise of abundance appears to increase, and, meteorologically, a rich summer is in prospect.

Croydon.

J. TOWERS;

REVIEW OF THE CORN TRADE DURING THE MONTH OF APRIL.

We have had another month of extreme depression in the grain trade, and the prospects for the future, as far as prices are concerned, are by no means of an encouraging character. The more rational of the free traders have long since discovered that to lower the value of agricultural produce in this country below the cost of production, by importations of foreign corn, is not likely to be so advantageous to themselves as they at one period anticipated. They have already found out that the falling off in the home demand for manufactures, in consequence of the altered position of our farmers, has lessened their trade and curtailed their profits far more than it has increased the export demand. A change is therefore gradually taking place in public opinion, which would certainly manifest itself plainly in case of a general election. Meanwhile her Majesty's ministers seem determined to stick to their places as long as possible, and farmers need look for no relief from the present government. The absurdity of the assertion made by the *Economist* and other free trade journals, as to the impossibility of foreigners sending corn to the British markets, owing to the lowness of prices here, is being daily proved. No sooner was the Baltic navigable, and the different rivers and harbours in the north of Europe free from ice, than shipments were immediately commenced, and within the last few weeks large supplies of wheat, barley, and oats have reached our shores from the Baltic and Mediterranean ports. That the extent of the future receipts from abroad will, to a certain extent, be dependent on the prices likely to be realized here, we freely admit; but that consignments on a sufficiently liberal scale to keep our markets amply supplied will continue to be made, even if the value of agricultural produce remains as low as it now is, we feel perfectly satisfied. Ultimately quotations of grain must arrange themselves in the continental markets to our prices; this will be found, upon looking back to the past, to have invariably been the case, under whatever form of law the trade has been regulated. We do not wish to imply that foreigners would continue to grow corn for a succession of years at a loss; but we maintain that present rates would well pay the Russian, Polish, and German growers. The fact is that the price of wheat has been kept up abroad by speculators, who calculated that the abolition of our corn laws would raise the value of the article all over the

world, and they probably would have been right in this anticipation if the last harvest had proved indifferent; but having had good crops of all kinds of grain in 1849, and a better produce of potatoes than in any previous season since 1845, we do not require to import largely. Under these circumstances our merchants are not disposed to send out orders to the Baltic, &c.; and in the absence of an English demand, quotations must ere long give way in the foreign markets, provided nothing should occur to create uneasiness in regard to the crops now on the ground. We believe that wheat was more extensively sown last autumn, in most of the large corn-growing countries of Europe, than in ordinary years, under the conviction that a ready sale would be found for the surplus growth in the British markets; in case, therefore, the seasons should prove tolerably propitious, the stocks which are at present comparatively small, owing to the enormous shipments to England several consecutive seasons, would be replenished, and prices settle down to their natural level. Any argument based on the range of quotations abroad during the last four years can, in our opinion, prove of little value in determining the probable future range of prices, the extraordinary demand caused by the failure of the potato having risen the value of corn far above what it would otherwise have been. If we go back only as far as 1844 and 1845, we find that at Danzig (the highest market in the Baltic) the top price of wheat was for many consecutive months 31s., and the lowest quotation in the first-named year was at one period 16s. 6d., and in spring of 1845, before the potato blight manifested itself, 21s. per qr. free on board. Our own impression is that in average seasons the foreign farmers will be quite willing to sell at such rates as to allow of good qualities of wheat being brought down from the interior to the different shipping ports at a cost of about 25s. per qr. This is, of course, a rough estimate; the price would probably be a little higher at Danzig and Königsberg, and somewhat lower at the lower ports. The capabilities of Odessa to furnish large supplies on even lower terms can scarcely be questioned; and how our growers are to derive a living from their occupation in future, we cannot understand.

The weather has throughout the month been highly propitious; the cold, dry winds of March were succeeded by a higher range of temperature

early in April; and though the fluctuations in the barometer and thermometer have been considerable, the mean temperature has at no period sunk so low as to check vegetation. The increased warmth and an abundant supply of moisture with which we were favoured the first fortnight in the month caused the spring-sown corn to germinate soon after it was committed to the soil; and barley, oats, beans, and peas have all come up regularly and strong. Meanwhile the appearance of the wheat plant has been greatly improved; and the grasslands, which presented a bare aspect at the close of March, are now clothed in rich verdure, giving promise of an excellent hay crop. There can be no doubt that the generally auspicious nature of the season has had considerable influence on the tone of the grain trade; still the main cause of the great depression has been the extent of the supplies already received from abroad, and the fear of further considerable imports during the ensuing summer. The future range of prices must, however, depend more on the weather than any other circumstance; the value of most kinds of grain is now so reduced that any occurrence, however slight, which threatened to endanger the next harvest, would probably suffice to give rise to considerable speculation. Even now growers appear to have determined to hold for the chance of something turning up in their favour; and during the past week the deliveries from the farmers have been so extremely small as in some measure to counteract the effects of large foreign supplies, and prices, which were rapidly receding in all parts of the country, have slightly rallied, at several of the markets in the agricultural districts held since the 22nd inst. Whether farmers will continue to act in the same manner in May and June will depend on the character of the season. Continued fine weather would probably cause them to lose confidence; whilst anything like a speculative demand would certainly have the effect of rendering those who hold most of the home-grown wheat, viz., the more wealthy of our agriculturists, more tenacious. The changes which have occurred in prices since our last will be more fully explained in our report of the proceedings at Mark Lane, which we shall now proceed to describe.

The arrivals of wheat coastwise into London have been on a very moderate scale throughout the month, and though a good many cargoes have come to hand from Lincolnshire, Cambridgeshire, and that part of the kingdom, the average weekly supply has fallen rather short of 3,500 qrs. The quantity brought forward at Mark Lane by land-carriage samples from Essex and Kent has been even smaller than in the month of March; though there has been nothing to prevent farmers thrashing

out, if they had been so disposed, the sowing of spring corn having been completed some time ago, in the home counties. Notwithstanding the insignificance of the supplies, the tendency of prices has been decidedly downwards throughout the month. The fall has been greater on red than on white wheat, but both kinds are cheaper than they were when we last addressed our readers—46s. being now an extreme quotation for the latter, and 38s. per qr. for the former. The decline has been as follows:—1s. per qr. on the commoner descriptions of red on the 1st inst., a similar reduction the following Monday, and a further fall of 1s. to 2s. per qr. on all descriptions on the 15th. Since then sellers have displayed rather more firmness, but they have been unable to recover any portion of the decline—the abundance of foreign on the market rendering the millers, in a great measure, independent of the home supply. Very good Lincolnshire wheat, weighing 63 lbs. per bush., such as was worth quite 40s. per qr. at the close of March, has lately been offered at 37s. per qr., without exciting much attention; and prime Kent, of the same weight, has been placed with difficulty at similar terms. Foreign wheat has come freely to hand—upwards of 55,000 qrs. having been reported at the London Custom House the first three weeks in the month. A considerable proportion of the supply has gone direct into the hands of the town millers; who have been induced, by the agents of the different foreign houses, to buy free on board from time to time. The effect of this has been to circumscribe the transactions at Mark-lane, and the operations have been comparatively unimportant. The country demand has been of the most retail character, and importers have consequently been under the necessity of accepting lower prices; but even at reduced rates it has been impossible to place any large quantity, and there is little doubt that a portion of that still aboard will have to be landed on importers' account. No actual decline was submitted to until the 5th of April, and really fine qualities of white were scarcely lower then than the preceding Monday. A good many cargoes arrived from Rostock about this time, in good condition and of fine quality, for which the receivers in the first instance asked 43s. They soon discovered, however, that that rate was not obtainable; and on the 15th instant the same article was offered at 40s., below which it has not since receded. The decline in the value of other sorts of red wheat has been equally great, say 2s. to 3s. per qr., and Polish Odessa, weighing 61 lbs. per bushel, cannot at present be quoted higher than 32s. to 33s. per qr. Superior high-mixed Danzig wheat, in granary, has, in consequence of its extreme scarcity, been held with great firmness; and we

believe that the very best would still command 50s. per qr. in small quantities; this is, however, no criterion to judge by of the value of other sorts of white wheat; and we know of sales of good, both Belgian and Dutch, at 36s. per qr., free on board ship.

The flour trade has been very heavy since our last; continued arrivals of French, and rather large supplies coastwise and per rail from the eastern counties, having occasioned a degree of competition materially to affect the interests of the town-millers. The nominal top price remained at 38s. until the 22nd, when it was reduced 1s. per sack. The best London-manufactured household flour has meanwhile been offered at 30s. to 31s., and Norfolk at 25s. 6d. to 26s. per sack, in the river. Prices of French have varied from 25s. to 30s. per sack, according to quality. From America the supplies have been trifling; and good brands have not been sold below 22s. per barrel.

English barley has come forward rather sparingly: the principal maltsters having, however, left off buying for the season, the supply has proved amply sufficient for the demand; and though no material variation has occurred in quotations, the turn has certainly been in favour of the buyer; good qualities having lately been sold at 22s. to 23s., and the top price for choice Chevalier being 25s. per qr. The arrivals of foreign barley have not been quite so liberal as they were in March; still the receipts have been large, say 10,000 to 12,000 qrs. per week. This has prevented anything like a rise in the value of the article; but the inquiry has, throughout the month, been active; having, in addition to a good consumptive demand, had some speculative inquiry, a good many parcels having been taken off the market to hold over. Nor is this to be wondered at, when we consider the rates at which good foreign barley has been selling, and is still obtainable in the London market: in some cases 13s. to 14s. has been taken for light 48lbs. to 50lbs. qualities, and capital sweet samples of 52lbs. to 53lbs. cannot now be quoted higher than 16s. to 17s. per qr.; the latter price being for kiln-dried Danish.

Very little change has occurred in the value of malt; but buyers have acted with extreme caution, and the tendency has, on the whole, been rather downwards.

The market has been very moderately supplied with English and Scotch oats, and from Ireland hardly any have been received at this port, though good stocks are known to be still held there; the consumption of London has therefore depended principally on foreign oats for supplies. These have, however, proved of so plentiful a character, that prices have been further reduced, notwith-

standing the smallness of the home receipts. The total quantity of oats from abroad, from the first inst. to the latest date of the account made up, amounts to 150,000 qrs; and though the dealers have been induced by low prices to buy rather freely, we have still a large quantity afloat at this port. Quotations did not undergo any material change until the 15th of April, when a decline of 1s. per qr. was very generally submitted to, and since then a further fall of 6d. per qr. has, in partial instances, been conceded, to clear vessels coming on to demurrage. Light 37 to 38lbs. oats have lately been freely offered at 12s. to 12s. 6d., and capital hard corn, weighing 40 to 42lbs., at 14s. to 15s., whilst 16s. per quarter may be considered an extreme price for the best foreign. English and Scotch have, in consequence of the abundance and comparative cheapness of foreign, been quite neglected, and quotations have become in a great measure nominal.

Beans of home growth have come rather sparingly to hand, farmers preferring to consume them at home rather than sell at the existing low rates. Lately there has been some slight disposition to buy good qualities of English, to hold over; and prices are at present quite as high as they were at the close of March. We have had rather large arrivals of Egyptian beans, mostly of inferior quality. Really good parcels of old, in granary, have commanded 18s. to 20s.; but some of the recently received lots of new have been offered from on board ship at 15s. to 17s. per qr., without leading to much business.

Prices of grey and maple peas have undergone no alteration since our last; but the article has been in slightly improved request; and fine English boilers, such as were freely offered at 25s. in March, have, in partial cases, since commanded 26s. per qr. Foreign grinding peas have sold at rates varying from 20s. to 23s. per qr. according to quality.

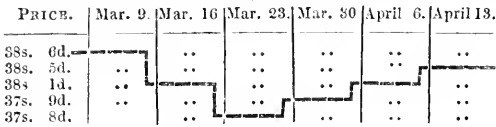
In the early part of the month some inquiry was experienced for floating cargoes of Indian corn, on Irish account; and on the 15th instant an attempt was made to establish an advance of 1s. per qr., fine Galatz being then held at 28s. to 29s. per qr. cost and freight. The high pretensions of sellers checked business; and though holders have since then become rather more reasonable, very few bargains have been closed.

The most singular feature in connection with the grain trade abroad is the indifference with which the dull reports from hence have hitherto been received, more particularly at the leading ports in the Baltic. Prices, which were already in March relatively higher there than in this country, have remained very nearly stationary; though wheat has since then receded 2s. to 3s., and spring corn fully 1s.

CURRENCY PER IMPERIAL MEASURE.

	Shillings per Quarter	
	OLD.	NEW.
WHEAT, Essex and Kent, white	38 to 45	38 to 45
Ditto, fine selected runs	—	44 46
Ditto, red	35 36	37 39
Ditto, extra	36 38	39 40
Norfolk, Lincolnshire and Yorkshire	—	35 38
Ditto, white	—	38 40
BARLEY, English, malting and distilling	—	22 24
Ditto, Chevalier	—	23 25
Ditto, grinding	—	18 20
MALT, Essex, Norfolk and Suffolk	43 45	44 48
Kingston, Ware, and town made	45 52	48 54
OATS, Essex and Suffolk	—	14 16
Lincolnshire and Yorkshire (Polands)	—	15 17
Ditto, feed	—	13 15
Devon & West Country, feed	—	12 14
Northumberland and Scotch, feed	—	16 21
Dundalk, Newry, and Belfast, potato	—	14 16
Limerick, Sligo, and Westport, potato	—	15 17
Ditto, feed	—	13 15
Cork, Waterford, Dublin, Youghal, and Clonmel, black	—	12 14
Ditto, white	—	13 15
Galway	—	11 13
BEANS, Mazagan	22 24	20 22
Tick	23 25	22 24
Harrow	23 30	25 26
Pigeon, Heliogland	30 35	26 28
Windsor	—	24 26
Long pod	—	24 26
FEAS, non-boilers	—	22 23
White, Essex, and Kent, boilers	—	24 25
Ditto, fine Suffolk	—	25 26
Maple	—	23 25
Hog and grey	—	23 24
FLOUR, best marks (per sack of 280 lbs.)	—	32 38
Norfolk and Suffolk, ex-ship	—	27 31
RYE	—	20 22

DIAGRAM SHOWING THE FLUCTUATIONS IN THE AVERAGE PRICE OF WHEAT DURING THE SIX WEEKS ENDING APRIL 13, 1850.



SEED MARKET.

FRIDAY, April 26.

Exceedingly little business was transacted in our market to-day, and last week's quotations were nominally unaltered. In cakes, scarcely a purchase was effected.

Duty was paid on the following quantities of Clover-seed up to the 20th of April:—

	1850.	1849.
London	52,172	84,270
Liverpool	6,904	8,283
Hull	19,009	30,077
Stock in bond, April 5,	25,857 cwt.	

HOP MARKET.

FRIDAY, April 26.

Fine colour Hops are in somewhat improved request, at fully last week's prices. In all other kinds so little is doing that the quotations are almost nominal.

	Per cwt.
New Mid and East Kent pockets	120s. to 208s.
New Weald of Kent do.	120s. — 163s.
New Sussex do.	105s. — 130s.
New Farnhams (nominal)	240s. — 260s.
Yearling Kents	60s. — 85s.
Yearling Sussex	48s. — 72s.
Old Hops	20s. — 65s.

POTATO MARKET.

BOROUGH AND SPITALFIELDS, Friday, April 26.

A considerable falling off has taken place in the arrivals of both English and foreign Potatoes at the water-side during the present week. Prime samples are scarce, and quite as dear; but all other qualities are very dull.

Yorkshire Prince Regents	90s. to 120s.
Do. Shaws, for planting	80s. to 90s.
Lincolnshire do.	80s. to 105s.
Scotch	70s. to 80s.
Minion cups	50s. to 60s.
Common whites	40s. to 45s.
Newcastle and Berwick Regents	75s. to 90s.
Wisbeach and Cambridge do.	60s. to 100s.
Kent and Essex Shaws	70s. to 85s.
Chats, sound	30s. to 40s.
— damaged	15s. to 20s.
French whites	45s. to 60s.
Belgian whites	40s. to 50s.
German and Rhine do.	40s. to 45s.

PROVISION MARKETS.

FRIDAY, April 26.

The supplies of Foreign Butter being large, prices have further receded 3s. to 4s. per cwt. Fine hay Friesland is selling at 74s.; fine Kiel and Holstein, 73s. to 75s.; and surplus, 54s. per cwt.

The value of old Irish Butter is nominal. Cork, 74s. to 78s.; and Limerick, 64s. to 69s. per cwt. New on board, deliverable in June, is offering at 70s. per cwt.

The best English Butter moves off steadily, at full prices. Fine Dorset, 84s. to 88s.; middling and good, 56s. to 76s. per cwt. Fresh, 6s. to 12s. per dozen lbs.

Irish Bacon, particularly fine parcels, moves off freely, at 1s. to 2s. per cwt. more money. Prime small Waterford, landed 48s. to 50s.; heavy, 44s. to 46s.; and prime small Limerick, 43s. to 46s. per cwt. Waterford is offering on board at 49s. to 50s. per cwt.

Hamburgh Bacon, and prime Hams, Lard, and Pork are quite as dear as last week.

HAY MARKETS.

THURSDAY, April 25.

The supplies of both Hay and Straw continue large for the time of the year; generally speaking the demand is heavy, at barely stationary prices.

At per load of 36 trusses.

	Smithfield.	Cumberland.	Whitechapel
Meadow Hay	50s to 70s	48s to 72s	47s 70s
Clover Hay	55s 90s	57s 80s	55s 93s
Straw	21s 28s	22s 30s	21s 28s

WOOL MARKETS.

FRIDAY, April 26.

Public sales of 24,000 packets of, chiefly, colonial Wool will commence on the 4th inst. This announcement keeps our market in a very inactive state for all kinds of Wool, and to effect large sales lower rates must be submitted to. The accounts from the manufacturing districts are rather more favourable as respects the article.

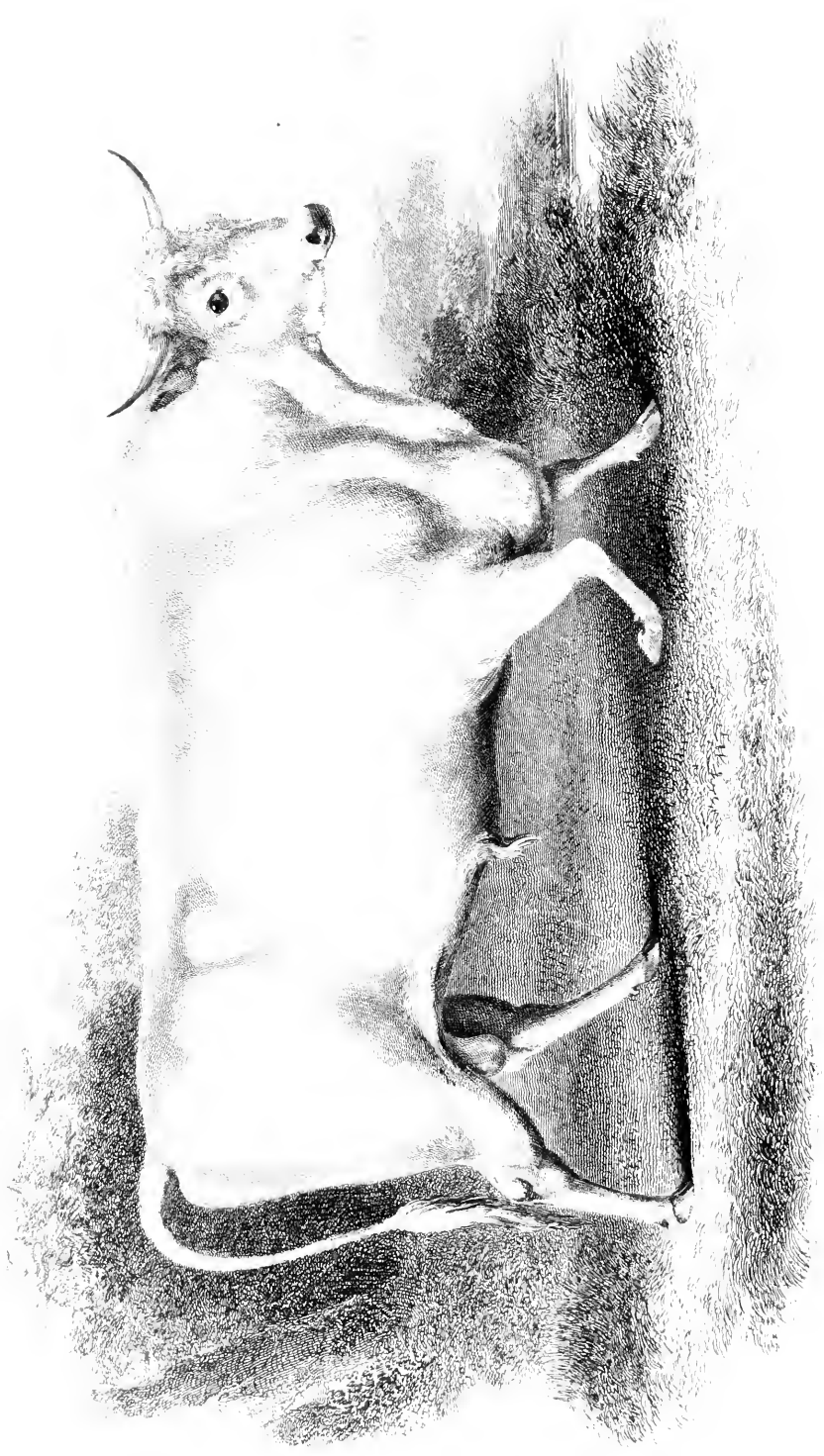
BARK.

Per load of 45 cwt.

English, Tree	£13 0 0	to	£15 0 0
Coppice	14 0 0		17 0 0

FLAX.

BELFAST, (Friday last).—Fine, 70s. to 80s.; good, 65s. to 70s.; good middling, 50s. to 65s.; middling, 58s. to 65s.; mid., 46s. to 56s.; coarse, 44s. to 45s. per cwt.





THE FARMER'S MAGAZINE.

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[SECOND SERIES.

PLATE I.

A BULL OF THE WHITE FOREST BREED.

The most remarkable of the wild or White Forest breed of cattle are those kept in the ancient park of Chillingham, Northumberland, the property of the Earl of Tankerville. The breed is also preserved at Chartly Park, Staffordshire; at Wollaton, Nottinghamshire; at Gisburne, at Limehall, Cheshire; at Ribblesdale, Yorkshire, and at Burton Constable, Yorkshire. The subject of our first plate is a bull of that breed. Professor Low gives the following description of the breed at Chillingham Park:—

“The eye-lashes and tips of the horns are black, the muzzle is brown, the inside and a portion of the external part of the ears are a reddish brown, and all the rest of the animal is white. The bulls have merely the rudiments of manes, consisting of a ridge of coarse hairs upon the neck. The bulls fight for supremacy, and the vanquished submit to the law of superior strength. They are very shy and wild, and start off on the approach of danger; and, when they threaten an attack, they make circles around the object, approaching nearer at each time.”

Lord Tankerville describes their method of retreat, which is eminently characteristic of their wild habits. Like the red deer, they place the inequalities of the ground between them and their pursuers. They set off in a kind of walk, which increases to a trot; and then, having got the ground between them and the object, they retreat at a gallop, availing themselves of the inequalities of the ground in such a manner, that they will traverse the whole park almost without being seen. The females conceal their young, returning to suckle them several times a day. The calves have the instinctive wildness of the parents, couching to the ground like fawns when surprised. It is said that, when one of the herd is wounded or disabled from age, the rest will set upon and destroy it; a trait common to other ruminants, to the deer, and even to the sheep in its wildest and rudest state. These animals can be all readily domesticated. When taken young, and treated in the manner of the common oxen, they assume entirely the habits of the domestic race.

PLATE II.

AYRSHIRE COW.

The subject of our second plate an Ayrshire Cow, was the property of the Honourable William Coventry, of Earl's Croome Court, near Worcester.

We extract the following account of the modern Ayrshire breed from Professor Low's work on Domestic animals.

“The modern Ayrshire may stand in the fifth or sixth class of British breeds with respect to size. The horns are small, and curving inwards at the extremity, after the manner of the Alderneys. The shoulders are light, and the loins very broad and deep, which is a conformation almost always accompanying the property of yielding abundant milk. The skin is moderately soft to the touch, and of orange-yellow tinge, which appears about the eyes and on the mamme. The prevailing colour is a reddish brown, mixed more or less with white. The muzzle is usually dark, though often it is flesh-coloured. The limbs are slender, the neck small, and the head free from coarseness. The muscles of the inner side of the thigh, technically called the twist, are thin; and the haunch frequently droops much to the rump, a character which exists likewise in the Alderney breed, and which, although it impairs the symmetry of the animal, is not regarded as inconsistent with the faculty of secreting milk. The udders are moderately large, without being flaccid. The cows are very docile and gentle, and hardy to the degree of bearing to subsist on ordinary food. They give a large quantity of milk in proportion to their size and the meat consumed, and this milk is of excellent quality. Healthy cows on good pastures will give from 800 to 900 gallons in the year; although, taking into account the younger and less productive stock, 600 gallons may be regarded as a fair average for the low country, and somewhat less for a dairy-stock in the higher.”

The animal given in our plate was considered a very perfect specimen of her breed.

ON PREVENTING THE INUNDATION OF LEVEL LAND ON THE BANKS OF RIVERS, AND PROVIDING AN OUTFALL WHICH SHALL BE AVAILABLE AT ALL TIMES FOR ITS DRAINAGE.

BY JAMES DONALD, C.E.

When the course of a small river or stream is tortuous, so as to check the run of the water, and cause it to overflow the adjoining land, a new channel should be cut, as straight as circumstances will allow, and of capacity sufficient to contain the water of the highest floods, without allowing it to rise to an injurious level. This is the first step necessary in the drainage of the land to a distance around. And, besides carrying off the water with facility, boundaries will be thereby straightened, and the fields brought into a more suitable form. But the channels of many of the larger rivers could not be readily straightened, deepened, or increased in their dimensions, so as to make them capable of receiving water direct from the land on all occasions, instead of discharging quantities upon it. In such cases embankments must be made, and an outfall for the water from the land must be secured, before the land can be advantageously occupied. This has been done in various places; and the benefits resulting therefrom are so important as to render it desirable that the subject should be more generally understood. Accordingly, it will be useful to consider how embanking can be managed to the best advantage, and an outfall provided for the perfect drainage of the land under all circumstances at the same time.

Before proceeding to discuss the requisite course of procedure, we may observe that land of the foregoing description is for the most part retained in meadow or pasture, a comparatively small portion thereof being brought under the plough. The soil itself would often be liable to removal if broken up; hay crops, in the middle of summer, are sometimes in danger; and pasture, on the occurrence of a flood, is soiled and rendered unpalatable to cattle for several weeks afterwards. In some places the land is porous and deep, requiring only to be protected from the inroads of water to enable it either to be kept in grass or pasture with safety, or to rank amongst the most valuable in the kingdom for the growth of all kinds of crop. In other places it is marshy or tenacious, showing that embanking and thorough draining are both necessary; and, when these are effectually carried out, this also would probably admit of being classed among the most fertile soils which can be found.

The common method of embanking consists

merely in the erection of mounds of earth by the sides of the stream, allowing the ditches which convey water from the land to join as before, at an angle greater or smaller according to circumstances. Sometimes tunnels or floodgates are inserted at the ends of the ditches to shut out the river water as it rises, the embankment being continued over the ditch. This plan is sufficient to prevent the water of the river from encroaching upon the land; but it provides no satisfactory outlet, during the continuance of a flood, for the water falling upon the level land, or coming upon it from higher lands, and is, for that reason, very imperfect. The water thus retained continues, in most cases, to accumulate upon the land until it is level with that in the river, and, being prevented from escaping until the river subsides, it greatly injures the grass or pasture, prevents the chance of any grain or green crop being grown to advantage, and leaves the land nearly in the same condition, with respect to drainage, as if no embankment had been erected.

A little consideration will show that, to remedy these evils effectually in any case, a suitable embankment must not only be formed, but a deep cutting, or main ditch, made inside thereof, to convey the water from the smaller ditches to a lower part of the river. Every river falls more or less in its course; and in those which are not navigable fords occur at intervals, the falls at which is usually considerable. If the embankment terminate at the lower end of a ford, the level of high water at that point will become the limit of outfall for the land protected, and all the land above that level may be kept dry. In many instances the requisite fall would be attained at a single ford of perhaps 500 feet in length; the only condition being, that the descent at the ford is equal to the depth of water which floods bring upon the land at its lower end. The ditch might commence where the level of the land is the same as that of the flood at the end of the embankment, and be continued upward as far as is necessary. The greater part of the land may be kept perfectly free from injury, even if no fords exist, provided the river continues to descend gradually, by embanking to a sufficient extent, and allowing the water of the river to enter upon the land only at the lower end of the embankment.

Supposing the river and the land to fall at the rate of one foot in the length of 500 feet, and the depth of water brought by a flood upon the land to be two feet, the water would then extend upward along the inside of the embankment only to the distance of 1,000 feet, and, at that point, would be two feet lower than the water in the river opposite thereto, whilst all the land above would be, or might be made entirely free from water. The ditch might, accordingly, be commenced at the end of the 1,000 feet; and if it were continued upward on a level 1,000 feet farther, it would be two feet deep, affording an outfall to that extent for drainage. By continuing the embankment downward an additional 1,000 feet, the first 1,000 would be laid dry in the same manner as the land above; and, by continuing the embankment and ditch to a sufficient distance, the drainage of the land for many miles might be rendered perfect, and independent of the state of the river, with the exception of the lowest 1,000 feet.

The upper parts of navigable rivers, such as the Thames and the Severn, are provided with weirs and locks to keep up the water for the purpose of navigation; and the fall between these erections is comparatively limited; accordingly, the embankments and ditches, to be thoroughly effectual, would require to commence at one weir and terminate at the next; the latter following the shortest practicable course between the two points, and discharging their contents at the level of the highest floods below the weir, or lower if required. The same rule should be observed where a weir has been placed in a river for any other purpose.

The earth taken from the ditch, and that obtained by sloping the side of the river, would serve to construct the embankment. The bank of the river should be sloped off, wherever it approaches the perpendicular, so as to prevent the water from affecting it in future. This is more particularly desirable if the water runs deep and strong underneath it, undermining it, and gradually encroaching upon the land. At such places the bank should be made a flat slope, and the embankment placed at a suitable distance from it. The channel of the river will thereby be made more capacious, as it requires to be after embanking. It is injudicious to attempt confining the water in a channel too small for it, inasmuch as the embankment in such a case requires to be higher and stronger in proportion, and after all is more liable to injury. Clay or strong earth is the best material for the body of the mound; light porous earth is less durable, the water being apt to soak into it and to effect its removal. If no clay is at hand, the strongest part of the earth should be placed upon the side nearest the river, and the mound should be covered with surface soil

to the depth of 5 or 6 inches. This will produce a crop of grass and preserve the clay in its natural state; otherwise it would soon become open and be more liable to give way. The sods obtained in cutting the ditch will answer better than loose earth for covering the embankment, and before they are laid on the mound should be pressed firm. To make it settle equally, and with as few rents as possible, the surface should be made a little rough before the sods are placed upon it, that they may incorporate readily with the earth and retain their position firmly. In order that the quantity of water in the ditch may not be too great, the small rivers or streams which it crosses must be allowed to flow direct into the larger river as at present, their sides being embanked as far upward as is necessary, and the water of the ditch being conveyed under them by a pipe or culvert; or, if the ditch is not sufficiently deep for that purpose, the pipe may be laid above the level at which the small river or stream usually runs, without forming any great obstacle to the flow of the water during a flood, as, from its proximity to the river, the water must at such times be nearly stationary.

Where the land is flat it would frequently be necessary to embank a tributary stream to a considerable distance, in consequence of the level of the water in the larger river extending backward in it; and when it is crooked it might be advisable to straighten its channel previous to forming the embankments. This would enable the land alongside to be drained and managed with greater freedom afterwards. If water tends towards the stream from the land on either side, a ditch or drain will be required inside the embankment, communicating with the main ditch, which is parallel to the larger river, and which passes under the stream. When a stream overflows merely on account of its tortuosity, its channel should, by all means, be cut straight, which would obviate the necessity of embanking, and carry off the water rapidly and effectually.

When an embankment is made in a place where the water will possess more than ordinary power, the side nearest the water should slope at the rate of not less than four horizontal to one vertical, in other cases it may answer a little steeper; the inside may be made of any convenient slope. Sometimes a wall of stones is substituted for a slope on that side, with the view of economising earth and land. Embankments should always be considerably higher than the river at any time flows, so that they may stand perfectly secure. Rivers in general will rise much higher after embanking than before. If a sudden bend or narrow part occur in the channel, the water for some distance above will be kept higher, and the embankments will require to be

higher and stronger in proportion. In many such places it would be imprudent to place them at the side; a considerable width from one embankment to the other should be allowed; and this is the less to be regretted, as the land betwixt them and the river need not be altogether lost. When an embankment has reached its upper extremity it must be continued as far outward from the river as the level of the water will extend, and this will be farther than formerly, especially if the river is embanked on both sides. The lower end of the land might be embanked in the same manner, so as to exclude the river water; but the quantity which the ditch conveys to that point would be retained until the river subsided; all communication between the river and the ditch must be carefully cut off, except at the lower end where the latter discharges its water.

In the case of tidal rivers of considerable width, the tide, when acted upon by the wind, possesses great power; and embankments, being subject besides to its daily attacks, require to be made very flat and strong to withstand it. The drainage of the land, too, is sometimes difficult, in consequence of the want of a suitable fall in any direction, and of the regular return of the tides, especially if much water is to be discharged. The outlet thereof in some places is more or less interrupted by each tide; but in most instances the land is above the level of ordinary tides, and the only difficulty is in dealing with spring tides and floods, the water of which must be excluded, whilst they flow, by embankments and floodgates, through which that from the land will escape as the tide recedes.

If the land is lower at a distance from the river than alongside thereof, as sometimes happens, the ditch, or another ditch should be made in that place, to enable the drainage to be easily and perfectly managed; but when the banks of the river are lowest the ditch will be of most service as near the side of the embankment as a proper regard to its straightness will permit. The size of the ditch should correspond with the area drained by it, and may be regulated also in some measure by the absorbent or impervious nature of the soil, and the quantity of rain falling in the district. If it extends a mile or two, and receives the water of 1,000 acres or more, it must necessarily be of considerable width and depth; but for an area of 40 or 50 acres a covered main-drain may be sufficient. To render the latter permanently available, however, the land must either be all thoroughly drained, or other means must be taken to prevent large quantities of impure surface-water from entering at one place. When the ditch deviates from the river, it should be carefully laid out, and its capacity in any case should be rather above what is necessary. A main ditch is required in many places, even where the

land is considerably above the level of the river; for, although many ditches have been made, no main channel has been provided to convey the water speedily away from them, or their outfall depends upon the condition of a small crooked stream. A main ditch should be carried through as nearly as possible in a straight line, especially if much level land is to be drained thereby.

It will be quite unnecessary to make any part of the ditch as deep as the bed of the river, or even as the surface of water therein at ordinary seasons, when the bed is 7 or 8 feet under the level of the adjacent land; and on the other hand, when the bed of the river is shallow, the ditch may require to be cut below its level, if deep draining is requisite in the vicinity; and this can be easily managed if the river falls sufficiently. If it be essentially necessary to keep the lower end of the ditch always clear of stagnant water, it should be begun as far upward from the end of the embankment as the level of the water at that point will reach; but by continuing it at a suitable depth to the end of the embankment, it will serve for the drainage of all the land at ordinary times. If it commences at the highest level of the water, it should be continued upward nearly on a level until its depth will suffice for the drainage, after which its inclination may be the same as the general inclination of the surface. A depth of 4 or 5 feet will probably answer, provided it is in the lowest part of the ground, and will take the water out of the old ditches. The width of the bottom may be increased in proportion to the quantity of water which is to be conveyed.

The ditch will be best situated at the side of the embankment, when the river is tolerably straight, and the land descends regularly thereto; but when the river is circuitous the ditch must not be allowed to follow all its sinuosities, otherwise it will fail in carrying off the water quickly, and the drainage will be imperfect. When the river makes a long circuit the ditch should be carried through in a straight line from point to point, if the intervening land will possibly admit thereof. The embankment may follow the course of the river, and a fence may be planted, if necessary, at the side of the ditch, from where it leaves to where it again joins the embankment: the land between the ditch and the river would thus form a field; the water in which could be brought into the ditch at the lower end by under-drains or otherwise. By preserving the straightness of the ditch the run of the water is shortened, and the greatest fall attained; the water will, accordingly, be carried off rapidly, and a ditch of smaller dimensions will suffice. In some places it would be advisable to cut off the principal bends of rivers, even of considerable size.

The sides of rivers are sometimes piled to prevent

their giving way, but even this after a time generally proves ineffectual; it is much better, although probably more expensive at first, to slope off the banks, that they may produce grass and resist the action of the water, instead of being liable to be gradually undermined. If the earth is not required for embanking, it might be applied directly to the land, or made into compost with lime, for which purpose it is usually well adapted.

Embankments should be made in spring, or the early part of summer, in preference to any other period, so that they may be consolidated before the winter's rains; and for some time afterwards they should be carefully examined, and any necessary repairs effected, but all parts of the works should be made perfect at first, to obviate the risk of failure afterwards.

There can be little doubt that the drainage of many towns on the banks of rivers should be conducted in the manner above described, especially if the river is encumbered by weirs, and its general fall is considerable. The water of the sewers would thus be constantly taken off to some lower part of the river, or to some place where it could either be pumped upon the land or separated from its sediment, whilst the river would be preserved in a state of purity until it has passed the town. The drainage by this means might often be made more perfect than it is; and, by the erection of embankments where necessary, the accession of water to which the lower parts of some towns are liable would be prevented; but for towns intersected by tidal rivers this method would be of little avail. London, for example, would derive little benefit from it, so far as procuring a fall is concerned. The Thames running each way, and its surface being at least as high twice a day in one direction as another.

The small rivers and streams flowing through towns should have been cut straight, and made of a suitable depth, before the land in their vicinity was built upon; and wherever any building remains to be done in the neighbourhood of crooked streams this should not be neglected, as it will enable a perfect drainage to be effected, and bring the ground at once into the most advantageous form in which it can be disposed.

In some cases land situated on the banks of rivers has been drained throughout before the requisite means were taken to prevent it from being inundated. Drains under such circumstances are no doubt better than none, inasmuch as they provide the means of allowing rain water to filtrate equally through the soil so long as their outlets are open, either by carrying off the stagnant water previously in the ground, or opening it up, if tenacious, by the shrinkage which they occasion; but

it is scarcely possible that their perfect action can be long maintained unless they have been very carefully constructed. They are covered with water repeatedly during the year, for several days together, which must tend greatly to their injury; but the worst thing is their failing to carry off the water at the time when their efficient action is most required, and leaving the land and crop liable to be submerged by water. In Scotland land so situated is frequently cultivated and even green-cropped, and losses have been sustained in a single year to an extent equal to the cost of perfect embanking and thorough draining. Sometimes the land is cropped whilst green cropping and proper working are neglected. As they cannot be undertaken with safety, embanking should be the first improvement, followed by thorough draining where necessary. The fine quality of the soil on the banks of rivers, the comparatively small quantity of manure which it requires, and the ease with which it might be managed, all increase the desirability of protecting it from the inroads of water, so that its natural productiveness may be realized; and on small farms it is particularly desirable that the whole of the land of which they consist should be brought into a condition in which it will be worthy of the industry of the farmer, and which will admit of the adoption of the best system of cropping throughout the farm.

When the water of a river overflows the land on each side to the width of a mile or two, as is the case in some places, the expense of embanking and providing an outfall for drainage would require to be shared by the landowners in proportion to the benefit which their property will derive from it. A length of several miles would also require to be embanked at once, so that one main ditch and one outlet may suffice; and, when the land is divided into small properties, the chief difficulty would perhaps be to obtain unity of arrangement; many are averse to improvements of any kind, and some might be disposed to deny the possibility of effecting the desired result. We need scarcely observe, however, that it is quite possible to confine the water of any river at all times to its proper channel, and equally possible to drain the adjacent land under all circumstances, merely by making a ditch, as already described, with other ditches and drains connected therewith, when the river falls sufficiently, and by other means when the river is level. A failure would only shew that the ability displayed and the means employed are inadequate to the task. There is scarcely any land on the banks of rivers possessing a fall that may not be rendered perfectly free from the risk of inundation, drained without mechanical appliances, and cropped with advantage afterwards, however

low and level it may at present appear. Many thousands of acres might be reclaimed in this manner at a comparatively small expense, and brought, in many cases, under the same system of cropping as the other parts of the farms to which they belong.

The water by which machinery is propelled is often conveyed from the wheel by a channel similarly situated to that required in the drainage of land upon the banks of rivers. The water, after passing the wheel, does not enter the river until it has reached a point at which the level of the highest floods is lower than the under edge of the wheel; this obviates the risk of the wheel being impeded by backwater; and the channel, when carried downward a sufficient distance, enables the wheel to be placed lower, and the water applied to it higher, in proportion.

The opinion that land derives benefit from being overflowed is sometimes entertained; and, under certain circumstances, this may be the case, when the water contains a quantity of mud, or other sedimentary matter, and deposits it upon the land. The addition of new substance, thus made, to the soil may counterbalance the evil effects occasioned. Such matter, however, is usually brought direct from the lands above, by water flowing over an impervious subsoil; in most instances the only share which the river has in its production consists in detaining the water which conveys it until it has subsided. There is no doubt that the value of land in general is much lessened by accessions of water, as it can neither be cultivated nor manured

with advantage. The fertility by which such land is often characterized is owing simply to the earth of which it consists being in a minute state of division, and constituting a good mechanical mixture, much of it having been conveyed from various parts of the higher lands in the manner already described; and this process will go on after embanking, and continue until all the land above is thoroughly drained, and the running of water on the surface, and consequent impoverishing of the higher land, prevented.

Much might be said respecting the arrangement of main drains falling into small rivers and streams, after the channels of the latter have been straightened, and in reference to outfalls for drains generally, but this must be reserved for some future occasion. Meantime, the whole of the operations necessary to procure an outfall, under all circumstances, for the drainage of land on the banks of the large rivers, have been specified, except in those cases where no outfall can possibly be obtained, in consequence of the land not being sufficiently high. This occurs in the fens of Lincolnshire, and other counties of England, as also in Holland, where the land is under the level of the sea. In these cases the only means of procuring an outfall are those which have long ago been employed; namely, embanking, to exclude the river or sea water, and collecting the water, from an area of 100 acres or upwards, into the lowest part of the land, at the side of the embankment, over which it is either pumped or lifted by a wheel, provided with buckets, and driven round by an engine or windmill.

ON THE PROGRESS AND PRESENT STATE OF AGRICULTURAL IMPROVEMENT.

BY M. M. M.

In primitive states of society, when man's wants are natural and few, it is easy to conceive how he would depend for his daily supply on the means most easily within his reach; hence he would be confined in his diet to the fruits which would supply his wants in summer, and the roots which he could obtain from the earth in winter. For higher delicacies, and for the exercise of sport, he would occasionally pursue the wild animals around him, or exercise his skill and ingenuity in capturing the winged inhabitants of the woods, or the funny denizens of the sea and the rivers. But as knowledge became extended, as families multiplied, as the demand for food became more general and more extensive, we may imagine the provident tendencies, which man in common with a few of the lower animals possess, becoming developed, and he would begin to accumulate as far

as possible the products at favourable seasons, against those which were less auspicious.

The chase is ever an uncertain mode of obtaining food, and hence it could not be long before the desirableness of domesticating the wild animals for the purpose of securing a constant supply, at least when required, of animal food, and of those animal products which are alike useful to the sustenance of life for the comforts of clothing. In a pastoral district the breeding of animals will ever be the leading object of attention, and though our earliest records speak of one part of our common parentage tilling the ground, another was a keeper or feeder of sheep, probably more for their fleece than for their flesh, except for an offering to the great Benefactor of the whole. Amongst those patriarchal chiefs whom the Jews claim as their progenitors, the herd was added to the flock, and the principles

of breeding animals were well understood. Instructed partly by natural skill, and aided possibly by Divine science, we find the most made of wages in kind by the attention of Jacob to the principles of breeding animals, both as to obtaining a peculiar kind of animal, and procuring these animals from such parentage as secured a strong constitution. Possibly the lessons which he had learned, who attended more to the flocks and the herds in early life than his brother, who lived by hunting, were brought to bear on his employment during twice seven years' servitude; or possibly it might have been transmitted skill which had taught him, treasured up in the experience and observation of his grandfather Abraham, who had flocks and herds so numerous that the land was not able to bear them.

How much soever animal food may be desired and prized, it is quite impossible to subsist upon it without a considerable proportion of vegetable. For numerous tribes of men accumulated in one place, or even predatory in their habits, a large supply of vegetables would be indispensable to a comfortable or healthy existence, and hence would arise a necessity for the cultivation of these in the same way as there arose a need for the domestication of animals. The reproductive power of vegetables is great enough in a natural way to teach the art of producing; but any effort which might be made to grow the same plant year after year on the same spot of earth, would soon violate one of the most clearly established of natural laws—that the soil will not furnish the means of nutrition to any description of plant whatever, for a succession of periods, without some restorative process is adopted to compensate for the material taken away. Thus the great Jewish chief, or his ancestors for two generations, rich as they were in sheep and goats and cattle, were subjected to visitations of famine, and thrice in three generations had they to go to the hated strangers in Egypt because of the famine in their houses. And how came it that in Egypt they could buy corn? How was it that the grapes of Eshcol and the kine of the fat pastures of Bashan could not satisfy the wealthy patriarchs while there was corn in Egypt? Nay, how could it be accounted for that not only could Egypt supply her whole population with corn for seven years in succession, when the famine was sore in all lands, and when all countries came into Egypt to buy corn? This very problem I will endeavour to investigate, because it appears to my mind clear at least that it is the origin of all agricultural improvement, and from it nearly all the principles of those agricultural improvements at present known are traceable, either directly or indirectly.

Egypt, it is well known, is watered by a long,

tortuous, and meandering river, called the Nile; otherwise its soil is dry and arid, and ill-calculated to withstand the burning suns which bake its surface; while Lower Egypt in particular is almost a net-work, from the ramifications of this noble and mysterious stream. Destitute of the rich pasturage of Canaan, there were less temptations, except in Goshen, to induce pastoral habits, and hence from necessity the Egyptians first became tillers of the ground, to obtain that sustenance directly from the soil which they could obtain indirectly through the animals. A remarkable natural phenomenon brought the process itself before their eyes. Once in the year their gigantic river overflowed its natural banks, and the waters accumulated in a rolling flood two thousand miles in extent, beginning at one uniform period—on the 17th of June—to rise and rise until the middle of September, until it attains a height of from 12 to 16 cubits, and does not find its usual level until the month of November. The cause of this strange phenomenon, once the subject of much mystery and many superstitions, is now generally understood to arise from the tropical rains on the mountains of Abyssinia, which commence early in June and continue till September, and which are so copious that it will be remembered Bruce observed that a tube 12 inches in diameter was filled in the course of an hour with fifteen pounds, or one gallon and a half of water.

Now the effect of this remarkable phenomenon would be twofold:—First, the waters so long covering the surface would destroy the land plants; and next, it would leave a deposit precisely similar to the warps of Lincolnshire, and containing vegetable and mineral matter in every stage of decomposition and solubility. This deposit would vary with peculiar seasons—always rich and fertilizing, it would bear in its troubled bosom the washings of the Siennite granite, of the carboniferous strata of the secondary series, and the multifarious and varied beds of the tertiary. And these deposits are so extensive that they appear to be rapidly filling up the delta of the Nile, and five of the branches into which it divided itself in the delta of Egypt are now no longer navigable, though known to the ancients. The deposits of turbid waters vary in different parts of the world. Thus, 1,000 gallons of the Oxus when in flood hold 250lbs. of mud, the Yellow Sea 50lbs., the Ganges 22lbs., the Mississippi 6lb., the Wear 16lbs.

The slightest observation would teach the Egyptians the rapid growth of vegetables in this deposit, in their warm climate; while its unoccupied soil would invite them to plant their corn—nor would the exhausting effects of growing it year after year on the same spots be felt or appreciated.

and consequently they would not be deterred by this from growing corn year after year in succession. If Pliny is to be believed, their cultivation was of a very primitive nature. "How easy," he remarks, "is the husbandry of Egypt. For them the river Nile, serving the turn of a good husbandman, begins to swell and overflow at the first new moon after the summer solstice. Upon the subsidence of the deluge they cast the seed upon the flooded lands, and immediately after turn in their swine to trample it into the soil whilst moist." If this be literally correct, it opens out a fact in agricultural history no less astonishing than ridiculous—that the pig was the first animal used in the cultivation of the soil—a use as improbable, to civilized ears, as its food was obnoxious to the sons of Abraham.

In Upper Egypt, where the valley was narrower, and the sands more sterile, artificial efforts were made to extend the benefits of the all-fertilising water, and viaducts or drains were, doubtless, first cut here, to convey the water over a larger tract of country. Pools, and dykes, and artificial reservoirs, were made to catch the truant water; and hence a wider area of cultivated land became available, so that Egypt, otherwise a desert, became a land of "corn and wine."

It is not my intention to enter into a history of the art of agriculture, though doubtless the very first lines are drawn—the very formations of the whole science are laid in the remarkable peculiarity of the Nile, and in a less degree of the Euphrates, the Tigris, and the Ganges—because it would be quite impossible to glance even at its outline in the limits of this paper; and because man has been so occupied in recording the deeds of kings and warriors, that the peaceful arts have only been deemed worthy of very incidental notice, and hence the materials for a history of agriculture are by no means extensive. I shall, therefore, strictly confine myself to a history of agricultural improvement, embracing only those broad outlines of the art where science and skill have shown their signal triumphs.

The plough, however, is so remarkable an emblem of the science and the art, that it seems to demand a single notice. The first improvement upon treading the land with the hogs, would be scratching it with something similar to these animals' feet; and this is exactly the road of the ancient Egyptian sarle or hoe, copied from hieroglyphics in the British Museum. To substitute the labour of animals for that of men would be a natural step for civilization, observation, and improvement, to suggest; and the ancient Egyptian plough is but an adaptation of the precise implement, the one being calculated for a perpendicular, and the other a horizontal power.

Before I leave Egypt, it is impossible not to see how a country which produces more than it consumes becomes rich and great. Dependent on its own resources, it can grow and multiply internally and all its institutions become firm and solid—can taunt and can dictate to those who come—can speak roughly to them; while they imploringly go, carrying "of the best fruits of the land, a little balm, and a little honey, spices, and myrrh, nuts and almonds." Nay, we may say the first nation rendered historical was this great agricultural nation. Not only in itself was Egypt great and powerful, but other great nations of antiquity owe their origin to its growth. Colonizing and carrying their arts and their knowledge, Greece owes whatever she possesses of agricultural improvement to what she learnt from Egypt; and though the age of agricultural writers may be said to commence with Grecian literature, still the want of the Nile, an ever ready, involuntary, and cheap supply, rendered the art much more laborious than in the mother country. Several writers concur in describing Greece as unsuited to agricultural pursuits. Thucydides and Herodotus speak disparagingly of the Grecian soil; while Hesiod, the father of agricultural writers, and one of the fifty said to have so occupied their pens in Greece, describes the soil of his own little farm at Askra, at the foot of Mount Helicon, as "bad in winter, hard in summer, and never good." It is in soils like this that necessity, always the mother of invention, compels the cultivator to improve in rural practice.

Amongst the means of improving the Grecian soils, one of mixing sand with the clay, and *vice versa*, is distinctly named;* and thus the mixing of soils, a practice now well understood, evidently has its origin, doubtless, in the mixture of the aluminous deposits of the Nile upon the sandy plains of Egypt. Here also we first hear of draining: the water, so needed for the burning and porous Egyptian sands, was just the source of trouble, inconvenience, and loss, to the Grecian cultivators; and hence there is no wonder that the drains to convey the water *to* the soil in the former should have suggested themselves to convey it away *from* it in the latter. The drains might possibly be cut more for municipal than agricultural purposes; as the ruins of ancient cities, which are now found situate in absolute swamps, are sufficient evidence that the artificial means which must have been resorted to, to dry the ground, had by neglect become incapable of discharging their offices. But that open drains at least were cut in the fields is quite evident from the law of Solon, which decrees that "he who digged a ditch or made a trench near his

* Theophrastus.

neighbour's land, should leave so much distance from his boundary as the ditch or trench is deep." In other, and the modern language of railway engineers, he must make his embankment or cutting at least one to one—a proof that the soil was very tenacious, or more inclination would have been considered necessary. Another step in advance of their Egyptian teachers was the substitution of a rake for the driving of pigs over the new sown land. Doubtless the character of the strong soils of Greece were so different from the alluvial deposits of Egypt, that an instrument more favourable to the covering of the seed was necessary; and we have no more difficulty in tracing the comparatively modern harrow to the hand-rake of the Greeks, than we have to trace the modern plough to the hand-hoe or sarle of the Egyptians.

The stream of history now brings us down to the iron legs and teeth of the great historical image—the banditti-formed republic of the ten kingdoms and the seven hills—the master-spirit of the age in which it triumphed—"dreadful and terrible, and strong exceedingly, and which had great iron teeth." The Roman empire commencing by making every man a small cultivator by its agrarian laws, it is not wonderful that these small proprietors, from a dictator at the plough,* to a laurel-crowned general, should bring original ideas to work to cultivate and make a series of experiments on a small scale, rather than follow any previously contracted system. And it must be confessed that the Romans rather consolidated and reduced previous knowledge to a system, than made any very decided steps in those vastly extended improvements, which are the wonder and the glory of the age in which we live.

Still there are marks of some progress even here—for to make a system is to make improvement to a certain extent. We have in Pliny's directory as to cropping a clear indication of the necessity of rotation of crops; and there is evidence that as far as the means were afforded in the plants then known, the ideas on this subject were substantially correct. As I have stated, the alluvial deposit of the Nile was always new and always rich, and no rotation was necessary—year after year the wheat and the barley might be placed in the ground. In Grecian soils this could not be done, nor could it in the Roman; but while the Grecian might adopt the primitive plan, so common now in Ireland, of allowing the soil to grow corn as long as it would, and then let it alone, and break up a new piece for a similar process—in Italy, where the land was so minutely subdivided amongst the citizens, expedients would be resorted to, to revive the wasted

powers of the soil. Nature might have been also observed, which distinctly follows rotations, in her ordinary operations. However it may be, Pliny says, "Let him sow next year's wheat crop where he has just gathered his beans, vetches, or lupines, or such other crop as *enriches the land*. For, indeed, it is worth observing that some crops are sown for no other purpose but as food for others." We could not have a better proof of the principle, on which the whole sentence might be considered a running commentary, than this is of the well acknowledged rotation of "crop green and crop grey."

Another step seemed to have been made in land draining over their teachers the Greeks, arising, doubtless, from Roman institutions. The circumscribed lands each citizen possessed made it necessary that he should economise his space, and hence we have the first reference to covered drains. Cato directs, for instance, for springy land, that drains should be made 4 feet broad at the top, 1½ feet wide at the bottom, and 4 feet deep—to lay them with stones, or if these are not to be obtained, with willow rods placed contrariwise, or twigs fastened together. The modern deep drainers can certainly claim a great authority and a high antiquity for their practical recommendations. Columella appears to be an improver on this, for he recommends a rope of twigs to be used, and this to be covered with leaves before putting in the soil; while Pliny recommends straw ropes, and advises the plan now described as the Deanston one, of filling with broken stones to within eighteen inches of the top.

Nor can we omit to mention the improvement now so much insisted on by some, and so determinedly resisted by others, of deep ploughing. The Roman predecessors and teachers doubtless saw the immense advantage resulting from the deepening of the soil by the subsidence of the floating mud suspended in the waters of the fertilising Nile; and though they could not have this, at least they could deep-plough and trench the soil, and make it artificially deep. Columella describes the people of Megara as trenching their fields every fifth or sixth year; they dug this as deep as they believed the rain to penetrate, turning the bottom soil to the top.

Hitherto I have said nothing of manuring as a discovery; it is certainly involved in some obscurity, and the traditions of its origin are clearly fabulous. Augeas has the credit of the discovery, and Hercules has the honour awarded to him of divulging it in Italy. I would, however, refer it back to a higher antiquity; and may not the cleansing of the Augean stable, by turning in a river, be all a georgical symbol of the reciprocal similarity between the fertility of the river and of the refuse of cattle?

* Cincinnatus.

I have never heard the notion mooted, much less argued or investigated; but it appears to my mind sufficiently plausible, and altogether rational, and refers back the discovery of manure to the grand annual phenomenon amongst the primeval agriculturists—the overflowing of the Nile. In the management of their manure the Roman's practice might still teach a lesson to the unimproved race of farmers. The bottoms of manure heaps were directed to be hollow, to retain their moisture; and their sides and tops were to be protected by the leaves and branches of trees. Though chemistry was not at all understood by the Romans, itself could not teach us better lessons of preventing waste by evaporation and solution.

Another principle carried out, if not discovered, by the Romans, and of which subsequent investigations alone have explained the *rationale*, is employment of carbonised and of inorganic manures. Nor is it impossible to trace the origin even of this to the wonder-working Egyptian river. That inundation not only destroyed the refuse vegetation and weeds of the land it submerged, but also brought down with it a variety of mineral matter from the rocks over which it flowed. As the Romans had not generally water, it was natural to use fire for a similar purpose of destruction, and the effects of the mineral matters left by these ashes would be so observable that the idea would be readily suggested of obtaining them by artificial means. Thus Palladius says that “lands which have been manured by ashes of trees will not require manure for five years.” How little did the Roman writer foresee the chemical principles involved in this process, or the identity of the supply afforded by the fire and the water! The cultivated crops, especially the corn, carried off the potash, for instance, from the land, and hence it became poor. The water disintegrated the Siennite rocks, which contain that ingredient, and supplied it to the delta of Egypt. The trees also had abstracted the same ingredient, and furnished it by burning to the worn-out land of the Romans; and thus we may now, though they could not, trace the identity of the two processes. Cato says, “If you cannot sell wood and twigs, and have no stone that will burn into lime, make charcoal of the wood, and burn in the corn-fields the twigs and small branches which remain.”

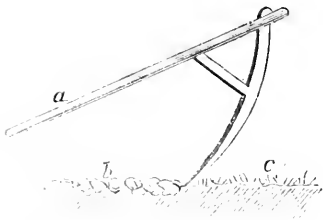
We ought, however, slightly to touch upon one other Roman practice which at that day prevailed, and which illustrates very strikingly the principle of our recent discoveries. Some plants derive a large amount of their elements from the air and from water, and some require these principles in great abundance. The first will grow in a poor soil, and will afford a rich manure for the second description. Thus the Romans were in the habit of

ploughing-in green crops for the purpose of manure. It is not very easy to trace the origin of this; but it is neither far-fetched nor irrational to attribute it to the same source as the rest. During the periodical inundations there would be a great destruction of vegetable matter; this would again be deposited, and its fertilising power would not fail to be manifest. May not the son of Amoz allude to this, when he says—“The paper reeds by the brooks, by the mouth of the brooks, and everything sown by the brooks, shall wither, *be driven away*, and be no more” (Isa. xix. 7)?

Whatever the Romans might teach the tributary nations, it appears pretty clear that they were themselves taught the advantage of marling from this island itself. Pliny says it was found out in Britain and Gaul; and here again we have the elements of the now explained value of the fossil riches of an entombed world, and remind us now of the mineral wealth of the coprolites, and the fertility of the soils resting on the gault or green sand. Varro speaks of noticing fields manured with a white fossil clay, and thus the geological riches of our substrata seem for many years to have been acknowledged, and their use carried into practice. Hence it would appear that though Britain was early described as inhabited by persons inland, who lived on roots, berries, flesh, and milk; yet Cæsar described them, at the sea-coast at least, as colonists “from Belgium, which having established themselves in Britain, began to cultivate the land.” It appears, however, that soon the Britains profited by the superior skill of the Romans. That they had corn fields before was evident enough, from the fact, related in the Commentaries, of a legion being surprised by the natives while cutting down a corn-field, and suffering much from an incursion of some British warriors who had hid themselves near it. Doubtless the splendid Roman roads, which still remain in many parts of the country, so far facilitated the transit of commodities as to encourage inland production, and in this respect to assimilate the interior in some respects to the sea coast, as described by the invader; and in the fourth century Great Britain was an exporting country for corn; for the Emperor Julian is described as sending a hundred ships to this country, built from timber from the banks of the Rhine, and lading them with corn to supply the wants of the devastated Low Countries till harvest.

We cannot help pausing a moment to reflect how that great empire fell. When luxury usurped the place of industry, when the statesmen of Rome forgot the plough, when agriculture was neglected and despised, the glory of the empire departed, and it soon became a small insignificant state, despoiled of its glory, and all but sunk in utter oblivion.

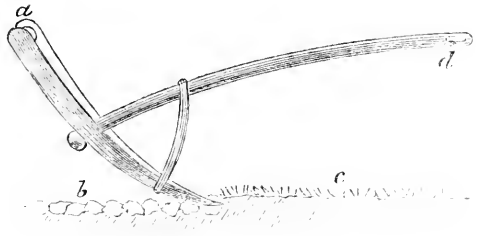
THE EGYPTIAN SARCLE.



- a, The handle.
b, The ground stirred.
c, The unstirred ground.

Sowerby, Thirsk, May 10, 1850.

THE EGYPTIAN PLOUGH.



- a, The handle.
b, The ploughed ground.
c, The unploughed ground.
d, The point to which the cattle were attached by their horns.

(To be continued.)

THE FILTRATION OF SEWAGE FLUID FOR GARDENS.

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

The friends of sanitary advances and of the improved cultivation of our lands will have read with much pleasure a recent valuable communication of His Royal Highness Prince Albert, on the subject of filtering sewage. This paper, which Colonel Grey read to the Council of the Royal Agricultural Society of England, contained a brief yet clear description of a simple apparatus, by which all the mechanically suspended matters of the sewage fluid may be readily separated from the chemically combined portion, so as to render the former available as a rich solid manure, and the latter no longer distasteful as a fertilizing liquid manure for watering growing plants.

Perhaps, however, one of the most valuable effects of this communication will be by drawing the attention of the higher classes to the losses hitherto sustained by an inattention to this not always inviting subject. It will tend very materially to render the inquiry more popular: it will render the labours of those with whom I have laboured so long more easy and more quickly productive of national good. The plan suggested by His Royal Highness is simple, and at first sight unobjectionable; but having tried the plan for some months in my own garden, I can bear testimony to the fact that it is not the best mode of accomplishing the desired end. It was thus described by Colonel Grey:—

“To form a tank with a perforated false bottom, upon which a filtering medium should be laid to admit the sewage into the tank *below* the false bot-

tom, when, according to the principle of water regaining its own level, the sewage liquid would rise through the filtering bed to its original level in the tank; and, provided the filtering medium had been of the proper nature, and of sufficient thickness, it would be thus freed from all mechanical impurity, and would pass off as clean and clear as spring water.”

The chief objection to this plan of filtering upward is, that the under surface of the filtering medium becomes speedily encrusted with the peculiar mixture of grease and earthy matters which sewage fluid always contains; and when this takes place, the passage of the clear liquid through the filter is soon very materially impeded, and at last passes through too slowly to be useful. It is true that this may be, in the case of a filter where the filtration is *downward* instead of upward, readily removed whenever the usefulness of the filter is thus impeded. In my own filters it is raked and flushed off the surface by a column of sewage, which passes rapidly and forcibly over the surface of the filter; but if I had them made so that the incrustation was *underneath*, I must have the whole filter taken up every time the cleansing took place. Now the necessity for such a cleansing every one will feel it is most desirable to avoid as much as possible. The construction of the filtering apparatus (which is neither difficult nor expensive) when once accomplished will amply repay any one for the trouble bestowed upon it. It is now two years since I first constructed a filter of this description: it has

been constantly in use ever since, and the more expert we have become in its management, the more useful and enriching we have found the sewage for almost every description of plant which our garden contains.

I described this plan in a paper, which in January, 1849, was printed by order of the metropolitan commissioners of sewers: and in that I endeavoured not only to show the chemical composition of the sewage fluid of towns, but to describe the mode I had adopted at my own house to render its use available without annoyance even to the visitors to the flower garden. In this, as I there observed, there is little practical difficulty; for I experimentally ascertained that the entire sewage of a house (using the word sewage in its most comprehensive sense) is readily filtered through coarse sand; and in my own case, after having for several months adopted this plan, the filter (adopting the occasional surface cleansing, to which I have alluded) still allows the fluid portion of the sewage to pass through with little diminution of its rapidity. The fluid portion after being filtered merely presents the appearance of dirty pond-water; it has a slightly disagreeable smell, but this ceases as soon as it is added to the ground—the whole of it rapidly soaks in, without leaving either any mechanically suspended matters, or even a stain on the surface of the ground. The chief principle to be steadily regarded in this operation is the avoidance of any considerable delay in the employment of the sewage—to use only such earthenware or metallic pipes, for the conveyance of the sewage to and from the tank, as shall, by the evenness of their surface, combined with as good a fall as possible, prevent all lodgment of putrefying matters: if this object is steadily borne in mind, not the slightest annoyance need in any case be apprehended. It is very easy to occasionally (as in hot weather) pass an extra supply of water from the house through its drain so as to wash out the pipe which communicates with the tank. The extra water will at such seasons be very useful in the garden; and then, as all fermentation is prevented (the sewage being used in as fresh a state as possible), the smell which arises from such sewage is totally different in extent from that which is so disgusting in an ordinary sewer or cesspool.

In my own case, when building a cottage at Croydon, feeling the importance of these objects, and knowing the danger of leakage in the ordinary brick drains, I employed chiefly leaden, iron, or earthenware pipes (of five inches bore), for the entire length of the drain; and as between the house and its kitchen-garden there is, fortunately, sufficient fall in the ground to admit of the construction of a second receiving, and also a second tank

(below the receiving tank, and lower down the slope), furnished with a sand filter I have hence no occasion to use a pump to raise the filtered sewer fluid to the surface of the soil. Both these tanks are made of bricks set in and faced with cement. The slope of the ground is sufficient, in my case, to enable the filtered liquid manure to flow through small iron pipes ($\frac{3}{4}$ -inch bore) to every part of the garden. I would advise, however, the use of pipes of at least one to two inches bore, and that these should be made of stoneware. These do not corrode, and are not acted upon by the ammonia of the sewage. It is true that, as these stoneware pipes do not bear much pressure at their junctions, it is necessary, when they are used, to have the regulating cock placed at the end of the pipe nearest the filter, and to have a receiving tub at the kitchen-garden end of the pipe. But these little disadvantages are, I find, amply compensated by the rapid and uninterrupted flow of the sewage fluid through the larger earthen pipes; and, since I have used pipes of two inches bore, I find that for the kitchen-garden a much coarser filter than sand will suffice; and when the sewage fluid is intended for the irrigation of some small, merely model water grass plots, that then straining it through a wooden box, perforated with $\frac{1}{4}$ of an inch holes, is amply sufficient. When the sewage is required to be passed through the filter, this is done by raising the plug of a pipe in the receiving tank. By this means the flow of the liquid on to the top of the filter is regulated; and this first tank is especially useful, amongst other purposes, when the sand filter needs emptying. The receiving tank is furnished with an overflow pipe into a small brick tank, made permeable in the ordinary way. This is done to provide against long frosts, when irrigation is stopped, or the neglect of the gardener. In every communication from the house to the drain, self-acting water-valves effectually prevent the escape of any effluvia; all of which, however, as I have before remarked, is the most certainly prevented by using glazed pipes for house drains, securing a good fall, and causing a pail or two of water to be systematically and daily poured down the water-closet, whose junction with the drain is the most remote from the tank. By this means the accumulations of the previous 24 hours are swept out of the pipe; all putrefaction is thus prevented in them; the bulk of the sewage is increased, and, for the purpose of irrigation, *advantageously diluted*. And, moreover, if the same care is taken to let out the tank every two or three days, not the slightest annoyance can ever be experienced by the inmates of the house. The tanks which I have made each hold about 500 gallons each; and, from an establish-

ment of five persons well supplied with water, one of these tanks is filled with sewage in about a-week. The facility thus afforded for carrying away house sewage by its own gravity, and its ready employment on the land, by placing a dwelling-house on the side of a sloping ground, afford two most powerful arguments, in addition to many others, for selecting such sites for the erection of our houses. In those situations where it is necessary to employ a pump, the great object of employing the sewage and its filtration may be readily accomplished with even a single tank, by merely dividing the tank into two compartments, and then allowing the sewage to filter through a layer of coarse sand, supported on a false bottom. I have adopted for the false bottom the tiles with which the floors of the maltsters' drying kilns are laid. These are perforated with small holes; on these is laid a stratum

of coarse gravel about two inches thick, and then about three inches of coarse sand; and, as when the plug of the upper tank is raised the sewage rushes into the lower tank with some force, I have laid upon the surface of the sand another paving (laid in both cases without mortar or cement) of these maltsters' tiles. By this means the sand is not disturbed when the sewage pours in, and the operation of flushing or cleansing the filter is much facilitated.

Those who have laboured in the cause of sanitary improvement will feel the advantage of thus speedily removing and mixing with the soil the now obnoxious sewage of our houses. It is an improvement alike beneficial to that portion of the animal and the vegetable world around us; it tends to banish disease from the first—it gives food and vigour to the last.

FARMING IN WIGTOWNSHIRE.

Wigtownshire possesses several notable advantages for the successful prosecution of agriculture. Though distant, and somewhat awkwardly disjointed by its far-stretching promontories and rocky headlands, from the great centres of trade and population in Scotland, it possesses easy and rapid communication by the Irish Sea with Liverpool, and the populous districts of Lancashire; and a large steamer has for several years afforded constant means of transit for all kinds of farm produce into these superior markets. The districts of the county round Lochryan have cheap and convenient access to Glasgow by means of the Stranraer steamers. The general slope of the county gives the greater part of the soil a fine southern exposure; the proximity to the sea diminishes the duration and intensity of frosts; and lying a degree nearer the sun, Wigtownshire enjoys a warmer and more genial climate than the central counties of Scotland, or even than the rich plains of the Lothians, exposed as these are to the cold and foggy winds of the German Ocean.

The soil of Wigtownshire is varied in its character, or rather in its qualities; for, except in plains over which the sea has at one time flowed, and where it has left a strong clay soil, a deposition of sand, or a deep flow moss, the soil almost wholly consists of a dry hazelly loam, inclining more or less to gravel, and reposing on beds of primary, transition, and secondary schists. But in Wigtownshire there is both the richest and the poorest land, and land of all intermediate degrees of fertility. More than one-half the area of the county consists of moor, the northern parts of which are extremely

bleak and barren in their aspect, and interspersed with immense and dreary mosses, which the hand of improvement has never yet touched, and probably never will. But even in this wild district, tracts of good land occur along the edges of the streams and on the knolls; and considerable efforts have been made of late years to increase the amount of arable land, and improve the quality of the grass. The improvements made by Mr. Rigby Wason, on the estate of Corwar, on the borders of Ayrshire and Galloway, are the most extensive examples of the reclamation of moor land in this quarter of the country; but as the property lies in a different county, we do not step aside in the meantime to make particular inquiries respecting it. The proprietor, we understand, is highly satisfied with the result of his operations; the improvement effected in the aspect of the country is undoubted; and Corwar may justly be pointed out as an example of what may be done to increase the amenity and productiveness of the bleakest districts. In limestone, one principal element of soil improvement, Wigtownshire is particularly deficient. The greater part of the county is supplied with lime from Cumberland and other parts of the English coast; and though it comes pretty handily to the lands along the bays and shores where it is least needed, it must be carted a great distance to the upper and moorish districts, where its application produces the best effects. Wigtownshire, therefore, with some advantages of situation and climate, has its own discouragements to contend against, and is neither the least nor the most favoured in an agricultural point of view.

From the borders of Ayrshire, to within a few miles of this place, the country is a dreary waste of moor, interspersed here and there with patches of natural meadow, and green slopes which yield some nibbling to a few sheep and young black cattle. Topping this moor, however, we descend into a more sunny and fertile sweep of country, forming the Vale of Cree, and broadening into carse fields, and into a deep and wide morass, which seems to run into the waves of the Bay of Wigtown. We are here introduced into a district of active, energetic, and enlightened farming. A spirit of improvement has been at work for several years, and has succeeded in making the most agreeable changes on the aspect and fertility of the soil. The braes skirting the Cree, not long ago covered with broom and furze, and over-run with rabbits, have been broken up, cleared of rubbish, drained where necessary, and are now yielding regular rotations of crops. Flocks of sheep, feeding on turnips, where a few years ago there existed only a rabbit-warren, is no uncommon sight; and marshy flats, black with moss and heather, are now, after a successful course of improvement, covered with a sward, vying, at this early season, in greenness with the rich fields of Ayrshire or Strathmore. The landlords have assisted the operations of the farmers, and fine belts of wood are rising to give grace and shelter to the country.

If these improvements had not repaid the outlay, they would hardly have been carried out so extensively. But the best proof that they have been profitable, and are expected to continue profitable, is, that they are still going on with undiminished vigour.

Challoch, a farm of 400 or 500 acres in this district, is well worthy of notice, as it is nearly all of modern reclamation from a state of barrenness, or a state approximating thereto. The soil of this farm, in many places, is thin and gravelly; but by thorough ploughing and manuring, the crops fall little short, in weight and abundance, of the produce of richer soils. There is a large tract of moss on the farm, which is in course of rapid improvement. Twenty acres of reclaimed moss were cropped last year, and as many more are being brought forward to the same arable condition. These, we believe, will form the richest parts of the farm. There is an extensive morass on Challoch, lying between finely cultivated hills, and covered with water to a great depth in winter. An embankment has been raised through the middle of this morass, with the view of drawing off the water from the upper side; and by deepening the burn which forms the natural escape for the water, the reclamation of a large proportion of this immense and level swamp seems to us a very practicable undertaking. As the

proprietor, Colonel Stopford Blair, of Penninghame, has both the means and the heart for executing great works, and is aided by a young and spirited tenant, there is every likelihood of a vast improvement being accomplished in due time on this morass. The farm-house of Challoch is a very stately residence. The offices are older, and not so complete in their accommodation and arrangement. They are built in the form of a quadrangle, with the manure-yard in the centre; but, for sake of water for the thrashing-mill, the barn is built at some distance from the steading; and considerable inconvenience, loss of labour, and probably of straw, are the necessary consequences. From twenty to thirty black cattle were feeding in the byres, the heifers singly in stalls, and the bullocks in boxes. These beasts are of great size, and in a very healthy and fattening condition. The byres and stables are drained into a tank sunk in the centre of the manure-yard; and the excellent effects of the liquid material are already very palpably seen on a ryegrass field, over which it has been rained. The importance of collecting the liquid manure of farmyards is universally admitted in Wigtownshire; tanks are consequently becoming quite common; but a step still further in advance is now in agitation. A manure-yard is not considered complete unless it has a roof above as well as a tank below; and the dung-heap at Challoch is immediately to be covered in from the injurious action of the elements. Challoch is a farm well suited for what is commonly understood as high farming. The soil is of that nature which best agrees with heavy manuring; the abundance of moss affords ample scope both for reclaiming new land, and manufacturing manure to almost any extent; and, able and spirited as has been the management of this farm for many years, we doubt not that the fillip of Free-trade will raise it shortly to a still higher state of cultivation. The tenant, though admitting himself to be a Protectionist, is one not likely to succumb to new difficulties, till he has tried all means of surmounting them. Sheep are fed with success on Challoch, and nine or ten score, kept on turnips during winter, were sold lately, and turned a good profit.

Several farms around Challoch are cultivated with great spirit. The adjoining farm of Lower Barnkirk is a fine specimen of rough, wet, mossy ground, being drained, improved, and laid off into dry, comfortable fields in the course of a few years. There is no appearance in this district of any falling off in the vigour and energy with which the soil has lately been cultivated. The ploughs are fully more busy than they have been for a long time; and draining and reclamation proceed as briskly as ever. The farmers generally regret the loss of Pro-

tection; complain bitterly of the low and still falling prices; and, contrasting present with past returns, are disposed to look with desponding feelings to the future. But few go the length of saying that farming cannot be made to do under Free-trade. There is an innate reliance on the resources of the soil, on the wonderful effects of good management, a steady attention to economy, and a vigorous going forward with the labour of cultivation, which are quite incompatible with despair, and, we will add, with ultimate defeat.

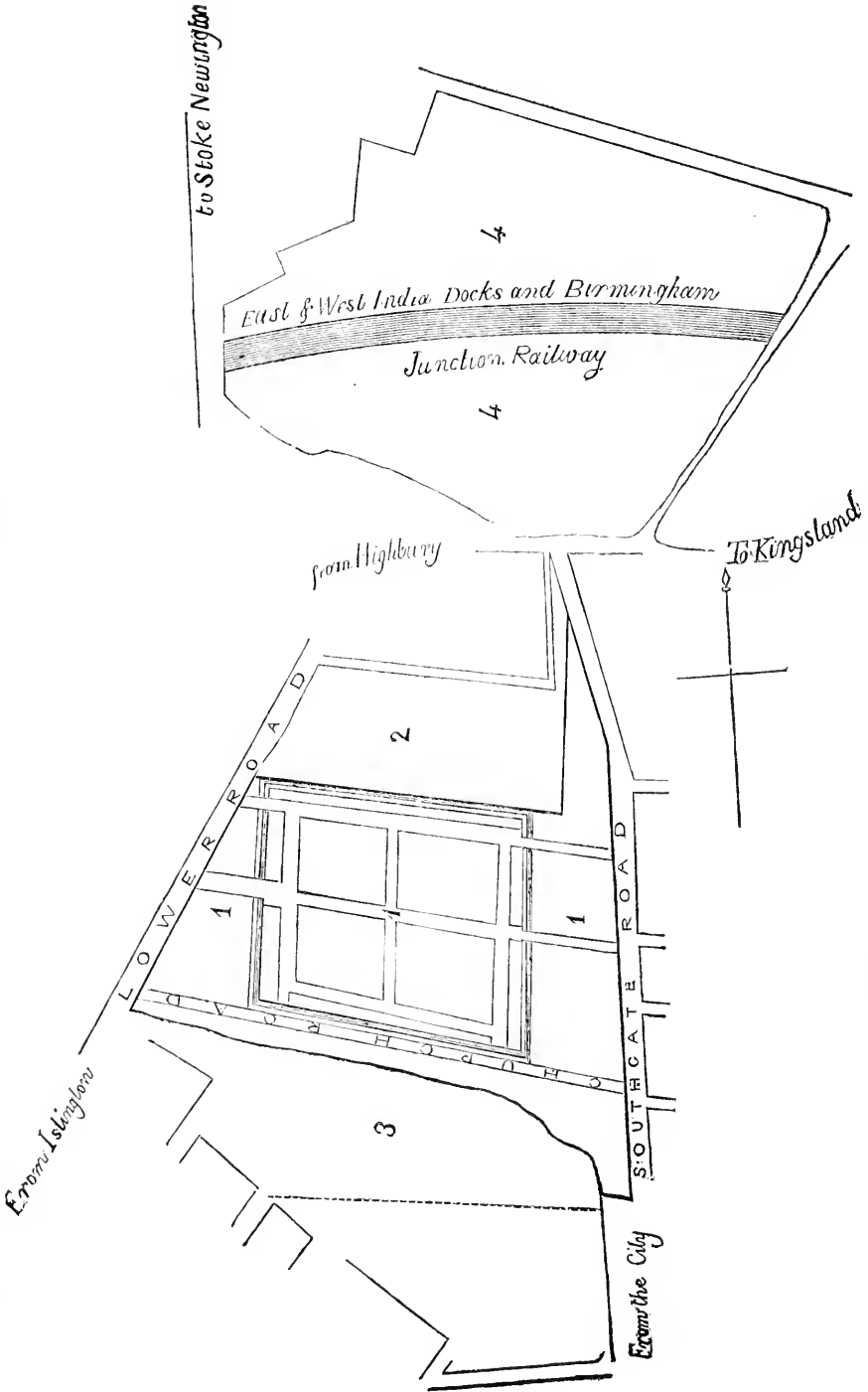
In the neighbourhood of Penninghame House, the seat of Colonel Stopford Blair, extensive improvements of the soil have been effected, and are still in progress. Unlike most residences of the gentry, this mansion is situated amidst not the best, but the poorest land of the estate; and a large sum is annually spent in covering with verdure soil which otherwise must have remained bleak and barren. We passed over tract after tract of moss which is in process of deep drainage; and the reclamation has ever been extended to a height on the moor, where, we should think, it cannot be, and is probably not, expected to pay, though we were informed by the steward that, with medium prices, it would yield a remunerating return. These improvements, however, cannot properly be held up as patterns of imitation, or signs of encouragement to farmers or capitalists; but they are worthy of approbation, inasmuch as they afford useful employment to the labourers, and compared with some modes of expending their incomes which are fashionable among the aristocracy, are entitled to the highest commendation. A farmer can only carry out such improvements as will return his capital with fair profits, and return it within a limited time; but there is a class of far more difficult and less remunerating works which a proprietor, in certain circumstances, may undertake, without exposing himself to the charge of a foolish or unprofitable expenditure of his money.

There is a beautiful little farm-steading at Penninghame House, which is probably intended as a model to the farmers. The houses are erected in a neat quadrangle, and consist, on the interior sides of the square, of milk cow byres, a turnip-house, stable, barn with thrashing mill driven by water,

and cattle-houses. A large manure factory, as it may be called, covered over with a double roof, and having a urine tank in one of its corners, occupies the centre of the square. On the exterior sides there are cart-sheds, a saw-mill, driven by the same wheel as the thrashing machine, a smithy's forge, and other workshops. The houses are two storeys high, and above the stable and byres there are hay-lofts, above the barn a granary, and so on. The byres accommodate a single row of cows, and have a passage along both sides, so that the cows can be supplied with turnips or mash without disturbing them in their stalls. The feeding-box is separated from the stalls by moveable bars of wood, which may be widened or tightened at pleasure. The heads of the cows are passed between these bars, and are kept in that position while they remain in the byre. Both byres and stables are completely ventilated, and drains are carried out of them, as well as from the adjoining dwelling-house, into the liquid manure tank, the contents of which are periodically poured over the dung-heap. A considerable quantity of mossy soil, carried probably from the drainage works, lies in the manure-house, which is also saturated with the urine from the tank, and mixed with the stable and byre-dung. Decomposition proceeds rapidly under roof, and as the gases are preserved from dispersion in the atmosphere, and absorbed in the decomposing substances, the result of the process is a large quantity of peculiarly rich and valuable manure. Great importance is thus attached to the manufacturing of manure; and this object cannot be too urgently impressed upon the attention of agriculturists. Now that the land of this country is brought into competition with the rich soils of America and the continent, the collection of large quantities of the best manure is undoubtedly the *sine qua non* of successful farming.

Draining is well encouraged on the Penninghame estate. The usual practice is for the proprietor to open the drains, while the tenant provides the tiles, and covers them in. The drains are kept open for two or three years, to allow the soil to consolidate, and, as it sinks, the drains are deepened, so that the labour of opening is considered a good half of the operation.—North British Mail.

PLAN OF THE ISLINGTON CATTLE MARKET, AND THE LAND PROPOSED TO BE ADDED TO IT.



REFERENCE.—Nos. 1, 1, 1, 1.—All the Property within the strong black line belongs to the Estate, which contains Acres 29 2 0
 No. 2.—Unoccupied land, available, containing 7 1 12
 No. 3.—Pasture land, available 10 0 0
 Nos. 4, 4.—Exhausted brick-field, available 35 0 0
 N.B.—Church Road is the private property of the Islington Cattle Market Estate. 81 3 12

UTILITY OF SUBSOIL PLOUGHING.

There are few persons who can now be found to doubt the utility of subsoil ploughing upon thorough-drained clay soils. By this process it is clearly established that a soil cold and tenacious, impervious to air and water, becomes loose and friable; and instead of being capable of growing only oats and wheat, it becomes fit for the production of seeds and turnips; and the bare fallow can be, if not altogether dispensed with, removed at least for a much longer period from its like, and the whole aspect of the soil, the crop, and the remuneration, entirely changed. And yet how frequently do we see the subsoil ploughs, even on the estates of gentlemen, who are owners as well as occupiers, laid aside, neglected, and rusty! and especially in the cases of tenants, where a landlord has made them a present of the implement, how frequently do we see it thrown aside and neglected! Nor is this because some old "Deanston" plough has been superseded by Barrett's or Read's or some new and more popular implement, which has been brought out as a candidate for popular favour. The newest and most improved—if there is any one which is so, as compared with the "Deanston" for clay soils—suffers the same chilling neglect; how therefore can it be reconciled with the admitted fact of the desirableness and propriety of subsoiling on well-drained clays?

We think there are two elements in the apparent difficulty, which in reality solves the paradox. The first is, that the whole process is extremely slow, tedious, and expensive—the quantity executed is small per day; it interferes much with the ordinary labour of the farm, by taking off work four to six horses, and executing only some half acre to one acre per day; while it is found to involve such a "wear and tear" of horseflesh as to render the horses almost unfit for their ordinary work. And the effects produced are rather prospective than immediate—so that the first crop is not perhaps at all benefited; and if for the second or third the common plough happens to go somewhat deeper than usual, which is not uncommon in a looser soil, it is possible that the second or third crop will be all the worse for the process.

Now these are substantial reasons for deterring parties from doing as much as they would in subsoiling those soils which clearly and manifestly need it; and we apprehend that there are not always a vast bulk of men who can year after year bear to see a process of so costly and expensive a

character proceed, which seems to themselves and their neighbours to produce only injury, and still persevere in the uphill work.

And it must be confessed that all subsoiling has not answered the expectations of the too ardent experimentaliser. Some have set about that toil-some and expensive process on soils not drained effectually nor sufficiently deep; and they have puddled, and kneaded, and consolidated the subsoil, making it still more retentive and tenacious; and hence they have given up the process in disgust.

But if they will apply it where it is not only useless but improper; if they will not use their common sense and proper discrimination, they must not blame the system, but their own improper application of it, and their own folly in not at first thoroughly draining their soils.

But can subsoiling be useful in sands, and gravels, and soils resting on limestone, and on chalk? Is it of any use to make these already too dry and too porous and burning soils still more dry and porous, and still more liable to burn? Will it not make them lose their moisture more, and render them still looser and more difficult to hold the roots of plants?

We remember a discussion some year or two ago, at Cirencester, as to the subsoiling of their oolite "brash," with a soil some four to six inches deep: and a scratching of which is the amount of cultivation the farmers think proper to give it. Well, at the meeting, a practical farmer from the north excited no small ridicule and merriment by recommending them to subsoil the "brash." They declared one and all it was absolutely useless, and might probably be injurious: they positively declared that the roots of the wheat could really get as deep as twelve inches notwithstanding the brash; to which the sharp northman answered, that "*He could squeeze through a hole which would astonish them!*" the force of which was acknowledged by loud and repeated plaudits.

Only consider how a soil is formed, and it follows that subsoiling will, as a matter of course, deepen it. Soil is nothing more than the rock broken down by the action of oxygen, of frost, and of water. Subsoiling lets in all these elements of disintegration and decomposition, and hence the very opening of the subsoil and exposing to these influences effect the object, as effect follows cause.

We recently had the gratification of witnessing a very wonderful metamorphosis effected by this process, on the farm of Charles Charnock, Esq., of Holmfild, near Ferrybridge, on the magnesian limestone. Many years ago, when he entered upon his farm, it was poor and thin, light crops, and these liable to be burnt up every dry season, because the cultivators scratched only the surface. He commenced the operation of subsoiling, to the alarm and derision of his neighbours, and a few threats of still graver interference were made. But he was immovable; nay, his immediate crop seemed somewhat to suffer; but he still persevered, and the consequence was what we witnessed—that on a soil originally not more than three or four

inches deep, the plough was crossing and turning up a furrow of twelve. We need add no more; the remainder of the farm was in keeping with a fact like this: and it is a principle which ought to be sounded far and wide, for those thin burning soils on a limestone “brash” may possibly in all situations derive a similar advantage from a similar process. Nor will the horse labour be so severe, for an instrument like that of Read’s or Barrett and Exall’s, or some of the lighter implements, will be found ample for an operation of this nature. If it be worth the labour of cultivation when the soil is so thin, it is surely worth it, when it can be deepened to so great an extent.—Gardeners’ and Farmers’ Journal.

ON DRAINAGE AND ITS PROSPECTIVE RESULTS.

BY J. H. CHARNOCK, DRAINAGE SURVEYOR, YORK.

It may on the one hand be matter of much congratulation, and on the other of some regret, that on the present occasion I have the privilege of addressing you at a period which may, perhaps, not inappropriately be designated *the half-way-house of the century*. With fair prospects and a determined purpose, we started at the hand-gallop of preassurance, on our agricultural course, and after surmounting more or less vigorously the several undulations of the way, have at length arrived somewhat out of breath, and it may be a little jaded, at the halting point of our journey. Who, having put his hand to the plough, looketh back, unless to contemplate what is already attained, and thence derive fresh encouragement for the completion of his career? True, the journey so far has been easy and pleasant, the road smooth, the perils few, the cheer good; but the remainder of the way is yet untrodden; and shall we venture to say that fairer prospects and nobler elevations do not yet remain to be witnessed than any which have been hitherto passed? Let us then, like prudent travellers, make fitting use of the halt by preparing for the remainder, and it may be the more perilous portion of the journey; examine carefully all the appointments of the stage; trim the lamps, secure the luggage, and provide against the coming shower. Possibly, as we proceed, some steeper ascent may need additional efforts, and we may even be obliged, unless we would sink in the Slough of Despond, to leave that long-cherished mode of conveyance, which has thus far served us well for the more magic-like and rapid locomotion which the enterprise and skill of modern times have placed within our reach. But it is time to drop the allegory by which we have designed, as introductory to our purpose, to enlist your consideration of what shall be advanced.

Eight years have now nearly elapsed since, in an evil hour, for my own interest—for praise does not always lead to what Southey calls “the solid end of praise,” pudding—but in a most auspicious one for the agricul-

tural interest of this kingdom. I propounded the practicability and advantage of applying collective capital to the drainage of the land. The leading features of the plan, as it was then circulated, have subsequently been adopted in the drainage acts which are now in operation; and if there was one impediment to improvement more than another, from which our efforts have been successfully instrumental in relieving the owners of life-estates, it was that of the troublesome and costly necessity of applying to the court of Chancery for permission to move a step. Although loath to intrude with anything of an individual character, it is nevertheless requisite for our present design, and for your information, as briefly as possible to epitomise the history of those legislative facilities for the promotion of drainage, which now exist and are in contemplation.

It may be in the recollection of many whom I have now the honour of addressing, that in the autumn of 1842 a preliminary prospectus was issued, bearing my own name, for the establishment of a drainage company, under the title of the “Yorkshire Land-Drainage Association.” It was circulated very extensively, and met with the most encouraging favour from all the agricultural journals and periodicals of the day, and I hold in the correspondence of many high names testimony to its prospective benefits. In 1843 a public meeting of land-owners, &c., was held at Richmond, to forward the project; and a committee was then appointed to proceed in carrying out the objects proposed. Finding that what was termed Pusey’s Act (which had been passed two sessions previously) went no further than to admit the principle that owners of entailed and settled estates should have the power to borrow for the purpose of improvement, the committee put themselves in communication with Mr. Pusey on the subject, in order to induce him to bring in an amendment bill. This he readily consented to; and it was, moreover, our good fortune to have retained, as our advising counsel, Mr. Bellenden

Ker, whose celebrity needs no comment from me. To this gentleman we found Mr. Pusey was indebted for the draft of his first Bill, and therefore with the instructions which it was in our power to suggest for the amendment bill, it was the more likely to be a practical measure, as in truth the sequel proves. There were three entirely new features embodied in it, which, as you may suppose, conduced to a great deal of correspondence and communication before the introduction of the bill. There were, first, the entire omission of any application to the court of Chancery; second, making the title commissioners the commissioners for the act; and third, making the drainage charge a first charge, with precedence over existing charges. The bill was read a second time in the session of 1813-4, and was then withdrawn, in consequence of an understanding that it should originate in the House of Lords the following session, under the auspices of the Duke of Richmond. Accordingly, in the session of 1814-5 the Duke moved for a select committee on the subject, when evidence was taken, which orms no bad manual of drainage work; and a bill was brought in, founded on the report of the committee, which was passed and is known as the "Richmond Act." It was, however, shorn of all its practical good as an operative measure, by retaining, as its dispensing medium, this said much-dreaded court of Chancery.

It was now the Government's turn to try; and in the session of 1815-6, the first general drainage act was brought in, authorising an advance of two millions from the public purse, and placing the dispensing power in the hands of the inclosure commissioners, setting aside the court of Chancery, and making the charge a first charge; in fact, it was our bill of 1813-4, and a most efficient measure it has proved. The two millions were presently absorbed, and hundreds of applicants left unsatisfied. To provide, however, as far as possible for this disappointment, the Government passed, last session, another act, enabling parties to borrow the money from *private* sources, instead of from the public purse, retaining all the provisions of the original act. And many applications are now in progress under it. A further public grant, however, of two millions is again proposed by the Chancellor of the Exchequer; and long may he continue to guide the finances of the state, and appropriate the surplus to so patriotic a purpose.

To make the history complete, one other important link must yet be added, which exercised progressive influence in these results. In the year 1844, after long communication with the Yorkshire Association for the maturing of their plans, a public meeting was held at Exeter, at which the Earl of Devon presided, for the formation of a company on the model of the proposed Yorkshire project, and which subsequently resulted in the establishment of the West of England Drainage Company; and which company has been in active and most beneficial operation since 1845. In the session of 1848 they obtained an act of incorporation, conferring on them all the powers of the general drainage acts, with the additional ones of being able to erect new and permanently repair existing homesteads, to provide for irrigation works, and to apply the drainage-water to

purposes of power; all of which form so essential a part of an efficient drainage system, that it is to be hoped they will be included in the promised act for the advance of the additional grant. It is further worthy of remark that the Earl of Devon was the head of the commission appointed to inquire into the agricultural condition of Ireland; and hence, possibly, the recommendations of that committee embraced so much of what was then working its way to maturity at home.

Whilst the attention of landowners was thus arrested by the discussions of the subject, and their aid secured for the promotion of that first step to improvement in cultivation, from which legal and financial disabilities had so long debarred them, the same cause had called into action mechanical skill, whereby the more ready and economical preparation of the material has been obtained, and the greater efficiency of the work secured. And although "the mass of mankind hate innovation; hate to unlearn what they have learnt wrong, and hate to confess ignorance by submitting to learn right," yet as respects drainage daily experience is attesting that the landed and agricultural interest are fully sensible of the beneficial effects which these improvements have had and are conferring upon them: no wonder then that a greater extent of drainage has been executed within the last five years than at any former period in the history of this country. As in every other pursuit, so in agriculture, external causes exercise an influence in conducing to those more marked features which each epoch presents; and as the war-prices of produce in the past half of the century tended to bring into cultivation upwards of three-and-a-half millions of acres of comparatively fresh and maiden land through the operation of 2,044 inclosure acts, so it is probable the more natural prices which may prevail in the latter part of the century will necessitate, if not conduce to the application of every scientific and mechanical means for bringing the cultivation of the soil to that point of productive fertility not inaptly symbolled by the admitted conjunction of "*peace and plenty*."

During the earlier years of the century, the practice of drainage, with the exception of what was known as Elkington's system for carrying off springs, was as imperfect as can well be conceived. Indeed, so little was it either known or appreciated, that in the agricultural publications of the period, but very slight, if any, mention of it is found, and what is recorded only serves to show the ignorance of the day regarding it. One example will suffice. "An account of the authorised improvements on the Duke of Buccleuch's estates, in the southern districts of Scotland," and which account was deemed worthy of this introductory passage: "About 40 years ago, it was not unusual for sheep-farmers to draw a few surface-drains over some of the wet portions of their land; but it is only within these 18 or 20 years that the practice has become general, and within a later period still that it was *completely understood*." It then proceeds to describe—"These surface-drains are in general from 24 to 30 inches wide at the top, from 8 to 12 inches at the bottom, and from 12, 15, or 18 inches deep; but the degree of depth depends

much on the hardness or softness of the ground." Such was the "completely understood" practice of 1808, teaching us that in drainage, as in many other agricultural operations, it is anything but a mark of wisdom to flatter ourselves that we have attained the perfection of the art.

From this we will pass on to the time of one of our highest and ablest authorities, Sir John Sinclair, who has left us the following record of the practice of his day in his *Code of Agriculture*:—"Clays.—It is a subject of great controversy, what is the proper breadth of ridges in clayey soil, with a view to drain it. The only point necessary to be here touched upon is, whether in clays the drains should be opened or covered. In general open drains are to be preferred, being less expensive in form, more easily kept in order, and more certain in their effect. At the same time, in some particular cases, covered drains have succeeded. In the Duchy of Limberg, they prefer having such drains in the furrows of strong land, by which less ground is lost, and the soil is rendered at all times accessible to culture. The celebrated Arbuthnot, who is characterised by Mr. Arthur Young as the best farmer he ever met with in the course of his long experience, practised that system near Mitcham, in Surrey; and an intelligent Scotch farmer has carried the same plan into effect with the greatest success." The mode of drainage was with stones, turf, and some tiles, and the depth comparatively very shallow; and consequently the work was of but an imperfect character as to durability, and although it did produce beneficial effects for a time, they were not of that complete and uniform description as are now attained. Sir John, however, was alive to the benefit to which a more perfect system would secure; and in justice to him, we must be permitted to quote the concluding portion of his article on the subject of drainage:—"While such advantages are to be derived from draining, it is unfortunate that any obstacles should exist to the execution of such a useful improvement. Unless parliament, however, will direct its attention to the subject, and enact regulations for the encouragement of draining, the efforts of private individuals will often be checked, and much valuable land will continue unproductive. A law might be passed, authorising proprietors, even on entailed estates, to charge their land with three-fourths of the expense of drains, and to compel the neighbouring proprietors to share in the expense of draining, if they derive any benefit from it. The laws of a nation ought to be improved from time to time, to keep pace with the accession of knowledge the people acquire, and with the necessities of the country, as it becomes more populous." Such were Sir John Sinclair's sentiments and recommendations in 1832, which, as we have seen, have been realized in the more recent acts of the legislature, and are daily becoming practically serviceable to both owners and occupiers. In the interval between 1832 and 1842, there was certainly much drainage done, and proprietors became more alive, not only to its benefits, but at the same time to the necessity of its more durable execution, and a reduction in the expense, for the high prices at which the material (tiles) was then sold, rendered it so

costly as to preclude anything being done, except either from necessity, or in a very imperfect manner, as to depth of cutting.

As respects the practical execution of drainage, there are three essential points to be regarded—*efficiency, durability, and cost*; and where works are systematically conducted, there are at least two subordinate objects to be attended to, viz., the providing for the application of the drainage-water to the irrigation of the lower land, and the conservation of it for purposes of power at the several homesteads of an estate, both of which have hitherto been, in too many instances, overlooked. Perfect completeness of effect can only be secured by a practical knowledge of the object to be obtained, and a fitting application of means to an end; in other words, the man who undertakes drainage operations must not only be thoroughly conversant with the most suitable state of dryness for land to be in, that its cultivation may be brought to the highest state, but he must possess corresponding skill to secure this at the least cost. The Sangrado doctrine of one remedy for all complaints, is as certain to lead to many adverse results in the bleeding of land as in the human frame. Each case must be treated according to the different circumstances of locality, stratification, contour, &c.

In the drainage of arable land, every district and every formation will afford, in the *naturally* dry soils of the locality, the best example for that completeness which is sought to be obtained by artificial means; and the more nearly we approach this standard the more complete will the work be. Where land is intended to remain permanently in grass, some difference in the system may be properly made; for, if the excess of moisture be removed so as thoroughly to eradicate all aquatic plants, experience shows that in our climate, subject to occasional droughts, grass land is retained in better condition by having some reserve of moisture for these seasons, derivable from below by capillary attraction. It is very different, however, in arable land, where a uniformity of dryness is so necessary to the growth of plants, most of which are of one year's duration only, and for the production of which the constant preparation of the land is required; and to effect this economically depends on the mechanical condition of the soil. Under ordinary circumstances, and to illustrate in point of time the efficiency of drainage on arable land, it is desirable that it should admit of the usual operations being proceeded in upon it, in not exceeding twenty-four hours after a saturating rain, and that the entire surface of the land should present a *uniform* dryness. I know that many, if not most occupiers, as well as owners, will not allow that it is practicable to render clay lands thus dry by artificial drains, at a compensating cost; but my own observations have convinced me to the contrary, over many varieties of strong soils; and, in confirmation of the practicability, you must permit me to refer you to page 497 of the last number of the "*Journal of the Royal Agricultural Society of England*" for an account of the drainage of a strong land field by the Hon. Mr. Arbuthnot (I presume, a descendant of him whose agricultural efforts have been before referred to), who says—

“The farmers of the neighbourhood said that such strong clay land was not calculated for turnips. They, however, turned out the best that I saw that year; and my bailiff, having gone, in the autumn, to see his father in Roxburghshire, declared to me on his return that he had seen no crop superior to it in Scotland. More than this: it had happened that Lord Lilford, living not many miles from me in Northamptonshire, saw that particular field while under the process of draining. He was struck with the very bad appearance of the soil, consisting, as I have said, of very strong clay above and below, and his lordship was again at my place when the field was covered with a magnificent crop of turnips. His astonishment was the greater from seeing upon that field of strong clay a flock of sheep, which remained there without the slightest injury to the land during the winter, till all the turnips were consumed.”

It will readily be conceived that opinions may differ as to what is strong land; and no doubt, both as to the active soil and the subsoil of what are ordinarily designated clay lands much misconception does really exist; but nevertheless, assuming Mr. Arbuthnot's description to be sufficiently accurate as to the mechanical texture of the land, it is ample evidence of that altered condition which drainage is certain to realize in such soils, if effectively performed. It is within the recollection of most of us that these were at one time the description of farms most sought after, as possessing more stamina for cereal crops than the lighter lands: experience and better farming, however, showed that grain crops could be produced at less cost on the naturally dry soils, and they in their turn were regarded as the most desirable. But let the strong lands of the country be once perfectly drained, and there is not a doubt but that they possess naturally far greater capabilities for cultivation. They are much less susceptible of excessive changes, less liable to weeds, retain and impart the fertilizing effects of the manures applied to them much longer than the thinner soils, and for the most part produce a heavier quality of grain. In fact, they need only that mechanical condition which effective drainage gives.

One great hindrance to vegetation on these soils, which can only be removed by good drainage, is that excess of evaporation consequent upon a constant excess of moisture, which keeps the land always at a low temperature, when, in fact, an ordinary observer would suppose from the sun's heat it was the warmest, and when vegetation should be progressing. The contrary, however, of this is really the case; for, except during frost, all wet land is absolutely the warmest when there is least heat from the sun; and, *vice versâ*, when the sun is most powerful, and exercising his beneficent influence on other more favoured lands, this clay soil becomes so torpid as to stop the progress of the crop until the sun's rays have converted into the atmosphere a portion of that excess of moisture which leaves the soil, after a time, dried to a certain depth from the surface.

The depth and distance at which drainage should be executed to secure a perfect result must depend entirely on the character of the subsoil. No general rule

can be laid down, except that in every case the depth should not be less than 3 feet to ensure permanency, and the distance such as will produce *uniformity* of dryness over the entire surface. In compact clays where the thickness of bed is considerable, and consequently where only the stagnation of the rain water has to be prevented, a depth of 3 feet, with a distance between the drains of from 16 to 21 feet, according to the retentiveness of the clay, will be effective. If the subsoil contains a greater proportion of sand, and the bed of clay is not so thick, it is more than probable that bottom water will be found, which must be carried off, and in this case the depth must be such as to pass through the clay, and the interval of drains may be extended to 21, 24, and up to 30 feet, as may be considered requisite. In sandy and gravelly subsoils, it is always necessary to cut the drains a sufficient depth to reach the source of the soil, and at distances of from 30 to 60 feet, and even up to 100 yards apart, as circumstances may warrant. These subsoils usually exist in districts either of an undulating contour, or on the flat; if in the former, the depth of drain must be such, as it proceeds up the rise, to reach the spring which will issue from the highest ground; and in the latter, it will frequently occur that the porous strata lies in a dish-like form, surrounded by a clay bed which holds in the water, and through which the outfalls being made, at once converts almost the entire area into an effective natural drain.

With regard to the most suitable material and its form, there cannot longer be a doubt but that the plain cylindrical pipe-tile is the best that can be used. For the strong lands, where the drains are more frequent, a size of 2 inches internal diameter for the parallel, and about 4 to 6 inches for the main drains, will be requisite; whilst in the more open subsoils, with deeper and more distant drains, 3 to 3½ inches, and 6-inch mains, may be necessary. Where the length of either the parallel or the main drains is considerable, the size of the pipes may be increased by degrees, as the drains descend to the outfall, so as to allow of an increasing volume of water passing off. This is a much more efficient and economical plan than putting in a main drain at the half-way length, as many too often think it necessary to do. In all cases where much fine sand prevails with springs, it will be necessary that the pipes should be collared, and not unfrequently to lay two pipes one within the other, cross-jointed, to ensure safety. Where the foundation is good, and no necessity exists for such precautions, I am of opinion that a little non-adhesive material, as straw, &c., is desirable immediately over the pipe; in the first instance, to prevent any particles of earth from getting between the joints when filling up the drain, and subsequently to prevent too quick and close a cohesion of the earth over the pipes. A very slight covering is sufficient, and I am decidedly of opinion that it is a safe and good practice.

In considering the cost of drainage, it must always be borne in mind, that whilst there is ever a fitting balance to be maintained between the sum expended

and the effect produced by it, it is nevertheless the very worst economy to jeopardise that effect in the least degree for the sake of a few shillings per acre. It is only those who are experienced over a variety of subsoils, who can nicely determine the most fitting distance of drains, so as to produce perfect efficiency at the lowest cost. And when you consider, for example, that the total difference in outlay between drains at 18 feet and 24 feet, amounts* to pretty nearly one-fourth. You will readily understand how the skill of the practised and experienced drainer may be exercised with advantage to proprietors, to say nothing of those mere occasional advantages which are not unfrequently derived from the introduction of new men and practices in a district. An instance of this has very recently come under my notice, and since it may possibly be of service to some of those present, I may perhaps be permitted to allude to it in this place. A few months ago I was called upon in my official capacity, to inspect and report on an estate in the North Riding, under "the Private Money Drainage Act," in going over which, a considerable proportion of the stones on the surface of the land attracted my notice as being limestone. I drew the attention of one of the best tenants to the circumstance, and suggested that they were worth the expense of gathering and burning on the farm. Some few were burnt in the house fire, and found to be lime of very good agricultural quality. The land when drained will need a supply, but there was none nearer than from 5 to 7 miles, at a cost of 13s. per chaldron at the kilns. When I was there last week, I was much gratified to find that the suggestion had not only been adopted already by a neighbouring gentleman with great advantage, but that the party to whom it was first made, had accumulated a large heap of the stone, and contracted with a burner to prepare them for lime, at a total cost of 6s. 6d. per chaldron, in lieu of 13s., and the loading, which would not be less than 3s. or 4s. more. On those estates where proprietors make their own pipes, very effective drainage of the strong land may be done at not exceeding £4 4s. per acre for arable land, and I have in grass land executed some effective work at £3 per acre. Of course this is assuming that the outfalls are sufficient with any extraordinary cost.

* *Difference in Cost of Drainage.*

18 feet apart.

808 yards, per acre, cutting, &c., at 1d. per yard ..	£3	7	4
2,125 pipes, at 20s. per 1000	2	8	6
	£5	15	10

24 feet apart.

605 yards, per acre, cutting, &c., at 1d. per yard ..	£2	10	5
1,815 pipes, at 20s. per 1000	1	16	0
	£4	6	5

18 feet—£5 15 10

24 feet—£4 6 5

£1 9 5 difference per acre.

This is of course assuming all circumstances equal in both cases, and is simply to illustrate what is really the difference of cost, irrespective of any other consideration.

I have endeavoured on more than one occasion to point out to landowners the advantage both as to cost and completeness, which would be derived by a more systematic conducting of drainage works on a previously determined plan. The doing of a field here and another there throughout an estate, without any regard to an *entirety of purpose*, is but a patch-work way of proceeding; and although it may in time complete the work, it must wholly preclude the carrying out of any well-devised plan for the application of the water to those subordinate purposes we have already alluded to. It is, moreover, absolutely more costly in money, by reason of the comparatively small number of workmen to be superintended by the foreman, whose attention could be just as well given to 50 men in the same or adjoining fields as to a dozen, for it is seldom that more than the latter number are to be seen at work together: and not only so, but experience shows that men work with more vigour when under the emulation which a larger number is sure to excite. It is, moreover, essential for the interest of both owner and occupier, that this improvement should be completed as early as practicable, that both may maintain that relative position towards each other which has happily for them and the community so long subsisted, and which by their joint efforts remains to be maintained.

In connection with the proper drainage of an estate, there are, as we have said, other subordinate works for which, wherever practicable, provision should be made. Unfortunately, with the exception of the West of England Drainage Company's act of incorporation, they have been wholly unprovided for in the other drainage acts, although they form so important a part of an efficient drainage system, that it is difficult to account for their omission. The first of these which claims attention is the practice of *irrigation*, and for which almost every estate offers some facilities. Where there are low-lying grass lands to which the drainage from the higher grounds can be applied either exclusively or in conjunction with other waters, there cannot be a question but that their fertility would be thereby increased; and if in addition they should be situated as to be within reach of the sewage of our towns, so much the better if proper provision be made for the application. And I say *proper* provision, because the principles which govern the increased productiveness of irrigated lands are at this day better understood. The old practice has been to let the water remain stagnant on the land for weeks at certain periods of the year, without any previous drainage; and the consequence is, that what the soil does not imbibe, passes off by exhalation, to the detriment of not only vegetable, but also of the surrounding animal life. We might as well attempt, when impaired by repetition, to restore the human frame to health with repeated doses of stimulants, as increase the fertility of land by irrigation when previously surcharged. Unless, therefore, it is naturally sufficiently absorbent as to allow of the ready percolation of the applied water, and thus impart its fertilizing property in its passage

through the soil, all land which is intended for irrigation should be previously so drained as to promote and secure this process; and instead of the water then remaining upon it in a stagnant and unhealthy state for weeks, each dose would pass off in succession, and so that *circulation of vitality* would be kept up, which is as essential to the vigour of a plant as it is to the health of an animal.

The next purpose to which the drainage-water might frequently be applied with great benefit, and at an easy cost, is that of *power* for threshing, chopping, &c. As one example out of many that may be given, I may mention an opportunity that but recently came under my observation, where, by the conservation of the drainage from the adjoining land, and the diversion of one or two other sources of supply to the small reservoir that would be required, a sufficient fall would be obtained at the homestead for a water-wheel of 12 or 15 feet in diameter, which would be of ample power for all the purposes of the farm; and the first cost would not exceed about £60, but were it £160, it would be extremely well spent money. Where the homesteads are situated on the higher ground, its drainage may also be made very serviceable for working a self-acting water-ram at the lower level, from whence a supply of water would be thus obtained sufficient for all the purposes of domestic and outdoor use, at a comparatively insignificant expense. I know one gentleman, farming extensively, who is about to put down one of these simple instruments for the supply of his house and homestead from a brook at a lower level, the cost of which will not be more than about £50, although the water has to be brought from some distance.

Now it is not solely because these applications form in themselves integral parts of an effective plan of drainage that they are brought under your notice, but rather that, in the present transition state of agriculture, whatever appliances hold out reasonable prospects of being made practically serviceable should be sedulously fostered and promoted by those most interested in their successful issue.

Whatever may be the immediate benefit to individual landowners and tenants of carrying out a course of thorough-drainage, its prospective benefits may be regarded as still more important to the well-being of the community. Our ten districts present us with undeniable evidence of its beneficial effects in the eradication of diseases to which an excess of exhalation had long subjected their inhabitants; and every attentive observer of nature who reflects upon the matter must be assured of the palpable change for the better in our climate which the drainage of the next fifty years will effect. The difference in time between the harvest on dry lands and wet, even in the same districts, is sufficiently obvious to most of us: how much more discernible, then, will it be when large and continuous tracts of country are effectively drained!

And it is not only meteorologically that agriculture will be benefited; but, by the improved mechanical condition of the soil, it will be kept in tilth with less

expense, and every succeeding crop will be increased by the increased yield of that which has preceded it. Different and more varied rotations of cropping will be adopted, and the land will be so managed as in each to yield its full capability of produce—a result hitherto too much neglected, not knowing, or forgetting, that one good crop begets a second, and that nothing puts land sooner out of condition than a continuance of poor crops. In this respect it very much resembles the constitution of our own minds—too much fallow tends to barrenness; and a scanty crop of corn is but too surely filled up with a pretty plentiful supply of useless weeds that take much time and perseverance to eradicate.

Such, too, at this day, is our mechanical skill, that I feel persuaded nothing short of the most complete apathy of the landed and agricultural interest will arrest the progress of that application to the requirements of cultivation which has already been begun. No later than seven years ago such a thing as a machine-made draining-pipe was not to be found in the whole of the north of England; and now it is almost as difficult to meet with the ordinary hand-made tile of that period. And just so will it be in other operations of the farm. Let the necessity arise for improved means, and the mechanic comes to the rescue, if he only receives a fair encouragement for his efforts. I know that, in what is considered the present improved construction of the plough, for example, it may be deemed extremely visionary to prognosticate a much further advance, and still more a total change of form; and yet I do confidently anticipate such a change, regarding the present implement as anything but suitable to the work which it has to perform, when compared with the *best* manner of effecting it by the use of the spade and manual labour. And indeed it may be regarded with much doubt whether the hitherto-adopted plan of frequent ploughings for every crop is the best practice. Once ploughing for each crop, where the land is in mechanical condition, is sufficient; and there are several other implements by the use of which the land can be brought into tilth. One great point appears to be much neglected, and that is, for every *course*, land should receive one *deep* turning, or digging, or breaking up, or ploughing—call it which you will—that shall at least go to the full bottom of the active soil, and be still better if it penetrate and disturb the subsoil. In what way this can be best and most cheaply effected, is the question; but of this I feel assured—the present plough is not the most perfect implement for the purpose. Possibly, on this hint, some of our West Riding mechanics may make an effort; and if with success, the Grand National Exhibition of 1851 will be ready to receive the production of their skill with open arms. I have myself for some time past been engaged with experiments for the construction of an implement to facilitate the cutting of drains, which, so far, promises success; and if means, health, and time are permitted me, I intend to introduce it to the public at the Exhibition of next year.

But farmers will say, perhaps, these are matters that concern the landlord more than the tenant, because unless he will put his land into a condition to be profitably farmed, it must either remain uncultivated, or he must occupy it himself. And there is much sound reason in the remark. The landowners are the educated portion of the agricultural community, and therefore cannot fail to be convinced of the necessity for those efforts on their part, which, if only for example's sake, they must first make. A readjustment of rents; complete drainage and all its accompanying effects; the discontinuance of those absurd covenants in agreements under which it may be that half a dozen different descriptions of land are to be treated with the same rotation and management; clearing away of useless and unsightly hedge-row wood; a fitting limitation of game; assistance in securing the best stock at cost price; where practicable, affording the use of a saw and bone mill to their tenants at cost charges—with some other facilities of little cost and yet great benefit to the tenantry in the aggregate—are all matters so deeply affecting the future interest of both parties as to claim at this time a more than ordinary share of their attention. Some few years ago, the Council of the Yorkshire Agricultural Society, in their Annual Report to the Subscribers, remarked, that "the occupiers of undrained and strong land farms could never maintain their position, if they persevered in endeavouring, with the means and appliances of the last century, to supply the wants of this." And is this any less applicable at the present day to both owners and occupiers?

The chymical knowledge which is now being disseminated must not be disregarded, for there are many things in nature not dreamt of in a farmer's philosophy; nevertheless, like his own produce, it may, and no doubt does, consist of chaff and grain, which must be separated before the latter can be used. But farmers are not generally much of readers, and hence it behoves the educated and co-interested portion of the landed interest to avail themselves of every opportunity to impart the knowledge which they can more easily acquire in its winnowed form to their tenantry. The parochial clergy too, who are many of them conversant with farming operations, and have moreover a direct interest in the farmer's success, might aid most materially by their influence and good offices in the great work of agricultural advancement which lies before us. There are none who better know and more constantly witness the blessings of having the necessaries of life at moderate prices to the great bulk of the population, and there are certainly none who possess such opportunities of imparting to their neighbours the information they may require in its most inviting and intelligible form.

In conclusion, Gentlemen, let me remind you that although drainage is the first step to all improvement in cultivation, it is very far from being all that is necessary. After your land is drained, let me advise you as the very next thing to be done to take care that the

high or rounded ridges are worked down as soon as possible to the same flat surface in which you would lay the naturally dry turnip soils; for, if this is not done, the rain flows into the furrows before it can sink into the soil, and thus the proper and equable action of the drains is prevented. One great object of good drainage is to secure the percolation of the rain to the drain where and when it falls, by which means those fertilizing properties, which we all know it possesses, are carried to the roots of the crop. A suitable rotation of cropping for each description of soil must then be adopted—the old open summer-fallow must be dispensed with by seeding or green-cropping, which must be consumed by sheep on the land, remembering that by this practice the land gets manured in the best form, without the cost of carting, at all times an item which those who advocate the folding of all stock at the homestead do not take sufficiently into account. And let me further urge upon you the great advantage which would accrue, in many respects, by having all your straw, whether for bedding or food, chopped—when, for the former, it will be sufficient in two-inch lengths, and if for the latter as you now ordinarily use it. The benefit would be felt in the more readily absorbing the moisture of the fold, and being thereby the sooner converted to manure and ready for use—in the much more accessible state for removal—and in the much greater facility it would present, from its shortness, of being spread on the land uniformly, instead of, as we now see it, in patches and lumps, leaving full one-third of the land uncovered. Its cost, with proper appliances, would not probably exceed about 2s. per ton, and which would be far more than repaid by the benefits to be derived. Suffer me to take my leave of you for the present in the words of the Prince on a recent occasion, which, to my mind, express in an admirable manner the requirements and the prospects of agriculture as well as other branches to which they were intended to allude:—His Royal Highness said "I conceive it to be the duty of every educated person closely to watch and study the time in which he lives, and, as far as in him lies, to add his humble mite of individual exertion to further the accomplishment of what he believes Providence to have ordained. (Cheers.) Nobody, who has paid any attention to the particular features of our present era, will doubt for a moment that we are living at a period of most wonderful transition, which tends rapidly to accomplish that great end—to which indeed all history points—the realization of the unity of mankind. (Great cheering.) Not a unity which breaks down the limits and levels the peculiar characteristics of the different nations of the earth, but rather a unity the result and product of those very national varieties and antagonistic qualities. The distances which separated the different nations and parts of the globe are gradually vanishing before the achievements of modern invention, and we can traverse them with incredible speed; the languages of all nations are known, and their acquirement placed within the reach of everybody; thought is communicated with the rapidity, and even by the power of lightning."

THE AGRICULTURAL DISTRICTS OF ENGLAND.

FROM THE TIMES COMMISSIONERS.

(Continued.)

STOW-ON-THE-WOLD, GLOUCESTERSHIRE,
January 29.

Travelling from Oxford in a north-westerly direction by Chipping Norton towards the borders of Gloucestershire, the country passed through possesses little variety in its geological character, being principally occupied by the lower oolite formation. The staple or surface soil is very thin and light, rapid in its yield, and well calculated for the growth of green crops and barley, but liable to blight from drought and other causes. Land of this description is said not to require much drainage, and therefore little in that way is done. The general aspect of the country varies considerably from that of the agricultural districts through which we had previously passed. The farm buildings, instead of being constructed with wood, are usually of stone; and, though still very far short of what they ought to be, either in shape or arrangement, they look somewhat more substantial than anything we have hitherto seen. Stone walls also appear, interspersed with the hedgerows. As the traveller approaches Gloucestershire the land slopes gently towards the south and west, opening into beautiful valleys, in most of which hamlets appear through the trees. Here grass lands again divide the soil with tillage, and hedges and hedgerow timber cover the face of the country as with a network.

Passing from the character of the soil and the general features of the district to the manner in which its agricultural resources are developed, the attention of an inquirer is naturally arrested by the present condition of the vast estate held by the Duke of Marlborough in this part of the county. Blenheim was the gift of the nation to the great Duke of Marlborough, and the name of the family is so closely associated with the glory of the country that the holder of the title must always submit to live under the eye of public scrutiny. Moreover, the Duke is a strong Protectionist; and, being included in the number of those, who, by their complaints of the evils of a free-trade policy, invite inquiry, cannot think himself aggrieved if that inquiry takes place on his own estates. His Grace has a home-farm within Blenheim-park, which is managed on the Scotch system, and has connected with it a set of farm buildings worthy of a nobleman who wished to set an example of good cultivation to the surrounding district. But, besides this,

and the management of immense possessions as a landlord, his Grace is a farmer on a great scale, holding at the present time, or being about to hold, as we are informed, not less than from 5,000 to 6,000 acres of his own land. What the considerations may be which influence him in undertaking such extensive operations as a cultivator we are unable to state; but we may mention it as the opinion generally entertained that he considers this course more profitable under present circumstances than the alternative of letting to tenants at a reduced rent. His Grace has the reputation of being a good farmer and a clever man. The extensive tracks of land which he is about to occupy appear to be falling into his possession, not so much by the acts of the former occupants, as by steps to effect that end taken by himself. The tenants, it seems, were hard pushed by the times, and allowed their lands to fall into a bad state of cultivation; so the Duke is taking them into his own hands. In this way he is about to become the occupant of one farm of 900 acres, another of 700, and another of 600, besides smaller holdings, which, taken with the lands which he previously held, make up the amount of acres we have already mentioned. When his Grace succeeded to the property, about 10 years ago, the rents were very low; and, in fact, the land is admitted to have been underlet. That state of things has since been so completely changed that the property is now considered rack-rented. We have been informed of cases in which the rents of farms were raised a third at once; and it is well known that the general rental of the estates has been vastly increased in the present Duke's time. Land belonging to his Grace which used to pay only 18s. an acre, now pays 32s. and upwards; and while this is the case generally over the property, it is said that his Grace loses no opportunity which the competition for farms presents him with of raising his rents still further. For some time past his Grace appears to have held little personal communication with his tenants, though nothing is said to take place in the management of the estate without his knowledge and approval. He steadily refuses to allow any deduction of rent; and if a tenant seeks for that deduction to be expended in the permanent improvement of the soil, he is met with a stern order to pay up the whole amount due without delay, or his stock will be distrained for it. When the

rents for the half-year before last were being paid a great number of the tenants gave notice of their intention to quit; but, as we were informed, the steward intimated that if low prices continued his Grace would take that into consideration; and upon this assurance the notices were withdrawn. Low prices have continued, but no reduction of rent has taken place, and the consequence is likely to be that, large as the Duke's farming speculations are at present, they will become much larger when the next rent-day comes round. Another important point in the management of the Blenheim estates to which our attention was directed was the rate at which labourers' allotments were rented. The allotment system exists to a very considerable extent, not only on the Duke's property, but on those of the surrounding proprietors; and what we are about to mention with reference to the working of that system applies to nearly all of them alike. Allotments are generally given on poor and useless pieces of land; but the thorough cultivation they receive soon raises them to a high pitch of fertility. The more fertile they become the more the rent of each portion is increased; and we were informed that there are at present allotments on the Duke's property which, under the influence of the same competition which exists with reference to farms, bring his Grace a rent of £2, £3, and even £4 an acre. A great number of instances were mentioned to us, illustrating the peculiar spirit in which his Grace deals with his tenants; but we feel that it would be disturbing the moderation of tone which we wish to preserve, were we to do more than indicate the broadest and most glaring defects of the system of management pursued by his Grace. He binds down his tenants (who are all yearly occupants) to the strictest observance of a particular system of cultivation. Deviations from that system never escape his notice, and are generally followed by the harshest proceedings. As the result of all this, it will surprise no one to hear that the Duke of Marlborough is an unpopular landlord, that his tenants are inferior in intelligence and general estimation to the great body of Oxfordshire farmers, and that his land has a poverty-stricken and neglected look, the unmistakable result of a system which leaves the cultivator of the soil without either heart or means to do it justice. We think it fair to his Grace to mention that he gives all his tenants leave to kill "fur game." The greater part of this district is a turnip and barley soil, and the course of cropping generally adopted is the four-field or Norfolk system. It is carried out with more or less energy, according to the security which the tenant feels that he will reap what he has sown. For instance, a tenant who holds extensively under different landlords, told us that from one of these he had

no lease, and paid a very high rent; he therefore spent nothing in purchased food or manures, as he might be obliged to go at any time, if his landlord took a fancy to the farm, and he must in that case leave his improvements behind him. His high rent also prevented expenditure, for he might wish to leave the farm as soon as he could get a better, and he was therefore on his guard against outlay which he could not take with him. On another estate the same man has a farm, *at a moderate rent, with a lease*; and this year he expended on it £100 in purchased manures, and £200 in purchased food. On the first farm he is losing a great deal of money; on the second he thinks, with prices a little better, he might do well enough. Great part of the land which forms the subject of this letter is let on yearly tenure. Farming is not generally carried on with any degree of spirit; and of this the farmers are themselves quite conscious. "We are not farming," one of them said to us. "We know that we are not farming; we are only taking out of the land what we can get from it at the least cost, as we don't know how long we may remain in possession, and have no security for what we might be disposed to invest in improved cultivation." Purchased manures and food, especially the latter, are highly approved, and must be of peculiar service on this thin, dry soil, but they are very scantily used. Lime has not been tried, as it is supposed that the natural limestone in the soil supplies all other calcareous matter necessary. We have, however, seen important benefit derived from the application of burnt lime on soils even more calcareous than this. Very little draining is said to be requisite, as the soil is thin and the subsoil porous; and yet we cannot altogether reconcile this statement with the fact, at the same time mentioned to us, that in ploughing the turnip lands for barley it is necessary to yoke the horses in line, in order to avoid the injury which the treading of the "near" horse, when yoked abreast, would otherwise do to the soft land. If the land were either naturally or artificially well drained this injury could scarcely be done. Then the farmers have a strong dislike to deep ploughing, as a matter of principle. Light ploughing, they say, is easier to the horses, keeps the manure near the surface, where it is at once within reach of the crop, and does not injure the staple by any admixture with the barren, hungry subsoil. We did not hear of an instance where this had been tried, followed up by ample manuring and cultivation, and had failed; and we may therefore venture to say that the farmers have no experience to warrant them in preferring their own practice to another which they have never tried. We cannot help thinking that a deeper stirring of the soil would materially lessen the injurious effects

of drought in summer, to which the land is said to be subject. The average produce of wheat for several miles round Woodstock was stated to us at 20 bushels, and barley 40 bushels an acre. Turnips were a light poor crop. The number of sheep kept on a farm is little more than one to an acre, or about 600 sheep on a 600 acre farm. The breed is a cross with the longwoolled sheep, as the lambs are kept for stock, and their fleece is therefore a matter to be considered. Good year-old sheep will be sent off fat in a few weeks, being previously shorn. They are worth 30s. each, and the fleece 7s. or 8s. more. Cattle form here, as in other parts of the county, quite a secondary consideration. A few are kept in the strawyard to trample down the straw, but they get little green food, and very seldom any corn or artificial food. The straw is wastefully consumed, and there are few proper buildings to admit of a different practice. As much as possible of the labour of the farm is done by taskwork, at which threshers earn 11s. a-week; carters and ploughmen receive 10s. to 11s. a-week; but, if present prices continue, the farmers say they must lower their rate of wages.

As to the house accommodation and comforts of the farmers in Oxfordshire, they appear to be at least equal, if not superior, to what we saw in Buckinghamshire. The same neatness and order characterize them internally, and the fronts of the houses are, in the majority of cases, so arranged as to command an agreeable prospect. One feature which we observed in nearly all of them was the close proximity of the farm-yard, and the disposal of it in such a way that everything that went on therein could be observed from the windows of the dwelling. It is singular that the spectacle of wasted provender and inconvenient buildings thus constantly before their eyes has had so little influence upon the practice and opinions of the farmers as a body. The farm-house has generally attached to it a good-sized garden, in which vegetables for the consumption of the family are grown. It is also not unusual to see a piece of orchard-ground close at hand, the fruit of which is disposed of in the London markets.

With reference to the care shown by the proprietors of Oxfordshire for the interests of agriculture generally, for the improvement of their estates, and the prosperity and welfare of the different classes engaged in the cultivation of the soil, the facts which we have already set forth will be found to throw some light on this subject. Few of them appear themselves to be practically engaged in, or acquainted with, farming; and of that few the most conspicuous exception is, as we have seen, not a very favourable specimen. The proprietors themselves, therefore, knowing little about the cultiva-

tion of the soil, one would naturally expect that their stewards would be practical men, capable of setting an example to the tenantry, and of directing and elevating the character of agriculture on the estates which they manage. So little, however, is this the case, that the stewards in the great majority of instances are lawyers, who know nothing about farming, except how most effectually to secure the landlord's apparent interests, and to bind down the tenant with conditions and limitations that are generally stringent, and often most injurious in their operation.

We close our review of the state of agriculture in Oxfordshire with an outline of the opinions which we found most prevalent among the farmers, in regard to their own prospects and the means by which they sought to be extricated from their present difficulties. On one point they were all agreed—viz., that free-trade had done everybody good but them; for, if the landlord's rent remained the same, he was a gainer by cheap food, and if the labourer's wages were the same he was also a gainer, both at the expense and to the exclusive loss of the farmer. As the readiest means of retrieval, many spoke of measures by which the free use of capital as a safe investment by the farmer might be encouraged. The most judicious with whom we conversed readily admitted that much might be done by improved cultivation, and that there was great room for such improvement. "But," said one of them to us, and he was a strong Protectionist, "if a farm is to be let, and one man with £3,000 and another with £300 bid for it, the right of *distress* possessed by the landlord enables him to pit the latter against the former, and the consequence is either that the first man takes the farm at a higher rent than it is worth, and thereby injures himself, or that the second man gets it at a rent which he has recklessly offered; he struggles on with inadequate stock for a few years, taking all he can out of the land; his rent falls into arrear, everything is seized to pay it, all other creditors (who have most probably advanced much of their means for carrying on the farm) are cheated, and the poor man himself is a beggar. Now, suppose I go into the market with my wheat; one man may offer me £14 a-load, which I reluctantly refuse because I know he has no capital, and am content to take £10 from a man who has capital; but why should my landlord have the privilege of forcing me to pay 40s. an acre for his land, because a man who has nothing to lose offers that sum; when, if no such privilege existed, he would be obliged to satisfy himself with 30s.? If we are to have free-trade, let us also have no unfair privileges." Such were the views we heard repeatedly expressed on this question in Oxfordshire.

We did not find, generally, that any very serious hope was entertained, even by the strongest Protectionists, that Parliament would restore the duties on corn, but a prohibitory duty on cattle and foreign provisions they looked to as a reasonable claim, and put it in this light:—That a fair case had been made out for the bulk of the people to insure them untaxed bread; but butcher's meat, being more of the nature of a luxury, was chiefly consumed by the classes above the labourers, and who could afford to pay for it; that the reduced price both of corn and cattle at the same time was a heavier blow than the farmers could bear unaided; that an encouragement of cattle and sheep-feeding was the surest means of improving the land, and that the facilities under the new corn bill of importing cheap kinds of corn for feeding stock would tend rapidly to increase the home supply. For these reasons many of the farmers in Oxfordshire seek a restrictive duty on foreign cattle and provisions for a few years, so that they may have time to adjust their affairs to the new order of things.

Allotments for labourers we met with in many parts of the county, and our inquiries were naturally directed to them. The farmers all complained of them as injurious to the steady industry of the labourer, and a heavy tax on themselves. The labourer's half-acre allotment, they said, was dug and tilled in the morning and evening—before and after the day's work. It was, therefore, in part an exhaustion of that physical energy which a full day's work required, and by so much a positive loss to the farmer. In almost every case, too, the allotments were let at extravagant rents, generally at least double the average of the surrounding land; in fact, they were in many cases given on bad land, which to a farmer was nearly worthless. As the labourer must pay his rent before he reaps his crop, he is frequently obliged to borrow it from his master in advance of his wages, and this leads to jealousy and bad feeling between master and servant. A piece of garden-ground in the neighbourhood of their cottages would, it was said, be much more beneficial to the labourer, as he could then, without fatigue, raise such potherbs as were requisite for his table, and most farmers would willingly give a portion of their green-crop land in which to plant his potatoes at a much more moderate rate than the rent of the allotment.

GLOUCESTER, *Jan.* 31.

From Stow-on-the-Wold westward towards the Severn, and south-west towards Cirencester, extends a tract of undulating country possessing a distinctive character as an agricultural district, and known as the Cotswold hills. The greater part of

this district has a considerable elevation above the sea, in some places as much as 600 or 700 feet, and this is said to delay the harvest about a fortnight beyond the period in the surrounding low grounds. The appearance of the country is a series of level plains, falling, at intervals, into gentle valleys, through which the natural drainage of the adjoining lands is carried off. With a cold climate the Cotswolds have a light soil, not very productive naturally, but capable of easy cultivation, and under a generous system of farming, likely to remunerate abundantly the skill and capital invested in it. At no very remote period the greater part of this district was devoted to the pasturing of sheep, a peculiar breed of which takes its name from the locality. Now, however, things are very much changed here. The grass lands have nearly all been brought under the dominion of the plough, and the richer pastures in some of the valleys are the only portions of the country that remain untilled. The fields are of considerable size, on the arable ground, being enclosed sometimes with hedge-rows and sometimes with stone. In the valleys devoted to pasture they are smaller and more encumbered with wood, but the inconvenience of this is less felt on grass lands, as the stock have a shelter thus afforded to them, and there are no operations of husbandry impeded. The general features of the country are very pleasing, an agreeable succession of hill and dale relieving the landscape, and villages and homesteads giving, at intervals, life and animation to the prospect.

On the Cotswold hills we found the farmers as deeply occupied in the consideration of their present condition and future prospects as in districts more within the stirring influence of the world. There seems, however, to be little reason for dissatisfaction here on one important point at least—land is generally acknowledged to be moderately rented, ranging from 10s. to 25s. per acre, and the average rent being from 16s. to 18s. per acre. The best and most wealthy farmers appear to hold their lands on lease, but the tenures are principally from year to year. The landlords generally lay down particular rules as to the system of cultivation to be pursued, but these are not adhered to, nor are they strictly enforced, and accordingly, as will be explained hereafter, considerable variety of practice exists throughout the district in the rotation of crops followed. As to the permanent improvements requisite, the custom appears to be, that when a tenant enters into possession of a farm the proprietor should put his house, farm buildings, and fences in good repair, but that everything else should be done by the tenant himself. Drainage is not carried out to any extent, being

considered unnecessary on the light, dry soil, predominating on the Wolds, except where a bed of clay intervenes. When drains are made, stones are used. For these and all other improvements that he may effect the tenant has no compensation, except what he may receive from the increased produce of his farm; and, as his occupancy is frequently from year to year, he has no certainty even of that return for his outlay. On the Cotswold hills the only compensation given to an outgoing tenant is for what are called "acts of husbandry." These acts of husbandry include the expense of ploughings by the farmer for the benefit of his successor, and of carting and applying manure to the land. The value of the manure itself is never considered, that being regarded as belonging to the farm, and not the property of the outgoing tenant. The consequence is, that he carefully avoids accumulating what benefits his successor at his expense, and generally leaves his occupancy unprovided with the necessary appliances for its future cultivation. The incoming tenant pays a moderate sum for the "acts of husbandry," and men of small capital are thus enabled to take farms for which their means would otherwise be inadequate. Not having manure in the land they are obliged to purchase it, and, in all probability, the profits of several seasons are lost before the impoverished soil can be brought to a proper state of fertility. The burden of local taxation appears to be little felt on the Cotswold hills, the rates seldom exceeding 2s. in the pound, and the land being frequently altogether exempted from tithes. Farmers appear to employ all the labour of the district, female as well as male labourers being engaged in carrying out the ordinary work of the farm. The best workers are paid by the piece, and make 10s. or 11s. a-week, but the usual rate of wages paid is as low as 6s. and 7s. a-week, and women receive only 6d. a-day. It is remarkable, and we think not very creditable to the Cotswold farmers, that they should have reduced to so low a point the remuneration of the labourer—for their lands are moderately rented in comparison with other districts, the poor-rates are unusually light, and it is quite evident that the pressure of the times does not affect them nearly so much as it does the farmers of Oxfordshire and Bucks, who still continue to pay 9s. and 10s. a-week as wages. There is said to be no want of capital among the Cotswold tenants, and, excepting where the land is of a less kindly nature, farms, as they become vacant, readily find fresh occupants.

The fields on the Cotswold farms generally present an unbroken surface with no impediment of any kind to husbandry. The farms, consequently, are large, and the operations conducted on an ex-

tensive scale. The rotations followed vary with the quality of the soil, the best parts being managed under the alternate system of corn and cattle crops; the inferior in a five, six, or seven years' course, as appears most advisable to the farmer. The five years' course is simply an extension of the four course, by permitting the grass to continue two years before being ploughed. The six years' embraces the same crops as the preceding, with the addition of a crop of oats after the wheat crop. The seven years' appeared to be—(1) turnips, (2) barley, (3) clover, (4) wheat, (5) oats, (6) and (7) sainfoin. And as this, we were informed, was the most prevalent mode of cropping followed on the Cotswolds, and as it has some peculiar features, we shall shortly describe it. In the seven years the land gives three corn crops, and four green or cattle crops. The great feature of the management is the burning of the land. Beginning with the turnip crop, the preparatory process for this is to pare and burn the surface, in which is the tough sward of the two years' sainfoin. This process is commenced early in the spring, and is done by men with a breast plough. With this they pare off the turf, and then collect it into heaps and burn it. 16s. an acre is usually the cost of the paring and burning, which is done by taskwork. This process, besides providing an immense store of ashes for manure, likewise prepares the soil for being worked down and completely pulverized for the reception of the turnip seed. When that is accomplished, the land is covered with the burnt ashes, and the seed sown, either broadcast or in ridges. The ashes secure a fair crop, which is eaten on the ground by sheep, after which the land is sown with barley and clover seed. The barley being removed, the clover is either mown or pastured—most probably the former—and the land is then ploughed up for wheat. The wheat is followed, after proper tilth, by a crop of oats, with which is sown the seed of the sainfoin. This is pastured for two consecutive years by the sheep stock, and completes the course, though a field of sainfoin is occasionally down for eight or ten years. Before the introduction of guano and bones, this system depended altogether on the burning of the soil at the commencement of each course. The ashes thereby afforded secured the turnip crop, which being consumed on the ground, enriched it for the succeeding crops. A stranger to the character of the soil would not easily believe that such a course could be long continued without the aid of other manures, and might be apt to think that in process of time, not only the organic matter, but the thin soil itself would gradually be burnt away altogether. But we must not too hastily conclude that such is the effect. The best farmers on the Wold

are the men who burn most extensively. On a 700 acre farm we were assured by its occupier that he every year burnt from 60 to 100 acres of land in preparation for turnips, and seldom failed to have a fair crop. One field over which we walked had been broken up from its natural state exactly 50 years ago; it was then pared and burnt, and so started the first crop of turnips, and supported the rest in the course. The same process had since, within the knowledge of our informant, been seven times repeated. No manure of any other kind had ever been applied, except such as arose from the consumption of its own produce on the ground, and the crops in each succeeding rotation had shown no sign of decreasing, the last grown having been an excellent crop of wheat. The soil is very thin, but as it is not more so than when first broken up, its depth must have been maintained by the ploughman, perhaps imperceptibly, bringing up some fresh subsoil after each burning. The value of the ashes as manure are probably enhanced by the effect of fire on the natural limestone of the soil.

The practical reader will see of how much benefit to the Cotswold farmer was the introduction of portable manures and cheap feeding stuffs. These he uses in too limited a degree—eight bushels of bones and 2 cwt. of guano per acre being a common application to the turnip crop in addition to ashes. When dung is used, four bushels of bones and 1 cwt. of guano are deemed a sufficient additional supply. In the use of these manures the farmers of the Cotswolds are not decreasing their expenditure, for we learnt from a corn merchant who supplies them with guano and other similar substances that their orders this season had fallen nothing off from what they were last year. The increased produce which a liberal application of manure is sure to leave from the same extent of soil is cheaply purchased by the first cost, as the rent, the labour, and the other farm expenses remain nearly the same whatever the acreable produce may be. The present average crops of wheat are 20 bushels, and of barley 32 bushels. The annual produce of both might, without doubt, be considerably increased, and not only so, but a liberal expenditure in manure and feeding stuffs would enable the farmer to take these crops at shorter intervals, and, consequently, in increased breadths, from his farm every year.

The Cotswold breed of sheep is the principal description of live stock. A breeding flock is kept on each farm, the produce of which is sold as "teggss," or year old sheep, and generally bring, with their wool, from 37s. to 40s. It is reckoned a very poor farm indeed where one sheep to the acre all round cannot be kept. Very few cattle are fed; but we met with a new branch of cattle manage-

ment here—viz., the rearing of heifer calves. These are bought from the dairy farmers of Bucks; they are reared on the Cotswold till three years old, and then sold to the Wiltshire dairy farmers for milch cows. The regular cattle stock of a 700 acre farm, which we visited, consisted of 24 calves bought every year, kept on for the next two years, and sold out the third to the dairyman at prices varying from £11 to £15. The management in the case here mentioned was the most methodical we met with, and leads us to infer that cattle do not form a very important item in the profits of Cotswold farming. The stock were all tied up in sheds, and their provender was a mixture of hay and straw cut into chaff by a machine driven by horse power. Machines are also used for thrashing wheat, but barley is thrashed with the flail. Twenty men are regularly employed on the farm above mentioned, besides women for light work. Seven of these men are *breast ploughers*, whose business during spring and the early part of summer is the paring and burning of the land in preparation for turnips; the rest of the year they are employed in draining and other necessary operations.

Our description of the actual condition of farming in the Cotswold-hills would not be complete without some notice, however brief, of the college founded at Cirencester four years ago, for the purpose of imparting to all who may desire it, a thorough knowledge of the principles and practice of agriculture. This college is the only institution of the kind in England; and when the importance of its objects, and the necessity for the instruction it is intended to convey, are considered, it becomes most desirable that the system of education provided should be made generally known, and that the attention of the public should be particularly directed to the efficacy of the means thus employed in order to rescue the oldest branch of human industry from the ignorance and prejudices, the rude practices, and the clumsy contrivances which at present in two many instances impede its progress and overshadow its prospects. The Royal Agricultural College is a very handsome structure in the gothic style of architecture, and partaking generally of the features of those venerable buildings dedicated to educational purposes in our great university towns. It adjoins the park and woods of Earl Bathurst, and is situated on a farm about a mile and a half from Cirencester. The principal front, 190 feet long, has a south aspect, and commands an extensive view over North Wiltshire. The buildings include a large dining hall, library, museum, lecture theatre, laboratories, class rooms, private studies, a chapel, and dormitories for about 200 students. The course of education extends over six sessions, of which there are two in each year.

The first and second sessions are chiefly devoted to instruction in practical agriculture, which is given on the farm, and, of course, familiarises the student with the manual operations of husbandry, the uses of the best agricultural implements, and the most approved systems of management in the different departments of the farm. A laboratory, conducted on Liebig's system, is appropriated to chymical manipulation and analysis. Botany, geology, and zoology are each made the subjects of practical instruction. Levelling, surveying, and the measurement of land are also attended to; and to the advantages of actual practice are, of course, superadded the lectures of the professors on every branch of science connected with or calculated to throw light upon the cultivation of the soil. Students are admissible only on the nomination of a proprietor or donor of £30, and must have had a liberal education before entering.

The college was originally founded in order to furnish a sound education in scientific agriculture for the sons of tenant farmers; but that class do not appear to have availed themselves of the advantages thus held out to them, nor was it altogether adapted for them; and the 60 students at present entered on the books are all the sons of solicitors, clergymen, officers, or landed proprietors. Of course most of them intend engaging themselves in the cultivation of the soil, either as owners or occupiers; but among them is included what may yet prove a very valuable class in the community, viz., an educated and competent body of land agents and stewards conversant with the details of agriculture.

The College farm extends to 700 acres, nearly all of which is under the plough. Three different rotations are adopted, both to suit variations in the soil and to exhibit different practices in operation for the instruction of the students. The four and five courses are carried out on all the lighter lands of the farm, which comprise by much the larger portion of it. A three-field course is followed on the heavy land, viz., turnips, beans, wheat. The turnip crop is an early kind, sown early, for the purpose of being consumed on the ground by sheep before the month of November, as after the rains of that month the ground becomes too soft for sheep feeding. Beans are planted after the turnips, and wheat after the beans. We had not an opportunity of examining the farm minutely, but observed that the fields were large, the hedges narrow, and no land wasted at their roots; that the ploughs were drawn by two horses a-breast, that the horses were in high spirit and condition, and turning over with ease a furrow three inches deeper than we saw five horses in line doing in a different part of the Cotswolds on soil of a similar character. We

remarked that when the furrow was turned over (in preparation for wheat after carrots) the foot of the "near" horse left no injurious effect on the *deep* dry soil, and that depth had been gained by the use of the subsoil plough. Good roads intersecting the farm admit the use of the handy one-horse cart; the corn is sown in rows by the drill, and is hoed cheaply and effectively by Garret's horse hoe; drains are made where required, and useless fences grubbed out and converted into useful land. The turnip crop we thought rather a light one; the manure used for it was 20 carts of dung and 3 cwt. of salt. We should certainly have preferred 3 cwt. of guano, and would have added 10 bushels of bones besides, in the belief that the superiority of the crop would have amply compensated the additional cost of the manure.

The arrangement of the farm buildings is commodious, and comprises sheds for all the implements of husbandry; workshops for the repair of these implements, and for the shoeing of the farm horses; stores for portable manures; a steam engine for thrashing the crop, grinding the feeding stuffs, bruising coprolites, guano, or bones; for turning the chaff cutter; and, finally, the waste steam is turned into vats, to cook a mess of chaff and meal for the live stock. The horses have each a loose box; the cattle are partly fed in boxes and partly in stalls, a tramway being laid from the turnip-house along the feeding-house to facilitate the feeder in bringing in the food, and afterwards carrying out the dung. Sheep are fed in covered pens; they stand on sparred boards, and require no litter. But it may be remarked with regard to this mode of feeding, that they are easily disturbed by the approach of any one, and slipping about the boards they want that quiet docility which marks the fattening animal. Lord Bathurst has his sheep tied up by the neck, like stalled cattle; and in this position they soon become perfectly quiet, and improve rapidly in condition. Sheds and yards for pigs are provided, of which a very large stock is bred and fed on the College farm. The system pursued on the farm is to breed and fatten every animal which it supports; and a slaughter-house is provided, in which the last process in the conversion of vegetable into animal food is completed. The offal is thus kept on the farm, and what portion of the meat is not required by the college establishment is sent to market. Besides the cattle and pigs kept in the buildings a large flock of sheep are fed on the turnip fields. The farm is held on a lease for 47 years, at a rent varying from 20s. to 28s. an acre. There is no tithe, and the rates are moderate. A machine is placed at the entrance of the farm buildings, on which all the farm produce is weighed as it is brought in for consumption;

and the progress of experimental cattle is ascertained at any period by putting them on the scales. A record is kept of weights; and if the system is followed out as it might be, very valuable results may be expected. We were also informed by Mr. Wilson, the Principal of the college, who kindly conducted us through the buildings and over part of the farm, that a well digested system of farm accounts is kept, and so arranged that it may with facility be applied to the ordinary receipts and expenditure of any other farm.

We have found that the Royal Agricultural College is looked upon with little favour by the

farmers of the Cotswold hills—a circumstance probably due in some degree to prejudice, but largely, also, to a persuasion that the college farming does not pay. It is not difficult to understand how farming for the double purpose of instruction and scientific experiment leads to expense which in the ordinary practice of individuals for remuneration may be avoided, and it would be very unfair to criticise too freely a novel system of education, not yet, from want of time, brought into full operation; but any wide departure on the part of the management from the idea of agriculture as a profitable employment would be a fatal error.

(To be continued.)

VENTILATION OF FARM BUILDINGS.

It is only within the last few years that any attention comparatively, has been given to the subject of the ventilation of farm-buildings. Either it was considered that the lower animals had some vital power so great as to counteract any bad effects arising from a close or poisoned atmosphere, or that air-holes would injure them by exposure to cold draughts, or some other reason, so that no attention whatever was given to matters of this description. Now, however, it is different: many a stable once as close as a travelling trunk, in which inflammation of the lungs, and staggers, and a mass of disorders arising from deficient respiration, were as rife as possible—in order to secure for the horses a brilliant and shining coat—is now reasonably ventilated, and health is made a consideration prior to mere appearance, or to an excuse for bad grooming.

Sir H. Davy estimated in his day the weight of carbon emitted from the lungs per day, in respiration, to amount to eleven ounces; while the more recent researches of Liebig gave the quantity expired as high as thirteen ounces; but the fact, as regards stock, is but little noticed: Boussingault gives it in a somewhat indirect manner as follows, viz.:—The cow, per day, 4lbs. 14 oz.; the horse, 5lbs. 7 oz.

Now, without averring any particular degree of scientific accuracy for these data, it is obvious enough that these animals require a large, nay a larger system of ventilation than even man himself. Connected with the lower animals, also, there is another element of very serious moment which presses very strongly in the same direction. Their ejectamenta, liquid and solid, are all deposited in the very place where the animals breathe, and this is a strong reason for means being afforded for additional ventilation.

On this subject, a recent writer, whose valuable work* is elsewhere noticed, says (p. 88.)—"In the construction of a proper stable or cowhouse, we conceive four points are necessary to be considered. These are:—1. Sufficiency of space in the stalls. 2. Proper methods of ventilating and heating. 3. Proper drains and reservoirs, by which all exuvia can at once be carried off (so as not to vitiate the air in the interior), and in which they may be collected and preserved for manure. 4. A properly arranged series of water-pipes and reservoir, so as to be available for clearing the whole range of stalls, and to provide a supply for the animal's use." Passing over the first two as sufficiently obvious—although important to be remembered, and as hereafter to be treated of—we shall give a few hints in connexion with the two last.

We would recommend all the stalls to be made sloping, at a certain angle from the head towards the foot: this slope may be one foot in every eight. At the bottom part of the incline a pipe, or covered drain, should be placed in front, running along before all the stalls, and should have a considerable fall or incline throughout its whole length, towards a convenient part of the building, where it should communicate with a large pipe or covered drain, which should lead to a reservoir for liquid manure placed in the back yard of the building. The liquid manure will flow down these pipes or drains to the reservoir. As the liquid collected from the stalls forms a very excellent manure, it is of importance that proper methods should be adopted for collecting and preserving it. As a most effectual means we recommend the power of run-

* Practical Ventilation, as applied to Public, Domestic, and Agricultural Structures. By Robert Scott Burn. London and Edinburgh: Blackwood.

ning water to be used in the following manner: the floor of the stall should be made of asphaltum, or be closely flagged (not floored with small stones, as dirt is exceedingly apt to collect between the interstices).

An iron pipe of the breadth of the stall, and closed at the ends, should be placed at the head of each stall, its under-side pierced with small holes, or, what will be better, a slit or small aperture stretching nearly across its whole length. This pipe should communicate with a cistern or reservoir, placed at a level considerably above that of the stalls. The coarse litter and solid manure (when the stalls are wished to be thoroughly cleaned, and the manure in the pipes to be flushed down into the reservoir) being removed, the communication between the pipe at the head of the stall and water-cistern is opened, and a thin, but powerful stream of water is projected down the inclined plane of the stalls, carrying along with it all impurities, and the manure in the pipes, to the reservoir. If the stream is continued for any length of time to sweeten the stalls, the accession of water to the contents of the reservoir might deteriorate the manure. To provide a remedy for this, let a pipe or drain be connected with the drain running before the stalls, leading to a cesspool independent of the reservoir. This pipe should be provided with a stop-crane, or other means for shutting off communication: the same should be applied to that leading to the reservoir.

Connected very intimately with the proper ventilation of agricultural buildings, is that of heating them; for the external air, though pure, must not be too cold, otherwise a vast amount of the carbon of the hay, turnips, corn, &c., which is given to the cattle or horses, will be expended, not in the ordinary processes of laying on fat, but in resisting this application of external cold, in other words, in keeping up the caloric. This carbon is burnt to every purpose but the use of the farmer, who wishes to deposit and not to dissipate it.

Animal heat may be abstracted too much, therefore, for the farmer's artificial purposes; but we must remember, in treating the whole question, that as hot or warm air is not always impure, so cold air is not necessarily pure. On this Mr. Stewart well speaks in his "Stable Economy"—another valuable publication from the same worthy publishers. He thus says of the modes of ventilating stables, p. 47:—

"Many people are perfectly aware that their stables ought to be aired, but they are ignorant of the mode in which it should be done. The owner or groom is told that the stable is too close, and he

replies—'The stable is not so close as you think; indeed, it is rather cold, if anything. This window is generally open all day, and that hole is never closed. I got it made on purpose to air the stable, for it was too hot before.' Now, it frequently happens that the stable is not too warm, and that the hole and the window do keep it cool. But this is not to the purpose. These people cannot be made to understand the difference between warm air and foul air. They are always thinking and talking of the temperature, when it is the purity of the atmosphere that ought to engage their attention. Ventilation may be managed in such a way as to preserve the air in tolerable purity, with making it comfortably cold. There must be apertures for taking away that which has been vitiated, and apertures for admitting a fresh supply; and these must be properly placed. Their situation is of some consequence, particularly when it is desirable to keep the stable warm. In general they are placed too far from the roof, too near the ground, perhaps about a foot above the horse's head. In this place they must be so large, in order to air the stable, that they must also cool it. When the impure air escapes from the horse's lungs, it is warmer than the surrounding air, and it is lighter: in consequence, it rises upwards. It ascends to the highest part of the building: if permitted to escape there, it does no harm. When there is no aperture so high up, the air remains at the roof till it becomes cooler or cold. When cool as that which occupies the lower part of the stable, or when cooler—and it soon loses its heat—the air descends, and is rebreathed a second, a third, or an indefinite number of times, until it becomes perfectly saturated with impurities, or exhausted of its oxygen—at least, comparatively exhausted—unable to supply the demand. Then a part of the blood must pass through the lungs without undergoing the usual change, and the horse becomes less vigorous, and consumes more food and more water than he would if the air were purer. There may be large openings in the stable, capable of admitting fresh air; yet they are of no use, unless there be others for letting out the impure air before it cools."

Hence, in order to ventilate any building properly, there must be apertures for the escape of impure air, viz., air deficient in oxygen, having an excess of carbonic acid or ammoniacal vapour, situated high in the building, and of sufficient capacity to allow its escape in sufficient quantities; and apertures, also, to allow the admission of the pure air to supply its place, and this generally towards the bottom of the building. For without they adopt both these precautions, all ventilation will be to a greater or less extent worthless.

In constructing farm buildings, a transverse horse-shoe drain-tile here and there will be found useful; and the ventilating bricks, at the bottom, with a similar area of aperture, will be an expensive mode of ventilating farm-buildings.—Gardeners' and Farmers' Journal.

LABOUR AND THE POOR.—THE RURAL DISTRICTS.

CONDITION AND PROSPECTS OF THE AGRICULTURAL LABOURER IN CORNWALL.

LETTER IX.

(From the Morning Chronicle.)

The Duke of Cleveland and the Dowager Lady Sandwich are the joint owners of considerable property in the county of Cornwall. One of the estates subject to this joint ownership is a small one, scarcely comprising 600 acres, situated in the parish of St. Martin's, near Looe. The property lies in a long irregular strip, stretching back from the sea to the estate of Morval, belonging to Mr. Buller, which it touches in one part, and to a portion of the "Duchy property," which it adjoins in another. Although of such limited extent, it is cut up into a number of small farms, which are in the possession of tenants destitute alike of capital, enterprise, and skill. Having reason to believe that the circumstances of the labourer on this property would form a not inapt illustration of his average condition throughout the greater part of Cornwall, particularly in those districts in which "small farming" is prevalent, I inspected, in addition to some of the farm-houses, every cottage upon the estate. I now proceed to state the results, and it may be that the proprietors themselves will be as much astonished at what I shall relate as will the public in general; for I am inclined to believe that they are completely ignorant of the condition of their property in the parish in question. Indeed, on inquiry of one long resident in the neighbourhood, if the Duke of Cleveland had ever visited it, I was informed that whilst Earl of Darlington he did once get as far as the borough of Saltash. "Did he come as far as St. Martin's?" I asked. "I do not believe that he has ever seen an acre of his *property here*," was the reply.

Let me here premise, that portions of the estate are in the occupancy of "*lessees for lives*"—a general system in Cornwall; whilst other portions are what is called "*in hand*"—that is to say, the proprietors are directly receiving the rack-rent for them. For the circumstances of the portions leased on lives they may not be wholly answerable, but for the state of the farms *in hand* they are directly and solely responsible. I do not select this estate, or even this parish, as affording the type of the best or the worst tenements in Cornwall. The estate is, as regards management, an average one, in a parish which, as regards the condition of the labourer, may be taken as an average one in the county. Let me also state that on leases for three lives, granted in consideration of a "fine" and a reserved nominal rent, harvest journey, heriot on death, &c., much property in Cornwall is still held.

As introductory to a description of the circum-

stances of the labourers on the estate, I shall first briefly advert to those of some of the farmers who cultivate it. I was kindly directed in my inquiries by the rector of the parish, the Rev. Mr. Farwell, without whose aid it would not have been easy for me to have accomplished my object.

The tenements to which we first directed our footsteps consisted of a group known by the designation of Barbican. There were in all four dwellings, with a considerable number of out-houses attached to them. A spot more favourably situated for drainage and health can scarcely be conceived, forming part, as it does, of a rather steep declivity, looking towards the sea. Indeed, there is not a house on the estate of which the same cannot be said, the broken and undulating surface of the district being replete with airy situations, and affording opportunities for drainage denied to the residents on the marshy plain. The houses in question were all built of the small slaty stone so commonly met with in Cornish architecture. In each case the walls had lost their original colour, being more or less covered with that peculiar mossy vegetation which betokens the prevalence of moisture in the climate. They were all *thatched* (the usual covering of dwellings in Cornwall remote from the slate districts), and with the exception of one, the largest of the group, which was being kept up for a purpose to which I shall presently advert, they were in a state of progressive dilapidation.

The first house which we entered was in the occupancy of a farmer of the name of Thoms. It had been a farm-house almost from time immemorial. The tenant is a man between 50 and 60 years of age. He cultivates fifty acres of ground, for which he pays a yearly rental of £60. He holds directly of the lord. He has held the farm for the last six years, having, up to that time, been himself a labourer, at 9s. a week, with the previous occupier. He was labouring under a severe attack of asthma when I saw him, of which, he said, he could not get rid. The house was not exactly open to the weather, but it was full of drafts, the doors being loose and crazy. They were about to be replaced by new doors, which was all in the shape of repair which the house had received for years, or which it was likely ever to receive. It was, in fact, doomed; and the repair of the doors would not tend to perpetuate the existence of the shell, which was giving way in all directions, and to support which nothing was done. There was but one tenantable room below, which was occupied by the family, consisting of the farmer, his wife, and daughter, and a boy or two at

service. When we entered dinner was on the table, consisting of some broth, with a little meat in it, several large slices of boiled turnips, and some black-looking "suet" puddings, to be eaten with the meat. The flooring was tolerably good, and the walls and ceiling were white-washed, but the latter was so low that I could scarcely stand upright. In a small recess leading from the room were pots, pans, pieces of bacon, washing tubs, fire-wood, &c.; whilst a hole leading off that again was made sacred to the purposes of a dairy. In the roof, up stairs, there were two sleeping rooms. On the other side of the small passage was another room, covered above by the roof, which was full of lumber and farm implements of the simplest description. The walls of this apartment leant at almost all angles from the perpendicular, and in some places appeared very unsafe. The coarse plaster had long since peeled off from the greater part of them. Directly over the contracted passage the ceiling bulged downwards, and was so frail that, in drawing our attention to it, the farmer raised it to its proper position with his hand. There was no drainage about the house, and filth had accumulated on all sides, the smells proceeding from which were as varied as they were offensive. Such are the circumstances, not of a labourer on this property, but of one of the employers of labour. "Like master like man," is a proverb. What are we to expect of the employed, when the employer himself is in a worse condition than that in which the employed should be? I asked if he gave steady work, to which he replied that he did not. And why? Simply because he had not always the money wherewith to pay for it. He had no capital whatever on which to come and go. The farm was, consequently, but half tilled, the occupier scraping sufficient out of it to enable him to pay a higher rent than the average rent of the parish, and to remove himself but one degree from starvation.

Contiguous to that just described was another farm-house. It formed, with a barn, one side of a court-yard, of which a low stable or two, with some other outhouses, formed the others. The court-yard was about 25 feet wide, and from 70 to 80 feet long. The whole of it, up to the very walls which inclosed it, was covered with straw, which was rapidly decomposing into manure. In some places it was wet and discoloured, in others it was drier and fresher, and we sunk up to the knees in it in making towards the door. By and bye it would all become manure, when the front of the dwelling-house, which looked upon the court, would form one side of an immense dung-heap. The fermenting mass would then underlie the windows, and partially block up the doorway. This was only what it did year after year. On coming suddenly in sight of this scene, I could scarcely believe that I was looking upon the habitation of a British farmer. The only living occupants of the courtyard, visible at the time, were three donkeys, several fowls, and a couple of pigs, who all seemed to be living amicably together on the socialist principle of a community of goods. As we made for the door (now through sheer muck, and then through the drier straw) one of the pigs projected itself half way in, and gave several grunts, as if announcing our arrival. It

then made way for us to pass, and we entered the tenement. It contained four rooms, two below and two above. On the left of the doorway was a very small sitting-room, with a deal floor, a step in advance, certainly, of the clay or the flag-stone. On the right was a much larger apartment, which, it was obvious, served the purpose of kitchen, dining-room, and sitting-room for the family, on all ordinary occasions. The ceiling, as in the other case, was extremely low and perfectly blackened with smoke. The rough, damp floor was composed of flags of almost every size and shape. There was but one window in the room, which was small, and admitted into it a kind of twilight. The family at one time numbered fourteen, but it had since been reduced to four, some being married, and others out at service. There were but two children left at home, a son and daughter, both grown up. The daughter was repairing some garment with her needle; the son, in his smock-frock, stepped in from the barn to see what we were about. The house and farm had been occupied by the same family for about thirty years. The present term would expire in about eighteen months; and the tenant was doubtful if he would continue his occupancy, even were it in his power to do so. During the whole time that he had occupied it, the house had undergone little or no repair. Its whole aspect betokened that it was fast crumbling to decay. The sinking wall was bending with its weight; the window-caps were of wood, so old and rotten that it almost powdered on being touched. We stepped into the barn. It was a small, but naked and desolate-looking place. The farmer himself was there, engaged with a labourer in threshing barley. "You're not too well off for accommodation here," I remarked to him. "Indeed, sir," he observed, "it is not fair play to good grain to thresh it out in such a place." At the end of the house was a pig-stye, in which, I was told, was a "prime pig;" whilst opposite it, on the other side of the courtyard, were the stables, which were small and filthy. Between the pig-stye, the stables, and the dung-heap, which covered the courtyard, the reader may imagine what the atmosphere was, which the inmates of the house breathed.

On the opposite side of the road was a third farm-house, larger than either of the others, but built of similar material, and in the same style, and looking as green, mouldy, and unwholesome as any of them. It gave token, however, of being kept in repair, and such was really the case—the intention being, when the present terms shall have expired, to throw several small farms into one, and keep *this* as the only farm-house upon it. This may be sound policy; for the larger the farms, provided they are not made too large, the better. But whilst this house is to be kept in repair, the others, it appears, are to be left to go to ruin. If several small farms are to be thrown into one, the object will be to improve the tillage, and increase the yield of the land. But to do this a greater amount of labour, steadily employed, must be applied to the land. But if such is to be the case, where are the labourers to live? There will be no accommodation left for them on the large farm in contemplation. They will have to live in Looe, not only off the farm, but also out of the parish.

Satisfied with these specimens of farm-houses on this property, I next directed my attention to the cottages of the labourers. The last house of the group alluded to, was in the occupancy of a labourer. It was the smallest and shabbiest of the group, but it was once a farm-house, although it is no longer so. On stepping over the filthy gutter which intervened between it and the road, and opening the outer door, we found ourselves in a somewhat spacious passage, one side of which was formed by the end wall of the house, and the floor of which was composed of a species of gutted causeway. This passage ran from the front to the back of the house. At the back end, and directly opposite the door, was a staircase, which led to the upper apartments, of which there were two. On the left of the passage was a door in a wooden partition, which we opened, and which led into the day-room of the family. To gain this apartment we had to descend three steps. The floor was roughly flagged, and slightly sprinkled with sand. But it was moist, cold, and clammy. On our entering, we discovered the family at dinner. The family consisted of but four individuals—the labourer and his wife, a grown-up girl, and a boy of about eleven. The first two rose on our entering, but the others remained at table, ravenously consuming what was before them, which was a concretion in the shape of soup, of bread and turnips boiled in water, flavoured with a little suet. I asked the boy if he could read. He replied, "No," with the spoon so far down his throat that he could scarcely articulate. I then inquired if he knew his letters; whereupon I was told that he could recognize some of them. I expressed my surprise that a boy of that age should be so ignorant, and a school hard by; but I was assured that he was by far "too handy to send to school." The room was better provided with light than most of the labourers' cottages, the window being unusually large for a house of the kind. The occupant worked steadily on the farm, and had his house rent-free—a nominal privilege, however; as a deduction was, in consideration of it, made from his wages. On complaining of the smells which pervaded the house, I was told that they came from the back premises. My friend entered the passage, and opened the back door, which was under the staircase. I have already said that the family-room was three steps under the passage. Behind the house the ground abruptly rose for several feet above the passage. About five feet above it, and but a few yards back, was the pig-stye. Close to it was a stable, and hard by a large dung-heap, all close to the house, at an elevation of almost eight feet above the sitting-room, and about the level of the bed-rooms. Immediately below the pig-stye, and between it and the house, was a large pool, full almost to overflowing with filthy and stagnant water. There was no drain connected with it, and it was never empty. The blast of pestilential air which entered the house, on the back-door being opened, was almost enough to knock down one who was unaccustomed to it. I asked the man how he could tolerate such a nuisance, and all the answer I got was, that it was the "leakage of the stye and stable." This completed the group, each dwelling and outhouse of which was not only

surrounded, but imbedded, in filth, although the opportunities for drainage were most ample. The road which passed between them was discoloured, whenever it rained, with the filthy infusions which came trickling from the fermenting abominations, which rested against their very walls.

The next point to which my attention was directed was the neighbourhood of the Manor House of Hay. The house is a long and straggling building far advanced towards decay, and is now occupied by one of the lord's lessees on lives. In its external accompaniments it is no better off than the tenements just described. It is equally wanting in drainage, and equally beset with pestiferous accumulations. At one end of it was an enormous heap of that which, as regards effluvia, is the worst of all the manures, viz., decomposing sea-weed. It had lain for some time fermenting and putrefying, and, as we approached the house, the whole atmosphere was impregnated with its pent-up odours, which were let loose by a boy who had just disturbed the mass, and was loading some of it into a cart. The worst of it was, that the Manor House was not the only dwelling which was in close proximity to this nuisance. Directly opposite were two cottages, one of which was inhabited by an old soldier, who officiated as clerk of the parish. He lived in it alone, and had occupied it for thirty years. It was small, dark, and ill-ventilated, and was sadly in want of repair. He held it, not direct of the lord, but of one of his lessees. The thatch was so rotten, that in some places he had put up pieces of matting to prevent it dropping bit by bit upon the floor. On one or two occasions a little new thatch had been put on the outside, but the whole had never been thoroughly repaired. The house was but a poor one when he first took it, but it had since been getting worse and worse every year, and must soon go completely to ruin. He was a pretty old man, but he scarcely thought it would last even his time. But they were all going the same way, he said, and in the course of a few years there would be but few left in the parish. This, it appeared to him, was what the lords seemed anxious for. Generation after generation, the peasantry were being driven into the towns, and in a few years but few would be left upon the farms.

Descending the hill, we came to the other cottage, which was on the same side of the road, and immediately below this house. But stretching from the one to the other was one succession of filth of all kinds, which not only went up to the walls of the houses, but here and there encroached upon the road. In fact, the whole of the wide space between the cottages and the manor house, comprehending the road, had the appearance of one great stable-yard, which was seldom cleaned, and never thoroughly so. After a little rain it would have been impossible to have entered any of the cottages without having the feet besmeared with something worse than mud. At no time of the year, not even in the coldest weather, was the atmosphere around these dwellings free from pestilential effluvia. On entering the second cottage I was surprised to find that which was so filthy without so neat and tidy within. The accommodation was very scanty, and the light insufficient, but the

flag floor was white from scrubbing, and the little furniture displayed was scrupulously clean, and neatly arranged. A neat, tidy, and thrifty little woman presided over the house, and explained it all. I asked her why she did not get the outside cleaned up a little? She replied that she had often endeavoured to do so, but that, although she was equal to the task of keeping the interior in order, she could not prevent them from accumulating manure all about, nor could she dig the drains, which were absolutely necessary for the purification of the place. I asked her if the smell was always as offensive as then? She said it was generally very bad, but that, fortunately, in summer, when it would be worst, the manure was carried off, more or less, to be put upon the fields. It is almost a universal practice in Cornwall to place straw upon the roads to the farm-steads, so as to be worked into what they call "dressing," which is finally scraped up and carted to the field as manure. That it is of small value after being thus prepared and well washed by Cornish rain may readily be imagined.

About a stone's throw below this group was another cluster of houses, with but one dwelling-house amongst them. It seemed that the lower down the hill we got the worse became the character of the tenements. This last group consisted of a stable, a barn, a species of shed in which a cart might be put, and a cottage. This last stood alone, the stable-yard intervening between it and the houses. On leaving the road to approach this group, we had to pick our steps through a compound of mud and dung, collected in a very soluble state about the gate. We had then to encounter the filth of the stable, of which it was difficult for us to make the detour. We then gained a springy dung heap, composed partly of straw and partly of seaweed. This brought us close to one angle of the cottage, which we had to turn ere we found the door. Before doing so, however, our ears were saluted with the disagreeable chorus of a child screaming at the highest pitch of its voice, and a woman scolding in a tone betokening both impatience and passion. On our suddenly appearing, the child stopped crying, whilst the woman endeavoured, but unsuccessfully, to moderate her wrath. The poor child was bare about the neck and shoulders, which were crimsoned all over from the flagellation which it had received. It had on its feet shoes that might have fitted the mother, but it had no stockings, and its little legs were bare up to the knees, if such a term can be used of legs literally encrusted with filth. It is a positive fact that they were so covered with dirt that you could not, from the ankle to the knee, discover the colour of the skin. Nor was this the filth of a day. The incrustation was the growth of weeks. It was as we saw it that the poor child lay down at night and arose in the morning.

To get into the house we had to descend a little to the door, and had then to go down a step to gain the room within. There was no passage or inner door, that which we entered opening at once into one of the gloomiest dens that I had yet witnessed. The floor was half clay, half flag, and near the door was a little puddle, caused by the water oozing in from without. There was but one window, and

that of the most miserable description, the light being deficient, although the door was wide open. The floor was besmeared with turnip-peelings and other things equally out of place. The miserable furniture, of which there was but little, was black and greasy looking, like the ceiling. There was not a chair in the room which she could offer us to sit down upon. There was a small bench fixed to the wall, before which was a table, on the other side of which was another bench; but everything—table, benches, and all—was damp and clammy. There were three other children in the room when we entered it. One was a boy about nine years old, who nursed a child on his knee; the other a little girl, considerably younger. Both the boy and girl were seated, each on a little black box turned upon end. Neither of them rose or moved a muscle as we entered, but they gazed upon us with a stolidity which it was painful to witness. I soon ascertained that the boy did not even know the letters of the alphabet; but before leaving, my friend got a promise from the mother to send him immediately to school, which was a little more than a mile distant. The woman's name was Mutton. I asked her what rent she paid for the house, to which she replied that they had it rent free, her husband having steady work on the farm. But, as in the case already mentioned, the abatement of rent was made good by the reduction of wages. Altogether, as I proceeded, I thought even Southleigh outdone. I cannot say that the cottages were in themselves worse than those of Southleigh; but, as regards external accompaniments, the tenements on the property of Mr. Gordon were clean and decent as compared with those on this remote estate of the Duke of Cleveland.

We then directed our steps more inland, and the next cottage which we came to adjoined the national school of the parish. As compared with those we had seen, it had a cleanly and cheerful appearance, from the quantity of whitewash with which its walls were covered. The upper half of the chimney, however, seemed to be parting company with the roof, and was apparently only kept from tumbling by the ivy, which bound it to the house. The cottage had but two rooms, one above and the other below—the upper one being, as usual, the sleeping room. It had two beds in it, one of which was occupied by the son, a young man, when at home, and who, as I afterwards ascertained, was the father of an illegitimate child by one of the girls of the parish. There had at one time been a large family in this room, but they were now scattered. The rent paid for the cottage, with a little piece of ground attached, was 1s. a week. It was rated to the poor at 30s. per annum. Mrs. Mutchmore, for that was the woman's name, showed me the receipt for the last quarter's rate. It amounted to 6d., the rate being one of 4d. in the pound. At the end of the house was a pig-stye, with a "brave pig" in it, to exhibit which Mr. Mutchmore opened the door of the stye. But the smell made us recoil from the sight. He smiled and shut the door again, and I dare say thought us rather delicate. He had been for months a victim to the influenza, under which he was then labouring, and of which he said he could not get rid. It sometimes kept

him for weeks at a time from work. When employed his wages were 9s. a-week.

From this we crossed some fields to a place called Coombe. Here I found two houses under one roof, tenanted by two different families. It had, in all, five rooms—two below and three above. There was one door in front, and another behind. The family which occupied one end of the house was named Martin; that occupying the other, Hawkins. The front door entered the room occupied by the Martins, the back door that occupied by the Hawkinses. If the Hawkinses wished to gain their own room from the front, they had to pass through the Martins' room; and if the Martins wanted to use the back door, they had to go through the Hawkinses' room. The two rooms communicated with each other by means of a door in the partition wall. There was but one staircase common to both, and that was in the room occupied by the Martins, which was by far the larger of the two. Having thus to use so many things in common, it was highly essential that they should agree better than neighbours generally do. As in the other cases, the house was on the side of a hill, but there was no drainage. There was much want of it, however, for immediately above and in front of the house was the usual accumulation of manure and garbage so common in these parts. Whenever it rained heavily the base of the house was temporarily flooded outside, as was evident from a kind of high-water mark, which might be traced along the stones, indicating the line to which the water and filth rose on such occasions. The number of inmates was not large, considering the room. The Martins numbered five in all; the Hawkinses the same. It was their distribution which was objectionable, as regards their sleeping accommodations. The parents of each family occupied a room by themselves; the children of both families slept together in another. The Martins had one boy, about ten years old, and two girls, one nine and the other seven. The Hawkinses had two daughters, one about sixteen and the other much younger. The elder had been out at service, in a common lodging-house in Liskeard, and became pregnant by one of the miners. She went home to be confined, and her child was born under her father's roof. It is with her and with her child that the rest of the children of both families sleep. What can be expected from such an association?

It was not until some time after we got into Mrs. Martin's room that we could discern distinctly all the objects which it contained. There were two windows in it, but they were small. As regards ventilation they were useless, for they did not open, which is the case generally with these cottages. Her husband was a labourer, and earned his 9s. a week, with liberty to buy his corn at the market price, as he was not steadily employed on any particular farm. They were thus enabled occasionally to buy a piece of mutton, and always killed their pig at Christmas. As to dietary, therefore, they were not so ill off as some of their neighbours. The same may be said of the Hawkinses. Their room was miserably small, over-crowded with furniture, and dirty as compared with the other. It was about sixteen feet long, and about ten wide, and

was very dark, except when the door was open. After inspecting the back premises, I re-entered the house, and found a young girl along with Mrs. Hawkins. I inquired if that was her daughter, and was somewhat surprised on her informing me that it was, and that it was the one that had the child. She curtseyed, as if confirming her mother's statement. I could scarcely credit that one who appeared to be yet but a child herself should be a mother. Not a blush rose to her cheek, and neither mother nor daughter seemed to be oppressed with any sense of shame. This is the worst feature of all, in cases of this kind, in the country districts. I asked her who supported the child, to which she replied that they had to do so themselves. She also informed me that she had tried to affiliate the child upon one of the miners, but that as they never had been seen together she did not succeed in the attempt. This was told me with the utmost *nonchalance* and composure. Yet she was, night after night, the companion of her younger sister and of Mrs. Martin's children.

I went up stairs, accompanied by Mrs. Hawkins. The floor of the middle room was rough and splintered, and appeared to be giving way. In one place it bent and creaked under my weight. She observed to me that people in their circumstances must not be particular. She then showed me her own bed-room. The thatch projected through the woodwork above, and at the angle of the roof there were several gaping rents, through which daylight was visible, and through which, when it was wet, the rain fell in streams upon the floor at the foot of the bed. Her husband, also, is troubled with an influenza, of which he cannot get rid, and no wonder. The door was not large enough to fill the doorway: but, although it could not keep out the wind, it served to keep out the cat, which she appeared to think its main object. She frequently worked in the fields, picking stones, and weeding in autumn time, and hoeing "turnots" (*Anglicè* turnips) in the spring. For this she got 6d. a day, unless she hoed by the piece, when, by working from early in the morning to late at night, she might earn a shilling.

As we pursued our way through the fields in quest of other cottages, we met Mrs. Martin hurrying homewards, with her two daughters by her side. The younger child was not more than seven. She was a delicate, shrinking child, small for her age, and her large blue eye gleamed with a degree of intelligence which seemed precocious. She had an extraordinary memory, could read well, and use her needle adroitly, which was evident from her sampler, which she carried in her hand, for she was on her way home from school. Yet this sweet and intelligent child is one of those condemned to breathe the contaminated moral atmosphere of her home sleeping in the same room, if not in the same bed, with the guilty and shameless associate of the miners of Liskeard. Poor little Susan! Would that opulent benevolence would snatch her from at least a doubtful fate!

Having passed through several fields, we came to another group of houses known by the name of Tregoad. The principal residence of the group was a farm-house, being decidedly the best of its class

on the property. It owed all its comfort, however, to some additions which had been recently made to it. Back of it were a number of out-houses enclosing the farm-yard, or, as it is called in the rural nomenclature of Cornwall, the "town place." A little in front was a cottage more than half gone to ruin. It was larger than cottages usually are, and was at one time a farm-house itself; a long chimney stalk rose in front of the house, close to one side of the door, to nearly the height of the house. Here, again, the ivy appeared of essential service, for nothing else seemed to support the chimney, which inclined over the door several degrees from the perpendicular. I asked the inmates if they were not afraid of their lives, but they seemed quite at ease, saying that it had "been that way" ever since they could remember. And that way it will remain, until some fine morning it tumbles through the roof. A rougher flag-floor than that of the narrow passage-way of this but I never saw. It was full of holes, each of which would have held at least half a gallon of water. On the right hand side was a miserable, naked-looking apartment, to gain which you had to descend a step or two. It was a shoemaker's shop, or rather that of a cobbler, for he had not a new shoe in his store, although there were several old ones lying about in various stages of decomposition and repair. Nor did he seem to have any new leather, his stock of material apparently consisting of bits of old harness, which were strewn about the floor. For the wretched room in which he worked he paid 6d. a-week, a sum which, it seemed to me, would have been sufficient to buy out his entire stock-in-trade, together with the good-will of the business. On the left was the common room of the family, which was that of an agricultural labourer. There were two rooms up stairs, the flooring of which was rather unsafe, judging from that part of it which was over the passage, and which was only kept from giving way by a rude and temporary expedient. These expedients are resorted to until the whole fabric is ready to crumble to pieces, when decay is left to do its work. They only serve to make it barely tenable as long as it stands, but do not absolutely retard the day of its final ruin.

We next passed through a turnip field, to another group called Pethick. In doing so we met a little boy, relieving two donkeys of their panniers, with which he had been "driving turnips" all day.

"Do you work with Mr. Rosevere?" I inquired.

"I be working with him," said he.

"Do you get any wages?"

"I get six-and-twenty shillings a-year," he answered.

"Anything more?" I asked.

"I get my mate," said he.

"Can you read?"

"No."

"Do you know your letters?"

"I do some on 'em."

"Do you go to school?"

"No."

"Did you ever go?"

"Yes."

"Did you ever go to Sunday-school?"

"Yes."

"Do you now?"

"I hav'nt gone," he replied, "since the things have laid in." My friend fortunately understood Cornish, and interpreted this for me. The boy had not gone to Sunday-school since the arrival of the season when the cattle were housed.

The situation of Pethick was preferable to that of either Coombe or Hay. But its superiority went little or no further. It consisted of three cottages, with a barn and several outhouses, the whole being divided into three groups, and enclosing nearly three sides of a tolerably large square. The whole assemblage had a green and mouldy look about it; and the small stone of which the walls were composed crumbled almost to the touch. Each house was thatched, the thatch being in most cases covered with vegetation, denoting its age and the long absence of repair. On turning the first that we encountered, to get into the enclosed space, we had, as usual, to make our way through a quantity of mud and manure, which were left from year to year to fraternize together. About twenty feet from this cottage was a huge puddle, which seemed to be the common receptacle for all the filth of the group. Its thick, putrid contents were covered with a slime, which reflected, whenever the sun shone upon it, all the tints of what is known in Cornwall as peacock ore. In the first cottage I entered were a lame woman and a male invalid. It had four rooms, two below and as many above. The outer door opened directly into one of the lower rooms, which served as a lumber room. In order to divide this from the part of the cottage used as a dwelling, a partition was run from the left side of the door, which formed a passage with the wall of the inner room, which was on the right. The partition was a kind of rough frame of wood, filled up with wisps of straw. It did not rise to the ceiling, nor did it extend farther back than the door on the right, leading to the inner room. You could, therefore, go round it into the lumber room. I did so, and was fain to retreat, for the smell which I encountered was offensive to the last degree. But the inmates seemed insensible to it. The whole foundation of the house appeared to be rotten from the filthy solutions in which it was constantly immersed. The family had once been large, but it had gradually dwindled away, the mother informing me that some of the children had gone off to service, whilst as to others she had "buried them!" Her own lameness had been occasioned by a cold which she caught whilst "lying-in with her last child." She was then living at Looe, in a house which was sometimes encroached upon by a high tide. It happened to be so in her hour of trial, and from the effects of the cold which she then caught she never fairly recovered.

Attached to this was another cottage, beyond which, and in the same line, was a barn. We had to cross a gutter in front of the door of this second cottage, to gain the threshold, which gutter also passed the entrance to that just alluded to. On the upper side of the door of the second cottage—for the whole row was on a slight declivity—was a putrescent dung heap, kept from falling across the entrance by a stone slab turned on edge. It was the compound essence of this filthy accumulation

that trickled in the gutter, which slowly emptied itself into the reeking and fermenting pool already alluded to. This cottage was closed, the family being from home. This family consisted of a labouring man, about thirty, his wife, and one child. He had had an illegitimate child since his marriage, for which he was paying a shilling a week out of his wages, which were 9s. We shortly afterwards met him, and on my inquiring what kind of a house he had, he replied that it was a "bravish house," by which he meant that it was tolerably good. I had looked in at the window, and found it dark, dingy, and disgustingly filthy.

There was still another cottage in the group. It had two rooms, and was inhabited by a couple tolerably advanced in life. Their family had been long since scattered, the woman told me. Three of her sons were in the navy, and one in the army. I thought that she had done something for her country, and that it was high time that her country did something for her and others in similar circumstances. They had the house rent-free, with about twenty yards of potato ground (a yard being twelve feet square, and rented at 1s.), and 6s. 6d. as wages, with their corn at 12s. and 6s. All this made their wages very nearly equal to 9s. a week.

These, as I have described them, are all the houses on the property in question. Are the proprietors aware of their condition?

We concluded our rounds, which occupied two entire days, by an inspection of a couple of cottages on a small property in the neighbourhood, owned by a Mr. Tuckett, a resident of Plymouth. Externally, they bore marks of comfort and even neatness; for they were faultlessly whitewashed. Their accommodation, however, was very limited, the first that I entered having only two rooms. The upper one was the sleeping room. The thatch, which was visible between the rafters, was almost covered with cobwebs. I asked Mrs. Simmons, for such was the name of the wife of the tenant, who was himself a gardener, receiving pretty constant employment from the rector, why she did not keep the roof cleaner? She replied that she was afraid to disturb the cobwebs, lest she should bring down the thatch. The fact was, that the latter was so rotten that it powdered to the touch. I tried it at one point with a broom; and on brushing away a cobweb or two, the rotten thatch came with them in dust. Yet, for a house so circumstanced, and with accommodation so straitened, she paid no less than £4 a-year.

The house was much infested with rats, which increased in numbers, despite all the cats, traps, and other appliances for rat killing in the neighbourhood. Different members of the family had been aroused from their slumbers by being bitten by them. As we entered, a girl was seated in one corner of the room, sewing; she soon rose and left. "Is that your daughter?" I asked. "No; but she soon will be," was the answer. My friend looked surprised, and the woman continued:—"I did not like it at first, sir; but then, you know, she's so handy with her needle." The girl had borne a child to the son of Mr. and Mrs. Mutchmore, the young man who, when at home, as already described, occupied the same room with his

parents. She was now about to marry the son of Mrs. Simmons, and her chief merit in the eyes of her mother-in-law was that she was "handy with her needle!"

I afterwards inspected some cottages on the estate of Morval, in the parish of the same name. The estate is the property of Mr. Buller, a resident proprietor. The benefit of his presence amongst them is perceptible in the superior condition of his tenantry. Their houses are built in the same style as, and have, generally speaking, no greater accommodation than, those described. But they are not permitted to become so ruinous, nor are their external accompaniments so filthy, unwholesome, and indecent.

The property I have before described is, as regards the condition of the cottages, but too true a type of many properties in many parishes contiguous to it. I have already said, that I did not select it for description as a specimen of the best or the worst parishes in the county. There are many parishes superior to it, as regards the accommodation of the poor, but there are also many much worse. Take, for instance, the adjoining parish of Talland, and the few cottages which remain in it are even inferior to those in St. Martin's. In fact, they are so wretched, and the rents so high, that their occupants are fast disappearing from the country, and seeking shelter in the towns of Looe and Polperro, to the great inconvenience of themselves, and to the detriment, both physical and moral, of these small communities. Take, again, the parish of Linkinhorn, a little back from Liskeard, where, whilst they are equally bad, the rents are high, and the cottages far more overcrowded. Or take the Duchy property, adjoining the estate described, and the type holds equally good. Going eastward, in the direction of St. Germans, you have a repetition, at almost every step you take, of the same physical wretchedness, accompanied by the moral degradation which is its necessary consequence. Along the high roads even, you will see specimens of cottages as bad as those described. Half way between Torpoint and Liskeard are wretched specimens to be met with. The same between Liskeard and Bodmin, and along the line between Bodmin and Fowey. Due west of Bodmin, and to the north of the dreary district of the china clay-pits, are many of the same description. The wild heathy district whence the china clay is extracted is strewn with them. They abound near St. Austle, Granpound, and Truro, and, with the exception of the cottages more recently built, are to be found all over the region known as the central mining district, the focus of which is Redruth. They dot the uplands that sweep around Mount's Bay, and come close to the very suburbs of Penzance. In this district it is difficult sometimes to distinguish between the wretched hovel called a farm-house and the miserable domicile of the labourer. Westward of Penzance, and on to the Land's End, it is the same. But it is along the north coast of Cornwall that the domiciliary condition of the labourer reaches its lowest point of wretchedness. If you take the line from Sennen, the first and last town in England, to Hartland Point, the majority of the cottages inhabited by the

labourer are in a worse state than even those on the property described. It is in the neighbourhood of the extinct lead mines, and near the ruined fishing villages of the north, that the most miserable specimens are to be found. If any one wishes to acquaint himself with the real extent of the physical misery under which human beings can exist, let him go and visit St. Agnes, the vicinity of Tintagel, and more particularly the wretched town of Port Isaac.

But overlooking, for the moment, such as are better, as well as such as are worse off, the specimens which I have given may be taken as the average house accommodation of the 45,000 people who in Cornwall either labour themselves in the fields, or are dependent on such labour for support.

The tourist in the Highlands will meet between Loch Lomond and Glencoe with a lovely little loch, on a small wooded point projecting into which the Marquess of Breadalbane has built a shooting-box. Behind the house, and some distance up the hill, is the handsome residence of his lordship's hounds. It is a neat little building, erected in the Elizabethan style, kept dry and warm, and covered with slate. The tenants in St. Martin's would scarcely know themselves if they were lodged in tenements like the Marquess of Breadalbane's dog-kennel.

It was whilst making my tour of inspection amongst the Duke of Cleveland's cottages that I had a long conversation respecting them with one of the oldest residents of the parish, who has himself been a farm labourer for fifty-six years of his life. His name was Alexander Lee. He was in his sixty-fourth year, and had gone to work when he was eight years old. I met him on the road, riding a small pony, on which he sat with both his legs on one side, for he had recently lost the use of them. He described the house accommodation of the poor many years ago to have been bad enough, but he thought that it was getting worse and worse every year, although he admitted that their general condition was improving. As a specimen of what was the case twenty-five years ago, he very coolly informed me that he, his wife, and five children occupied the same bed-room, at the time there were also in it two women about to be delivered of illegitimate children. They were delivered in that room, and remained for some time afterwards in it, the whole number occupying the room being then eleven. When the women and children were gone, two men took their places. On my expressing my surprise that he could submit to such a state of things, he simply remarked that they were then glad, as now, to do many things that they didn't like for a "bit of money." I asked him in what respect he thought the condition of the labourer better than it was formerly. He said that he thought it improved as regarded his diet and clothing. Whilst wages had declined but little, the price of most things had gone greatly down. Formerly, when the farmers got high prices for corn, the labourer had to pay a high duty on salt—a serious consideration with him if he contemplated keeping a pig for his own use. He had also to pay double, and sometimes treble, what he now paid

for bread. He scarcely ever saw tea then, and never tasted sugar, although it was but little of either that he saw or tasted yet. Besides, there prevailed shortly after the war a very pernicious practice of determining the amount of wages by the extent of a man's family. For instance, if a man had nine children, he might get 9s. a week, whereas if he had but four he might be offered 7s. a week. The point was not whether he could do his work, but how many mouths he had to feed. Not only did this encourage men to marry early, but it was generally to the halest men that the lowest wages were proffered. And, according to my informant, a man with four has more need of good wages than a man with nine children. "We never count a man's family more than four, sir," said he. "But why not more than four, if he has nine?" "O, because by the time he has four one at least is in most cases ready to go to work, and as he has more some of the rest get hardy and earn something." He proceeded to say that the young men with small families, and those without any incumbrance, did not long submit to so unreasonable a discrimination, most of them emigrating to America. "Some of the best workmen of this parish, sir, went off to America, and they are doing so yet, and will be ready, in case of a war, to come agin us." He thought that if a man could have steady wages at 9s. a-week, he would be well off, even if he had some children. That would enable him, he said, in a fortnight, to get about 2s. in advance of his "grist," which is his monthly allowance of corn. I have already shown that that monthly allowance, when the corn is given at 16s., and 8s., would come to 16s. He would get this corn within the first fortnight, when a fortnight's wages would be paid him. Deducting the price of the corn, he would have 2s. over of that fortnight's wages, and the whole of the remaining fortnight's earnings would come to him in money. Such was, in his estimation, the essential condition to a labourer getting comfortably along. If, at the end of the first fortnight of every month, he found himself 2s. in advance of his "grist," he had no good reason to complain.

I shortly afterwards met another working man on the high-road to Looe. He was employed in the town of Looe, having abandoned the fields. His wages when at work were 2s. a day, but then his employment was not regular. Taking the average of the year, he did not regard himself as any better off than a farm labourer with steady work at 1s. 6d. a-day. He very much feared that that rate could not be paid to the farm labourer long.

"Can the farmers afford to keep it up?" I asked.

"They can't, sir, the way they're going on."

"What are they doing?"

"They're not doing nothing," he replied. "Instead of trying harder to make a good thing of it, they're doing less than they used to do. You don't see no dung-heaps nor no burning of line in the fields now, as before. Its dressin' they want. If they don't dress, they can't expect no returns, and they don't dress enough. They think that a pinch of guano will do for a good dressin', but they're

mistaken; and if they don't take care, they'll all go to the wall. I tell you what it is, if they don't dress the land more, they'll all have to scat."

I was here once more indebted to my friend's knowledge of languages, "scat" being the Cornish for "fail."

(To be continued.)

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A WEEKLY COUNCIL was held at the Society's house, Hanover-square, on Wednesday, April 24; present, his Grace the Duke of Richmond, K.G., Trustee, in the chair; Earl of Ducie, Lord Wharncliffe, Lord Portman, Hon. R. H. Clive, M.P., Hon. J. J. Carnegie, Sir M. W. Ridley, Bart., Sir Robert Price, Bart., M.P., Mr. R. Barker, Mr. J. Bethell, Mr. F. Burke, Mr. D. Burton, jun., Col. Challoner, Mr. W. Clavering, Mr. E. Denison, M.P., Mr. W. Denison, jun., Mr. G. Dyer, Mr. T. Ellman, Mr. A. Foster, Mr. F. Hobbs, Rev. A. Huxtable, Mr. Langston, M.P., Mr. Lawes, M. D. Lewis, Mr. Majendie, Mr. C. E. Overman, Mr. Parkins, Mr. Pendarves, M.P., Mr. H. Porcher, Mr. J. F. Powell, Mr. Pusey, M.P., Mr. G. H. Ramsay, Dr. Ryan, Professor Sewell, Mr. Shaw (London), Mr. Brinsley Sheridan, M.P., Mr. Bridgeman Simpson, Mr. E. Slade, Mr. Stansfield, M.P., Capt. Shawe Taylor, Mr. G. Vernon, Rev. J. C. Wharton, Mr. J. T. Wharton, and Professor Way.

Sewage of Towns. — His Royal Highness Prince Albert, as one of the Governors of the Society, transmitted to the Council, through Colonel the Hon. Charles Grey, a communication on turning the sewage of towns, at present the cause of disease and pestilence, into a source of national wealth, by its application to purposes of agriculture. Colonel Grey informed the Council that this important subject had, along with the general interest it had lately excited in the public mind, become a matter of interest and study to his Royal Highness Prince Albert, and that he was commanded by his Royal Highness to bring before the Council of the Society, for their consideration and inquiry, should they think the subject worthy of it, what has struck his Royal Highness as being a simple plan for effecting the object in view. Leaving it to more competent judges to decide whether the sewage should be used as a liquid manure, or solidified, upon which point his Royal Highness wished to give no opinion himself, he had confined his consideration to the latter mode of application, for two reasons; namely, that, in the solid form—1. It could be more easily transported. 2. It could be obtained at the least possible expense. Colonel Grey then proceeded to describe the plan proposed by his Royal Highness, which was simply this: To form a tank, with a perforated false bottom, upon which a filtering medium should be laid; and to admit at one end the sewage into the tank *below* the false bottom, when, according to the principle of water regaining its own level, the sewage liquid would rise through the filtering bed to its original level in the tank, and, provided the filtering medium had been of the proper nature and of sufficient thickness, it would be thus freed from all

mechanical impurity, and would pass off into the drain, at the other end of the tank, as clear and clean as spring water. This simple and effective plan was illustrated by drawings, showing the vertical and horizontal sections of the tank, and by a neatly-constructed model of its external form and internal arrangements. It was also clearly shown, by these sections, how the sewage matter could be let into the tank, or shut off, when necessary, in the simplest manner by means of common valves; and with what facility such a filtering tank might be applied to every existing arrangement of sewers, without requiring any alteration in their structure. The filtering medium having abstracted from the sewage all extraneous matter, would, in all probability, become the richest manure, and could at any time, by stopping the supply of sewage, be taken out by a common labourer with a shovel, and carted or shipped to any place thought most desirable. The solid matter, too, held in suspension by the sewage, would probably form a very rich deposit at the bottom of the tank, of a substance approaching in its qualities to guano, and could be extracted by removing the false bottom, which rested on arches or vertical supporters over the sewage below it in the tank, and could be easily made to lift up or take out for the purpose of such extraction. Two tanks might easily be constructed together, so that one might continue in operation, while the other was being emptied. The experiment might be tried at any house-drain in town or country; in fact, his Royal Highness had himself tried the operation on a small scale with apparent success; and, while he thus suggested an important and extensive application of the hydrostatic principle involved in the plan proposed, he wished to lay no claim to originality in the adoption of that well-known law of fluid bodies by which they make an effort, proportionate to their displacement, to regain their original equilibrium. On that principle was founded, as he was well aware, the upward-filtering apparatus used by the Thames Water Companies. His Royal Highness's great object was by the simplest possible means to attain a great end, to effect an essential sanitary improvement, and at the same time to create a new source of national wealth, by the very means employed for the removal of a deadly nuisance, and the conversion of decomposing matter, highly noxious to animal life, into the most powerful nutriment for vegetation. His Royal Highness, too, wished to offer no opinion on the details required to complete the plan proposed, or on the mode of carrying it out in the most effective manner. Supposing it to be right in principle, its advantages in an economical point of view could only, his Royal Highness conceived, be ascertained by practical experience; and it was on that account that he wished to submit it

to the consideration of the Agricultural Society, who might be better able to carry out the necessary experiments. It would remain to be decided what is chemically or mechanically the best, and what the cheapest substance for the filter; what the best and cheapest construction of the tank; how long the sewage will pass before the filter becomes choked; and how soon the filter could be sufficiently saturated to make it profitable as a manure. His Royal Highness had used, as the filtering medium, the following substances:—

1. Charcoal: admitted to be the most perfect filtering substance for drinking water, retaining effectually extraneous matters, and well known for its singular powers of purification.

2. Gypsum (plaster of Paris, or sulphate of lime); recommended by agricultural chemists, for fixing ammonia and other volatile substances, by the decomposition to which it becomes subject, when exposed to the action of volatile alkali.

3. Clay, in its burnt state, would act mechanically as a filtering bed; and in its unburnt state, on account of its aluminous salts, have also the property, like gypsum, of fixing ammonia, or of decomposing the ammoniacal and other alkaline salts present in manure; and in either state would be cheaply procured.

All these substances, his Royal Highness thought, would in themselves be highly useful as manures, independently of the purpose they would subserve as agents for filtration, or of the additional amount of manuring matter they would receive from the sewage which they purified. His Royal Highness, however, in thus incidentally referring to the substances he had himself employed for the filtering medium, was well aware how many more of equal, if not superior, value would suggest themselves to others, who, like himself, felt an interest in effecting the important object proposed. As he had given no opinion on the general question of the liquid or solid application of manure, but had merely stated the grounds of preference, in a practical sense, of the solid form over the liquid for the purposes of the filtering operation under consideration, his Royal Highness entered into no discussion on the amount of manuring matter retained by the filter compared with the soluble matter that might pass through it along with the water, and remain in that liquid, insoluble, colourless, and transparent form; nor of the value of such filtered water for agricultural purposes. He had confined his observations to the agricultural value of the filtering bed, and the rich deposit obtained in the purification of sewage for sanitary purposes.

After the general expression of the members, of the gratification it gave them, to find that questions so intimately connected with the welfare of the community and the objects of the Society enjoyed so large a share of his Royal Highness Prince Albert's deep interest and enlightened attention, Lord Portman informed the Council that the plan proposed by his Royal Highness was not any suggestion made to him by other parties, and which he had been induced to patronize; but that it was his Royal Highness's own plan, and the result of his own deliberate consideration on a subject that his Royal

Highness regarded as of vital importance to the country. His Lordship thought the plan proposed the simplest and cheapest contrivance that he had seen for the purpose proposed in all cases where there was a sufficient fall of drain in the declivity of ground where it was employed. The communication with which they had been honoured by his Royal Highness was a great proof of the useful matters to which his Royal Highness was devoting his attention. His Lordship expressed the pleasure it would give him to institute experiments on the plan proposed by his Royal Highness, in localities well adapted for their trial, and to report the result to the Council. Sir Robert Price and Colonel Challoner considered the principle most excellent. Col. Challoner thought the only difficulty would be found in adjusting the filtering bed to a just proportion to the amount of liquid that would have to pass through it, in order that all the extraneous matter might be abstracted and retained. He regarded the first results of the trial already made to be confirmatory of Prof. Way's views of the power of certain soils over manuring elements. Prof. Way was much pleased to find Prince Albert turning his attention to subjects of so much interest as the one his Royal Highness had then brought under the consideration of the Council. He had himself attended much to the question of the sewage of London; and whether in the most fashionable squares or in the most squalid courts, the crying evil was alike felt and present to the inhabitants of this great city. The sewage was itself divisible into two portions—the soluble and the insoluble. The insoluble matter consisted of cells of vegetable and animal matter, of hair and other floating substance; the soluble portion contained ammonia and the salts of potash and soda. The insoluble was retained by charcoal and clay. Clay, by burning, gradually lost its peculiar property of arresting ammonia: in its raw state it possessed twice the power in question. Burnt clay would however form a good mechanical material for the filling in of the filtering bed. He thought gypsum would not answer the purpose of arresting ammonia in a case like the present, where the solid matter only was intended to be obtained and employed as manure. The gypsum, being sulphate of lime, yields its sulphuric acid to the ammonia, and thus forms sulphate of ammonia, which, as a soluble salt, is at once dissolved and carried off by the clear filtered water, and is consequently not left behind in the filtering bed. Thus, unless the filtered water is also used for irrigating purposes, the ammonia is thus carried off and lost. He thought the plan proposed by his Royal Highness for obtaining the solid manuring matter of sewage, if employed in connexion with the application of liquid manure, would form a complete system, and secure all the advantages to be derived from such a source of manuring matter. He then concluded by some remarks on the application of liquid tank manure, and to the excellence of his Royal Highness's suggestion in reference to the solid matter of sewage.—The Duke of Richmond thought it desirable to ascertain how far charcoal, after its use as a chemical and mechanical agent during the filtering operation, would prove of value as a manure; whether, during such action, it gave up its own substance

to effect the changes produced, or became changed by such agency; or whether it simply retained the manuring matter, and again yielded it as a manure to the field. It would also, his Grace conceived, be as well to determine the value of the filtering bed in comparison with farm-yard manure.—Mr. Shaw inquired whether peat charcoal was recommended for use in this plan. Eight different experiments were at that time going on in different parts of the kingdom with such charcoal saturated with the best manuring matter.—The Duke of Richmond thought that Mr. Shaw probably meant charred peat, and in his opinion there was a wide difference between charred peat and peat charcoal, or charcoal of any kind. The Council then unanimously voted their best thanks to his Royal Highness Prince Albert for the kindness with which his Royal Highness had honoured them with this interesting communication on so important a subject.

Cottage Grate.—Viscount Barrington, M.P., having called the attention of the Council to a cottager's grate he had seen, that he thought of considerable benefit where coals are generally burnt, the inventor had leave to exhibit to the members a model of its construction.—Colonel Challoner favoured the Council with the result of his experience in the use of household grates, and of the advantage of their being placed low down in the hearth, and with backs of peculiar construction, to prevent their splitting.—Mr. Pusey suggested, that as there was a prize of £5 offered by the Society for the best "Cottage Stove or Range for burning coal," shown at the Society's Country Meeting at Exeter in July next, it would be at the option of the inventor of the cottage grate, of which a model was then exhibited to the Council, to make an entry of his invention for that occasion.—The Duke of Richmond concurred in the suggestion, which he communicated to the party in question, thanking him for the trouble he had taken in submitting the model to the inspection of the Council, but without conveying any opinion of its merits or otherwise.

American Churn.—The Council were favoured by Mr. Key, of Newgate-street, with an inspection of the new American Churn, for which he is the agent, and with a trial of its operation in their presence. This churn consists of a square wooden box, nearly cubical in its dimensions, and capable of holding nearly 3 gallons, with a revolving dasher inside, turned round by a crank handle on the outside, a lid to fit closely on the top of the box, and a spigot and forecet aperture at the bottom of one of its sides. The dasher is very nearly equal in length to the internal dimensions of the box, its end sweeping close to each end of the box, and to the under part of its lid. It is similar to a double box or shallow drawer, having, on each side of it, narrow rectangular grooves or cells, and an iron axle through its centre, communicating with the handle outside. Before use the churn is scalded out, and the cream being warmed to about 62½° of Fahrenheit, it is poured into the churn to not more than half its depth. The lid is then closely pressed down perfectly tight upon the churn, and the dasher kept in rapid but uniform revolution by turning the handle. At the end of 8 minutes the operation is completed; and, from 5 quarts of cream, 5½lbs. of fine

fresh butter is produced. The peculiar action of this churn appears to consist in the mechanical mode in which atmospheric air is rapidly brought, at a given temperature, into most intimate contact and compression with the cream. By a single revolution of the handle, the box-dasher is brought down upon the surface of the cream in a position nearly parallel to that surface, as the churn is only half full of the cream, which accordingly is on a level with the axle of the dasher. When the dasher thus enters the body of the cream, it carries with it the air enclosed in its under cells or rectangular partitions, while the cream fills the partitions on the opposite and upper side of that end of the dasher. As the dasher passes down through the cream, it presses by its rotary action the included air upon the cream immediately in contact with it; but as the dasher, in the course of its revolution, rises through the cream on the other side of the churn, the included air gradually escapes, and bubbles up through the cream; while the cells on the upper side being filled with cream, and carried to the upper part of the churn, the cream is dashed out, and falls down through the body of the churn. This combined mechanical action being constantly kept up, it may easily be conceived in how intimate a manner, and in how short a time, the atmospheric air is brought into contact with every portion of the cream, and the result of churning effected. The butter is then washed in the churn, without being touched with the hands. Nothing, as it appeared, could be more simple in its construction than this churn, or more decisive in its result; and the agent only regretted that, instead of providing himself, as he thought it his duty to do, with the cream for the operation, he had not requested the Council to favour him by ordering the cream, at his expense, from some indifferent party, and by causing the churn to be worked by any person they thought proper to employ. It would then have removed all doubt that might exist respecting any peculiar mode of treating the cream or of working the churn. He expressed the satisfaction it would give him to be allowed to repeat the trial under those conditions. The Council ordered their thanks to Mr. Key for the kind trouble he had taken in favouring them with this inspection and trial. The secretary then read to the Council an extract from a report, made by the New York State Agricultural Society, and to which his attention had been kindly called by Mr. John Bethell, in reference to the entrance of time as an element in the due formation of butter. The report is contained in the last volume of the "Transactions" of that body, page 267. After detailing the trial of an atmospheric churn, producing butter in 7 or 8 minutes, with other similar churns used in America, Mr. Howard, the assistant-editor of the "Cultivator," who was present at the trial, says, "The atmospheric churn appears to operate on a correct principle, that of mingling the air with the cream; but we are not in favour of such rapid churning. Having formerly had some experience in making butter, we should prefer that the churning, for a quantity of 10 to 20lbs. of butter or more, should be prolonged to 30 minutes at least. According to our experience, the best butter is

not produced by a very short nor a very long period in churning. If it is churned too quickly the separation is not complete, and the butter, besides being less rich, is deficient in quantity; if the process is continued too long, the butter is likely to be oily. We think our best butter-makers would decide that churning, for ordinary quantities, should occupy from 30 to 50 minutes." Mr. Johnson, Secretary to the New York Society, then adds to these remarks of Mr. Howard, the following observations: "We have conversed, in relation to this subject, with many of our best dairymen, and they agree with Mr. Howard, that the best time for churning butter is from 30 to 50 minutes. The proper temperature for producing the greatest quantity as well as the best quality of butter is from 58 to 60 degrees."—Professor Way remarked on the construction of the churn, that it would probably be an improvement in the dasher, if, instead of its being made so as to strike the surface of the cream in a parallel position, it were divided into oblique segments, similar to the sails of a windmill, or the fans of a revolving ventilator.

Prize Essay.—Mr. Pusey, M.P., Chairman of the Journal Committee, laid before the Council the report of the judges on the essays sent in to compete for the prize of £30 offered by the Society, for the best essay on the diseases of cattle and sheep, occasioned by mismanagement; and the sealed motto-paper, corresponding with the motto of the winning essay being opened by the noble Chairman, it was found that the successful author for this prize was Mr. William Floyd Karkeek, veterinary-surgeon, of Truro, in Cornwall.

Wheat-grubs.—Mr. Pendarves, M.P., having received last week from one of his tenants in Shropshire some specimens of grubs, then existing in great numbers in that part of the country, but unknown previously, which were committing great devastations on the blade and root of the young Wheat plant, but resisted lime, salt, soot, and the remedies usually applied for the destruction of such insects, they had been sent to Mr. Curtis, the distinguished entomologist, for the favour of his inspection, and the following report, addressed to the secretary, had been kindly made by that gentleman:

"15th April, 1850.

"I am much obliged to you for the grubs, which I wish very much to breed, in order to ascertain the exact species, but I fear they have had such a shaking by the post, that few of them will be able to slip off their jackets, and change to pupæ. Will you do me the favour to inform Mr. Pendarves, that the larvæ he left with you will change to large gnats, probably to a species described and figured in my last report; and as Mr. Pendarves seems interested in this matter, I beg to refer him to the 'Royal Agricultural Journal,' vol. x., pp. 89 and 92, where I have expressed my belief that the corn crops suffer from the larvæ of a species of *Tipula*, especially on sandy and light soils; and these larvæ of Mr. Pendarves's are the offspring, I expect, of the identical gnat which is figured in Plate, letter V. (opposite to page 117), in the same volume of the Journal; the larvæ at figures 42 and 43 are the pupæ at figure 44. This, I hope, will prove satisfactory; and if Mr. Pendarves be inclined to transmit me some more larvæ, in damp moss in a small tin box, which may be safely transmitted by post, I shall be happy to endeavour to rear them, and send you the results. (Signed) "JOHN CURTIS."

The Council ordered their thanks to Mr. Curtis for the favour of this kind attention to the objects of the Society.

Mr. Fisher Hobbs has also received from a friend of his in the neighbourhood of Colchester similar grubs, from a nine-acre field of Wheat in that neighbourhood, much injured by their ravages, to the extent of nearly half the crop. The grubs attack the centre of the root of the plant.

Australian Barley.—Mr. R. W. Baker having transmitted details connected with his trial of the Australian barley received by the Council a few years ago, and distributed among such members as kindly undertook to try and report upon its qualities, Mr. Pusey, Mr. Raymond Barker, and Mr. Fisher Hobbs favoured the Council with their views on the general question of the trial of naturalized barley, and the comparative mode by which its qualities ought to be tested by cultivation in this country along with the best ordinary varieties, and under precisely the same circumstances.

Asphaltic Manure.—Mr. John Bethell requested leave to put a question to the noble Duke before he quitted the chair. He had for some years been much interested in the conversion of bituminous substances into manure, but he had hitherto failed in obtaining a clue to any means by which their application in that respect could be made successful. He had accordingly learned, with much interest, from the communication made by Earl Grey to the Society a short time ago, that the Earl of Dundonald had succeeded in the attempt to render the pitch of the Asphaltic Lake in Trinidad beneficial as a manure, and had tested its value as such in the Government Gardens at Bermuda. Specimens of this bituminous manure were in the hands of Professor Way for analysis, and the results would in due time, no doubt, be laid before the Council; but, as he had much doubt whether that analysis would inform us of more than we might anticipate from the probable nature of the compounds, he felt a great desire to hear what proofs Lord Dundonald had to offer of the excellence of the manure so prepared; and he begged to inquire of the noble Duke whether such communication had been received.—Mr. Pusey, M.P., stated that he had already anticipated Mr. Bethell's wishes on this subject, having written to Lord Grey to make a similar inquiry, when his Lordship had informed him that such communication was on its way from Lord Dundonald, and when received would be forwarded to the Council. Mr. Pusey took that opportunity of stating the interest he too felt on this question, though on grounds different from those stated by Mr. Bethell, namely, from cases in which increased fertility could apparently be due only to casual admixture with bituminous matter in the soil. This had been found to occur on some property of his relative's the Earl of Carnarvon's, in Wiltshire, not far from his own residence at Pusey, where dark-blue clay had been thrown over the land, and had exerted a manuring effect that could only be attributed to the bituminous matter the clay in question was known to contain.

Mr. John Martin, K.L., the celebrated artist, pre-

sented to the Society his work on diverting the sewage of London and Westminster from the Thames, and applying it to agricultural purposes; on improving the navigation of the river; and on establishing a supply of pure water to the metropolis. Messrs. Blackie and Son, of Glasgow, presented the first division of the "Cyclopaedia of Agriculture" (edited by Mr. J. Chalmers Morton, so well known to the Society and the public, as a distinguished writer on agricultural subjects). Mr. Bruce Allen presented his "Rudimentary Treatise on Cottage Building." For all which the Council ordered their usual acknowledgments to be conveyed.

The Council then adjourned to Wednesday next, the 1st of May.

A MONTHLY COUNCIL was held at the Society's House in Hanover Square, on Wednesday, the 1st of May. The following Members of Council and Governors were present: His Grace The Duke of Richmond, K.G., trustee, in the Chair; Lord Bridport, Lord Portman, Hon. R. H. Clive, M.P., Hon. Dudley Pelham, M.P., Hon. H. W. Wilson, Sir Thomas Dyke Acland, Bart., M.P., Sir Charles Lemon, Bart., M.P., Sir John V. B. Johnstone, Bart., M.P., Mr. Alcock, M.P., Col. Austen, Mr. Raymond Barker, Mr. C. Barnett, Mr. S. Bennett, Mr. H. Blanshard, Mr. Braston, M.P., Mr. Brandreth, Mr. Burke, Col. Challoner, Mr. Evelyn Denison, M.P., Mr. R. Garrett, Mr. Brandreth Gibbs, Mr. Grantham, Mr. Hamond, Mr. Fisher Hobbs, Mr. Hudson (Castleacre), Mr. Jonas, Rev. C. E. Keene, Mr. Lawes, Mr. W. Miles, M.P., Mr. Milward, Mr. Pen-darves, M.P., Mr. Pusey, M.P., Prof. Sewell, Mr. Shaw (London), Mr. Shaw (Northampton), Mr. Villiers Shelley, Mr. Sillifant, Prof. Simonds, Mr. W. Simpson, Mr. Stansfield, M.P., Mr. H. S. Thompson, Mr. C. Hampden Turner, Mr. Turner (of Barton), Mr. G. Wilbraham, and Prof. Way.

Finances.—Colonel Challoner, chairman of the Finance Committee, laid before the Council the Monthly Report on the accounts of the Society; from which it appeared that, on the previous day, the current cash-balance in the hands of the Society's bankers was £2,582 (including £1,260 as the subscription from Exeter, £180 on account of compositions for life, and £1,142 as special balance available for current purposes). The Report contained the following reference to legal proceedings, instituted, by special order of the Council, against those members of the Society who were more than two years in arrear of their subscription, and who have failed to comply with the claims of the Society, as communicated to them in the numerous circulars addressed to them, from time to time, on the subject.

"The Finance Committee have to report that, in conformity with the orders of the Council, they have, in the course of the past month, taken out summonses in the County Court against a portion of those persons residing in and about London, who have neglected to respond to any of the applications repeatedly made to them for the payment of their arrears; most of whom, on the receipt of their summons, have paid into Court the amounts due to the Society, together with the costs. The Finance Committee cannot but regret

that the painful necessity which obliges them to resort to these extreme measures, for the recovery of arrears due to the Society, should entail additional expense on the parties who thus contend its just claims in these cases, as well as in those, which may hereafter arise, in which parties, by order of the metropolitan courts, and agreeably with the power vested in them, may be required to be summoned from distant parts of the country to London, as the locality within which their obligations to the Society have been contracted, and become thereby subject to a still further amount of costs.—The Committee will continue to persevere steadily in carrying out the orders given to them by the Council for the recovery of the arrears still remaining due."

The Committee concluded their Report by recommending that Messrs. Saunders and Co., of Exeter, should be requested by the Council to accept the appointment of Bankers to the Society during the period of the Exeter meeting.

The Council having taken this Report into their deliberate consideration, decided, that, while the just claims of the Society should be fully maintained in these actions, and the various powers at the disposal of the Society made known to the parties resisting them, every care should be taken to prevent an increase of costs to the defendants, although cases might unfortunately occur in which it would be imperative on the Society to avail themselves of a special order of court for the summoning of a member from a remote part of the country to London, to answer in person the claims made against him, a necessity which, they trusted, would only seldom occur. They also expressed a hope, that when the Society had established, by a few decisive cases, its full claim for the recovery of arrears, the members in arrear, both for their own sake and that of the Society, would at once, without further appeal to legal forms, discharge the obligations into which they had voluntarily entered. It was also thought desirable that it should be known, that, in all cases where parties withheld their subscriptions because the Journals of the Society had not been transmitted to them, the Journals, on the payment of the subscriptions, would be immediately forwarded, and had been only withheld in accordance with a rule of the Society which required the subscription to precede the transmission of the Journal. The Report of the Finance Committee was then adopted and confirmed.

Prize Essays.—Lord Portman, in the absence of Mr. Pusey, reported the further awards made by judges of Essays for the current year, which, on the chairman's opening the sealed motto-papers of the Prize Essays, were as follows:

I. The Prize of £50, for the best Report on the Farming of Somersetshire, awarded to THOMAS DYKE ACLAND, JUN., of Holnicote, near Minehead.

II. The Prize of £20, for the best Essay on the Management of Oats, awarded to JOHN HAXTON, Farmer, of Drumrod, near Cupar, Fifeshire.—The Judges commended the essays bearing the mottoes, "Theory without Practice is nothing worth," and "Let Experience test the truth of Science."

III. The Prize of £50, for the best Essay on the Climate of the British Islands in its effect on cultivation, awarded to

NICHOLAS WHITLEY, Surveyor, Turo, Cornwall.—The Judges commended the Essays bearing the mottoes, "Observation guided by Science," and "A. B. C."

Agricultural Chemistry.—Lord Portman also laid before the Council the Report of the Chemical Committee, including a special report made by Prof. Way on the operations carried on in his laboratory during the past year. The Council directed that this Report of Prof. Way should be read before the Members at the Weekly Council to be held on the following Wednesday; and they adopted the following proposed subjects of investigation during the ensuing year:

1. The continuation of the investigation into the absorptive properties of soils, including clays.
2. The nutritive properties of the Grasses.
3. The agricultural properties of the chalks and marls.
4. The chemical properties of water, with a view to its effect on irrigation, and on the health of animals.

Exeter Meeting.—Lord Portman then reported the favourable progress of the arrangements connected with the Exeter Meeting; the erection of the pavilion and show-yard, under the direction of Mr. Henry Manning, the Contractor of Works to the Society; the entries for implements and stock by exhibitors; the personal explanation of the theory and practice of catch-meadows in Devonshire, by Mr. George Turner, of Barton, and the exhibition of Sir Thomas Acland's water-meadows at Killerton; and the preparation of the programme of proceedings connected with the Exeter meeting, for the information of the members. This report was adopted by the Council.

Colonel Challoner having called the attention of the Council to the convenience and advantage of the Pavilion Dinner taking place on the Wednesday instead of the Thursday, as heretofore, it was carried, on the motion of Lord Portman, that after the present year the Pavilion Dinner should take place on that day. The Council referred the question of the place where the judges' awards of live stock were to be read at the Exeter meeting, to the consideration of the general Exeter Committee.

Mr. Fisher Hobbs and the Hon. H. W. Wilson having called the attention of the Council to the desirableness of an extension of time for the exhibition of implements and live-stock at the country meetings of the Society, the noble Chairman suggested that such extension should this year be tried at Exeter only as an experiment, in order that the Directors and Stewards might examine into the result of its effects on the animals exhibited, for the future guidance of the Council in repeating or discontinuing such extension. The Council then agreed that the show-yard should be open to the public on the Friday, at one shilling each person, from 6 o'clock in the morning till 12 at noon, after which time the cattle might be removed.

On the motion of the Hon. Capt. Pelham, seconded by Mr. Shelley, Mr. Anthony Hamond, of Westacre Hall, Norfolk, was appointed the Steward-Elect of Implements for the Exeter Meeting, to come into office as a Steward in that department at the ensuing meeting

of the Society, at which there would be an exhibition of implements, namely, in 1852.

On the motion of Mr. Brandreth Gibbs, Mr. Samuel Jonas, of Ickleton, Cambridgeshire, was appointed one of the Stewards of Cattle at the Country Meetings of the Society, in the place of Mr. Kinder, who retires by rotation.

The following committees were appointed for the selection and recommendation to the Council, of proper persons to be appointed as Judges at the Exeter meeting, from nominations particularly requested to be made by the members at large of the Society, and communicated to the Secretary before the general meeting on the 22nd instant, or to the President on that day; such members, in making these nominations, being requested to certify from their personal knowledge that the parties proposed are qualified and willing to act as Judges for the particular class for which they are respectively recommended, and who are unconnected with any exhibitor of stock or maker of implements, and have no direct personal interest in the stock exhibited, as the breeder of any of the animals upon which they may be called upon to adjudicate. 1. Committee for Judges of Implements: Lord Portman, Mr. Thompson, Col. Challoner, Captain Pelham, M.P., Mr. Brandreth, Mr. Hamond, and Mr. Shaw, of London. 2. Committee for Judges of Cattle: Lord Portman, Col. Challoner, Mr. Shaw of London, Mr. Miles, M.P., Mr. Shaw of Northampton, and Mr. Brandreth.

Meeting of 1851.—The Council, having had letters read to them from Mr. Pusey, M.P., the Chairman of the Inspection Committee, appointed by the Council "to inspect any site or sites of ground proposed for the show-yard in 1851, and to report to the Council their suitability or otherwise for the purposes of the Society," and received statements from the members of the Committee then present at the Council, unanimously agreed to the following resolutions:—

1. That the Council are prepared to fulfil their promise of holding a Cattle Show in Hyde Park in 1851, as requested by the Royal Commission.
2. That the Inspection Committee be requested to communicate the above resolution to the Royal Commission.
3. That the General Meeting in the country required by the Charter, be held in 1851, at Hampton-court.

The Council then appointed the following General Middlesex Committee:—Duke of Richmond, Marquis of Downshire, Lord Portman, Hon. Capt. Pelham, M.P., Mr. Raymond Barker, Mr. Brandreth, Col. Challoner, Mr. Brandreth Gibbs, Mr. Fisher Hobbs, Mr. Milward, Mr. Shaw, of London, Mr. Miles, M.P., Mr. Shelley, and Mr. Pusey, M.P.

Veterinary Inspection.—Mr. Raymond Barker, Chairman of the Veterinary Committee, reported that an interesting statement had been received from Prof. Simonds, detailing his inquiries into the cause of the great amount of illness and death of cattle on farms in Somersetshire occupied by tenants of Lord Portman. The circumstantial evidence derived from the locality in which the cattle were placed, and the post-mortem ex-

amination which Prof. Simonds had made on one of the animals placed at his disposal, appeared to fix the cause of the malady on the water the animals had been in the habit of drinking. Specimens of the water were undergoing the chemical examination of Prof. Way, and Prof. Simonds was prosecuting his researches into the physiological changes of condition and structure found to have taken place in the diseased cattle. Mr. Barker hoped that the final report would be received by the committee, and laid before the Council at their Monthly Meeting in June next.

The Council then agreed to the House List of Council, to be recommended at the ensuing general meeting, agreeably with the terms of the Bye-laws; and having decided that such general meeting should be held at 11 o'clock in the forenoon of Wednesday, the 22nd inst., they adjourned to their weekly meeting on Wednesday next.

PROF. WAY has signified his regret that he will be under the necessity of postponing his lecture "On Variations in the Chemical Composition of Water, as affecting its Agricultural uses," from the 15th of May to the 19th of June, in consequence of his inability to complete the details of that lecture, from the more immediate pressure of other engagements for the Society, which at present entirely occupy his time.

A WEEKLY COUNCIL was held at the Society's house, in Hanover-square, on Wednesday, the 8th of May; present, M. Raymond Barker, V.P., in the Chair, Earl of Lovelace, Hon. R. H. Clive, M.P., Hon. Dudley Pelham, M.P., Sir M. W. Ridley, Bart., Mr. Alcock, M.P., M. T. C. Blackden, Col. Blagrove, Col. Challoner, Mr. W. Clavering, Mr. G. Dyer, Mr. Fisher Hobbs, Mr. W. Miles, M.P., Mr. C. E. Overman, Mr. Parkins, Mr. Pendarves, M.P., Mr. Rowlandson, Mr. Villiers Shelley, Prof. Simonds, Mr. Slaney, M.P., Mr. Stansfield, M.P., Prof. Way, Mr. Wilson (of Stowlangtoft), and Mr. F. Woodward.

Miscellaneous Communications.—Annual Report of Professor Way to the Chemical Committee, of the satisfactory progress of the investigations in his laboratory, and the gratifying fact of a great increase, during the last quarter, in the number of persons interested in agricultural chemistry, who had applied to him for analyses. Communication from Dr. Royle, of the East India Company, on the sheep of Thibet. Letter from Mr. Bickford to Mr. Pusey, M.P., on the formation of water-meadows in Devonshire.—Samples of Guernsey butter (of very fine quality) from Mr. Le Beir, secretary to the Agricultural Society in that Island.—Specimens of gutta percha hose for the distribution of liquid manure, from Mr. Beale Browne; and of gutta percha junctions (by means of slide fitting and circular clamp) for such hose, from Mr. Key.—Communication from Colonel E. Napier, on experiments, in which the ulti-

mate decomposition of diseased Potatoes gave rise to the production of winged insects.—Specimens of Indian Corn grown in the United States of America, under latitudes and circumstances favourable for the cultivation of the produce in England, with a practical statement of the management of the Indian Corn crop; from Mr. Pliny Miles.—Schedule form for farm-accounts, from Mr. Popliss.

The Council ordered their thanks for these communications, which they referred to the Journal Committee.

Lecture.—Col. Challoner having alluded to the circumstances which prevented Prof. Way from being able to complete the details of his lecture, announced for Wednesday next, "On Variations in the Chemical Composition of Water, as affecting its Agricultural Uses," informed the Council of the great interest which had been very widely felt among the members who were unfortunately not present at the Professor's important lecture on soils and manure delivered in the Council-room last month, and of the general wish he had heard expressed that an opportunity might, if possible, be afforded them to hear that lecture. He thought, therefore, that Prof. Way would confer an additional obligation on the members if he would kindly consent to repeat the lecture, "On the Absorptive Powers of Soil in reference to Manure," on Wednesday next, the 15th inst., at 12 o'clock. Mr. Slaney, M.P., seconded the proposition; to which Prof. Way very cheerfully acceded. It was understood that to this lecture, as to the former, all members of the Society would have the privilege of admission.

Presents.—Mr. Hewitt Davis presented a volume containing his collected communications on farming; Mr. Richard Smith, his treatise on the most profitable system of farming; Mr. Joshua Trimmer, his proposals for a geological survey, specially directed to agricultural objects, illustrated by a coloured sectional chart; Mr. James Matthews presented copies of works published by him—Dixon on Poultry, A. H. B. on the Tree Rose, and Paxton's Cottager's Calendar; M. Yvart, Inspector of the Veterinary and Cattle Schools of France, copies of his work on Merino sheep; transactions were received from the Geological and Statistical Society; proceedings from the Agricultural Society of Paris; and Annual Report from the Guernsey Agricultural Society. The following agricultural journals were also presented by their respective editors: The Farmer's Magazine, by Mr. Shaw; the Journal of the Chemico-Agricultural Society of Ulster, by Dr. Hodges; Journal and Transactions of the Lower Canada Agricultural Society, by Mr. Evans; and the first number of the Agricultor Espanol, published at Madrid:—for all which the usual thanks of the Council were ordered.

The Council then adjourned (over the day of lecture on the 15th, and the day of general meeting on the 22nd) to their weekly meeting on the 29th inst.

LECTURE ON SOILS AND MANURE.

PROFESSOR WAY, Consulting Chemist to the Society, repeated, at the request of the Council, his lecture "On the Absorptive Properties of Soils in reference to Manure," on Wednesday, the 15th of May, in the presence of a large number of the members, at the House of the Society in Hanover-square. The chair was occupied by Mr. Raymond Barker, one of the Vice-Presidents of the Society; and among the company present we remarked Lord Braybrooke, Lord Bridport, Lord Camoys, Lord Charles Manners, M.P.; Hon. R. H. Clive, M.P.; Hon. Henry W. Wilson; Hon. J. J. Carnegie, Sir Robert Price. Bart., M.P.; Sir R. P. Jodrell, Bart.; Mr. Alcock, M.P.; Mr. John Bethell; Mr. Burke; Mr. W. G. Cavendish, M.P.; Mr. Chadwick, C.B.; Colonel Challoner; Mr. Clavering; Dr. Drummond; Mr. Dyer; Mr. Overman; Mr. E. Parkins; Mr. Pendarves, M.P.; Mr. Beauchamp Proctor; Professor Sewell; Professor Simonds; Mr. Slaney, M.P.; Mr. Stansfield, M.P.; and Mr. Wilson, of Stowlangtoft.

Prof. WAY commenced his lecture, by giving a short statement of the circumstances which had led him into the train of investigation that had resulted in the important facts to which he was again invited by the Council to call the attention of the members. About two years ago, the Rev. A. Huxtable had stated to him that urine, by its passage through certain filtering substances, might be so entirely deprived of its colouring matter and characteristic odour, as to be rendered in every respect to the senses as tasteless, inodorous, and colourless as spring water. About the same time, Mr. Thompson, of Moat Hall, related to him the singular effect of soils in arresting the volatile alkali, ammonia, when brought in contact with them. Prof. Way was not only deeply interested in these statements, but totally unable to account on chemical principles for the effects thus simply produced; and of so high a degree of importance did he consider them, as fertile in a series of new facts, which would lead not only to new views of chemical combination, under peculiar mechanical conditions, but also to a modification of the theory of the mode by which manure is reserved in the soil until required as food for plants, and to immediate applications in practical agriculture, that he lost no time in verifying these results, and in endeavouring to account for their occurrence. As he proceeded in this path of inquiry, the new facts, as they rapidly succeeded each other, were such as would have been totally unexpected on the ordinary principles of combination; and which would eventually, he had no doubt, lead to new modes of regarding chemical action when taking place under certain conditions. He had pursued these researches with undiminished interest and attention, until at length his results were brought to that connected and established form in which they could be laid with confidence before the Society, and the details submitted to the Journal Committee for publication. He had the great satisfaction of finding that Mr. Thompson also had pursued his inquiries on the same subject, and would be able to submit

the results of his experiments to the Journal Committee. Carried out independently of each other, as Mr. Thompson's experiments and his own had thus been, it was highly gratifying to him to believe that the results obtained in each case would be found to be nearly the same, and their truth accordingly confirmed in the most satisfactory manner. Prof. Way then proceeded to show experimentally the power of finely-divided clay soils to abstract the colouring matter and smell from logwood water, London porter, putrid urine, infusion of flax, and tank water; and to explain the probable manner in which such soils decomposed the salts of ammonia, arresting that alkali and replacing it by lime; and also by what a beautiful provision of nature the substances valuable as food for plants were retained in the soil, while other results of such decomposition were allowed to pass through it, one of those provisions in the operation of natural laws which strikingly arrest the attention of the most inconsiderate, and mark the beneficence and wisdom of the Creator, of whose works only perfection is the unvarying attribute. Professor Way then congratulated the Society on the manner in which his Royal Highness Prince Albert had so strongly drawn public attention to the purification of the sewage of towns and the application of the manuring matter contained in it to the purposes of agriculture. He also referred to a great advantage possessed by the plan of upward filtration adopted by his Royal Highness for carrying out these important national objects, namely, the avoidance of that incrustation formed on the surface of downward filters by sewage water on clay, which retarded in a considerable degree the progress of percolation. Professor Way then proceeded to discuss the various conditions under which the new principle under consideration was found to prevail, and the explanations it furnished in the various practical applications connected with irrigation, artificial manuring, and sewage or tank water. As these details are similar in their character to those which formed the subject of the former lecture on the same subject, on the 20th of March last, and were fully reported to our readers in our first publication after that date, it will not be necessary to repeat them. The lecture on this occasion, as on the former, excited the most lively interest among the members present, and, at its close, an unanimous vote of thanks was passed to Professor Way for his kindness in repeating the lecture, on the motion of the Hon. J. J. Carnegie, seconded by Sir John Johnstone, who concurred in expressing a hope that the Council would make arrangements for the continuance of these important lectures, and that Professor Way would kindly continue to favour the members with their delivery.—Mr. CHADWICK, referring to the communication made to the Society at a preceding meeting from Prince Albert, said it must be a matter of satisfaction that the direction taken by the studies of such men as Mr. Huxtable of ascertaining for the benefit of agriculture what the earths would detain, of the matter conveyed in solution or suspension by liquid manures, had been independently comprehended in the mind of his Royal Highness, with yet wider interests, when he had given his own attention, and had directed the attention of the Society

to the conversion of the sources of pestilence into the means of fertility. He (Mr. C.) might state to the Society that his colleagues of the General Board of Health deemed it an event of great importance to their proceedings, that the Society had under these high auspices opened practical investigations so important to the populations of towns as well as of the rural districts. The fact must have been in the Prince's high view and forecast, that these investigations would tend to make manifest to the town and the country their mutual dependence, abate differences, and strengthen common interests. His Royal Highness would no doubt regard with much interest all well-directed experiments upon the subject. Under the necessities of considering in what way the manures which encumbered the worst-conditioned districts of towns could be disposed of, he (Mr. Chadwick) had read all he could find, and inquired as to what had been done not only in this country, but in Belgium and other countries, especially with the liquid manures, by horticulturists as well as agriculturists; he therefore felt himself qualified to speak as to the originality of the views now propounded by their Professor. It had been hitherto the general belief that liquid manures were merely deposited in the soil in slight suspension, and that their effects were transient. In displaying the chemical action that took place, and the conversion of the manure into the permanent and insoluble form, which was not to be washed away by the first shower, a very serious obstacle to the use of sewer manure had been removed. At Liverpool and some other places it had been objected, that inasmuch as the sewer manure could only be used upon the growing crops, that is to say during short periods in the year, enormous reservoir room must be required, and the storage of sewer water must of course be a nuisance, and therefore it was argued it must still be thrown into the river. Now the Professor, in showing the greater permanence of the effect of the manure, had proved that it might be applied throughout the whole of the year, with no other interruption than the frost. He (Mr. C.) could give an instance in corroboration of the Professor's view. Trials of sewer manure were promoted by Lord Ellesmere on some farms near Manchester, for one year; but notwithstanding eminent success the first year, some of the farmers in despair, or in pet, during the second year would do nothing with the land; to the surprise of all parties, however, the fields manured with the liquid manure gave as good a crop the second year as those which had been heavily top-dressed with solid manure, and even as those which had been recently dressed. Professor Way, in showing the immediate chemical action of the manure upon the earth, or of the earth upon the manure, had shown how unfounded was the objection to its application, near the town, arising from the apprehension of the nuisance it must create. He (Mr. C.) could offer facts in corroboration of the Professor's conclusion. It was found in the distribution of liquid manure, containing three loads of night soil, in about seven times its bulk of water, as a dressing per acre. If such a quantity of human feces were spread upon land undiluted, they must be aware what a nuisance it would be for days and

weeks. Parties were surprised to find that, within little more than half an hour, after the delivery of the liquid manure upon the land, they might pass over it without perceiving what had taken place; and so it was with sewer manures, distributed in a high state of decomposition. He hoped, however, that it would shortly be shown how erroneous, in an engineering point of view, was any system of house and town drainage, which occasioned the retention of such matter underneath habitations in a state of decomposition (and waste), and which did not remove it clear even from beneath so extensive a site as the metropolis before it could pass into the state of decomposition. Even in its present usual state of delivery, the effect of the earth upon it, and the immediate suppression of smell, was quite remarkable when the manure was so applied in the liquid form as to favour the chemical action of the earth. Persons at the West-end were accustomed to complain, and properly, of the effluvia arising from the solid manure spread on the surface of the parks. This manure, with three or four-fold fertilizing powers, diluted in water, might be applied in the liquid form early in the morning, and persons passing over them soon after would be unable to detect what had taken place. The application of sewer manure might now be proposed as a means of obviating the nuisance arising from the common methods of manuring in such cases. The light opened upon them by the Professor's experiments on the powers of soils to detain matters in solution or suspension in common water were of the highest order of importance. Those who had read the older writers on irrigation would be aware how faint was the perception of the cause of the different fertilising powers of different waters, some ascribing them to warmth solely, others to rapidity of its motion, and others to the simple absorption of the water; on all this obscurity light was now dawning. The researches displayed before them had an important bearing on the supply of water to towns. He had considered the determination of what the earth would detain, of the matter carried into it by the fermentation of the surface rain-water, so important as bearing upon the improvement of the water-supply of towns, that he had proposed the subject as one for the investigation of the new college of chemistry, when it was first instituted; but it was objected that it would require the labours of a multitude of chemists. It was due to Professor Way to say that he had shown how much could be accomplished by the well-directed exertions of a single hand. In showing how large a proportion the clays would, by thorough drainage, detain of what was good for the land, namely, the lime contained in water, he displayed a valuable quality of depuration for the water supplies of towns in arresting the ingredients which were bad for them, more especially the lime, which rendered water hard, which diminished its solvent power for food, rendered the washing of the skin disagreeable, and the washing of clothes, by the increased quantities of soap required, more expensive. He might mention, for the information of the Society, that the investigations conducted under the General Board of Health, for the improvement of the sanitary condition of towns, strongly displayed the

superiority of surface drainage waters over well and river waters. Out of upwards of 400 different waters, from different places and sources, examined under their directions, the general results stood thus: the deep spring or well waters were of 20 degrees of hardness; the river waters were of 13 degrees of hardness; and the land drainage waters were of 5 degrees of hardness. These last degrees denoted the general rank of the land drainage water in relative purity when properly collected; they formed the ground for expectation of wide arrangements for the relief of land from the surplus water which encumbered it and impeded its fertility, for the service of the town districts which required it, and which would return it with powers of fertility for the disposal of the agriculturists. The researches opened by the Society would serve for the guidance of these great processes. —Mr. SLANEY, M.P., thought it very fortunate that his colleague, Mr. Chadwick, was present on that occasion, to bear his high testimony, as a practical authority on every question relating to the sanitary condition of towns, to the value of Professor Way's researches. As Mr. Chadwick's coadjutor on the commission relating to that inquiry, he (Mr. Slaney) had himself visited many towns in the kingdom, so favourably situated for drainage that their fall alone would, by very slight direction, carry off the whole of their sewage, which would bring great quantities of land throughout the country into a state of fertility. He hoped experiments would be made on this subject in the mode so clearly pointed out by Professor Way. He (Mr. Slaney) had himself already made such an experiment on a piece of sour land of his own in Shropshire, which he had drained, subsoiled, comminuted, and manured; and the result was such a crop for the first time as to excite the astonishment of his neighbours. According to the principles laid down by Professor Way, manuring might take place at any time throughout the year, excepting during the prevalence of frost and rain; thus increasing the wealth and strength of the land, and at the same time removing from the poorer classes the immediate cause of many of the evils affecting their health and comfort. Mr. Slaney then ventured to offer two suggestions: 1. Whether an instrument similar to the saccharometer for ascertaining the amount of sugar in wort, could not be contrived for ascertaining the amount of manuring matter in sewage or tank water; so that by a preliminary testing with such an instrument, the strength of the liquid manure might be obtained by inspection, and the number of gallons or tons at once determined, which it would be requisite to apply to a certain quantity of soil of the same quality, and for any given purpose. 2. Whether the rate could not be ascertained, at which equal successive depths of soil have the power of taking up manuring matter.—Col. CHALLONER agreed with Mr. Slaney, in hoping that experiments would be tried on this subject. He dwelt on the advantage he had himself already derived from the former lecture. He had directed his farm-bailiff to collect together the scrapings of his yards, the bottom of ditches, peat, and earth; and he had so arranged his tank that every drop of liquid manure was caught. He had directed

heaps of manure to be formed of these substances, with alternate layers of clay intervening, which he hoped would arrest the manuring matter as it became soluble, and attempted to pass through it, and thus obtain for him a much larger amount of that valuable substance than he had hitherto been able to secure, as the liquid would in that case pass out as clear and tasteless as water. A test would thus be afforded of the efficiency of the plan, which was so simple that any farmer might by its means avail himself of Prof. Way's researches, and satisfy himself of the correctness of his theory. He himself thanked Prof. Way for what he believed would prove a future advantage to practical agriculture.—Mr. TOWERS, of Weald Hall, stated that he had extensive trials in hand, on his estate in Essex, on the application of every kind of artificial manure and sewage he could meet with; and he would be happy to receive Professor Way and other members of the Society who would favour him with a visit, and submit to their inspection the arrangements he had made for those trials. His land consisted of singularly poor soil, in some parts sand and clay, in others wholly sand. He conceived the sewage of towns to contain untold wealth to the land, if properly deodorised by charcoal or other substances, and rendered in a fit state to be shipped from the place of manufacture to different ports along the coast of the kingdom. He agreed with Mr. Slaney in the necessity for draining, subsoiling, and manuring, as preliminaries to good cultivation. He concluded by referring to the experiments of his neighbour, Mr. Harvey, in ascertaining the value of a mixture of urine and distillery wash, as a liquid manure. He had already found it very powerful in its operation, but so great a nuisance in its present state as to render its application on the land inconvenient to his neighbours.—The CHAIRMAN concluded the proceedings by referring to the arrangements made by the Council for the delivery of these lectures; and the high gratification he had felt in again listening, on that occasion, to the important lecture of Professor Way, to whom he expressed personally his best thanks.

Audit of Accounts.—The half-yearly audit of accounts was held at the Society's House, on Friday, the 17th inst.: present, Colonel Challoner, Mr. Raymond Barker, and Mr. Henry Blanshard, on the part of the Finance Committee; with Mr. Thomas Knight, of Edmonton, and Mr. Robert Beman, of Donnington, two of the appointed auditors on the part of the Society. The whole of the accounts connected with the half-year ending December 31, 1849, having been laid before the audit, they were duly examined and certified as correct, under the signatures of the auditors then present; the total receipts during the half-year (including the balance in hand) being £5,517 12s. 2d., and the total payments £4,474 11s. 9d., leaving a balance in hand at that date of £1,043 0s. 5d.

Special Council.—A Special Council, for agreeing to the Report to be made to the ensuing General Meeting of the Society, was held on the same day, Mr. Raymond Barker, V.P., in the chair. The various topics of business transacted by the Council, since the previous

General Meeting in May, having been taken into consideration, the Report, on the motion of Sir Charles Lemon, Bart., M.P., seconded by Colonel Challoner, was finally agreed to, and ordered to be laid by the Secretary before the General Meeting, to be held on the following Wednesday.

GENERAL MEETING.

The half-yearly general meeting of the members was held at the Society's House, in Hanover-square, on Wednesday last, the 22nd of May; Mr. Raymond Barker, V.P., succeeded by the Marquis of Downshire, President, in the chair. On the motion of Colonel Challoner, seconded by Mr. Druce, of Ensham, the Duke of Richmond was unanimously elected President of the Society for the year ensuing the Exeter meeting to be held in July next. Mr. Barker laid before the meeting his correspondence with the noble Duke on this subject, in which his Grace expressed the satisfaction it would give him at all times to obey the call of the Society to any station in which they thought it might be in his power to aid its laudable objects; he also expressed his regret that temporary indisposition prevented the personal attendance he had hoped to give at the meeting on that day.—Colonel Challoner, in proposing the Duke of Richmond to thus fill, for a third time, the highest office in the Society, passed a high eulogium on the noble Duke's long devotion to its interests, and to his powerful co-operation in promoting, on every occasion, its welfare, and the successful carrying out of its national objects.—On the motion of Lord Camoys, seconded by Mr. Brandreth, the Trustees of the Society were unanimously re-elected. On the motion of Mr. Grantham, seconded by Mr. Dyer, the Vice-Presidents of the Society were unanimously re-elected. The meeting then proceeded to the election of 25 members of Council; and the Chairman having named Mr. Barugh Almack, Mr. T. Knight, and Mr. G. Dyer, as Scrutineers, who retired with the balloting lists into one of the committee rooms, those gentlemen, on their return from this scrutiny, declared the house-list of the Council to have been unanimously adopted by the meeting, and the following 25 members to have been elected on the Council for the two years ensuing the Exeter meeting, namely, Lord Ashburton, Mr. John Beasley, Mr. Henry Blanshard, Mr. French Burke, Lord Camoys, Mr. W. G. Cavendish, M.P., Mr. S. Druce, Mr. R. Garrett, Mr. Brandreth Gibbs, Mr. Grantham, Mr. Fisher Hobbs, Mr. Jonas, Mr. Kinder, Mr. Lawes, Sir Charles Lemon, Bart., M.P., Hon. Capt Dudley Pelham, R.N., M.P., Prof Sewell, Mr. Shaw of London, Mr. Shaw of Northampton, Mr. Sheridan, M.P., Mr. Sillifant, Mr. Slaney, M.P., Mr. Robert Smith, Mr. H. S. Thompson, and Mr. Jonas Webb.

Mr. Hudson, the Secretary of the Society, by direction of the Chairman, read the following Report from the Council.

REPORT.

The Council have the satisfaction of reporting to the members at their present half-yearly meeting the most favourable condition of the Society at the completion of the twelfth year from its foundation. Although in point

of numbers its census is diminished by 127 members since the last general meeting, such diminution is in a great measure more apparent than real; for the average number of members periodically lost to the Society by death being deducted, the remaining names removed from the list will be found to be those of parties who had joined the Society at its country meetings for the local and temporary purposes only of the occasion. On the other hand, members who feel a deeper and more general interest in the welfare of the Society and the promotion of its national objects, are constantly elected into its body, and are gradually increasing its list of efficient members. The Society at the present time comprises 5,261 members, namely—

90 Life governors,
169 Annual governors,
627 Life members,
4,356 Annual members, and
19 Honorary members.

The Funds of the Society are in a highly satisfactory state; every claim against it has been constantly discharged as it has become due; an ample cash-balance lies available for current purposes in the hands of the Bankers; and the invested capital has at length approximated to the gross amount of those sums which have been received from time to time, since the commencement of the Society, as compositions for life. The arrears of subscription, so long the source of trouble to the Finance Committee and of irregularity to the income of the Society and its means of usefulness, have at length, by the persevering attention of that Committee, been brought under salutary control and placed in train for final settlement. The names of defaulters, whose tardy fulfilment of their obligations to a Society into which they had voluntarily entered, and whose unwilling compliance with the chartered regulations of the general body, have thus occasioned so much inconvenience to the Society and injury to its available income, have been gradually removed from the list of members, and replaced by the names of willing contributors to its funds, who cheerfully acquiesce in a recognition of the validity of general laws, enacted, under the charter of the Society, for indiscriminate application to all its members, and for carrying out by united efforts the great and useful objects of their incorporation. The Council, in dealing with this question of arrears, have, accordingly, felt it their bounden duty to the body at large, acting as their representatives and the appointed guardians of their common interest, to take the most decisive measures for bringing the settlement of this long-contested question to a final issue, by an appeal to the County Courts of the kingdom. The administration of the Society being situate in London, and various obligations having been incurred within the jurisdiction of the Metropolitan Courts, the Council have commenced their actions by summoning to those Courts such of their members in and about London as are more than two years in arrear of their subscription, and who are known, or are found on inquiry, to be in circumstances to justify, in their cases, the full enforcement of the claims in question. The summonses having been issued, the parties, on receiving

them, have, with a single exception, declined offering any further opposition to the legal claim thus made upon them on the part of the Society, and have paid into Court the whole amount of arrears, as well as the costs incurred. In the single case referred to, the summons was not answered by the defendant's either discharging the claim or making his appearance, and the action accordingly took its course; when His Honour the Judge of the Westminster County Court, in which the case came on, having heard the grounds on which the action was brought, as well as the evidence adduced of due election and membership, and having ascertained the powers of the Society conferred upon it by its charter, at once decided on the validity of the Society's claim, and made a formal order of Court, that the amount of arrears claimed, with the accumulated costs incurred, should be paid by the defendant on or before that day week. When the Council shall have thus cleared off the London list of arrears they will feel it to be equally their duty to proceed in a similar legal manner to summon parties resident in the different counties of the kingdom whom they shall ascertain to be in a condition fully to meet their liabilities, and who by the time of such issuing of summons shall have failed to discharge their just obligations to the Society. The Council, however, having now established the principle on which they have sought to recover these arrears of subscription, and being thus fortified by a judicial decision which leaves no doubt of the validity of the claim of the Society against all its members, trust that the remaining defaulters will no longer evade their obligations, and impose upon the Council the invidious task of enforcing the payment of these arrears in a court of law—a final appeal as painful to the Council to make, as it must be inconvenient and derogatory to the parties in arrear to become subject to. When the arrear list shall have thus been disposed of, the income of the Society will lose its anomalous character, and correspond in actual amount to the payments due from the willing contributors, of which the Society will then consist; and the funds being thus established on a regular basis, the estimated income and expenditure of the Society may at all times be satisfactorily adjusted.

The Council have to report the favourable progress of the preparations for the Country Meeting of the Society, to be held this year in the city of Exeter, in July, in the week commencing on Monday, the 15th of that month, of which the Thursday will, as usual, be the principal day of the show. In order, however, to meet the wishes of the Members and the public, heretofore so often expressed on this subject, that a longer period should be allowed for the due inspection of the Live Stock by all parties attending the Meeting than the single day hitherto devoted to that object, the Council have decided this year to try, as an experiment, the extension of that period from one day to a day and a-half—namely, on the Thursday, as formerly, and on the Friday from six o'clock in the morning till noon, when the Stock will be at liberty to leave the yard; the result of which experiment will be a guide to the Council in their arrangement for future years. The entries for Implements and

Stock for the Exeter Meeting promise to be as numerous as for the previous country meetings of the Society; and the various Railway Companies have received the application of the Council for concessions in favour of the Society's exhibitors, in a spirit no less courteous than in former years, and there is every probability of an extension, on their part, of privileges no less liberal than heretofore, thus aiding by their powerful co-operation the national objects of the Society. The Council have accepted from Mr. Slaney, M.P., a renewal of his Prizes for Ploughs to cut out to a certain extent, and to fill-in, drains; and from the South Devon Association a Schedule of Prizes for their local breed of stock, known as the South Hams Cattle: all of which prizes will be open to general competition, under the general regulations of the Society. The Council have also accepted the kind offers of Sir Thomas Dyke Acland, Bart., M.P., and Mr. Turner, of Barton, to submit to the Members, during the period of the Exeter Meeting, the construction and operation of their Catch and Water-meadows, and to take measures for explaining on the spot, to all such visitors as will favour them with their company on the occasion, the theory and practice of Irrigation in Devonshire. Mr. Hamond, of Westacre Hall, in Norfolk, has accepted the new appointment of Steward-elect of Implements at the Exeter Meeting, agreeably with the arrangement adopted for the first time this year, by which an opportunity will be afforded to the Junior Steward of Implements to qualify himself for the duties and details of that department; and Mr. Jonas, of Ickleton, in Cambridgeshire, has accepted the appointment of a Steward of Cattle at the Country Meetings of the Society, in the place of Mr. Kinder, who, after a long period of valuable services to the Society, retires this year by rotation from that office. The Council have again resorted to the same mode of appointing the Judges for Implements and Stock as that of last year—namely, by requesting the Members at large of the Society to favour them, at or before the present General Meeting, with the names of parties proposed by them as Judges, and on whose behalf each proposer shall be ready to certify, on his personal knowledge, that they are in every respect qualified and willing to act as Judges in the particular classes for which they may be respectively recommended, and that they are unconnected with any exhibitor of stock or maker of implements, and have no direct personal interest in the stock exhibited, as breeders of any of the animals upon which they may be called upon to adjudicate; and by referring these nominations to Special Committees, who will select and recommend to the Council the most fit persons, in their opinion, to fill respectively the office of Judge in the particular departments and classes of the Show. The Council, however, feeling, as they do deeply, how much the character of the Society, and the value of its prizes, depend on the talent, experience, and integrity of the Judges by whom the awards are made and from whose decision there is no appeal, are fully sensible of the imperfection attendant on all the modes hitherto adopted for their nomination, selection, and appointment; and

they are accordingly most anxious to receive and adopt any means that may be suggested to them, by which every just cause of suspicion and complaint, on the part of the exhibitors, may be obviated for the future. The position of the Western District, and the strong desire to profit by the means of agricultural improvement with which the presence of the Society has hitherto been accompanied; the direct communication by railway, from every part of the kingdom, to its different chief towns, and by sea to convenient ports on its northern and southern coasts; the varied agricultural character of the south-western counties, of which that district is comprised; and the peculiar attractions offered to general visitors by the county of Devon alone, in which the meeting will be held; are circumstances that will no doubt conspire, with the especial and more immediate objects of the occasion, in drawing together, in the city of Exeter, a very large and interesting meeting. The parties composing this numerous assemblage, by their personal communication and interchange of sentiment on topics of practical agriculture, will be enabled to promote among themselves a spirit of enlightened inquiry by mutual comparison of local systems and their results, and at the close of the meeting will in all probability carry back to their different neighbouring or distant residences throughout the country, such an improved acquaintance with the best mode of carrying into operation, the most useful system of economy, both of the time and the means at their disposal, in every department of husbandry, as will lead to the adoption of modes of management by which the most effective results may, in every case, be obtained at the least expenditure of time and money: a mutual conference on topics of deep practical interest to the agricultural community, which it has been one of the great objects of the Society to recommend and promote, through the medium of its Country meetings.

The Council have accepted the invitation of the Royal Commission for the Exhibition of the Works of Industry of all Nations in 1851, to hold a Show of Cattle in Hyde Park in that year; but finding that the Royal Commission have included in the arrangements for their own Exhibition a department for agricultural implements, the Council, with a view of not interfering with this department of the Royal Exhibition, have resolved to omit the implement portion of the Society's Show in 1851, and to confine their exertions entirely to their Show of Cattle, as invited by the Royal Commission, and to take every means to render that Show interesting as an exhibition of Breeding Stock. In order to meet this new arrangement for the year 1851, the Council have re-arranged accordingly their districts for the Country Meetings of the ensuing four years, and have agreed to the following rotation:—

- 1851, *Middlesex District*, consisting of the county of Middlesex.
- 1852, *South-Eastern District*, comprising the counties of Kent, Surrey, and Sussex.
- 1853, *South-Wales District*, comprising the whole of South Wales, with the addition of the counties of Gloucester, Hereford, Monmouth, and Worcester.

1854, *East-Midland District*, comprising the counties of Leicester, Lincoln, Nottingham, and Rutland.

The Council trust that, as so large a portion of the Country Members of the Society, from every part of the kingdom, will probably visit London next year, the circumstance of the Society's Show of Cattle being held in Hyde Park will meet the wishes of a great majority of its body, and promote the general objects of the whole; while the postponement of the Society's accustomed Country Show for one year, in the pre-arranged rotation of districts, will prevent any failure that might probably occur in holding it at a time when another Exhibition will be drawing public attention, in an especial manner, to the Metropolis.

The Council have received from the Chemical Committee the Annual Report of Professor Way, the Consulting Chemist to the Society, on the satisfactory progress of the chemical investigations in his laboratory, of which the results will be published in the Society's Journal; and on the great increase, within the last quarter, of chemical analyses required for agricultural purposes by members of the Society. The Council have adopted, on the recommendation of that Committee, the following subjects for investigation during the ensuing twelve months:

1. The continuation of the investigation into the absorptive properties of soils, including clays.
2. The nutritive properties of the grasses.
3. The agricultural properties of the chalks and marls.
4. The chemical properties of water, with a view to its effects on irrigation, and on the health of animals.

The members have already been favoured by Prof. Way with three very interesting lectures during the present year: the first, on Guano, and on that extensive adulteration at present prevailing in it, which entails so great a disappointment and pecuniary loss on the farmer who purchases the spurious article; the second, on the absorptive powers of soil in reference to manure, when a new faculty in certain soils was experimentally elucidated, by which manuring matter is arrested by them from liquids, and retained in intimate combination until required as food for plants; the third, on butter and cheese-making. In consequence of the great interest excited by Prof. Way's second lecture, he kindly consented to repeat its delivery, previously to laying before the Journal Committee the full details connected with the history of the important discovery to which it had reference, and the experimental researches by which the truth of that discovery has been extended and confirmed.

The Council have been honoured by his Royal Highness Prince Albert with communications on the result of an attempt to naturalize a hardy and prolific race of sheep from Thibet at her Majesty's farm at Osborn; and on a plan for turning the sewage of towns into a source of national wealth by its application to the purposes of agriculture. They have also been favoured by the Earl Grey, H. M. Principal Secretary of State for the Colonial Department, with a communication on asphaltic manure from Vice-Admiral the Earl of Dundonald, Commander of H. M. Naval Forces on the West Indian Station.

The Council, in conclusion, beg to remind the Members of the Society of their privilege to attend the Weekly Meetings of the Council; the first Wednesday, however, of the month being excepted, when only the legislative business of the Society is under consideration, and the admission is consequently confined to Members of Council and Governors. At the Weekly Meetings discussions take place on the communication of personal experience on topics of practical interest in agriculture; and on those occasions the presence and co-operation of the members generally of the Society are at all times desired and esteemed as a favour by the Council.

By order of the Council,

JAMES HUDSON,
Secretary.

On the motion of Sir Hugh Richard Hoare, Bart., seconded by Mr. Barugh Almack, this report was unanimously adopted by the meeting.

The Marquis of Downshire, the President, then took the chair, when Colonel Challoner, chairman of the Finance Committee, proceeded to lay before the meeting the report of the Auditors, and to make a few remarks on the state of the arrears of subscription, and the means of recovering them, agreeably with the special orders of the Council. He took that opportunity of referring to the satisfactory arrangements of the documents of the Society, placed by the bye-laws under the charge and custody of the Secretary, by which every portion of the correspondence could at once be produced which had taken place at any time with members against whom actions were brought in the County Courts, and all other documentary evidence required in court to establish the due election and membership of any defaulter under those circumstances. The advantage of this arrangement and ready production of papers had already proved of high value in each case, and led to the payments of arrears claimed. After the decision in the Westminster County Court he thought there would now be no doubt of the Society's claims, or of the necessity of the Council enforcing them.

On the motion of Colonel Challoner, seconded by Mr. Thomas Rowlandson, the best thanks of the meeting were voted unanimously to the auditors, for their care in auditing the Society's accounts.—Mr. Knight returned thanks. He had the satisfaction of informing the members that the accounts of the Society were so admirably kept, that there was not the slightest trouble in comprehending or examining them; on the contrary, that the auditors found it a pleasing task to audit them.

On the motion of Mr. Raymond Barker, seconded by Mr. Fisher Hobbs, a vote of thanks was passed to Prof. Way, for the kind manner in which he had taken the trouble of delivering three valuable lectures to the members during the present year.—Mr. Barker having expressed his sense of the great scientific value of those lectures, and Mr. Fisher Hobbs having borne his testimony to their great practical utility, the noble President put the question from the chair, with his special amendment that the thanks offered should be "cordial" ones, and the motion was carried unanimously.—Prof. Way returned thanks, expressing the gratification that it gave him to find that his application of science to the pur-

poses of agriculture were approved by the practical farmers of the country, of which on that occasion Mr. Fisher Hobbs might be regarded as the representative. It would always give him pleasure, whether officially connected or not with the Society, to aid in the advancement of the great art they were that day met together to support.

On the motion of Lord Camoys, seconded by Sir Richard P. Joddrell, Bart, the thanks of the meeting were voted unanimously to the President.—The Marquis of Downshire acknowledged the compliment paid to him, and expressed the warm interest he felt in promoting the great objects of the Society, although distant engagements so frequently prevented his due attendance at its meetings. His lordship took that opportunity of stating to the members the result of his trials of azotised manure, and the great success attending its application.

NEW MEMBERS.

Sir Montague John Cholmley, Bart., M.P., of Easton Hall, Lincolnshire, was elected a Governor of the Society.

Arnold, George, jun., Dolton, Crediton, Devon
 Barnes, Ralph, Exeter, Devonshire
 Boseawen, Emlyn, Mereworth Castle, Tonbridge
 Byers, Frederick C., Exchange Chambers, Plymouth
 Cann, W. M., Dawlish Devon
 Chalcraft, Thomas, Amory Farm, Alton, Hants
 Corner, Richard, Torweston, Williton, Taunton
 Coulton, William, Dean Court, Barton, Dean Prior, Ashburton
 Creed, John, Whiddon House, Newton-Abbots, Devon
 Duly, John, Northampton
 Field, Charles, Trunk Farm, Horley, Bagshot
 Fursdon, George, Brampford-speke, Exeter
 Goucher, John, Woodsetts, Worksop, Notts
 Hartshorn, Thomas, Silkmore House, Stafford
 Heale, Henry Newton, Highfield, Hemel-Hempsted
 Hill, Hon. H. Noel, Berrington, Shrewsbury
 Hocking, W., Bude, Cornwall
 Horsfall, Thomas, Burley Hall, Otley, Yorkshire
 Kingdon, Samuel, Duryard Lodge, Exeter
 Limbrick, George, Horton, Chipping-Sodbury, Gloucester
 Lovaine, Lord, Albury Park, Guildford
 Loveband, Rev. A. W., Yarnescombe, Devon
 Lumley, Robert Wheatley, 9, Charles-street, Berkeley-square
 Mackeleau, G. J., Lechlade, Gloucester
 Northcote, Stafford H., Pynes, Exeter
 Norris, Thomas George, Southernhay, Exeter
 Pedlar, Richard, Barton, Tiverton, Devon
 Penoyre, Rev. W. T., Napleton, the Moor, Hereford
 Saunders, Philip, Rudge Farm, Morehead-Bishop, Crediton
 Shorten, Charles Thomas, Ipswich, Suffolk
 Smith, Richard, Sedlescombe, Battle, Sussex
 Talbot, Hon. Wellington Patrick, Honeybone-grounds, Evesham
 Titchhurst, Frederick, Hastings, Sussex
 Tout, Michael, Burrington, Chumleigh, Devon
 Tyrell, John, Exeter
 Walker, William Henry, 38, Sackville-street, London
 Watson, Richard Huxham, Dorsley, Totnes
 Whidborne, J., Teignmouth, Devon.
 White, James, 266, High Holborn, London.

DOMESTIC AND CULTURAL ECONOMY.

BY J. TOWERS, MEMBER OF ROYAL SOCIETIES OF AGRICULTURE AND HORTICULTURE.

No. II.

In the preliminary article, commencing at p. 387, the superior excellence of meadow-grass above all other artificial substitutes, was impressed. Enough, therefore, has for the present been said on the subject; and I come to the operations of the dairy, which, if clearly defined and understood, can at once be practically applied by every one who possesses a good milch cow. In endeavouring to instruct others I shall not only insist upon the evidence furnished by home experience, but without scruple appeal to the authority of many writers of excellence; among whom I know not one who claims more confidence than does Mr. Henry Stephens, author of *The Book of the Farm*. The reader is referred to the first edition of that work (vol. iii., pp. 896, 920.), and to the second, now under publication, (part iii. pp. 268-282). In the latter we find several diagrams of the vessels required during every process, some of which will be duly noticed in their proper place.

If there be but one cow kept, and the land under meadow grass do not exceed half an acre, a good deal of attentive foresight will be required to maintain the animal in full, rich milk, from (we will presume) her calving in March or April to the middle of November, when green food must cease with the last cut of the lucerne, and yield to dry hay only; unless (which I repudiate) recourse be had to swedes, mangold, and turnips. Many persons permit the calf to suckle till fit for the butcher; others prefer to bring it up by hand, or to dispose of it at once, and thus to obtain the full advantage of dairy produce from the first. In any case, a well-constructed dairy, with a favourable aspect, and the required utensils must be at command.

The milk-house should be exposed to the north, built with substantial walls of brick or stone, ciled and amply roofed with straw thatch. Everything, in a word, ought to be so arranged as to maintain the utmost equability of temperature, winter and summer; also to provide for the admission of pure air by wire-latticed windows, across which, in hot weather, mats or screens of stout hempen cloth, soaked in cold water, might be suspended. These, by promoting evaporation, would cool the passing air.

As general rules for the situation of a dairy, select a dry spot, exterior of the dwelling, over-hov-

ered with sprayey trees, which, like the lime, emit a gentle fragrance. "Milk and cream retain their sweetness much longer in dry than in moist air. All foul smells, and indeed the odour from a pure larder, are injurious. The free use of spring water is always advantageous, particularly in warm weather; and the utmost cleanliness should everywhere be observed. All the utensils employed in the dairy should be scalded (hence the need of a copper or boiler in a separate room), scrubbed, rinsed, and dried every time they are used.

Of the utensils, the chief are the milk dishes, the cream jar, and the churn. Of the first, I have employed several sorts; but upon chemical principles, should recommend that made of glass, thus described in *The Book of the Farm*. It is a dish made of light, green-coloured glass, of a circular form, sixteen inches in diameter at the rim, and four inches deep, with a mouth or rim. The cost of a dish is 4s. 6d. It was first introduced by Mr. Pellatt, glass-manufacturer, London." Brown stone-ware, glazed with salt, is also excellent. Baxter writes:—

"The utensils most proper for the dairy are those made from wood. Taste has introduced others of lead, tin, iron, earthenware, &c, most of which are objectionable."

He alludes to the zinc milk-pan, and hints at an increase of cream and butter produced by it. As a chemical agent, it may tend to separate the cream; but at the same time is acted upon by the lactic acid, and a solution of the metal offensive and dangerous is the result.

The cream jar is a vessel of stone-ware, with a foot (Fig. No. 371 given in the "Book of the Farm"), about 18 inches high, 10 inches in diameter, concave at the bottom to provide for the ready cleaning of the jar, with a moveable lid to fit into the rim, slightly convex, and having an opening or short neck in its centre, to be covered with muslin, tied over its orifice, to keep out dust, and let in air. This vessel may be of a size to suit the purposes of any dairy, and is adapted to the double object in view, viz., to retain and preserve all the cream produced between the churning, and to bring that cream to the required temperature in very cold weather, by placing it on a warm hob, or in a vessel containing hot water.

Churns are of various forms, according to the usages and extent of the dairy. Public attention has lately been excited by the exhibition of an American churn, a full account of which has been given in *The Mark Lane Express*. What is wanting, and which I hope will be supplied by this magazine, and *The Journal of the Royal Agricultural Society*, is a minutely correct diagram of the agitator (dasher as it is now styled); for hitherto the mechanism delineated, has tended to mystify rather than to instruct. In the mean time, I can safely and practically refer to the box hand-churn used in our own family, and lucidly figured and described in *The Book of the Farm*, p. 277, whence I obtain the following particulars:—"The churn is 18 inches in length, 11 in width, and 20 in depth, inside measure. Birch or plane-tree is the best for the purpose: for the sake of cleansing, the curved bottom is advantageous. A cover of the same material fits, and closes the top of the box. The revolving agitator is of the usual form; the two pairs of arms, at right angles to each other, are half-lapped at the centre, and the cross-bars (12 in all) mortised into them: these arms are made to revolve by means of a spindle and winch-handle," which need not be now described, as the churn can be inspected at every shop where dairy utensils are vended. I shall here only observe that the form of the dasher, or of the churn itself, generally, is of far less consequence than the precisely accurate degree of temperature of the cream when churned, and the equability of the surrounding atmosphere; hence, that a correct thermometer becomes one of the most important instruments of the dairy.

Having thus glanced at some particulars which are important to every one who contemplates dairy operations, we must solicit attention to a few leading principles which cannot be overlooked, if regular and profitable results be contemplated.

Mr. Way, consulting chemist to the Royal Agricultural Society, delivered a lecture "On the Chemical principles of Butter and Cheese-making," before the council, on the 17th of April last. I refer to it, as the readers of this magazine will find it at full length, commencing p. 440 of the number V., for May. It contains many instructive truths—a correct table of the constituents of the new milk of several animals: those of the cow (always allowing for some constitutional differences) corresponding with what are found in the tables of MM. Henri and Chevalier. In these, however, we find the analysis of that first product of the cow's udder, which is known by the singular term of biestings, and which the calf ought by all means to be per-

mitted to draw, as being precisely adapted to act medicinally upon it; while, for a day or two, it is unfit for domestic purposes:—

COW.		
	Biestings.	New milk.
Casein	150·7	44·8
Mucus	20·0	—
Butter	26·0	31·3
Sugar	trace	47·7
Salts	—	6·0
Water	803·3	870·2
	—	—
	1000·	1000·

Thus it appears that the biestings contain nearly three-and-a-half times more casein (*i.e.* cheese-curd, than new milk does, a considerable proportion of mucus, only a trace of sugar of milk, and no alkaline salt (soda). Mr. Way has told us, that milk is turned sour, and the curd separated by the acidification of the milk sugar, a process which is always induced by atmospheric influence in a very few hours, but more speedily by the presence of acid in any of the imperfectly-cleaned utensils.

Sugar of milk (*saccharum lactis* of former chemists) was made in my father's laboratory nearly 75 years ago, from whey (*serum lactis*). And whey itself is a very aqueous solution of milk sugar, which still retains some of the curd, saline matter, and traces of butter. Acid of sugar of milk, now called lactic acid, was also known by the last generation of chemists. It doubtless results from the absorption of oxygen, either from the air or from that developed by chemical disturbance of water. Whenever so much lactic acid is formed as is sufficient to neutralize the soda that is naturally present in new milk, curdling takes place, and the cheese-curd is separated. Curdling can also be effected by hydro as well as by oxy-acids. Thus the stomach of the calf prepared as rennet, acts upon milk heated to a moderate temperature for the preparation of cheese. Muriatic (*i.e.* hydrochloric) acid, in very small quantity, will likewise curdle and decompose milk.

From these and similar data, we are led to conclude that a weak solution of crystals of soda, cautiously added to milk, furnishes the best chemical preventive of acidity; but that thorough cleanliness is above all things the paramount consideration.

We are now prepared to enter upon the subject of milking and butter-making.

THE CART-HORSE STABLE.

TO THE FARMERS OF THE WEALD OF SUSSEX.

Brother Farmers,—Economy in the management of all business connected with farming must be now more than ever the watchword of the agriculturist. To attain that economy, however, frequently involves an outlay of money inconvenient, if not impracticable, to the landlord as well as the tenant. Infinite time and labour, I am well aware, may be saved by a more judicious arrangement of buildings, by a closer concentration of outlying barns and hovels, and by the use of the admirable machinery which modern science has discovered and adapted to the use of the farmers. These all, nevertheless, involve a very serious immediate expense, which can now be ill afforded, and a material time must elapse before the outlay can be compensated by the return. Still there are many methods by which a considerable saving may be immediately effected in the management of a farm, and to which it does not appear that the general attention is sufficiently directed. Superfluous enclosures may and ought to be done away with, straggling fences reduced and straightened: draining at least the most obviously wet fields, cutting down the hundreds of stag-headed and stunted trees, which serve no purpose, except to tell tales of poverty, and to abstract light and air from the fields and nourishment from the headlands, and working the subsoil plough, are all obvious and cheap modes of improvement within the compass of every man's pocket and intellect, and in which landlord and tenant can easily and cordially unite.

I need hardly say that the working team of horses is one of the most costly and valuable possessions of a farmer; it is always (or ought to be) immediately under his own eye and superintendence; it is (or ought to be) the most interesting stock which he keeps; and in spite of all this it is usually the worst managed, with regard to the well doing of the animals and to the pocket of their owner. A certain quantity of oats per week being allotted to the carter, in too many instances all further supervision ceases, and the hay stack and the pump are with fatal effect committed to his discretion (!). Now, I have known many a horse killed by too much water, but I never yet heard of any one dying by too little. A carter is not satisfied with giving his horses water when they are thirsty, but he always gives an extra bucketful to prevent their becoming so. The horse's stomach, compared with his bulk, is not half so large as that of a human being; no horseman or groom in his senses waters a horse before he mounts him, yet we expect a cart-horse to exert his utmost muscular and corporeal powers in a heavy struggle immediately after this absurd preparation, and with a pressure upon the lungs and diaphragm which paralyzes exertion, and renders a prolonged

strain impossible. Who ever heard of a broken-winded horse in a hunting or coaching stable? I have been the owner of a good many horses for these purposes, and, with very few exceptions, all of them distinctly traceable to a cause, never had a thick-winded one. I have shot old horses of thirty-two, twenty-five, and twenty-two years of age as sound and clear in their wind as when they were foaled; but how many farmers can produce one of half that age in the same condition? They need not go farther than their own stalls for the reason, for there they will find the hay rack and the pail. The blind confidence with which a hundred and fifty pounds' worth of property is placed in the hands of a thoroughly ignorant and bigoted man, utterly incapable of reasoning or reflection, is most unaccountable. I allow many and most carters much credit for honesty, sobriety, good temper, and (to the best of their knowledge) care for their horses; but in no single servant employed on a farm is "progress" so much required. Watch the simplest operation performed in a cart stable. How does the hunting groom or the coachman bridle a horse? When he is fully harnessed or saddled, he casts off his headstall, and holding the bridle in his left hand, stands behind him, speaks to him or taps him on his near quarter, and he immediately turns himself round in his stall, and the bridle is slipped on like an old glove, the left hand adjusting the winkers and foretop, while the right draws the rein down to the withers. Look at your carter: he walks up to the rack, bridle in hand, reaching at his horse's mouth, which is generally up in the rack and full of hay, and lugs him round by the bit, blindfolded by the winkers, one of which (for he sometimes turns him left and sometimes right) generally carries off its stay against the bail chain or stall post. The picking out of horses' feet is likewise a curious adventure whenever it is performed, which is not often. He walks all round his horse, and, of course, is reduced to his left hand when he operates upon his off feet—the right being engaged in holding up the leg. You will probably point out a more convenient and business-like way of effecting these trifling duties—and you flatter yourself that on Saturday night you had fully persuaded him to adopt your improvements—but, take my word for it, on Monday morning you will find him again pursuing the course which his grandfather had always used, which his father continued, and in which he himself hopes to live and die.

Shoeing is woefully neglected in a cart stable. While nails will hold, the shoe remains; no matter whether a strong foot or a weak one, box-shaped or flat, sound or unsound, the blacksmith is only applied to in the last extremity. I bought a couple of mares last week, and

on remarking that they did not appear to have been lately shod, and asking the carter when they had last been to the forge? he replied "Can't 'xactly say—somewheres about the fore part of the winter." This was on the 22nd of March!

I most strongly recommend the one-sided nailing, invented by Mr. Turner, of Regent-street, and lately brought to great perfection by Mr. Miles. *If the shoe fits the foot*, no leverage is allowed for the deepest or stickiest clay to draw it off; and the ease and expansion which it affords to the foot is incredible. But I do not go the length with cart horses which I do with roadsters, upon which I only use three nails on the outer, and one on the inner quarter. With cart horses I content myself with omitting the two hinder nails on the inside. My carters have orders to come home every Saturday at one o'clock, and that afternoon is devoted to greasing wheels, oiling harness, washing legs, and scrubbing stables—operations which, without some such arrangement, are seldom or never performed. Every fourth Saturday the blacksmith comes to the stable and removes the shoes, but new shoes are always fitted at the forge. This plan cannot of course be constantly adhered to—sowing, hay, and harvest must interfere with its observance—but at other seasons I by no means reckon on the time as lost.

Of all grievous errors in stable-management none is more slovenly, more detrimental to the health and utility of the horse, and to the interest of his owner than one which is now nearly exploded—I mean turning horses out for the winter. I have seen horses as soon as the wheat season was got in—full of hard keep, and in good working condition—cast off and condemned to a straw-yard till spring-ploughing begins. In more favoured counties a standing joke against the Sussex farmer used to be related, and I fear not altogether without foundation. About old Michaelmas his usual speech to his carter was, "Come, Jack, turn out the horses, and let's go out for a hunt." Look at the animal in condition—his head as small as a pike in season, his crest hard, his eye bright, his skin kindly, his body straight, his muscle developed. Look at the same horse with his belly blown out with oat-straw and refuse-hay; his eye languid, his lip drooping, his neck like an ewe, his legs scurfy, and his feet rotten. He is not himself again till the summer is far advanced; he is utterly unable to stand an extra pull at that most critical of all times—spring-sowing; and at the very period of the year when all are on the look out for purchase, he is not within £10 of his real value. I am confident that nothing is more advantageous to a Wcald farm than fetching up those fields destined for spring beans or tares late in the autumn, and as long as the weather will permit—slugs and ground vermin are thus extirpated, and the land exposed to the action of the winter frosts generally receives the drill most kindly, or at all events, and under the most unfavourable weather, can be quickly and easily moved by the edget in the spring; but all this must be sacrificed if this fatal and false economy be followed.

Few farmers, and fewer carters, have any respect for physic; but if an occasional dose be requisite for the riding horse, whose diet is nicely regulated, and whose whole system is conducted as by clock work, how much

more indispensable must be a periodical purgation to an animal so grossly fed, and with his stomach and bowels so overloaded as the cart-horse! The general objection is the loss of time to which it subjects the team. To obviate this, we must pick our opportunity. I am aware that cold weather is not the most desirable for administering physic; yet, with proper precautions, I have no hesitation in giving it during a deep snow, when my team is standing idle in the stable. I then usually give physic to all. The more foul feeders—those whose heels or eyes betoken heat or weakness—get it at other times also, as I can spare them; and I am able to speak with some confidence of its good effects, for although I have been a farmer for five-and-twenty years, with a team ranging from four or five to ten or a dozen horses, I never had one go blind, and only one (who died in 1838 of the distemper then so prevalent, and *when I was abroad*) dragged dead out of my stable. Do not wait for disease—prevent it. Should it appear imminent, in ninety-nine cases out of a hundred a gallon of blood and five or six drachms of aloes knock it on the head. It cannot be said that I urge this point without tolerably strong proof of the efficacy of the plan. I have had for the last two years eight horses, about fifty head of cattle, with sheep, &c., in proportion. In 1848 my farrier's bill, which chiefly consisted in operations impracticable for any other than a veterinary surgeon, amounted to £1 12s. 6d., in 1849 to 1s. 6d.

Let me, in conclusion, insist strongly, that if any reform in the management of the cart stable be necessary (and whether it be or no I leave to the conscience of every farmer) it should be commenced immediately. The evils of the old and present system are being perpetuated from day to day; under every carter is placed a boy bound to implicitly obey his directions, and who has no other means of acquiring promotion and his ultimate livelihood than by imitating and acquiring the qualifications of one who is infinitely more his master than is the man who pays him his wages. If he sees that man when he begins to wisp a horse (I will not say dress him) put on his hat and frock—as he invariably does, I suppose, to keep himself warm—he will of course do the same; if he sees a horse coaxed into distending himself to bursting with cold water, he will hold it to be a correct practice; if his nose gets inured to the exhalations of a foul stable and wet litter, he will never reflect upon the delicate sensibility of the lungs and eyes of the animals under his care, and thus we shall find the next generation not one whit ahead of the present in bodily or mental activity. I will not overload either the farmer's mind or bookshelf with study, but I strongly recommend to every one the possession of that invaluable work "The Horse," by the late Mr. Youatt, and published (10s.) by the Society for the Diffusion of Useful Knowledge; there he will find plain facts, sound sense, and humane feeling, united with clear medical advice and simple prescriptions, attention to which will save himself infinite trouble, anxiety, outlay, and loss, and which will materially lessen the sufferings and prolong the existence of that useful, patient, docile, and indispensable slave "The Cart Horse."

Saint Hill, April 2, 1850. ROBT. CRAWFURD.

THE AMERICAN CHEESE TRADE.

NEW YORK, April 18, 1850.—As the cheese trade for 1849-50 is now closed, the following remarks may not be uninteresting to our friends. The supply to the tide-waters of the Hudson was 42,097,818lbs, against 43,278,526lbs. in 1848-49. The slight decrease instead of anticipated increase was owing to a severe drought in the State of New York, and the price of Ohio cheese causing less of that section's make to come to seaboard; had the season been favourable, from the increase of dairy cows, the supply must have reached 45,000,000lbs.

The severe losses sustained by the British shippers in 1848-49 causing a more moderate demand, prices fell about one cent. per lb. under last season, ranging for fair to strictly prime from 6 to 6½ c. for Ohio, and 6¼ to 6¾ c. for New York State—any extreme price paid after the great bulk of the purchases were made not being worth quoting. Five-sixths of the cheese was bought and shipped by the middle of January: the remainder, say 2,000,000 lbs. was bought by two or three parties at 5¾ to 6½ c. per lb., which was generally thought by the "Trade" too dear, as nearly all the prime must have been previously culled out; however, the results may show the operators wiser than their neighbours; it is only to be regretted that the residue of the stock did not sell from 1 to 2 c. per lb. less, as it is only through their pockets that the majority of dairymen will learn to improve the quality of the article.

The export of cheese to Great Britain will reach this year 12,000,000lbs., against 15,386,836 in 1848-49, being a decrease of one-fifth. Last year may be considered a maximum, *unless quality improves*, which, if it does, Great Britain could take double the quantity; as a proof of which, the consumption of foreign cheese there in 1831 was only 14,000,000lbs., and in 1848 had increased to 48,000,000lbs., being about 250 per cent.

The quality this season has shown an improvement, but only to a moderate extent; still there was great difficulty in getting a prime article, there being only about 10 per cent. strictly prime, and 20 per cent. fit for profitable shipment to England. However, we have great dependence upon American enterprise, and feel confident that American cheese, as a rule, will in a few years equal, if not surpass English. We would caution

farmers to be careful and improve the quality, as they may depend upon it, that every year there will be a greater difference in price in favour of first class, and parties must get tired or unable to make shipments to incur a certain and increasing ratio of loss on inferior quality. The result of sales in England this year has proved that only first class has made a small profit, and that inferior has made a great loss; and we would suggest to careless dairymen and country buyers, that if they do not keep an eye to the quality, they will certainly find to their cost, instead of a ¼ per cent. per lb. being the difference in price between inferior and prime, it will sink down from 2 to 3 cents., and be a drug at that.

We have been led to make these remarks as to quality, which may be thought by some too pertinent. The reasons are, at the opening of the trade, owing to the reduction of duty in England and wasteful consumption there, during the railway mania, the trade was profitable, and "all was fish that came to the net," so that in a scarce market an inferior article might pass; but now matters have changed, and the supply both of English and foreign cheese is fully as great as the demand, therefore we hesitate not in affirming, it is only by improving the quality, that the American cheese trade can last, thereby advancing the interest of all parties concerned.

Receipts of Cheese at tide-waters of the Hudson.		Cheese exported to Great Britain in years and seasons.		Cheese retained for Home Consumption.	
Years.	Pounds.	Years and Seasons.	Pounds.	Years.	Pounds.
1834	6,341,000	—	—	1834	6,310,000
1835	9,586,000	—	—	1835	9,856,000
1836	14,060,000	—	—	1836	14,060,000
1837	15,560,000	—	—	1837	15,560,000
1838	13,810,000	—	—	1838	13,810,000
1839	14,530,600	—	—	1839	14,530,000
1840	18,820,000	1840	723,718	1840	18,096,287
1841	14,170,000	1841	1,748,781	1841	12,421,219
1842	19,004,000	1842	2,458,671	1842	16,547,329
1843	24,336,000	1843	3,440,144	1843	20,893,856
1844	26,672,500	1844	7,433,145	1844	19,239,355
1845	29,371,000	1845	7,941,187	1845	21,429,813
1846-7	34,812,513	1846-7	10,368,419	1846-7	24,444,094
1847-8	40,844,000	1847-8	19,550,230	1847-8	30,293,770
1848-9	43,278,526	1848-9	15,386,836	1848-9	27,891,690
1849-50.	42,097,818	1849-50.	11,921,875	1849-50.	30,175,943

—Messrs. Kemp and Co.'s Circular.

REMARKS ON THE KIRKLEAVINGTON HERD OF SHORT-HORN CATTLE,

WHICH WERE SOLD BY AUCTION BY MR. H. STRAFFORD, ON THURSDAY, MAY 9, 1850.

BY JOHN EWART, LAND-SURVEYOR, ETC., NEWCASTLE-UPON-TYNE.

The sale of this celebrated herd took place on Thursday, May 9, 1850, in presence of a company, which, at the lowest estimate, could not be less than five thousand persons, including nearly every breeder of short-horn cattle of note in the United Kingdom, as also breeders from the continent of Europe, and from the United States of America. It may with confidence be maintained that on no similar occasion has so great an interest been excited amongst the breeders of this variety of the ox, so justly the pride of our country, as on that referred to above: and well, indeed, did the herd deserve the far extended fame which attracted such a mighty gathering on the occasion of its dispersion, to be the *nuclei* of new, or to enrich collections already in being, in our sea-girt isles, in Europe, and

in the great western quarter of our planet, beyond the Atlantic ocean.

To criticise in print a herd whilst it remains the property of the breeder is obviously an improper intermeddling with private property, by which no good purpose can be answered, but which may be productive of controversy, liable to excite vexation. When, however, a herd is dispersed, as on the occasion under consideration, the reason for withholding an opinion of its merits, and of those of the several animals of which it is comprised, ceases: in fact, an event in the annals of rural affairs of such interest and importance as the sale of the Kirkleavington herd, not only demands a more permanent record than the ordinary notice in the columns of a newspaper, but now that the cattle in question

no longer form a distinct herd, a monument of the incident becomes useful; and no repository for such can be so fitting as the pages of the *Farmer's Magazine*.

The herd in question, comprising forty-eight cows, heifers, and heifer-calves, and twenty bulls and bull-calves, late the property of Thomas Bates, Esq., formerly of Halton Castle, afterwards of Ridley Hall, both in Northumberland, and lastly of Kirkleavington, near Yarm, in Yorkshire, displayed an eminence in every point of excellence, which has been very rarely attained.* In a combination of those qualities which constitute excellence in the short-horn variety of cattle, it may be asserted with confidence, that the Kirkleavington herd at the time of its dispersion was unequalled by any other in existence. Magnificent size, straight and broad back, arched and well spread ribs, wide bosom, snug shoulder, clean neck, light feet, small head, prominent and bright but placid eye, were features of usefulness and beauty which distinguished this herd in the very highest degree; whilst the hide is sufficiently thick to indicate an excellent constitution, its elasticity when felt between the fingers and thumb, and its floating under the hand upon the cellular texture beneath, together with the soft and furry texture of the coat, evinced in an extraordinary degree throughout the herd excellent quality of flesh, and disposition to rapid taking-on fat. In the sixty-eight head of cattle, not one could be characterised as *inferior* or even as *mediocre*—all ranking as first-class animals; and when an idea of inferiority arose, it was only in reference to a comparison with some of this splendid herd, which, from their most extraordinary excellence, may demand especial notice.

The herd consisted of six families:—The Duchess, the Oxford, the Waterloo, the Cambridge Rose, the Wild Eyes, and the Foggathorpe, which are here enumerated in succession according to the prices which each realized at the sale; a synopsis of the pedigrees, prices, and purchasers, being subjoined, to which it will be sufficient to refer for such particulars.

Of the Duchess family, which originated with Young Duchess, a two-years old heifer, got by Comet, dam by Favourite, and purchased by Mr. Bates at Mr. Charles Colling's sale in 1810 for 183 guineas, were four cows, three heifers, one heifer calf, four bulls, and two bull-calves; the first of which that demands especial notice is the Fourth Duke of York. This animal, now the property of Earl Ducie, is the *beau ideal* of bovine excellence.† His magnificent size, and perfection in every point of excellence, entitle him to be considered as the brightest gem of the herd; and if not the very best bull in existence, he certainly cannot be surpassed. Grand Duke, Duchess 54th, and Duchesses 55th,

59th, 61st, 62nd, and 64th, all of the same family, are the finest imaginable specimens of the short-horn tribe. Next in order is the Oxford family, consisting of four cows, two heifers, four heifer calves, and three bulls, of which Oxford 6th, Oxford 11th, and Second Duke of Oxford, are all animals of extraordinary excellence. The Waterloo and Cambridge Rose families were less numerous than the two preceding. The whole of the animals composing them possessed great excellence, although inferior to those previously noticed. The Wild Eyes, the most extensive family in the herd, consisting of twenty-five head, in which were nine cows, seven heifers, two heifer calves, four bulls, and three bull calves; and of which Baleo, a remarkably fine yearling bull, and two three-year-old heifers, Wild Eyes 22nd and 23rd, were prominent lots in the sale. The only remaining family now to be mentioned is the Foggathorpe, descended from a cow of that name, bought by Mr. Bates, for which he gave one hundred guineas when she was of so advanced an age as not to be likely to breed. This family comprised two cows, one heifer calf, and four bulls; of which Ebor, a yearling sold for 90 guineas.

The sale of this extraordinary herd realized a total amount of £4,558 1s.; and, great as this sum may seem, it is not in any degree extravagant to suppose that had the identical animals been in existence in 1839, and put up for sale after Mr. Bates's unparalleled triumph as a breeder of short-horns at the show of the Royal Agricultural Society of England at Oxford, in obtaining four principal prizes with the only four animals entered by him on that occasion, the sixty-eight head of cattle would then have realized double the sum they did on the 9th inst. In support of this opinion the writer can state upon undoubted authority, that so great was the estimation in which the premium animals referred to were held, that an offer of 400 guineas each for the premium cow and heifers was refused; and that for the bull, Duke of Northumberland, Mr. Bates might have had almost any sum he might have asked; but he considered the animal valuable above all price. When the circumstances of the great yearly increase and diffusion of short-horns of the very first class in every part of the kingdom for many years past, and the crushing influence which Free-trade policy must have on the price of cattle, are considered, the proceeds of Mr. Bates's herd fully corroborates the writer's opinion of its being the most excellent ever submitted for sale by auction.

In conclusion it may be observed that the arrangements of this great sale reflect the highest credit on Mr. Chrisp, who represented the owner of the stock; and that the perfect knowledge of the subject, the great professional ability, and the gentlemanly demeanour of Mr. Strafford as auctioneer were universally the theme of the highest praise; and that gentleman may be assured that he has won the admiration of those short-horn breeders of the northern part of the kingdom who had not previously an opportunity of becoming acquainted with his professional qualifications.

Newcastle-upon-Tyne, May 16, 1850.

* A memoir of Mr. Bates was published in the *Farmer's Magazine* for January, 1850, with a portrait of that gentleman

† As a proof of this remark and what may be expected from his produce, we beg to observe that the only three calves got by him realized the sum of £379 1s., or £126 7s. each. [Ed. Far. Mag.]

SYNOPSIS OF THE PEDIGREES, PRICES, AND PURCHASERS OF THE KIRKLEAVINGTON HERD OF SHORT-HORN CATTLE.

DUCHESS FAMILY.

Cows, Heifers, and Heifer Calves.

Name.	Colour.	Calved.	Sire.	Dam.	Bulled by	Price.	By whom purchased.
Duchess 51st	Roan ..	Aug. 18, 1840	Cleveland Lad (3407).	Duchess 41st, by Belvedere (1706), &c.	2nd Duke of Oxford, April 1	£ s. 63 0	Mr. S.E. Bolden, Lancaster
Duchess 54th	Red	Dec. 30, 1844	2nd Cleveland Lad (3408).	Duchess 49th, by Short Tail (2621).	Do., Nov. 8	94 10	Mr. Eastwood, Burnley
Duchess 55th	Red	Oct. 31, 1844	4th Duke of Northumberland (3649).	Duchess 38th, by Norfolk (2377).	Do., April 1	110 5	Earl Ducie, Tortworth Ct.
Duchess 56th	Red & w.	Nov. 3, 1844	2nd Duke of Northumberland (3646).	Duchess 51st	Grand Duke April 5.	54 12	Mr. Ambler, Halifax
Duchess 59th	Roan ..	Nov. 21, 1847	2nd Duke of Oxford (9046).	Duchess 56th	Do., Nov. 23	210 0	Earl Ducie
Duchess 61st	Red roan	Aug. 19, 1848	Ditto	Duchess 51st	—	105 0	Lord Feversham, DuncombePk.
Duchess 62nd	Red & w.	Oct. 10, 1848	Ditto	Duchess 56th	—	126 0	Mr. Champion, Ranby, Retford
Duchess 64th	Red	Aug. 10, 1849	Ditto	Duchess 55th	—	162 15	Earl Ducie.
						926 2	
<i>Bulls and Bull Calves.</i>							
Duke of Richmond (7996).	Roan ..	Aug. 8, 1844	2nd Cleveland Lad (3408).	Duchess 50th, by The Duke of Northumberland (1940).	—	126 0	Mr. A. L. Maynard, Martoulemoor, Ripon
Third Duke of York (10166).	Red ...	Oct. 31, 1845	4th Duke of Northumberland (3649).	Duchess 51st	—	74 11	Mr. G. D. Trotter, Bishop Middleham, Durham
Fourth Duke of York (10167).	Roan ..	Dec. 22, 1846	2nd Duke of Oxford (9046).	Ditto	—	210 0	Earl Ducie
Grand Duke (10284)	Red	Feb. 14, 1848	2nd Cleveland Lad (3408).	Duchess 55th	—	215 5	Mr. Hay, of Shethin, Aberdeen
Duke of Athol (10150).	Red ...	Sept. 20, 1849	2nd Duke of Oxford (9046).	Duchess 54th	—	42 0	Mr. Parker
Fifth Duke of York (10168).	White ..	Oct. 21, 1849	Ditto	Duchess 51st	—	33 12	Mr. R. Bell, Kirklevington
						701 8	

OXFORD FAMILY.

Cows, Heifers, and Heifer Calves.

Oxford 2nd	Roan ..	April 20, 1839	Short Tail (2621).	Matchem Cow, by Matchem (2281), &c.	Duke of Richmond May 5	54 12	Marq. of Exeter, Burghley House
Oxford 4th	Red & w.	Aug. 8, 1843	Duke of Northumberland (1940).	Oxford Prem. Cow, by Duke of Cleveland (1937), &c.	3rd Duke of York, Nov. 2	28 7	Mr. E. James, Wylam Hall, Northumb.
Oxford 5th	Roan ..	Nov. 24, 1849	Ditto	Oxford 2nd	Do., Apr. 27	74 11	Mr. L.G. Morris, U. S. of America
Oxford 6th	Red	Nov. 6, 1846	2nd Duke of Northumberland (3646).	Ditto	Grand Duke Feb. 6	131 5	Earl Ducie
Oxford 9th	Roan ..	Oct. 27, 1848	3rd Duke of York (10166).	Ditto .....	.....	42 0	Mr. A. Maynard
Oxford 10th	Red & w.	Dec. 30, 1848	Ditto	Oxford 5th .....	.....	53 11	Mr. L.G. Morris
Oxford 11th	Dk. roan	Aug. 25, 1849	4th Duke of York (10167).	Oxford 6th .....	.....	131 5	Earl Ducie
Oxford 12th	Lht. roan	Aug. 27, 1849	Ditto	Oxford 4th .....	.....	85 1	Lord Feversham
Oxford 13th	Roan ..	Jan. 7, 1850	3rd Duke of York (10166).	Oxford 6th .....	.....	66 3	Mr. Becar, of the U. S. of America
Oxford 14th	Roan ..	March 1, 1850	Ditto	Oxford 2nd .....	.....	21 0	Mr. Downs, Grays, Essex.
						687 15	

[* Those who feel interested in tracing further the pedigree of this most interesting and valuable stock, will find all the information requisite in Coates's Herd Book, to which the numbers refer, or they may obtain a price catalogue by application to the auctioneer, Mr. Henry Strafford, 3, Camden Villas, Camden Town, London.—ED. F.A.R. MAG.]

OXFORD FAMILY (continued)—*Bulls.*

Name.	Colour.	Calved	Sire.	Dam.	Bulled by	Price.	By whom purchased.
Second Duke of Oxford (9046).	Roan ..	Aug. 26, 1843	Duke of Northumberland (1940).	Oxford 2nd.....	.....	£ s. 110 5	Earl Howe Gopsal
Third Duke of Oxford (9017).	Roan ..	Oct. 9, 1845	2nd Duke of Northumberland (3646).	Ditto .....	.....	64 1	Mr. Robinson Clifton Olney
Beverley (9964) ..	Red & w.	Oct. 1, 1848	2nd Earl of Beverley (5963)	Oxford 4th .....	.....	32 11	Mr. Townshend, Sapcote Fields
						206 17	

WATERLOO FAMILY.

Cows, Heifers, and Heifer Calves.

Waterloo 4th	Red & w.	May 20, 1840	Cleveland Lad (3407).	Waterloo 3rd, by Norfolk (2377), &c	3rd Duke of Oxford, April 26.	22 1	Mr. Singleton, Pocklington
Waterloo 9th	Red roan	Feb. 24, 1847	2nd Cleveland Lad (3408).	Waterloo 6th, by Duke of North. (1940), &c.	Do., Nov. 9	79 16	Mr. Aslton, Bury Lane
Waterloo 10th....	Red	Oct. 7, 1847	4th Duke of Northumberland (3649).	Waterloo 8th, by 2nd Cleveland Lad (3408), &c.	Grand Duke April 25	63 0	Mr. A. Maynard
Waterloo 11th....	Red & w.	Jan. 29, 1848	2nd Duke of Oxford (9046).	Waterloo 4th	4th Duke of York, Feb. 26	73 10	Mr. Eastwood, Burnley
Waterloo 12th....	Red	Jan. 15, 1849	3rd Duke of York (10166).	Ditto .....	.....	44 2	Mr. Cruickshank, Aberdeen
Waterloo 13th....	Roan ..	Aug. 8, 1849	3rd Duke of Oxford (9047).	Waterloo 9th ....	.....	74 11	Mr Hay, Shethin, Aberdeenshire.
						357 0	

CAMBRIDGE ROSE FAMILY.

Cows, Heifers, and Heifer Calves.

Cambridge Rose 5th.	Roan ..	April 28, 1846	2nd Cleveland Lad (3408)	Cambridge Rose 2nd, by Belvedere (1706), &c.	Not bulled	47 5	Mr. S.E. Bolden, Lancaster
Cambridge Rose 6th.	Roan ..	Dec. 11, 1848	3rd Duke of York (10166).	Cambridge Rose 5th.	.....	73 10	Mr. H. Combe, Cobham Park
Cambridge Rose 7th.	Red	Dec. 29, 1849	Ditto	Ditto .....	.....	26 5	Mr. Downs, Grays, Essex.
						147 0	

WILD EYES FAMILY.

Cows, Heifers, and Heifer Calves.

Wild Eyes 5th ..	Roan ..	Mar. 19, 1840	Short Tail (2621)	Wild Eyes, by Emperor (1975), &c.	3rd Duke of Oxford, April 21	21 0	Mr. A. Stevens, New York
Wild Eyes 7th ..	White ..	Nov. 27, 1841	Duke of Northumberland (1940)	Wild Eyes 3rd, by Belvedere (1706),	Grand Duke March 1	24 3	Mr. Jefferson, Whitehaven
Wild Eyes 8th ..	Roan ..	Feb. 16, 1842	Ditto	Wild Eyes 2nd, by Belvedere (1706),	Do., Jan. 15	42 0	Marq. of Exeter, Burghly House
Wild Eyes 14th ..	Red & w.	Jan. 24, 1845	Ditto	Wild Eyes 3rd ..	Duke of Richmond May 8	30 9	Mr. Jonas Wcbb, Babraham
Wild Eyes 15th ..	Red & w.	April 3, 1845.	4th Duke of Northumberland (3649)	Wild Eyes 8th ..	2nd Duke of Oxford, March 24	32 11	Mr Featherstonehaugh
Wild Eyes 16th ..	Roan ..	Aug. 1, 1845.	2nd Duke of Northumberland (3646)	Wild Eyes	3rd Duke of York, April 18	23 2	Mr. Higgs
Wild Eyes 17th ..	Red & w.	Aug. 4, 1845.	Ditto	Wild Eyes 5th ..	4th Duke of York, Jan. 20	43 1	Mr. Faviell, Snydale Hall
Wild Eyes 19th ..	Roan ..	Mar. 20, 1846	2nd Duke of Oxford (9046)	Wild Eyes 10th, by 4th Duke of Northum. (3649)	Grand Duke Nov. 26	63 0	Mr. Cartwright, Haugham, Louth
Wild Eyes 21st ..	Roan ..	Feb. 19, 1847	2nd Cleveland Lad (3408)	Ditto	4th Duke of York, April 4	49 7	Mr. A. Morison, Scotland
Wild Eyes 22nd ..	Roan ..	July 26, 1846	Ditto	Wild Eyes 8th ..	3rd Duke of York, Jan. 24	105 0	Mr. Champion, Ranby, Retford
<i>Carried forward</i>						433 13	

Names.	Colour.	Calved	Sire.	Dam.	Bull'd by	Price.	By whom purchased.
						£ s.	
<i>Brought forward</i>						433 13	
Wild Eyes 23rd ..	Roan ..	Sept. 3, 1847	2nd Cleveland Lad (3408)	Wild Eyes 9th, by Duke of Northumberland (1940),	3rd Duke of York, Feb. 26	105 0	Mr. A. Maynard
Wild Eyes 24th ..	Roan ..	Sept. 18, 1847	Ditto	Wild Eyes 5th ..	Do., Jan. 12	42 0	Mr. Drummond
Wild Eyes 25th ..	Red & w.	Jan. 1, 1848	Ditto	Wild Eyes 12th, by 2nd Duke of Northumb (3616)	4th Duke of York, Nov. 23	74 11	Mr. B. Baxter, Marsden Hall, Colne
Wild Eyes 26th ..	Red	Aug. 9, 1848	Ditto	Wild Eyes 5th ..	.....	31 10	Mr. Haigh
Wild Eyes 27th ..	Roan ..	Dec. 8, 1848	Ditto	Wild Eyes 17th ..	.....	45 3	Mr. N. Cartwright
Wild Eyes 28th ..	Roan ..	Jan. 14, 1849	Ditto	Wild Eyes 16th ..	.....	27 6	Mr. E. Bates, Cloden, Prussia
Wild Eyes 29th ..	Lht. roan	Aug. 3, 1849	3rd Duke of York (10166)	Wild Eyes 19th ..	.....	39 18	Lord Feversham
Wild Eyes 30th ..	White ..	Dec. 4, 1849	3rd Duke of Oxford (9047)	Wild Eyes 7th ..	.....	24 3	Mr. Townshend, Sapcote Fields.
						813 4	

Bulls and Bull Calves.

Lord George Bentinck (9317).	Roan ..	April 29, 1845	2nd Duke of Northumberland (3646)	Wild Eyes 2nd ..	.....	29 8	Mr. Annett, Wid-dington
Parrington (10590)	Red & w.	Dec. 16, 1847	2nd Cleveland Lad (3408)	Wild Eyes 15th ..	.....	25 4	Mr. Fisher
Red Rover (10692)	Red & w.	Sept. 26, 1848	Ditto	Wild Eyes 8th ..	.....	36 15	Mr. E. Bates
Balco (9918)	Red	Feb. 23, 1849	4th Duke of York (10167)	Wild Eyes 15th ..	.....	162 15	Earl of Burlington, Holker Hall
Retriever (10707)	Lht. roan	Aug. 12, 1849	3rd Duke of Oxford (9047)	Wild Eyes 8th ..	.....	52 10	Earl of Carlisle, Castle Howard
Crusader	White ..	Jan. 10, 1850	2nd Duke of Oxford (9046)	Wild Eyes 21st ..	.....	42 0	Mr. Blackstock
Wonderful	Red & w.	Jan. 12, 1850	Ditto	Wild Eyes 15th ..	.....	31 10	Mr. H. Smith, the Grove, Bingham, Notts.
						380 2	

FOGGATHORPE FAMILY.

Cows and Heifer Calves.

Foggathorpe 2nd..	White ..	Sept. 14, 1840	Duke of Northumberland (1910)	Foggathorpe, by Marlbro (1189)	Grand Duke April 18	22 1	Mr. Parker
Foggathorpe 4th..	Roan ..	Dec. 14, 1842	Ditto	Ditto	3rd Duke of Oxford, April 6	52 10	Mr. Sanday, Holme Pierre-point
Foggathorpe 6th..	Lht. roan	Jan. 8, 1850	3rd Duke of Oxford (9047)	Foggathorpe 4th ..	.....	31 10	Mr. Gardiner.
						106 1	

Bulls.

Euclid (9097)....	Roan ..	Dec. 13, 1845	2nd Cleveland Lad (3408)	Foggathorpe 4th ..	.....	42 0	Duke of Sutherland
Chevalier (10050)	Roan ..	Aug. 23, 1847	Ditto	Foggathorpe 2nd..	.....	43 1	Mr. Pullen
Chieftain (10040)	Roan ..	Aug. 11, 1848	Ditto	Ditto .....	.....	43 1	Mr. Wharton
Ebor (10184)	Lht. roan	Jan. 31, 1849	3rd Duke of York (10166)	Foggathorpe 4th ..	.....	94 10	Lord Feversham, Duncomb Park
						222 12	

SUMMARY OF THE SALE OF THE KIRKLEAVINGTON HERD OF SHORT-HORN CATTLE, HELD MAY 9, 1850.

Families.	Cows.			Heifers.			Heifer Calves.			Bulls.			Bull Calves.			Total.			Average per Head.		
	No.	£	s. d.	No.	£	s. d.	No.	£	s. d.	No.	£	s. d.	No.	£	s. d.	No.	£	s. d.	£	s. d.	
Duchess	1	332	7 0	3	441	0 0	1	162	15 0	4	625	16 0	2	75	12 0	14	1627	10 0	116	5 0	
Oxford	4	288	15 0	2	95	11 0	4	303	9 0	3	206	17 0	0	.....	.....	13	891	12 0	68	16 4
Waterloo	2	101	17 0	3	180	12 0	1	74	11 0	0	.....	.....	0	.....	.....	6	357	0 0	59	10 0
Cambridge ..	1	47	5 0	1	73	10 0	1	26	5 0	0	.....	.....	0	.....	.....	3	147	0 0	49	0 0
Wild Eyes ..	9	328	13 0	7	430	10 0	2	61	1 0	4	254	2 0	3	126	0 0	25	1203	6 0	48	2 7	
Foggathorpe	2	74	11 0	0	.....	.....	1	31	10 0	4	222	12 0	0	.....	.....	7	328	13 0	46	19 0
Total	22	1163	8 0	16	1221	3 0	10	662	11 0	15	1309	7 0	5	201	12 0	68	4558	1 0	67	0 7	
Average		52	17 7½		76	6 5½		66	5 1		87	5 9½		40	6 5						

THE LONDON FARMERS' CLUB.—MONTHLY DISCUSSION.

The ordinary monthly meeting of the Club took place on Monday evening, May 6, at the club rooms in Bridge-street, Blackfriars; Mr. Payne, of Felmersham, in the chair. The subject appointed for discussion was the following: "What is the best mode of securing a heavy crop of swedes? what is the cost per acre? and what proportion of such cost is chargeable to the succeeding crops in rotation?" It was introduced by Mr. Lawrence, of Cirencester.

Mr. LAWRENCE said:—The questions proposed for our evening's discussion, viz., What is the best mode of securing a heavy crop of swedes? what is the cost per acre? and what proportion of such cost is chargeable to the succeeding crops in the rotation? embrace matter of such interest and importance to the farmer, that we might well have devoted a separate evening to the consideration of each of them. With respect to the first question, practice will necessarily vary as much as the soils on which we have to operate. The object in view is to elicit the details of that practice which has been found successful by the more experienced cultivators of various soils for the instruction of those who have the same materials to work on. The answer to the second question must also, to some extent, depend on similar considerations. It is possible that all may arrive at the same point in resolving the third, however various the soils and the course of their cultivation. If the suggestion of this subject to the consideration of the committee, and our acceding to their request to introduce it to your notice, should have led any to anticipate at our hands the solution of all or any of these questions, they will have very much misapprehended our powers and purposes. The economy of the root or green crop has become a matter which presses much on the attention of the agriculturist, and demands very careful consideration. Those only who have bestowed most of this on all the details of the subject can correctly appreciate the difficulties which are yet in the way of sound conclusions. We can do little more than explain our own views and the practice we have adopted on a farm, the greater proportion of which consists of a fair depth of soil lying upon the ordinary rubble or stone brash which overlies the oolite, and the remainder exhibits a greater depth of loam lying upon the Bradford clay. The surface soil is for the most part of an aluminous character, which adheres to the implements in moist weather, and is injured by the treading of animals in that state. The practice we have adopted has in the course of one rotation so greatly increased the facility of working that we have been enabled to dispense with one team out of four. On preparing for any root crop we cannot too strongly insist on *deep tillage* as the rule, rarely admitting of exception. This we commence as soon as the wheat has been carried. We set the first plough as deep as the nature of the surface soil may admit, gradually increasing this depth. We

have increased our depth from between three and four inches to from six to seven for this plough. That is followed by Reid's plough (each plough drawn by a pair of horses), which stirs the *subsoil* from five to six inches. Each subsequent furrow-slice is laid as roughly as may be on the preceding subsoiled furrow. The entire depth of twelve inches and upwards then receives the benefit of atmospheric influence for the next seven months, especially of frost, that most effective of all pulverizers. The bridle of the first plough is so extended on the off-side as to admit of both horses walking on the land; for if the near horse be allowed to walk upon the subsoiled furrow much of the advantage would be lost. Minute subdivision of the soil is material, for various reasons. It facilitates the early decomposition of its inorganic or mineral constituents, so beneficial in the first stage of growth of the embryo plant; the temperature of its bed is thereby increased; it also induces the formation of fibrous rather than of tap roots; and thereby a quicker absorption of food by their numerous mouths. The preceding wheat crop having been thoroughly horse-hoed after the annual weeds had commenced vegetation in the spring, the stubbles are found to be perfectly clean. Under these circumstances, provided there has been frost during the winter, and no hauling over the land since it was ploughed, we find no spring ploughing necessary in ordinary seasons; and that after a few days' dry weather the land will work down with the cultivator and harrows to a fine tilth in a fit state to be ridged up to receive the manure in the trenches. We have not found it necessary to plough a single field so treated this spring for the root crop of the present season. We would here advert to a common objection urged against deep tillage, which we submit has no sound foundation; viz., that you bring to the surface an infertile soil. A well constructed subsoil plough merely loosens the earth through which it passes, and brings nothing to the surface excepting large stones, with which it may come in contact. The first plough, if set deeper than the land has been ploughed before, undoubtedly brings soil for the first time to the surface, which, but for the previous subsoiling, it must be admitted would be comparatively ill adapted to the growth of plants for want of the organic matter which accumulates in the surface soil, and of the inorganic constituents having been set free by the disintegration effected by atmospheric influences. But is it infertile? Excepting only in the cases of alluvial and diluvial deposits, the original composition of the surface and subsoil was identical; they contained the same mineral agents essential to the growth of plants. Furthermore the immediate subsoil has been enriched by soluble salts, &c., washed down by rains from the manures spread from time to time on the surface, and it speedily becomes fertile from exposure by thorough tillage. If we double the quantity of available soil by deep tillage, the space

between our plants may be considerably reduced, and the number may be consequently increased. In fact, by the process recommended, we practically *increase our acreage on a given area*. We will now consider the subject of manure and the mode of its application—a matter on which we feel as one walking in the dark, over ground he has never seen in daylight. *Practice* has led us to put great faith in manure, the ordinary produce of our farms. *Science* has taught us that no manure combines so many essential elements of fertility, and has also pointed out to us ample reasons for making and preserving it with great care. We have recently had a sample of manure made in our boxes subjected to careful analysis by Professor Way. You will perhaps be somewhat surprised to hear that though not one drop of water had ever come in contact with this, other than the urine of the animal, the manure contained 71 per cent. of water. Now, when it is considered that our farm-yard manure of the best description is commonly filled and carted to a heap, and is subsequently filled a second time and carted to its ultimate deposit on the land, containing this large proportion of valueless water, and that so far as bullock feeding goes, the root crop, containing about 90 per cent. of water, is filled and carted to the sheds, we cannot conceive this to be an economical system, and invite the attention of our brother farmers to a review of it. We have hitherto adopted *mineral* manures, drilled in contact with the seed, having found this by experience the best security for an abundant plant, and for carrying it rapidly through the first stage of growth. We believe there is no cheaper or better agent for this purpose than that now in general use—superphosphate of lime in the shape of ground bones, first wetted and dissolved in about one-third their weight of sulphuric acid, diluted with an equal weight of water, to which three parts more of water may be subsequently added. In the latter stages of growth, when the formation of bulb commences, we have observed the plant to flourish more in manures of a different description, containing abundance of organic, particularly carbonaceous matter, and in nothing better than in carefully preserved farm manure. We therefore apply from 15 to 25 tons of farm manure per acre, according to its quality, laid in the furrows, and then split the ridges over it, and we drill with the seed 4 bushels to the acre of the dissolved bones, mixed with 20 bushels of turf ashes. In the case of mangold wurtzel, we find dibbling insures the most regular plant. We have been pleased to find this practice identical with that recommended in the admirable essays and analysis contributed by Mr. Lawes and Dr. Gilbert to the transactions of the Royal Agricultural Society, in which the specific action of these manures is clearly explained, and their advantages demonstrated by numerous experiments, which appear to have been conducted with unusual care. The results from those experiments are, that the effect of dung is attributable mainly to the large supply of carbonaceous matter which it contains, so congenial to the development of bulb; and that the nitrogenous matter, essential to the growth of corn and all crops, the seed of which is the object of cultivation, has very little influence on the production of bulb, the special object of

the root crops; that the *mineral* manures may be most efficiently applied in contact with the seed, and that this is injurious in the case of *organic* manures, which should be so placed as not to come in contact with the embryo plant until it has developed its powers of feeding, and attained a state of vigour. The experiments of Mr. Lawes are unusually interesting and instructive, from the fact of their having been conducted on land previously rendered nearly sterile as respected natural supply of food for the turnips. This land had been cropped with wheat, beans, and wheat, since it had been manured. It was then sown with turnips four years successively, without any addition up to the commencement of the experiments recorded. The state to which it had been reduced is best explained by this table:—

Seasons.	Produce of bulb. per acre.				Average weight of bulbs in lbs. and tenths.
	tons	cwts.	qrs.	lbs.	
1843	4	3	3	2	0.52
1844	2	4	1	0	0.36
1845	0	13	2	24	0.11

In all these experiments a portion of the field was left unmanured, in order that the effects of the supply of various artificial stimulants should be in each case distinctly shown, as well relatively to each other as to the land unmanured. Those who feel sufficiently interested in this important subject, to ascertain the relative effects of a great many specific applications, are referred to the tables in the 8th volume of the "Journal of the Royal Agricultural Society." We will now only mention three selected results from those tables, in confirmation of the practice we have ventured to recommend, founded on our own observation:—

	Bulbs per acre.				Average weight of bulbs in lbs. and tenths.	Number of plants per acre.
	tons	cwts.	qrs.	lbs.		
Unmanured.....	0	13	2	24	0.11	13,296
Man by purely mineral manure.....	12	8	2	3	1.16	23,882
Farm-yard dung.....	17	0	3	6	1.61	23,731

All Mr. Lawes' experiments clearly show the superior efficacy of *mineral* manures in establishing *plant*, and of *organic* manures in carrying it forward and promoting the formation of *bulb*. Before we leave the subject of manuring, we would suggest as a matter for future consideration and discussion, whether, on the four-course shift, the usual practice of applying the manure to the root-crop is the most advantageous period. It must be borne in mind that ordinary manure, from well-fed animals, made and preserved on the best principles, contains much nitrogenous matter as well as phosphates and carbonaceous matter—that the former is calculated to produce exuberant *top* rather than *bulb*, and is supposed to be the most important agent in the nutrition of the cereal crops, though it is generally deemed ineligible by the most scientific agri-

culturists to employ it immediately to those crops—and that after the cereal crop has appropriated from such manure its most essential food, the carbonaceous food most suitable for the turnip remains. Would not these considerations rather indicate the seeds as the crop in the rotation on which the manure might be applied with the best effect on the whole? Mr. Garrett having enabled us by his admirable implement to hoe from eight to ten acres a day with one horse in the most effective manner, we strongly urge the frequent repetition of this process, and *that* though the land may be perfectly clean; for we believe it is impossible to overrate the value of the influence of this tillage in rendering the soil readily accessible to those influences which contribute so materially to the formation and extension of roots. After the final hoeing, if from wet weather or other causes the intervals between the ridges have become hard or close, we recommend a turn with a small implement having three tines slightly carried forwards, one in front and two behind—something after the fashion of the Ducie cultivator on a small scale—drawn by one horse, which stirs the soil three or four inches deep. This treatment produced a crop of swedes in 1848 which weighed 24 tons per acre on an impoverished field, which had never been previously ploughed more than three or four inches deep, nor had produced a crop of roots of half that weight. We now proceed to consider the cost of this crop. The elements of this will probably vary more or less in every instance—certainly in various soils and in different seasons. We have heard such a variety of opinions on this point, ranging from £4 to £12 per acre, that we can hardly hope to assign any specific cost which would meet with general concurrence; we will therefore merely state the actual cost according to our own practice and experience. This, amounting to £11 per acre, is the charge in a favourable season, involving no additional ploughings or spring tillage:—

ESTIMATE OF THE COST OF THE ROOT CROP PER ACRE.

Rent, rates, tithes, and taxes	£2	0	0
Interest on capital (£12 per acre)	0	12	0
Ploughing and subsoiling 2 days, 4 horses at 3s. . .	1	4	0
Two men, 2 days, at 20d.	0	6	8
Twice harrowing in spring, and rolling	0	4	0
20 tons farm manure and filling	4	0	0
Hauling out and spreading	0	11	0
4 bushels bone dissolved in acid	0	16	6
Double bouting	0	4	0
Drilling and seed	0	6	0
Horse-hoeing man and boy	0	1	0
Singling	0	3	6
Horse-hoeing man and boy, twice	0	2	0
Hand-hoeing the ridges	0	2	6
Pulling, topping, and storing in clamps	0	5	0
Sundries	0	3	10
	£11	0	0

It was objected by a farmer to whom this statement had been submitted, and who estimated the expenses at about £7 per acre, that the item for manure, excepting as respecting the hauling, ought not to form an item of charge unless the manure were actually purchased, assuming that every farm ought to produce its own manure. In these days, however, we presume farmers to keep accounts. If so, the cattle will be debited with

their prime cost, with the food they consume, and the beds they lie on; when sold, that account will be credited with the sale price, and the value of the manure left behind to the debit of the root crop. Mr. Huxtable estimates this cost on a different principle, on which he states the cost at £5 12s. 4d. Assuming his mode of getting at the motive power per acre to be correct, we cannot agree with him in considering £1 12s. per acre for manual labour sufficient; neither can we think he is entitled to take credit for 20 tons of swedes per acre on land rented at 20s. at the cost of 20s. only for manure. We now arrive at the last point in the inquiry, and that which involves by much the greatest difficulty, viz., what portion of the large cost of the root crop is chargeable to the other crops in the rotation? This question has arisen in consequence of the very general conviction that the root crop is not self remunerative, but forms an essential basis for the other crops in the rotation, and which ought therefore to be charged with some portion of the cost. It is an axiom in Norfolk that a ton of swedes will make a stone of beef. Assuming a crop of 20 tons to the acre, and 6d. per lb. for beef, this would only give £4 per acre. We have seen some experiments recorded on feeding sheep which seem to prove that we cannot on swedes alone get more than 3s. worth of mutton from a ton of roots. This upon our assumed produce would not return a third of the cost. Authorities may be adduced, founded on carefully conducted experiments, too, for any feeding value of the root crop, from nothing to 10s. per ton and upwards. Excluding from our consideration instances in some parts of Scotland where the value of the Swede crop is clearly ascertained by letting the crop for feed to the Highland flockmasters, and those cases in which roots are grown for the supply of London and other large towns, after examining a great number of experiments and calculations, we are inclined to think, under favourable circumstances, the *feeding* value of a good crop of roots may be put at 5s. per ton, or £5 per acre. What is the value of the manure left on the farm for the succeeding crops by the consumption of the roots alone? for we are not entitled to take into account for our present purpose the excreta, liquid and solid, of the hay, straw, and other feeding stuffs consumed by the animals nor the straw with which they have been littered. The analyses which have been published of the swede, and especially the papers of Mr. Lawes, supply us with the data for an approximate estimate. We all know that nitrogen is a very important agent to the full development of the cereal crops which follow in the course, however little we as yet know of its specific operation. It is a very curious fact, clearly demonstrated by the experiments of Mr. Lawes, that increase in the weight of animals bears a direct relation to the quantity of nitrogen consumed in the food up to a certain point, beyond which the proportional effect is lessened. In one experiment a pen of sheep swallowed food which contained 246lbs. of nitrogen, of which 16½lbs. only were carried off in the carcass; while in another case, in which 96lbs. of nitrogen were swallowed—15½lbs. were carried off. In the former case there was an unusual consumption of

highly-nitrogenous food—oilcake, linseed, barley, malt, and clover. Assuming that all the analyses were correctly performed, it would seem a legitimate inference that a very large proportion of nitrogen consumed in each case was left in the manure, capable of giving out ammonia in some shape for future fertilization. From analysis it appears that 20 tons of the bulbs of swedes contain about 80lbs. of nitrogen. We may take tops at 5 tons, which would contain about 50lbs. Of these 130lbs. of nitrogen it has been shown by Mr. Lawes that under ordinary circumstances about one-fifth is carried off by the animals fed, leaving four-fifths in the manure, or 104lbs. of nitrogen, equivalent to something more than 12lbs. of ammonia. The money value of this, at the usual estimate of 6d. per lb., would be £3 2s., which, if added to our estimate of £5 per acre as the feeding value of the swede crop, would give a return in money value somewhat under the cost of the crop. We wish it to be clearly understood we give this as the market value of the article, for the present state of knowledge does not justify us in assigning to nitrogen a specific agricultural value. We may, however, confidently state that, in addition to the nitrogen left in the land, the root crop also leaves potash, soda, lime, magnesia, phosphoric and sulphuric acids, and chlorine, with other elements of fertility; and furthermore, that the tillages charged against this crop have a very material influence on the produce of the succeeding crops. We think, therefore, after a careful consideration of the whole subject, we may safely conclude that on well-drained land, thoroughly tilled and skilfully manured, the root crop, judiciously consumed, is remunerative, if we stop there and receive from our successor the fair value of the manure arising from its consumption and of the tillages, the benefit of which extends beyond that crop. We submit, therefore, that in the case of the four-field shift, the excess of cost beyond the actual return from the animals fed is chargeable in equal parts on the three succeeding crops, none of which, upon this system, receive any further manuring. Though the remunerative price of wheat and beef is not the subject for our discussion this evening, some of the calculations of Mr. Huxtable have so much bearing on it, and they have been so universally read and received by the owners of land (the pamphlet having gone through some seven or eight editions within a short period), that a few observations on it may not be deemed irrelevant. Mr. Huxtable has founded, chiefly on the experiments of Mr. Lawes, *arithmetical* conclusions, which if demonstrated would not only resolve the questions under our consideration, but many others which are now perplexing both landlords and tenants. The chemist only undertakes to inform us that certain food contains a given quantity of nitrogen, convertible into a fixed quantity of ammonia; but Mr. Huxtable undertakes to give us in figures the exact quantity of ammonia which will produce a bushel of wheat or a pound of beef. He appears to have established to his own satisfaction of those data, by simple arithmetic, that wheat can be grown profitably at 40s. per qr., and beef at 5d. per lb. Far be it from us to undervalue the most important aid

of science to our pursuit; neither would we in any degree discourage the more ardent spirits (of whom Mr. Huxtable may be considered the type), the pioneers of agriculture, whose onward course indicates to those behind, the bogs and quicksands to be avoided, as well as the ground which may be safely ventured on; but to Mr. Huxtable's position we must say, "Not proven." We know that ammonia is an important agent in vegetation, but we do not as yet know with any certainty from what source plants immediately derive it, nor in what manner it is assimilated by them. Liebig, who would be generally admitted an authority on such a subject, characterizes this very course, which has been adopted by Mr. Huxtable in estimating the value of a manure according to the amount of its nitrogen, as quite fallacious; and he adds that its value does not stand in proportion to its nitrogen. We may safely rely on the laboratory of the chemist for the elements of any compound and their relative proportions, and we may obtain from his analysis many highly useful indications; but our operations are conducted in the laboratory of Nature, whose *modus operandi* is extremely obscure, and often baffles our most elaborate contrivances.

Mr. J. C. NESBIT said: I have one or two observations to make upon what has fallen from Mr. Lawrence. In the first place, I would observe that the opinions of Liebig quoted by Mr. Lawrence this evening upon the effect of ammonia are not, I think, to be received as his opinions at the present moment. They were promulgated by him a considerable time since, upon a theory to which he then attached himself, irrespective of considerations to which he ought to have paid more attention—a theory which has been repudiated by everybody who has examined the matter carefully, and which he himself I believe does not advocate at the present time. The theory in question was one which, as applied to one great series of plants, might be very sound. He assumed certain principles, and deduced, in accordance with the ordinary rules of logic, certain results. His logic was undoubtedly good (no one, I think, can quarrel with Liebig's mode of reasoning); but his data were wrong, and consequently his conclusions also were wrong. He assumed that *all* vegetables had their growth by the same means—that the mode of their existence was precisely similar. That assumption was erroneous. We all know very well that some vegetables exist upon bare rock, while others exist upon decomposed vegetable matter, and others again will not exist unless mineral and vegetable matters are united. Liebig took as the basis of his theory vegetables which grow upon rock, where no particle of vegetable matter exists, and the consequence was that when any one came to apply his principles to plants which did not possess the power of growth on mineral matter alone, he was altogether wrong; and any gentleman who should attempt to farm on Liebig's plan alone, not taking into account the necessity of a union of organic with inorganic matters, would find the result unsatisfactory. Liebig himself was wrong in this case; but I believe we shall all admit that much good has been done by the publication of his work on agriculture. With respect to the pulverization

of the soil, there can be no doubt that in ordinary descriptions of land, the more the soil is stirred, disintegrated, and acted upon, the better it must be for any description of plant which may be grown upon it. Not only, for example, would the turnip have the advantage of the action of the air for so many months in winter upon a properly loosened soil, disintegrating and rendering capable of absorption mineral matters existing naturally in the earth in an insoluble condition, but capable of being rendered soluble by atmospheric action—not only will the turnip have these mineral ingredients furnished to them, but the loosened porous earth will also absorb from the air a large quantity of ammonia and other organic materials which plants require to a considerable extent. Everybody knows that porous soils always act a good deal better than soils which have not been stirred about. The reason of this is two-fold; not only does well-stirred land suffer greater disintegration, but the soil has an absorbent power which brings down ammonia, vapours, and so on, from the atmosphere; and those who neglect to get a good tilth will lose a certain quantity of ammonia for want of securing the power of absorption. With respect to the mixture of manures for turnips, spoken of by Mr. Lawrence, there can be no doubt that it is the best. I have known experiments on farms in which guano has been tried on one side, and super-phosphate on the other, of farm-yard dung; but the best crop has always been with a proper mixture of the three. This plan leaves more dung for the corn crops. The farm-yard dung serves to carry on the plant in the after stages, while the more soluble guano and superphosphate bring the early plant quickest to the hoe. When the amount of organic matter in the soil is great, as on many thoroughly well cultivated farms, the farm-yard manure may even be dispensed with. I think the amount of farm-yard dung used by Mr. Lawrence, twenty tons, is far more than sufficient for the turnips. With regard to the remark of Mr. Lawrence, that very little is known as to the absorption of ammonia, I must observe that thus much at least is known—that manures containing ammonia and nitrogen are always valuable, and that the ultimate results of the decomposition of all valuable manures are the same. In conclusion, I may observe, the better the draining is, and the greater the facility for the action of the air, the greater will be the benefit to plants. Excuse these hasty observations, which I thought it better to make now than at a subsequent period, when the discussion will probably turn on more practical points.

After a short pause,

Mr. MECH said: It may appear presumptuous in me to make any remarks on the subject of discussion so early, but I have not risen for that purpose without first waiting to see if any gentleman was disposed to precede me. I am quite satisfied that on the successful conversion of our root crops, and on the economy of the manure arising therefrom, depends our success in farming. I am satisfied in my own mind that under the ordinary modes of treatment the root crop is not applied in the best manner as food for the animal, and that sufficient care is not taken of the manure after it has been pro-

duced. It is quite clear to myself that so long as animals remain unsheltered there must be a great waste of property in agriculture. The value of a ton of turnips is a very interesting question, and by no means a settled one. Much depends on the mode in which turnips are administered to the animal, and upon the position in which it is placed. I have recently heard of an instance in which a breeding flock, having had access to an unlimited supply of turnips in cold weather, their condition was absolutely deteriorated after the consumption of a heavy crop. On the other hand, we know that by using a moderate proportion of roots with other kinds of food, such as oil-cake, hay, and cut straw, animals have derived great advantage from the consumption of roots. I am now sure that it is decidedly wrong to cram a bullock with three or four bushels of roots per day. The quantity of water contained in three bushels of roots is about 21 gallons. The urinary organs must undoubtedly suffer, and unless dry food be also administered the animal does not make a sufficient return for the food which is given to it. So far as my own practice goes, I have arrived at the conclusion that not much more than half a bushel of roots per day should be given to any bullock. I believe we are all agreed that it must be a very extraordinary bullock which will lay on more than 2lbs. of butchers' meat per day, which, at the present price, is worth 10d. I shall be happy to hear from Mr. Thomas, or some other gentleman, whether or not I am right in considering 2lbs. a day a good average. Well, then, it is quite clear that if we give an animal, as we often do, oil-cake, and a quantity of hay, and three bush. turnips, amounting together to 2s. or 2s. 6d., we can never be repaid, the animal having the power of making at the utmost only 2 lbs. of meat per day. My own practice has convinced me that the expense of the food administered to the animal should never exceed the amount of the return. The stomach and system have not the power of assimilating more than a given quantity, and anything beyond that must be so much lost. I have, as many of you are aware, given a great quantity of expensive food to animals; but now I have found practically that with a very moderate proportion of roots, and a small supply of meal, linseed, or oilcake, boiled with chaff, the best result is obtained. This remark applies equally to sheep and bullocks. The value of turnips in my county can scarcely be reckoned more—I appeal to Mr. Hobbs for confirmation of my statement—than 2s. 6d. to 3s. 6d. per ton. I know whole fields of turnips which were let to owners of sheep to feed off at prices varying from 50s. to 70s. This has been the range of prices since Christmas for good crops of roots.

Mr. W. F. HOBBS: You are speaking of swedes.

Mr. MECH: Yes. For some time £1 was the extreme price of heavy crops, and assuming them to have been from 18 to 20 tons, it is quite clear that the value of the swede could not be estimated at above from 3s. to 3s. 6d. per ton. The value of a ton of roots must, I think, depend very much on the position of the animal as to warmth. Mr. McCulloch, during a visit which he paid to me the other day, found great fault with me for not keeping my animals warm enough, and this although

they were in very comfortable closed sheds. I believe he was quite right in finding fault, and I have amended the error since. He said to be, "I like to feel perfectly warm myself when I enter a bullock shed, for then I feel certain that the animals are making the most of their food." I agree with him in that respect. I do hold that the allowing animals to feed in a cold yard is not the way to make the most of that expensive article, the turnip. I think, gentlemen, that the days of dung-heaps are numbered (laughter, and expressions of dissent).

Mr. BENNETT: Oh, monstrous!

Mr. MECCHI: I speak practically, and I know my friend, Mr. Bennett, has a great regard for the word practice. I assure you that all my animals are boarded on open floors, and I assure you that I will never again commit the extreme folly of making a dungheap, which is a costly affair, and dispels in the most patent way that most valuable ingredient of manure, ammonia. Our friend Mr. Bennett says, "Monstrous!" (Hear, hear, from Mr. Bennett.) It does appear monstrous, but still it is only in appearance. I assure you that the manure from under those animals is unmixed with straw. It is at once carted to the land; and I assure you, from a year and a half's practice, that no manure, no guano, put on the adjoining land, can compete in the production of corn, wheat, root, or leguminous vegetation, with this manure without straw.

Mr. NESBIT: What do you do with the straw?

Mr. MECCHI: The whole of the straw on my farm, with the exception of two or three bundles a day for the horses, is cut up and boiled with linseed-meal or ground oilcake. I believe that we are on the eve of a great revolution with regard to the use of our straw. When I say that the days of dungheaps are numbered, what I mean is, that it would be to our advantage to give all the straw on our farms to our animals. It will compel you to keep a much larger amount of stock; and I do assure you that you would be able to feed your bullocks for 7d. a day (which is the cost of mine at the present moment) more advantageously than you could feed them for a much larger sum on the old principle of giving it dry and uncooked. So important and so practical do I consider this subject, that, if you will allow me, I will detain you a few minutes longer.

The CHAIRMAN: You mean to finish by connecting your remarks with the question which we are discussing, the growth of root crops?

Mr. MECCHI: Certainly. I contend that roots are not advantageously used when used unaided by other food, or when they are made the principal food of the animal.

Mr. BENNETT: That question was settled twenty years ago.

Mr. MECCHI: I consider that the first digestion should not take place in the stomach of the animal—that the food should be soaked or cooked before the animal receives it. I repeat that I speak practically. Twenty bullocks which are tied up are getting on twice as fast upon half the quantity of food that they used to do when the food was taken dry on the old principle.

The CHAIRMAN: Have you anything by way of test, or is all this matter of observation only?

Mr. MECCHI: We were so convinced by the result of only a week's trial, that we have ever since continued to give them their food cooked. It has led to a saving of a sack and a-half of meal per day. The mode which we adopt is this: A copper of water is boiled, about three bushels of cut straw are put into it, meal is added, then more straw; the whole is then rammed into one solid mass. It is then left till the next morning, when it is given to the animal warm. And this particular fact must be observed—it is a very important one: that which was before light and feathery becomes solid and heavy like lead, as heavy as pudding. The animals eat it greedily; and, instead of being at their troughs three or four hours a day, I can safely say that they devour their food in less than half an hour, after which they lie down. They drink much less water, too, than when their food was given to them in a dry state. I am quite sure that farmers would be able to keep three times their present amount of stock by the consumption of straw, together with the use of a certain amount of meal and linseed. I have also found that it is most injudicious to administer oilcake in lumps. A gentleman has lately taken the trouble to examine with me the excrements of animals, and we observed that at least half the food which the animal eats passes away undigested (Question). I am only alluding to this on account of its bearing on the consumption of roots.

The CHAIRMAN: I think Mr. Mecchi's recent observations have not borne directly on the question before us (Hear, hear).

Mr. MECCHI: Perhaps not strictly.

The CHAIRMAN: This can hardly be called a test. It is merely a statement of Mr. Mecchi's opinion. If he had had a certain number of beasts under one regimen, and a certain number under another at the same period, and if upon one set of beasts he had tried the mode which he has described, we should have been able to arrive at some definite conclusion; but at present I do not see that we have anything to guide us.

Mr. MECCHI: I consider that the charge on the subsequent crops depends on the amount of profit which you make by the consumption of the roots; the question depends entirely on the price which you are able to make of the roots when you have grown them. That is, in my opinion, the real test. The most difficult point which I have found in farming is the profitable conversion of the green and root crops; and I have satisfied myself by experience that this system is the best. I will not occupy your time further, unless it be to say that I consider that a large consumption of straw is the point on which the profit of farming hangs. I may remark also that it is very desirable that we should arrive at some conclusion with regard to the system of ploughing in the autumn, in doing what some of my Essex friends do, namely, giving seven or eight ploughings. It is quite evident that there is a great discrepancy in the cost of production. I agree with Mr. Lawrence that the land should be broken up after harvest. I do hope that you will all take the trouble to try the consumption of straw as a substitute for making it into dung heaps; for I am quite sure you would find the advantage of doing so

very great. As regards the cooking of hay and straw, I may observe that while it is going on you would not know whether or not brewing was taking place.

Mr. OWEN: You make the straw malt and the hay hops (laughter).

Mr. MECCHI: It may be so. I dwell on this point the more because I consider it the testing point of profitable farming. When we have seen Mr. M'Culloch succeed in these difficult times in converting his green crops profitably, I think we should try whether we cannot imitate him. I have tried successfully, and have thus mastered what was before a difficult matter to me—the feeding of bullocks.

Mr. AMBROSE: When the straw is not worth carting home your system would not do.

Mr. MECCHI: I apprehend that is never the case?

The CHAIRMAN: Oh yes, it was so in Sussex in 1818.

Mr. MECCHI: The cost of housing animals in buildings of brick and slate, with boarded floors, is one farthing per week for pigs and sheep, and six farthings for bullocks, to pay me 10 per cent. for the outlay.

Mr. W. BENNETT rose and said: It is, gentlemen, not a little marvellous that what most practical farmers have regarded as exploded some twenty years ago, namely, the feeding of cattle on straw, should have been just now represented as that on which the profit of farming hinges (Hear, hear). Mr. Mechi may be right, but it is certainly singular enough that the practical farmers of the present day should have exploded a practice long since, which is all at once introduced as the very thing which is to save them fortunes; and that which we had regarded as obsolete should have been again revived by our modern agriculturists in the manner that it has been. Mr. Mechi says that all the straw is to go through the stomach of the animal, and a pretty job we shall have in some instances to get it through (Hear, hear), especially if you happen to have a wet season (cheers). It is certain you must give the animals something very tempting at the same time to induce them to eat it (Hear, hear); however good their appetite may be, unless you give them other food far more palatable they will not eat it; and if you even succeed, what will this straw do towards making beef? (Hear, hear). You may make straw more palatable, but what do you accomplish after all? I think we are justified in exercising a little caution where the profits of farming are made to hinge on this point and then on that, the turning point now being the consumption of straw (cheers). As to making those platforms and sheds, and all that sort of thing, I do not think that in the present state of affairs we should find landlords prepared to go the whole hog in this matter, and I cannot imagine that practical farmers would be justified in incurring such expense. Sheds are doubtless very important, as warmth is necessary for the successful feeding of animals, but boards are another thing. I sincerely hope that when our friend Mr. Mechi comes out with his balance sheet we shall see all these things really brought to bear (Hear, and laughter); but at present I regard all these statements as the statements of a gentleman who is

very scientific certainly, and who possesses a great many excellent qualities, but who is rather too whimsical a farmer to stick to anything long enough to be able to tell us what is really useful (laughter). When we remember that we have in Mr. Mechi a gentleman who first commenced draining by putting stones at the bottom and tiles at the top (laughter), practical men may well be disposed to weigh these notions before they adopt them by wholesale (cheers), more especially when the adoption is attended, as it must be, with a considerable outlay of money. There is an immense quantity of straw in the fens of Lincolnshire and Cambridgeshire of so very inferior a quality that we never think of getting it through the animals, and I have my doubts whether it would not be more expensive to cut up all this straw than it would be worth. After all, it would be nothing but filling the animal. It cannot, I suppose, be contended that boiling imparts any feeding quality to straw, but makes it somewhat more palatable, and enables you to mix up other food, and a portion of the sweetest straw may occasionally be so used to advantage. I cannot, however, but receive Mr. Mechi's suggestions with some degree of caution. (Hear, hear). I know his observations were well intended, but I think they must be regarded with much caution. This is, however, rather apart from the subject, and the only excuse which I can offer for having wandered from it is, that Mr. Mechi led the way. I, for one, feel indebted to Mr. Lawrence for his observations with respect to the proper mode of growing turnips. I coincide, however, in the observation of a subsequent speaker, that no ordinary arable farm will furnish on one-fourth of the farm 20 tons of manure per acre. No man can on a given quantity of arable land produce that large quantity per acre. If he can produce 10 or 15 tons per acre, it is quite as much as he can obtain, and even if he could, it would be better husbandry to apply a portion of it to other crops rather than use it all for turnips. The subject is one of great practical importance. I have myself, for the last 10 or 12 years, generally used from 10 to 12 tons of farm-yard manure per acre with rape-cake or other artificial dressings, on a naturally weak soil, such as superphosphate of lime, &c. And thus I have managed to grow on poor land an extremely fine crop of Swede turnips, and, on the whole, I do not know how I could do better than recommend the farmers of the country generally to adopt a similar method, more especially with regard to weak land. (Cheers).

Mr. THOMAS: I need not tell any one here that I am a practical man, having been a farmer on an extensive scale for many years, and I, like many others of my friends, was for a long time in the habit of not using any light dressing; but I was at length led to consider whether it might not be very beneficially applied, rather than resorting to farm-yard manure at a time of year when it is exceedingly valuable. For some time I adopted the plan of giving the land a partial dressing of farm-yard manure, and then raising turnips by drilling in the light dressing, using less manure each time. I found the crop of turnips was quite as large when applied to the crop of wheat previously, as when applied to

the turnips; and I am so thoroughly convinced of this, from experience and observation, that for the last few years I have not used a single load of farm-yard manure to the turnip crop, but applied it all to the clover and bean stubbles for the growth of wheat, using only light dressings for the turnips. I have tried this in mixed soils, both of loams and of sands; and I have never found any manure which would bring them earlier to the hoe and secure a better crop than superphosphate of lime. With regard to the quantity of turnips that should be used for cattle, I think it does not require the experience of my friend Mr. Mechi to find out that turnips can be given in too large quantities. This was remarked by Sir John Sinclair in 1790, and also by Arthur Young; and in the Journal of the Royal Agricultural Society, in which one may find writings made up from old books, which one has read when a boy, it is mentioned again and again; but when Mr. Mechi tells us that half a bushel a day is the largest quantity that beasts can have with advantage, I can only say he is in error (Hear, hear). In large shorthorned oxen I have taken particular notice of the thriving of the animals and the manner in which their dung has been passed through them, and I have no hesitation in saying that a hundred-weight per day, equal to two sliced bushels, is not too large a quantity for an animal weighing 100 stone, and in good health, and that it will thrive better on that than on any smaller quantity. With regard to the consumption of straw by the animals, there was an opinion many years ago that all the straw ought to be eaten by them, and Mr. Mechi revives it; but there has been a growing opinion from the year 1790, when farming took such an extraordinary start in Scotland, that less and less straw ought to be consumed on the farms, and that we ought to resort to a better description of food, in order to improve the dung, not only in combination with straw, but without it; and if you look at the kind of farming that existed in the Lothians, you will find that the practice was to draw off one-third part of turnips for the beasts, and consume one-third part of straw, and the other two-thirds of the turnips were eaten off with extra food by the sheep. But after a length of time you find Arthur Young, in his Calendar, mooted the question, and giving the authority of perhaps half a score or a score of the best farmers in England, as to the propriety of straw being used at all; and he gives it as his particular reason that manure made in that way is very inefficient to the growth of turnips afterwards, and that you ought to endeavour not only to get concentrated essence in your manure, but to give as large a quantity as you can, provided you maintain its quality; and he conceived that the best way of doing that was by not consuming any straw at all, but by giving simply oil-cake and clover chaff. But there is no doubt that in feeding cattle we can concentrate the nutritive part in a very great degree, though we know that the bowels of most animals must be distended in order to make the food work well. Therefore I am not at all inimical to giving beasts a certain portion of straw, and I think the best plan is to give cooked straw and boiled linseed by way of a compound. We have not yet ar-

rived at the *acme* of farming, and therefore we can only reason by analogy and experience, but we should always keep our eyes and ears open to improvements; and I have no hesitation in saying, that this new mode of steaming food is one of the best schemes of the times, raising as it does a larger quantity of manure; but I do not think the application ought to be made to the turnip crop, but to the wheat crops, relying solely on light dressing for the turnips, not only on account of the quickness of the time in which it brings the turnips to the hoe, but also on account of the better crop which it secures. The light dressing only costs £2 per acre, and will be well repaid in the sheep.

Mr. MECHE: What charge do you make on succeeding crops?

Mr. THOMAS: About £3 per acre.

Mr. MECHE:—There has been an objection to the making dunghoops, on account of the dissipation of the ammonia?

Mr. THOMAS: I believe most farmers cover them with a layer of earth.

Mr. NESBIT: It cannot escape if you apply to it marl and any calcareous matter, for it will be turned into nitre. That is the way the French made the saltpetre to blow us up with during the old war.

Mr. MECHE: The one I made some time ago poisoned the water for some miles.

Mr. RAMSEY: I think our friend, Mr. Lawrence, has sufficiently elucidated the question to put any experienced person in the right way of producing a crop of turnips successfully. The arguments which have since been adduced have not, I am sorry to say, borne so closely upon the subject as I should have liked. The questions of making straw into manure, and cooking—forgetting that we have some ruminating animals who will work in their own way—may be questions for another occasion. But I think our friend's estimate of the cost of producing swedes is higher than necessary (Hear, hear). I certainly think that the outlay our friend Mr. Lawrence says is necessary, for converting it into butcher's meat would render the crop a losing one altogether; but if he errs at all, he errs on the right side, for it is better to show at once that you can scarcely produce large crops without considerable outlay, than to deceive each other by saying that you can have large crops upon a small outlay. I agree with Mr. Thomas and others, that the mixture of manures is one of the best methods of raising turnips. I need scarcely tell you, that in our district, where we grow immense quantities of swedes and white turnips upon all kinds of lands, our farming interests could not otherwise have been so prosperous as they have been. I have just received a letter, written by a gentleman named Elliott (of Dumfries), one of the cleverest men I ever saw, and having very considerable experience. In the Scotch magazine he goes into the subject very deeply. Forty farmers compared notes of their swede crops, and he stands at the top of the list, having poor land, which he took at 2s. 6d. per acre, on what is called an improvable lease; and he shows in the *Highland Society's Journal* that he produced the largest weight.

Now this is a subject of great importance. I believe the Swedish turnip requires more room than any other crop. It has often been thought that it might be drilled closer than wheat, but the fact is quite the reverse; you cannot get a good crop of swedes unless you give them room. He says he is this year using 12 yards of dung, 12 bushels of bones, 2 cwt. of guano, and 1 cwt. of dissolved bones. That is a very heavy dose indeed, but I know Mr. Elliott's land to be of such an inferior description that it is quite necessary. Supposing he was to make a deduction from this quantity he would have the same cost to pay on the land in every other respect; and the question with him is, whether by giving an additional quantity of manure he gains a more than proportionate quantity of swedes. I have known him weigh 30 tons per acre. Now, if 20 tons per acre can be produced with what I would call an efficient manuring, and 10 tons more could be produced with a little addition, it might prove a source of handsome profit to the farmer. I am sure that we do not sufficiently attend to some of these points; and notwithstanding the depreciation of price, like my friend Mr. Elliott, I think, that this is the time when if any man has money he should not hold back, but manure better than he has done before. If he begins to take off the manure and to cultivate more cheaply, he may rest assured that the profit will be less. I did hope that this subject of the Swedish turnip would have been followed out by some very experienced gentleman in this room, in addition to our friend Mr. Lawrence; but I pretty well know, from experience, that 30 tons an acre can be grown, if the land be not too light. But at the same time, I believe there are many other kinds of turnips which ought to be cultivated as well as swedes. We have long been in the habit of reading that the old Norfolk globe and the swede were the two greatest desiderata; the one producing weight, and the other quality. If we were to look closely into the subject, and ascertain what quantity of turnips an animal can eat, we should find that 20 tons of swedes would likely produce as many pounds of beef or mutton as about 35 tons of white. I believe the proportion has been shown by experiments in many cases. The weaker the quality of the food the more the animal will consume; the richer and stronger the food, which is the Swedish turnip, the less will the animal consume, and give as much, perhaps more weight to the butcher. Therefore, the swede is a very valuable kind of turnip; it not only stands the English winds well, but in the spring it is one of the most valuable supports a farmer can possess for all his cattle, and particularly for his ewes and sheep. I think if Mr. Lawrence would apply 10 or 12 square yards or tons of rotten dung in opposition to 20 yards he would perhaps see that there was not much difference in the crop. It is perfectly certain that no farmer producing manure from his own growth, can raise even 10 tons of dung to the acre; he must purchase either one kind of manure or the other. With regard to what Mr. Mechi said on the cooking of food, I believe great improvements are to be made on that particular; and the

greatest desideratum is raising a root crop and eating it upon the land with sheep. It is not only the eating of the crop; but upon light soils, that are naturally turnip soils, the treading of the land makes it form a different body. It would grow wheat where it would never do it before, entirely through this system. I know lands which, after wheat was thus grown, produced excellent clover, then two or three years of grass, and then corn again. Besides, if you introduce sheep upon land on which there is a heavy crop of turnips, and let them eat them, all the couch grass will be destroyed, and will not rise afterwards. The plan I have mentioned is one of the best modes of making land clean with which I am acquainted.

Mr. SHAW said, This question is so purely practical that I should not have ventured to offer any remarks upon it were there not one circumstance, or rather an incident, connected with the Swede turnip crop which is not, I think, generally known. I was reminded of it by an observation which fell from Mr. Ramsey, that a gentleman in the neighbourhood of Dumfries has grown on very poor land thirty tons of swedes per acre. It is a singular fact, that as you advance north the swede flourishes better, grows to greater weight, and is intrinsically of a better character than the same root in the south. That has been proved lately by examination and comparison. I believe it will be found invariably that in the growth and use of the swede in Scotland, the farmers there enjoy a great advantage over those of the south, on account of the climate, and that the swede is much more effectual in its feeding qualities there than in the south. I believe that if a given quantity of swedes grown in the north and a like quantity grown in the south, were given to animals of equal aptitude to fatten, the feeding qualities of the former will be found very superior to those of the latter. Although that point has not attracted attention till lately, the view is perfectly rational, for it is plain that any root may be expected to flourish best in its native climate or which approaches nearest to it.

A MEMBER.—Did you speak of a Scotch acre in mentioning the quantity grown?

Mr. SHAW.—I would take any given quantity. I was alluding to Mr. Ramsey's remark.

Mr. F. HOBBS.—It was not my intention to make any remarks this evening, but I wish to back up Mr. Lawrence and Mr. Shaw in their statements. In the first place, I quite agree with Mr. Ramsey that in order to obtain a good crop of turnips we must manure heavily, and that the old system of manuring with farm-yard dung alone is not so advisable as that of having a portion of farm-yard dung and a portion of artificial manure. We are, I think, all very much indebted to Mr. Lawrence for the able manner in which he has brought forward the subject. His plan with regard to preparing land for turnips coincides in a great degree with my own. I do think that the material points in reference to the production of a heavy crop of turnips is to prepare the land as much as possible in the autumn, and to cultivate deeply. I agree with Mr. Lawrence that those two points are most essential. With regard to spring cultivation,

I may observe that in the county of Essex it is frequently done very disadvantageously. We frequently plough in a dry climate, and so retain many clods; whereas by the use of Biddle's scarifier and other machines of a similar nature, we go deeper and secure moisture, and the land makes a better seed bed than when cultivated on the old system of ploughing. With regard to a remark made by Mr. Shaw, I may observe that I have myself seen at Mr. Skirving's, near Liverpool, and at other places in Lancashire, crops exceeding 30 tons weight per acre, though the same labour and attention which we in the south bestow had not been bestowed there. Again, mangel wurzel, which is a plant that comes from a hot climate, has only been introduced into this country a few years, and we find that in the south, where it has most sun, it will flourish better than in the north. I find that the more humid the climate, and the moister the season, the worse our crops are; and I therefore have no doubt we should find it advantageous to grow turnips of a different character to the swede, unless the land be peculiarly suitable for them. There are turnips in the present day, which even in Scotland are admitted to produce more beef and mutton up to Christmas. The point introduced in reference to manure is one which deserves great attention. We have here two champions of two particular systems sitting side by side. Our friend Mr. Lawrence is certainly carrying out the box system most admirably. I have not met with an instance in any part of England in which it is perhaps carried out so well; the straw not being given to the animals to consume, as on Mr. Mechi's farm, but in a cut state for them to tread down into manure. Mr. Mechi told us a few minutes ago that we could not grow turnips at a profit unless we fed our animals straw from the land. It has been stated that in many instances both turnips and mangel wurzel are grown at a loss of several pounds per acre; and Mr. Mechi tells us that he has found a panacea for that evil, namely, to give animals straw in a prepared state. I condemn Mr. Mechi's plan, because I think that its adoption would lessen the quantity of manure in the country, would also lessen the supply of beef and mutton, and would be injurious to agriculture generally. The experience which I have had in farming has taught me that there are seasons in which it would be impossible to give straw to animals with advantage. I have known two or three wet seasons in which the straw was so bad that with no amount of steaming or boiling could it be given with satisfaction. I will not trouble you with any further remarks, conceiving, as I do, that the subject is nearly exhausted.

The CHAIRMAN: Previously to calling upon Mr. Lawrence to reply, I will give you a little of my experience with regard to the growth of the turnip. I quite agree with those gentlemen who hold that the best mode of manuring for turnips is to use a portion of yard manure and a portion of artificial manure. Our plan used to be to make manure on the farm to the extent of 20 or 30 loads per acre, and to make up the rest with whatever we could get. That plan has now been exploded for some time. I think we have for the last two

or three years been growing as good turnips as can be seen in any part of the country. Our system has been recently to put on ten cart-loads of good manure, and to drill in the artificial from the top; and that system, I am satisfied, as regards my soil, is the most beneficial that can be adopted. Mr. Thomas has told us that he does not cart manure for turnips at all. I could not carry out that system on my own farm. If I were to manure my land for wheat I should have great bulk and no quality. We find that the further the manure is from the wheat crop the better. I can easily understand that such a method might suit with our light land very well; but every man must study the character of his own soil, and adopt that plan which seems most expedient for himself. I am happy to hear the remarks which have been made this evening, with regard to the use of two descriptions of manure for turnips. That is a system which in my own district has been found most advantageous. I cannot concur in Mr. Mechi's opinion with regard to cutting up all the straw on the farm; and I must say that, if even it might be otherwise desirable to carry it out, we should never get buildings or steam enough for the purpose of consuming all the straw on our farms.

Mr. RAMSEY observed that on one occasion he was one of twenty farmers who put down their names for a sweepstakes for the growth of the largest quantity of white turnips, and in the result, although he grew upwards of forty-four tons, he was second.

Mr. LAWRENCE replied: As regarded Mr. Nesbit's observations, he was quite aware that Liebig, like Mr. Mechi, had sometimes been charged with taking different views at different periods; but he did not think Liebig had ever distinctly admitted that he was wrong in the particular referred to. He had only mentioned the matter for the purpose of showing that there were persons who did not concur in the opinion laid down by Mr. Huxtable. Professor Johnston and others had distinctly stated that they did not know by what means plants obtained ammonia, or how assimilation was performed for the purposes of nutrition. There were many speculations afloat on the subject, some entertaining one view and some another. He had merely intended to put the matter in this shape—that Mr. Huxtable was not justified in telling them that they could grow so many bushels of swedes by the use of so many pounds of ammonia, or could produce beef with certainty at so much per lb. He quite agreed with Mr. Bennett that twenty tons of manure were more than could be generally made. It was exceedingly hard work to produce that quantity. His own experience justified him in saying that he could produce it, but he did not think the case general. He fully admitted the advantage of mixing manure; but he thought it important that in these times they should see whether they could not get on without buying, and therefore it was that he had treated the subject as he had done. Where there were so many fixed charges, it was a matter of economy to secure, if possible, a good crop. So far as the turnip was concerned, he doubted whether the extra 10 tons of turnips would pay for the extra manure which Mr. Ramsey recommended them to use.

He was not sure whether he had rightly understood that gentleman, that he used 12 bushels of bones in addition to farm-yard dung.

Mr. RAMSEY: Yes.

Mr. LAWRENCE: Well, he knew not what was the price in Mr. Ramsey's district, but in his own district 12 bushels of bones cost 30s., and 2 cwt of guano 20s.

Mr. RAMSEY: Yes.

Mr. LAWRENCE continued: He could not make out more than 30s. for the extra quantity of roots, according to the testimony of Mr. Mechi and Mr. Fisher Hobbs. He thought they could hardly be going to work economically in applying such a quantity of manure to get ten extra tons of turnips per acre. As regarded the application of twenty tons of manure for the turnip crop, it must be borne in mind that in the system under which that was recommended no other manure was added. That quantity was intended to carry through the whole rotation, and not merely to raise the turnip crop. Mr. Thomas had suggested that a portion of the manure might be applied to other crops. He had wished to elicit from the meeting whether it was the feeling that it should be applied to the wheat in part or to the seed crops. He had understood Mr. Thomas to say that he had found it most beneficial to apply it to the seeds and the beans.

Mr. THOMAS: Wheat and beans.

Mr. LAWRENCE went on to remark that he agreed with Mr. Hobbs on the subject of mangold-wurtzel. Up to a certain period it was much more valuable than the swede. Whatever might be the case up to the 1st of March or thereabouts, from that time the turnip began to deteriorate; and they wanted roots in backward seasons to carry them on up to the 1st of June. This showed the great value of mangold-wurtzel. He had this year more than doubled his growth of mangold-wurtzel with that view.

After some discussion, on the motion of Mr. Shaw, seconded by Mr. Nesbit, the following resolution was agreed to:—“That the best mode of securing a heavy crop of swedes is by the use of a fair proportion of farm-yard manure, with the addition of a dressing of some accredited artificial manures, and that the cost per acre will necessarily vary according to circumstances; that as regards the proportion of the expense chargeable to the succeeding crops in rotation, there has not been sufficient information afforded to warrant a positive conclusion, but that it may be estimated at from one-third to one-half.”

On the motion of Mr. W. Bennett, a vote of thanks was given to Mr. Lawrence for the able manner in which he had introduced the subject.

This terminated the proceedings.

PROTECTING FRUIT TREES.—Whether protection to agriculture is necessary I leave to be decided in the arena of political discussion, but that it is indispensable in horticulture, in reference to fruit trees, I have had this spring sufficient and undeniable proof. My apricot trees were protected principally with canvas, the usual description; but, notwithstanding, a great deal of the bloom was cut off during the severe frosts in March. I frequently examined the bloom in the morning after a frost, and invariably found ice imbedded as it were around the embryo fruit, and this at a time when the weather was very dry. The result is, on some of the trees which was covered with bloom I shall scarcely have

half a crop. And if this is the case with protection, what would they have been without it? I am fully convinced that a single covering of canvass is not a sufficient protection for apricots during such severe weather as we had in March. My peaches and nectarines have escaped, owing no doubt in part to their being later in coming into bloom; but I believe they will stand a greater amount of frost than apricots. I believe temporary coping-boards of much utility in keeping off a great amount of frost, and I would invariably use them where I could have them. I have none here, and I will mention a case in point which I think goes far to prove their utility. There are two apricot trees here growing against a wall bearing a southern aspect, which have by far the best crop of fruit upon them, and over which hangs what I may term a natural coping, for it grows there. There is growing on the other side of the wall some ivy, which has reached the top, and which projects over the south side about a foot, forming a most effectual coping. By the bye, these two trees were not covered with canvas, but with double-twine netting, and which I do not consider so effectual as canvass. Surely it is enough to lose above half one's apricots; but no, I have even greater tale of woe to tell yet—plums, cherries, and all other fruit trees promised a fine crop (and surely we might hope to be secure when the sweet month of May had arrived); but no, on the night of the 2nd inst. John Frost worked sad and irremediable mischief; plums and cherries, which were covered with bloom and setting beautifully, no matter what kinds or what aspect they occupied, were alike injured, and the Morello cherry with me did not escape. I believe full three parts of the crop of plums and cherries are gone; and I am afraid a great many of the young pears will drop off, for the styles of many of them appear to be withered before their time. In the open quarters gooseberries and currants have suffered much. The expanded strawberry blossoms are all black in the centre. Asparagus shoots that escaped the knife are all hanging their heads like whips; and the poor potato is much affected, not even escaping at the foot of a south wall, but all cut down to the level of the ground. The apple blossoms not having been expanded so soon, are still safe, and that is some consolation. The frost was very severe this morning (May 10); the vegetables covered with hoar, and the mats on the frames frozen as stiff as a board. Three years ago I was living in Hertfordshire, and I find by my *Journal* that in 1847 we began “bedding-out” on the 10th of May. The last frost is dated May 3rd, when the thermometer fell to 32 degrees by morning. Our plants were standing out to harden some time before bedding, and here I dare not trust them without a mat yet. Surely there must be a great difference in the seasons; but I also consider that the severe weather we experience here is partly owing to the low situation in which this garden is situated, and also to the presence of so much water, a stream running through both the flower and kitchen garden. I cannot conclude without remarking how “penny wise and pound foolish” it is for any gentleman to build expensive walls and plant them with valuable trees, having them trained and managed in first-rate order, and risk the loss of the crop of fruit for want of effectual protection.—HENRY WOOD, Tichbourne Park.

STALLIONS FOR THE SEASON.

Name.	Colour.	Age.	Pedigree.	Performances.	Principal Performance.	No. of winners out by.	Sire of	Standing at	Apply to	Price.
Alman	bay	8	by Venism, out of Southdown, by Defence	started 17, won 13	won Ascot Cup	untried.	—	Hampton Court	Mr. F. Croft	15 gs.
Almanade	brown	8	by Touchstone, out of Reliance, by Lottery	started 15, won 3	ran second for Derby	untried.	—	Lane Paddocks, Sheffield	Mr. F. Croft	10 sovs.
Archy	bay	11	by Camel, out of Garcia, by Octavian	started 8, won 3	won £1,000 at Newmarket	untried.	—	Stockbridge	Mr. Isaac Sadler	5 gs.
Arsicote	brown	11	by Physician, out of Solace, by Longwaist	started 60, won 18	won Liverpool Cup	untried.	—	Stockbridge	Mr. Young King	10 sovs.
Ascot	bay	18	by Reveller, out of Angelica, by Rubens	started 8, won 4	ran second for the Derby	4	Fernhill	Old Warden, Beds	T. Morgan	6 gs., h. b. 3 gs.
Auckland	brown	10	by Touchstone, out of Maid of Honour, by Champion	started 9, won 5	won £700 at Ascot	untried.	Castoff	Stoke's Farm, Wokingham	Mr. Rand	10 gs., h. b. 5 gs.
Auctioneer	bay	14	by Pantaloon, out of Puff, by Waterloo	never appeared	—	untried.	Flying Dutchman	Malton, York	W. Wilkinson	5 gs., h. b. 2 gs.
Bay Middleton	bay	7	by Sultan, out of Cobweb, by Phantom	started 7, won 3	won the Derby	82	—	Drubury, Stockbridge	—	30 gs. (30 mares.)
Beverley	bay	5	by Heaton Platoff, dam by Plenipotentiary	started 4, won 2	won £275 at Chester	untried.	—	Drubury, Stockbridge	Mr. C. Lilly	7 gs.
Black Prince	black	8	by Touchstone, out of Queen of Trumps, by Velocipede	started 1, won 1	—	untried.	—	Kilsby, Rugby	Mr. C. Hunt	3 gs.
Burgundy	bay	7	by Ishmael, out of Caroline, by (Irish) Drome	started 94, won 13	won Newton Manor Cup	untried.	—	Eastby Abbey, Yorkshire	T. Winttingham	7 gs., h. b. 3 gs.
Cesar	bay	14	by Sultan, out of Cobweb, by Phantom	started 6, won 3	won the Riddlesworth	9	Icicle	Wesby Hill, Wanksworth	J. Coppin	10 gs., h. b. 3 gs.
Calnuck	bay	17	by Zingone, dam by Rubens	started 27, won 12	won Gorhambury S	untried.	—	West Hill Farm, Wands- worth	J. Coppin	5 gs., h. b. 3 gs.
Catesby	bay	10	by Slane, out of Cobweb, by Phantom	started 1, won 1	—	untried.	—	Wellbourn, Strat- ford-on-Avon	Mr. Taylor	10 gs., h. b. 3 gs.
Cato	chestnut	12	by Muley Moloch, out of Miss Fox, by Glowworm	started 2, won 1	won £50 at Beverley	untried.	—	Carnaby, Burlington	Mr. H. Rolinson	—
Charles XII.	brown.	14	by Voltare, out of Wagtail, by Prime Minister	started 34, won 19	won St. Leger	13	Fire-eater	Lane Paddocks, Sheffield	Mr. F. Croft	10 sovs.
Chatham	chestnut	11	by The Colonel, out of Heister, by Camel	started 16, won 8	won the Criterion	3	Woolwich	Ham, Arundel	R. Mates	13 gs.
Chesterfield	chestnut	6	by Chesterfield, dam by Glaucus	never appeared	—	untried.	—	Wroughon, Swindon	Mr. H. Reeves	5 gs., h. b. 2 gs.
Conyngham	bay	6	by Slane, dam by Whisker	started 8, won 1	won 2,000 Gs. Stakes	untried.	—	Wilkeson, Northampton	Messrs. Tattersall	11 gs.
Cootherstone	bay	10	by Touchstone, out of Emma, by Whisker	started 11, won 2	won the Derby	11	Glaucus	Althorpe, Northampton	Mr. J. Elliott	25 gs. (20 mares)
Cranebrook	chestnut	7	by Alcaston or Lord John, out of Uganda, by Tiresias	started 19, won 6	won the G. York Handicap	untried.	—	Cow Lane, Northampton	Mr. S. Dickens	7 gs., h. b. 3 gs.
Crozier	bay	6	by Lanercost, out of Crucifix, by Priam	started 13, won 3	won £650 at Ascot	untried.	—	Ardee Co., Louth	Mr. Hatch	4 sovs., h. b. 2 sovs.
The Cure	brown.	9	by Physician, out of Morsel, by Mulatto	started 26, won 15	won the Claret	untried.	—	Rawcliffe Paddocks, York	Mr. T. Bateson	7 sovs., h. b. 3 sovs.
Delirium	brown.	19	by Filho da Pata, out of Lanatic, by Prime Minister	started 17, won 6	won a Royal Plate	4	Insanity	Malton, York	Mr. W. Wilkinson	6 gs., h. b. £2 5s.
Dulcimer	chestnut	14	by Muley, out of Dulcamara, by Waxy	started 1, won 1	—	3	Dulcet	Corralls Farm, Wood- ford, Walls	B. Horriott	30 sovs.
Earl of Richmond	brown	10	by Touchstone, out of Queen of Trumps, by Velocipede	started 1, won 1	won Lyme Park Stakes	2	Goodwood	Clay Hill, Enfield	Mr. A. Grey	7 gs., h. b. 2 gs
The Emperor	chestnut	9	by Defence, dam by Reveller	started 4, won 2	won the Ascot Cup (2)	untried.	—	Quidenham, Norfolk	Mr. W. Edwards	12 gs.
Epirus	chestnut	16	by Langar, out of Olympia, by Sir Oliver	started 81, won 12	won Copeland Handicap	13	Pyrrhus the First	Pitford, Northampton	Mr. Potterton	20 gs. (40 mares)
The Fallop Buck	brown	5	by Venism, out of Plenaria, by Emlinus	never appeared	—	untried.	—	Ander's Ash, Peterborough	Mr. W. Ayling	12 gs., h. b. 5 gs.
Faugh-a-Ballagh	brown	9	by Sir Hercules, out of Guiccioli, by Bob Booty	started 9, won 5	won St. Leger	untried.	—	Dean's Hill, Stafford	Mr. J. Painter	10 sovs., h. b. 5 sovs.
Footstool	bay	7	by The Saddler, out of Prudge, by Tramp	started 24, won 13	won Swinley Stakes	untried.	—	Turf Tavern, Doncaster	Mr. W. Sherley	5 gs., h. b. 2 gs.
Fossil	brown	10	by Sheet Anchor, out of Valentin, by Cervantes	never appeared	—	untried.	—	Twickenham, Common	Mr. W. Sherley	5 gs., h. b. 2 gs.
Gabrial	bay	6	by Bay Middleton, out of Flycatcher, by dolphin	started 14, won 3	won £325 at Doncaster	untried.	—	Erdington, Birmingham	J. Sheppard	5 gs., h. b. 2 gs.
Gadipoli	brown	14	by Sultan, out of Velvet, by Oiseau	started 5, won 1	won £50 at Newmarket	1	Christiana	Hampton Court	—	5 gs., h. b. 2 gs.
Gilbert Gurney	chestnut	15	by Muley, out of Miss Orville, by Pendulum	started 19, won 4	won Wolverhampton S.	5	The Traveller	Old Warden, Beds	T. Morgan	6 gs., h. b. £2 10s.
Gentitt	chestnut	6	by Plenipotentiary, out of Glenai, by Sultan	started 4, won 3	won the Clearwell	untried.	—	Danebury, Stockbridge	—	2 gs.
Gwalior	bay	8	by Dick, dam by Whisker	started 15, won 5	won Leamington S.	untried.	—	Ketton Hall, Stamford	Mr. Toon	2 gs., h. b. 3 gs.
Harkaway	chestnut	10	by Economist, dam by Naboclish	started 38, won 25	won Goodwood Cup (2)	2	Peep o' Day Boy	Wilkeson Paddocks	Messrs. Tattersall	19 rs.

Hautboy	chestnut	13	by Muley, out of Dulcamara, by Waxey	started 25, won 6	won £110 at Hereford..	untried.	Carroll's Farm, Woodford Wells	10 sovs.
The Hero	chestnut	7	by Chesterfield, out of Grace Darlinz, by De-force	started 37, won 29	won Emperor's Plate (2)	untried.	Daubeury	10 gs.
Heron	brown	17	by Bostad, dam by Orville.	started 41, won 17	won Liverpool Cup	8	Ribaldry	10 gs.
Herman Pitoff	brown	14	by Brutaudorf, dam by Comus.	started 10, won 6	won Northumberland P.	39	Cossack	10 gs.
Idas	bay	8	by Liverpool, out of Marvessa, by Muley	started 24, won 13	won 2,000 gs. Stakes	untried.	White Lion, Melton	—
Johnny	brown	13	by Elvas, out of Perdila, by Langar.	started 40, won 8	won Ascot S.	untried.	Fox Hall, Lamport	Mr. G. Treadgold
John of Gaunt	chestnut	19	by Taurus, out of Mona, by Partizan	started 38, won 29	won Newmarket S.	1	Newmarket	Messrs. Barrow.. 15 gs. (40 mares.)
Jon	brown	15	by Cain, out of Margate, by Edmond.	started 6, won 1	won second for the Derby	8	Newmarket	Messrs. Barrow.. 15 sovs.
King of Kildare	bay	2	by Touchstone, out of V. Stephens, by Velocipede	started 3, won 2	won Liverpool St. Leger	untried.	Middlethorpe, York	Mr. Smallwood.. 10 sovs., h. b. 5 sovs.
King of the Whistle	chestnut	12	by Tearaway, out of Anna Maria, by Huntingdon	started 22, won 8	won Curraghmore S.	untried.	Leicester	Mr. Bailey, V.S. 5 gs., h. b. 2 1/2 gs.
Kremlin	brown	14	by Sultan, out of Francesca, by Partizan	started 13, won 6	won R. Hunt Cup	untried.	Skirmish, Henley-on-Thames	Mr. T. Hussey.. 5 gs., h. b. 2 1/2 gs.
Lanercost	brown	13	by Liverpool, out of Otis, by Buzzard	started 40, won 96	won Ascot Cup	65	Passion Flower.. High Wycombe	Mr. T. Robinson.. 7 gs., h. b. 2 gs.
The Libel	brown	8	by Pantaloon, out of Pasquinade, by Camel	started 7, won 3	won Chester St. Leger	untried.	Burgley, Stamford	Mr. H. Rose.. 25 sovs. (35 mares)
The Little Known	bay	14	by Muley, out of Lacerta, by Zodiac	started 2.....	---	1	Bacon Castle, Co. Down	R. Fleming.. 8 gs.
Little Tommy	chestnut	16	by Tom Brown, out of May Day, by Sir Ulic	started 8, won 1	won Gt. Monmouth S. C.	untried.	Willshaw Paddock	Messrs. Tattersall.. 11 gs., dams of winners 2 1/2 gs.
Louthborough	brown	22	by Mamuluke, dam by Sholensko	started 4, won 3	won Goodwood S.	---	Ladykirk, Berwick-on-Tweed	C. Cotton.. 3 sovs., h. b. £1 10s
Manchester	bay	16	by Whisker, out of Muta, by Tramp	started 36, won 11	won Ludford S.	17	Doonington, Hereford	Mr. Vevers.. 5 gs., h. b. 2 gs.
Melbourne	brown	8	by Humphrey Chinker, dam by Cervantes	started 18, won 9	won the Fatigue S.	---	Norton, Mansfield	Mr. B. Smith.. 10 gs.
Merry Monarch	bay	10	by Slane, out of The Margravine, by Little John	started 4, won 1	won the Derby	---	Syokan, Leicester	Mr. J. C. Moore.. 7 gs., h. b. 3 gs.
Minotaur	chestnut	6	by Taurus, out of Lynness, by the Flyer	started 22, won 12	won £800 at Newmarket	untried.	Turf Tavern, Doncaster	Mr. H. Robinson.. 13 gs.
Mr. Martin	brown	9	by Lanercost, out of Miss Martin, by Voltaire	started 2, won 1	won Windsor Shakes	---	Ham, Tunbridge	Mr. R. Mates.. 13 gs.
Morpeth	brown	6	by Muley Molech, dam by Cervantes	started 33, won 9	won Northamptonshire S	---	Burgh, Woodbridge	Mr. Reason.. 5 gs., h. b. 2 1/2 gs.
Mosque	bay	12	by Sultan, out of Legend, by Merlin	started 43, won 13	won Newmarket St. Leger	untried.	Burgh, Woodbridge	Mr. G. Holmes.. 5 gs., h. b. 2 gs.
Muley Molech	brown	20	by Muley, out of Nancy, by Dick Andrews	started 17, won 11	won the Port	79	Canary, Dunnington	Mr. H. Robinson.. 5 gs., h. b. 2 gs.
Napier	chestnut	10	by Gladiator, out of Marion, by Tramp	started 12, won 7	won the Clearwell	---	Cirencester	Mr. Lane, V.S. winners of 100 grates
Narwith	bay	10	by Tomboy, dam by Comus	started 7, won 3	won St. Leger	---	Eberston, Melton	Mr. J. Stebbing.. 5 gs.
Oakley	brown	12	by Taurus, out of Oak-apple, by Royal Oak	started 49, won 31	won the Column	---	Broughley, Stamford	T. Wilkinson, Esq. 20 sovs. (40 mares)
Old Perf.	brown	6	by Sir Hercules, out of Beeswing, by Dr. Syntax	started 4, won 1	won the Derby	---	Daiketh, Leicestershire	Mr. H. Rose.. 7 sovs., h. b. 3 sovs.
Orlando	bay	26	by Touchstone, out of Vulture, by Langar	started 11, won 10	won the Derby	---	Scottdale, Ilkerton	Mr. J. Luxton.. 5 gs., h. b. 2 gs.
Pantaloon	chestnut	19	by Castel, out of Italia, by Peruvian	started 7, won 6	won Warwick St. Leger	44	Bonehill, Tanworth	---
Penitentiary	chestnut	19	by Emilius, out of Harriet, by Pericles	started 8, won 7	won the Derby	45	Custon, Rugby	---
Poynton	bay	11	by Touchstone, out of Lady Stafford, by Comus	started 6, won 2	won Great Yorksh. S.	---	Horsboth, Linton	---
The Prior	brown	7	by Muley Molech, out of Rebecca, by Lottery	started 10, won 3	won £140 at Chester	---	Turf Tavern, Doncaster	Isaac Watson.. 7 gs., h. b. 3 1/2 gs.
Pyrrhus the First	chestnut	9	by Epirus, out of Fortress, by Defence	started 13, won 10	won the Derby	---	Stad Paddock, Malton	Mr. J. Mason.. 10 gs., h. b. 2 gs.
Ratan	chestnut	9	by Buzzard, dam by Picton	started 7, won 3	won the Criterion	3	Easby Abbey, Yorkshire	T. Wintingham.. 10 gs., h. b. 5 gs.
Ratcatcher	chestnut	20	by Langar, out of Rufina, by Blacklock	started 65, won 25	won the Cleveland Cup	---	Catterick, Yorkshire	Mr. J. Abbott.. 7 gs.
Red Deer	bay	6	by Venison, out of the Soldier's Daughter, by The Colonel	started 16, won 8	won the Chester Cup	---	Willshaw Paddock	Messrs. Tattersall.. 9 gs., h. b. 4 1/2 gs.
Red Hart	bay	6	by Venison, out of the Soldier's Daughter, by The Colonel	started 16, won 8	won Grand D. Michael S.	---	Newland, Hull	D. Price.. 10 gs.
Robert de Gorham	brown	11	by Sir Hercules, out of Duvernay, by Emilius	started 20, won 7	ran second for the Derby	2	York and Murton	Mr. Kirby.. 103 gs.
							Ham, Arundel	R. Mates.. 13 gs.

STALLIONS FOR THE SEASON—(Continued).

Name.	Colour.	Age.	Pedigree e.	Performances.	Principal Performance.	No. of winners out by.	Sire of	Standing at	Apply to	Price.
Robinson	brown..	15	by Robin, out of Miss Muley, by Muley	7 won £140 at Newcastle..	untried.	—	—	Skerne, Driffield	Mr. R. Stockdale	5 gs., h. b. 2 gs.
Roschus	brown..	14	by Turcoman, out of Miss Foote, by Whisker ..	started 15, won 12	untried.	—	—	Newmarket	Messrs. Barrow..	7 gs., h. b. 2 gs., winners and dams of winners of 100 <i>gratts</i> .
Ruff	brown..	8	by Jerry, out of Dublin, by St. Patrick	started 17, won 4	untried.	—	—	Stud Paddocks, Melton	Mr. J. Mason	5 gs., h. b. 2 gs.
Safeguard	chestnut	18	by Defence, dam by Selim	never appeared..	untried.	—	—	Dominion Court, He-	Mr. Verers	5 gs., h. b. 2 gs.
St. Francis..	bay	15	by St. Patrick, out of Surprise, by Scud	started 49, won 28	untried.	—	—	Newmarket	Mr. Pettit	10 gs.
St. Lawrence.	brown ..	13	by Skylark or Lapwing, out of Helen, by Black-	started 58, won 28	untried.	—	—	Lewford, Sussex	—	1 sov.
The Sea..	bay	5	by Whalebone, dam by Orville	started 5, won 2	untried.	—	—	Newmarket	—	—
The Sheriff..	black...	20	by The Provost, out of Treacherous, by Pan-	started 6, won 2	untried.	—	—	Bonehill, Tamworth..	Messrs. Barrow..	10 gs., h. b. 4 gs., 5 gs., h. b. 3 gs.
Simoon	brown ..	12	by Camel, out of Sabreeze, by Paulovitz	started 3, won 1	untried.	—	—	Newmarket	—	—
Sir Hercules.	black ..	24	by Whalebone, out of Peri, by Wanderer	started 9, won 7	untried.	—	—	Calodon, Ireland	Mr. T. Wise	6 gs.
Sir Isaac	brown ..	19	by Camel, out of Archane, by Fillo da Puta..	started 7, won 3	untried.	—	—	Wilton, Wils	—	10 sovs., h. b. 5 sovs., 10 gs., h. b. 3 gs.
Sir Roland de Bois	bay	5	by Touchstone, out of Valerina, by Chateaufort	started 1	untried.	—	—	Yardley, Birmingham..	—	—
Sir Tatton Sykes	bay	7	by Methone, dam by Margrave	started 12, won 4	untried.	—	—	21, New Park Road, Brixton	Mr. Ramsey	6 gs., h. b. 3 gs.
Slane	bay	17	by Royal Oak, dam by Orville	started 18, won 9	untried.	—	—	Clay Hill, Enfield	Mr. A. Gray	10 gs., h. b. 5 gs., 20 sovs.
Spanish Jack	brown ..	3	by Don John, out of Miss Lydia, by Walton ..	started 3, won 1	untried.	—	—	Stampton Court	—	—
Springy Jack	bay	7	by Herman Piatto; out of Oblivion, by Jerry ..	started 5, won 3	untried.	—	—	Seznico, Morton Marsh ..	D. Gladdill	5 gs., h. b. 2 gs., 10 gs., h. b. 3 gs.
Svevemat	brown ..	8	by Gladiator, out of Lillypop, by Starck	started 23, won 23	untried.	—	—	Eaton, Chester	—	—
Tearaway	bay	12	by Voltaire, out of Taglioni, by Whisker	started 16, won 7	untried.	—	—	Nesham, Darlington..	—	—
Theon	brown ..	13	by Emilius, out of Maria, by Whisker	started 6, won 3	untried.	—	—	Hamilton Lodge, Cur-	—	5 gs., h. b. 2 1/2 gs.
Tom Tit (a pony)	chestnut	12	by Wanderer, dam by Whalebone	started 102, won 87	untried.	—	—	Newmarket	Messrs. Barrow..	11 gs., h. b. 3 gs.
Tory Boy	brown ..	12	by Tomboy, out of Bessy Bedlam, by Fillo da	started 2, won 2	untried.	—	—	Great Bradford, Essex..	Mr. Kings, V.S..	2 gs., h. b. £1 5s., 5 gs., h. b. 2 gs.
Triumvir	bay	8	by Emilius, out of Variation, by Bustard	started 4	untried.	—	—	Foxholes, Lancaster...	—	—
Trueboy	brown ..	10	by Tomboy, dam by Muley	started 45, won 11	untried.	—	—	Slapley Heath, Winch-	Mr. J. Webb	through-bred <i>gratis</i>
Van Tromp	brown ..	6	by Lanerosc, out of Barbelte, by Sandheck ..	started 15, won 12	untried.	—	—	Beverly	Mr. W. Dalton..	10 gs.
Venison	brown ..	17	by Partizan, out of Fawn, by Smolensko	started 29, won 16	untried.	—	—	York and Merton	Mr. Kirby	25 gs. (50 mares)
Venloman	bay	16	by Lottery, out of Wire, by Waxy	started 1	untried.	—	—	Broughton, Stockbridge	Mr. E. Rogers	25 gs. (20 mares)
Wintonian	brown ..	16	by Camel, out of Mommia, by Muley	started 4, won 3	untried.	—	—	Lane Paddocks, Sheffield	Mr. F. Croft	15 sovs.
Young Physician	bay	13	by Physician, dam Spaewife, by Southsayer ..	never appeared...	untried.	—	—	Broughton, Stockbridge	Mr. E. Rogers	15 sovs.
						—	—	Selby, Yorkshire	Mr. J. Markham	5 sovs., h. b. 2 sovs.

The Groom's Fee, if not included, varies from 2s. 6d. to £1 1s. We have not accounted for all the winners out by Harkaway, Launcelot, or Tearaway, in Ireland, nor for Louthborough's, in Germany. The following stallions have been advertised either to be sold or let for the season, but so far without any appearance of their obtaining an harem:—Vol-au-vent, Iago, Kedger, Joe Lovell, Scutari, Phlegon, Wood Pigeon, Mentor, Telemachus, Broadholm, Barnacles, Colwick, Oxonian, The Dean, Cardinal Puff, Bourton, Jovous, Perion, Cattomie, Honest John, Sir Launcelot, Young Plenipo, Gardham, Glycon, Ishmaelite, Sultan Junior, and Erl King.

AGRICULTURE IN SCOTLAND.

BALDOON, WIGTOWN.

The land in this neighbourhood is the property of the Earl of Galloway. It is generally superior in quality, and is occupied by an enlightened and wealthy class of tenants.

The Carse of Baldoon, stretching from this place along the Bay of Wigtown, is justly celebrated as one of the finest tracts in Scotland. The soil is a strong clay, well mixed with sea-shell and other marine remains, which greatly promote its pulverization. The Carse is probably 3,000 acres in extent, and is all in the hands of farmers, who understand their business, and have both the enterprize and the means to adopt the best systems of culture.

It is on this rich and beautiful tract that the farm of Baldoon, occupied by Mr. Caird, is situated. It is, perhaps, the largest arable farm in the south of Scotland, paying a rent, we understand, of £1,200 per annum. It contains a quantity of hard land, but the main proportion of the farm consists of the soil we have described. It is divided into fields of large size by thorn-hedges, some of which are permitted to grow to a great height, in order to break the force of the winds, which sweep with violence over so broad and level a surface. The river Bladenoch forms one of the boundaries of the farm, and carries sloops up to a small quay within a gun-shot of the steading. Baldoon is not a farm on which there is room for any great improvements, or for much variety or novelty of cultivation. Every acre of it is tillable, and has been tilled in a superior way from time immemorial; yet the enterprizing and innovating spirit of Mr. Caird has contrived to execute some very excellent ameliorations since his entry on the farm. A rivulet, along which the tide runs, flowed through the middle of the farm, winding its course among the richest of the fields, cutting them into points and corners, and laying a large portion of the soil frequently under water. Mr. Caird at once proceeded to cut a new and more direct course for this stream, and by draining and filling up the old one, has succeeded in saving land, in getting rid of obstructive fences, in giving a finer sweep to his fields, and greatly facilitating the labour of cultivating them. This is a species of improvement which might frequently be carried out with great advantage. The amount of land lost, and of damage and difficulty occasioned by the crooked windings of rivulets, and by ill-planned ditches and fences over the face of the country, is

immense; and the benefits would, in most cases, far exceed the expense of correcting these abuses. There is a disinclination sometimes to meddle with the course of streams, lest the water might prove discontented with its new bed, and provoke troublesome land-slips. The true plan will be found, we believe, to cut sufficient channel for the water at once; and when this is done the dreaded disturbance of the banks will hardly ever begin. A gravel pit in one of the hard land fields of Baldoon has been rooted out and ploughed; and with the exception of a rough piece of ground near the steading, where there is a fine pool for watering, there does not appear to be a foot of land on the farm which has not been brought into thorough cultivation. The drainage of the farm is complete. After a night of heavy rain, water was only visible over a small corner of one of the fields. Mr. Ross, the farm-grieve, observed that this was a spot where the drains had happened to be covered with sea-shells. It is just possible that the innumerable little receptacles for the lodgment of water, which we can conceive to be formed by a quantity of shells thrown together, may retard the access of the water to the drains; but it is also probable that drains $2\frac{1}{2}$ to 3 feet deep, and in the middle of the ridges, as in this field, may be too shallow to draw the water powerfully from the bottom furrows. The farm is well ploughed, well sown, well harrowed; the implements used are of the best class; and we saw enough to convince us that every department of labour on Baldoon is conducted in the highest style of husbandry.

Baldoon is exactly one of the class of farms which will suffer most severely from the abolition of the corn laws. Its *forte* is wheat growing. The qualities which render it eminently suitable for wheat crops increase the difficulty of labouring it, and have enhanced its rent; the free introduction of wheat from abroad, reducing the price of this staple one-third or one-half, cuts up by the roots the very elements of income, by which it was calculated that these enhanced charges could be met. It is remarkable that the farmer who has stood most prominently forward to maintain that domestic agriculture can prosper without Protection is one who will himself feel most keenly and severely the effects of Free-trade. The heavy stake he has in the issue of this question proves the perfect disinterestedness and thorough independence of mind

with which Mr. Caird is actuated, and should protect him from the ill-mannered attacks of a clique of partizans, who never attempted an experiment, or risked a sixpence on the soil in their lives. If farming can be made to succeed on Baldoon under Free-trade, there is not an agricultural district in the country which need be alarmed at the results of foreign importation. It is fortunate that the experiment will receive from Mr. Caird a fair and enlightened trial, and that he is one who has the honesty and frankness, as well as the ability, to make known to others the results of his experience, whatever these may be, whether favourable or unfavourable to his cherished anticipations.

Within the last year or two, Mr. Caird has introduced a dairy stock upon Baldoon. His milk cows are about 100 in number, all of the Ayrshire breed. The bull is a Teeswater. The cows are kept constantly in the byres, and have been fed during winter on wheat, straw, turnips, and beans. They are all sound and healthy. The dairy keeper, an Ayrshire man, who pays a rent to Mr. Caird for the produce of the cows, and who has not always been accustomed to the system of in-door feeding, is highly satisfied with their condition, and complains only of the heavy labour which the system entails. The trouble of feeding, cleaning out, and carrying water to so many animals, in addition to all the usual work of milking, churning, and cheese-making, must necessarily be severe. Water-pipes are about to be introduced into the byres, which will abridge one part of the labour; and Mr. Caird has so far relaxed his system as to agree that the cows shall be put out to the field during [the summer nights. Great attention is paid, we need hardly say, to the ventilation of the byres. The gutter behind the cows is laid with freestone flags, which struck us as peculiarly suitable for the purpose. The straw used for bedding is chopped into lengths of three or four inches by a circular cutting-machine which does the work with great expedition. The calves are sold off early—Mr. Caird preferring to renew his stock by purchases.

Practical farmers will at once perceive the advantages which Mr. Caird expects to derive from his dairy stock. He obtains a quick and profitable consumption of straw and roots on his own steading, without the necessity of having any considerable proportion of the land in pasture. With the exception of a few acres round the house, there is no old grass on the farm. A hard land field in rye-grass, which has been watered from the tank, and will be brought forward for early cutting, will supply the cows with summer feeding. A clay field is also sown with rye-grass, and has at present six scores of hogs upon it, which will be sold off shortly, and the grass be brought forward for late cutting.

Rye-grass, turnips, and beans, which are all available for the cows, alternate the white crops; and Mr. Caird thus gets rid at once of both permanent pasture ground, and of preparatory fallowing. No wheat on Baldoon is sown this year on fallow. While other clay land farmers are fallowing a large proportion of their soil, Mr. Caird is busy raising food, on all parts of his farm not in white crop, for a hundred milch cows, the produce of which pays well nigh the whole of his heavy rental.

The practical question which will be asked is, will this system work permanently on such a farm as Baldoon? This is exactly the question in course of experimental solution; and we will here just mention one or two facts which will serve to indicate the probable result. The system of house-feeding promotes, in an amazing degree, the collection of manure, with which to grow large breadths of green crop, and to keep the soil in good heart for wheat, without fallowing. The dunghill at Baldoon is not covered over, and probably an improvement may yet be made in the manuring department of the farm; but it is impossible not to see that the keeping of so many cows constantly in-doors, and the complete drainage from all the byres, stables, and houses, into a capacious tank, afford advantages in this respect of no ordinary character. The second fact we would notice is, that the turnips on the clay land on Baldoon last year were superior to those on the hard land, which, in ordinary acceptance, would be described as "the finest turnip-land." And, as a third fact of some significance, we may observe, that of two wheat fields in immediate juxtaposition—one in Baldoon, sown in November, after beans; and another in the neighbouring farm of Crook, sown in fallow: the former is considerably superior in strength and greenness of baird.

Mr. Caird sows his wheat thinly—two-and-a-half to three bushels per acre; and each acre receives two cwt. of guano. Three of the hard land fields are this year in wheat, which was sown in February, and is now brairding satisfactorily. An immense field of eighty acres in grass last year is sown with oats, and harrowed. A clay field, trench-ploughed, is in preparation for turnips. It may be mentioned as an example of the unity and speed with which operations are conducted on large farms, that a field of beans, probably from twenty-eight to thirty acres in extent, was drilled, manured, sown, and covered in by six pairs of horses in five days—the ablest horses at the head, and one pair following steadily on the heels of another. It is by this concentration of forces in one piece of work that a proper spirit of emulation is excited, and the labour of a farm proceeds with order and spirit.

A quantity of potatoes are planted this year on Baldoon in beds, which are dug by Irish labourers

at 35s. per acre. This plan is new on clay land, and is regarded with various opinions. We hear general complaints of the backwardness of ploughing—the long frosts in January and February having impeded operations to an extent which the fine weather of March has not altogether redeemed; and as the Irishmen execute the spade work well, when properly looked after, and at a cheap rate, there is a strong inducement to take the readiest method of planting a crop which is still regarded with a certain degree of distrust. Mr. Caird has a large stock of sound potatoes in his stackyard—we can hardly say in pits, for they are laid down on the surface of the ground in long heaps, and wrapped over thickly with straw, which is the best possible covering for potatoes when straw can be spared. When frost sets in, the straw is covered with a layer of manure, which is removed as soon as the weather opens.

The farm-buildings on Baldoon are equal to the average found on the superior class of farms; but

there is nothing new or extra about them. The thrashing-machine is driven by water, and adapted equally for corn and beans. The granary is small for so large a farm; and we have no doubt that Mr. Caird could point out to his landlord, who is not the worst of his class in Wigtownshire, many improvements on his steading which would be advantageous to both.

The dwelling-house is a neat modern structure, commanding a fine view of the farm, and embosomed by a wood of ancestral repute. The last wall of the old castle of Baldoon stands at a little distance; and a rudely-carved gateway, which must have been the entrance to this feudal residence, has been preserved with fine taste in the open lawn. This old castle was the seat of the Dunbars of Baldoon, and it may probably increase the interest of our description to add, that it was the scene of the tragic incident which suggested to Sir Walter Scott his novel of "The Bride of Lammermoor."—North British Mail.

CALENDAR OF HORTICULTURE.—JUNE.

Retrospect—commencing in the evening of May 15th, that being the day wherein most persons imagine that danger from frost has passed away; and, therefore, that the garden may be safely furnished with all its semi-hardy tenants. The parterres have in fact been in progress; and scarlet geraniums, among other beauties, are to be observed in their summer quarters. By referring to the meteorological diary, the state of temperature for every day in this locality can be ascertained; and it will be seen that it has been some degrees below the general averages. This spring has assuredly been cool, but no material injury has been sustained; and, so far from having justified the lugubrious prognostics of sundry weather prophets, few correct observers will be tardy in acknowledging that, taken as a whole, the seasons during the bygone four months and a-half have been fine and auspicious.

The subject will be resumed at the close of the calendar.

VEGETABLE DEPARTMENT.

Asparagus.—We possess the following results of an analysis of the herb by the chemist, Levy:—

Potass	per cent.	20.48
Soda	do.	2.89
Lime	do.	13.16
Magnesia	do.	3.24
Peroxide of iron	do.	4.22
Silica	do.	9.99

Sulphuric acid	per cent.	5.72
Phosphoric acid	do.	10.03
Carbonic acid	do.	25.71
Chlorine	do.	3.21
Loss	do.	1.35

100.00

If the above be a correct approximation, the following question suggests itself: Had common salt (chloride of sodium) been *then* employed as a top dressing, or to the extent now recommended and practised? If it had, there will be some difficulty to account for the predominance of potash in the ashes. If it had not, the circumstance favours the opinion that potassa as a chloride (formerly termed muriate of potash, "digestive salt, of Silivius") would be the more appropriate manure. Liebig has most interesting remarks on the substitution of one alkali for another. (See edition, 4th, p. 68-9.) These and the notes claim most serious attention.

OPERATIONS.

Cutting of this choicest vegetable ought, if weather permit, to be in full progress (it is at present tardy, though fine). Great care is required not to wound the crowns, and we are inclined to second the advice lately given in the *Gardeners' Chronicle*, "to cut over all the advancing shoots, however small, till the period close for the season, as thereby the regular summer growth will be promoted. It is a rule to cease cutting at Midsummer, allowing

a week one way or the other, according to earliness or lateness of the spring. We may safely restrict the season of asparagus to two calendar months.

Continue to *sow* at various periods, according to the supply required, lettuce, small salading, spinach, radish of sorts; kidney beans and scarlet runners for dwarfing twice, but not later than the 22nd of the month; peas of short growth, once for the last time at the beginning of June.—if later, the tall marrow peas are to be preferred. These, if the summer be occasionally showery, may bear well till October. If the weather be dry in June, the ground before sowing must be dug and thoroughly moistened 16 or more inches deep, and should have decayed manure as a stratum below that. This also it would be desirable that kidney beans should have, in order to provide a fund of ground moisture of rich quality. Be it remembered that all the leguminous vegetables like calcareous earth; and if this be absent, some chalk and bone-earth should be occasionally given.

Cape broccoli may still be sown for the latest supply of autumn.

Celery may go into trenches early in the month. The plot ought to be naturally sound, and then be deeply dug and intermixed with spit-dung. When settled pretty firm the trenches should be made six inches deep, after digging into the bottom of each four inches of similar dung. Select fine stocky plants all of a size; trim off every offset, and plant firmly with the dibble or hand-trowel five or six inches apart. (N.B. The fingers are the most efficient tools for insinuating and firming the soil and roots. They *feel* what is done) Give soft pond-water, and renew it till the plants remain firm and erect.

Cauliflowers coming forward should have plenty of manure-water once or twice. Smaller plants raised in May are to be pricked out in a nursery-bed of rich earth to remain a few weeks, being occasionally and copiously watered.

Stone turnips sown about the 15th will, if the weather prove showery, come in seasonably for the autumn. Charcoal dust or carbonised oak saw-dust sown freely with the seed will attract ammonia, and produce a rapid and strong vegetation. Open plots of loamy ground are most favourable to these and all the brassica families.

Thin out to proper distances beets, parsnips, carrots, onions, and transplant some leeks. Take in thinning order plants of seedling broccoli, borecole, Scotch kail and the like, and transfer them to nursery beds to remain till July.

Plant capsicums and love-apples early in the month. Hoe and weed everywhere; stick peas, top broad beans and peas, and see to all the routine operations.

Plant out cucumbers; the runners of former plantings will become too long for hand-glasses; these, however, can be raised by a brick placed at each corner, and may remain to protect the roots from too much rain; the vine or runners will pass under the glasses, and must be, from time to time, pegged down in open, regular order. Previously, however, each shoot must be stopped about the 4th eye beyond the central stem, to induce fertile laterals. McPhael's rule of stopping every shoot of plants, within warm pits, immediately above a showing fruit, is worthy of notice, even in this open-air culture.

Melons in warm frames must have daily attention, to give air and to impregnate two or three fertile blossoms at the same time. New beds must be formed; but, at this season, dung or hot-beds will not be required. I never saw more or better fruit than was produced in large brick pits, containing deep masses of semi-decayed tree-leaves, covered with rich loamy soil a few inches deep where the plants were turned out from their pots. Shade for a time, sun, air, and some water were duly supplied, and the roots traced over the whole extent of the leaf-beds. Each melon should be supported on a cradle or trellis, to keep it dry and clean. The amateur who can afford to grow melons and pines should, however, have a good working hot water apparatus, to furnish bottom and atmospheric heat to every pit.

FRUIT DEPARTMENT.

Thin wall-fruit—cautiously at first; when peaches and nectarines are as large as hazel nuts; leaving the greater number of fruit on till the stone is hardened. In regulating for the next year's bearing, the lowest advancing shoots must be selected and preserved with care, while each little shoot that advances *from a fruit* should be pruned back to a leaf or two.

Vines.—Look them over, cut off tendrils, stop each fruitful lateral one joint above a cluster, and nail-in, so soon as the wood shall become a little firm.

Strawberries beginning to produce runners must be divested of all that are not wanted for new plantations, or for forcing. With the latter intention, plunge small pots at appropriate spots, so that a strong, *first* little plantlet may reach the centre of a pot; fill with loam, and peg the plant, or secure it on the mould with a stone, giving water now and then till the roots have firm possession of the soil, then detach it from the string: remove any secondary runners that shall proceed from the potted plants.

Fig-trees, when trained against walls, must be kept in regular order. Stopping, or rather firmly

compressing the uppermost internode, as directed in a late calendar.

Our notices of the *forced fruits* in former articles will suffice.

ORNAMENTAL DEPARTMENT.

In moist weather transfer many young seedlings of ornamental annuals, where they stand too close, to other spots of fine earth, where they may produce a pleasing effect. Do this in the evening. Sprinkle lightly, and shade by day, with clean, inverted pots. Fill the borders and parterres with plants raised for the express object, working the earth effectually with the hand-trowel, giving water before planting and filling up, then shade the plants.

Transplant, with similar precaution, seedling or off-set perennials, biennials, and strong layer-raised plants of pinks and carnations. These may now be raised by new layers (or pipings), made about the middle of June. Prepare some finely-sifted light mould, mix it with equal parts of road-sand and powdered old mortar; break up the soil about the parent plants with a trowel or hand-fork; strip the lower leaves of a selected shoot; press it carefully into a groove of the earth, as high as its middle, and secure it firmly with a small hooked stick, or *fern* peg.

A skilful, light-handed operator can previously cut a shoot, slitting it through a middle joint, and

fully half way above it; but, in many cases, it is more safe to *split* the layer, by passing the point of a penknife through it, at a joint, and carrying it on to another joint, after the shoot is secured by the peg. This slit can be kept open by a scale of oyster-shell, and being covered with an inch or so of the prepared earth, and watered, it will emit roots.

Propagate, by layers or cuttings, *double scarlet lychnis*, *phloxes*, *double rockets*, and *wall-flowers*. Let the cuttings be of three or four joints each; plant as many inches apart, in a shaded spot, two of the joints in the soil; give water from time to time; a hand-glass, however, will expedite the processes.

CONCLUDING RETROSPECT.

The weather meliorated on the 16th, with change of wind; and, though the latter has returned to an eastern quarter, the temperature remains bland and genial. Solar power has also greatly increased. Some persons, according to custom, talk of "*blights!*" *Aphides*, called green flies, are certainly seen; and *roses* demand attention in time, as they are always attacked, more or less, by them, and by the maggot that curls and glues itself into the tender leaves. But the prospect appears to be generally favourable to flower and fruit, and in the belief of this I close the 6th monthly calendar of the year.

JOHN TOWERS.

Croydon.

AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR MAY.

The state of our markets for the sale of all articles of agricultural produce still forms the subject of deep solicitude amongst the farming interest. The cold, and consequently unseasonable weather experienced during the first fortnight of this month, and which had the effect of materially retarding the progress of the wheat plants, as well as of vegetation in general, produced a slight speculative feeling in the corn trade, and a somewhat steady advance in the quotations of wheat and spring corn. This was speedily followed by reaction in the demand, in nearly the whole of the principal shipping ports up the Baltic and elsewhere. Many parties, including not a few of the home growers, appeared to entertain the conviction that the lowest period as to price had been passed, and that the future was full of hope. These illusions, however, have since been dispelled; and we look upon the present state of demand as anything but satisfactory. True it is that consumption is

immense; but to meet it we have superabundant supplies. For instance, during the month ending on the 5th of May, the imports from abroad into the United Kingdom were upwards of one million quarters of grain, exclusive of large quantities of flour. Now, when it is considered that nearly the whole of those supplies have passed into the hands of the consumers, and that equally large quantities are following, it must be patent to all that any permanent rise in the value of English wheat is wholly out of the question. We are importing at the rate of upwards of twelve million quarters per annum; we have large stocks of home-grown wheat on hand; and the French millers still continue to send us from 15,000 to 20,000 sacks of flour every week. Who, then, can feel surprised at the fall which has taken place within the last two weeks? The fact is, so long as only nominal duties are levied upon corn in this country, so long shall we be in a position to command unlimited supplies, greatly to the disadvantage of the interests of native agriculture. We have heard it asserted that the stocks of wheat at this time in

France are unusually small ; and it has been broadly stated that it is by no means improbable that importations will be necessary to meet consumption before the next harvest is secured. Since the beginning of last September upwards of 300,000 sacks of flour have arrived in the United Kingdom from that country, being the largest quantity on record ; nevertheless, we learn from the best authority that the supplies still on hand are *above* average ones. The shipments, in point of fact, have been scarcely equal to the quantity of bread usually consumed by English and other foreign visitors in Paris. During the last twelvemonths the number has been from 20,000 to 30,000 below that of some former periods : hence, the flour, instead of finding its way in the usual course of things to the French capital, is forwarded to England for a better, and certainly a *ready money* market.

From most parts of the country, especially from the leading districts, we learn that the stocks of barley are nearly exhausted : foreign qualities are therefore supplying nearly the whole of the demand. As these are turning out remarkably well, the want of English is not much felt, but prices are likely to be well supported for some months to come.

The quantity of oats, beans, and peas, is much reduced ; hence, the late speculative purchases have turned out extremely well.

It will be recollected that in our estimate of the productive qualities of the potato crop last year, we stated most distinctly that the losses by disease were very unimportant, and that the actual yield was unusually large. Events have proved the accuracy of our opinions. Potatoes are still everywhere to be met with, though of course the quantity on hand is much reduced : as to quality, they have turned out remarkably well. That the produce last year in France, Holland, and Belgium, was immense, will be evident when we state that from the first of September, 1849, to the present time, at least 150,000 tons have been imported thence into this country. The crop of early potatoes appears to have suffered from the effects of frost, but that of those planted later in the season is looking remarkably strong and healthy.

Generally speaking, our reports on the subject of the growing wheats are favourable : they do not appear to have grown to the extent frequently observed at this season of the year ; nevertheless, they exhibit signs of health and vigour.

In some parts rye is in full ear, and the barleys and oats, as well as beans and peas, exhibit a promising appearance.

A very extensive demand has continued for Indian corn, although the importations are large. This article is being shipped freely to Ireland, and

is paying the importers remarkably well—say from 6s. to 8s. per quarter.

Some fluctuations have taken place in the value of live stock during the month : on the whole prices have ruled the turn in favour of the graziers. From abroad the importations have been very moderate.

The show for fruit in Kent and elsewhere is by no means good, owing to a large portion of the blossoms having been cut off by the frosts.

In Ireland and Scotland very moderate supplies of wheat and most other articles of grain have been brought forward. The general demand has ruled steady, and prices have been fairly supported. In the Dublin market Indian corn has sold as high as 33s. to 34s. per qr. Unusually small shipments of all grain have taken place to England.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

Notwithstanding that a full average amount of business has been transacted in fat stock in Smithfield and elsewhere, no improvement worthy of particular notice has taken place in value. Compared with that realized at many previous corresponding periods it has proved extremely low and unsatisfactory. The immense numbers of stock at this time on hand in our own grazing districts as well as in Holland, together with the abundance of food, which is still selling at very low prices, appear to preclude the possibility of any permanent rise in the quotations. Very few losses have resulted from the epidemic ; and we may further observe that both beasts and sheep have “died” remarkably well. The importations from abroad, into London, have been seasonably good ; but those at Hull, &c., have fallen off. The returns for the metropolis are as follow :—

Beasts.....	1,275	Head.
Sheep.....	3,491	
Lambs.....	357	
Calves.....	928	
Pigs.....	9	

Total 6,060

Same month last year.....	5,465
Same month in 1848.....	7,904
Same month in 1847.....	6,275

The total supplies of English and Foreign stock on offer, in Smithfield, have been as under :—

Beasts.....	16,468	Head.
Cows.....	456	
Sheep and lambs.....	128,910	
Calves.....	1,740	
Pigs.....	2,258	

CORRESPONDING PERIODS.

	May, 1847.	May, 1848.	May, 1849.
Beasts.....	17,175 ..	16,541 ..	16,320
Cows	601 ..	491 ..	450
Sheep & lambs	109,670 ..	102,230 ..	115,340
Calves	1,727 ..	2,087 ..	1,555
Pigs	2,816 ..	2,581 ..	2,193

From the above comparison it will be seen that the supplies of sheep exhibited during the past month have been considerably in excess of those shewn in 1847, 1848, or 1849.

About 1,400 lambs have come to hand from the Isles of Wight. From Ireland, direct by sea, 369 beasts, 100 sheep, 91 calves, and 146 pigs have reached the metropolis.

Arrivals of preserved meat have taken place from Sydney, but its quality is by no means good.

The bullock supplies have been thus derived:—

	Head.
Eastern Counties	9,000
Other parts of England.....	2,000
Scotland	2,020

COMPARISON OF PRICES.

	May, 1848.	May, 1849.	May, 1850.
Beef	3 0 to 4 2	2 4 to 3 8	2 6 to 3 6
Mutton	4 0 to 5 2	3 4 to 4 0	2 10 to 4 0
Lamb	4 8 to 6 10	4 10 to 6 0	4 0 to 5 4
Veal	3 10 to 4 10	3 4 to 4 0	3 0 to 3 6
Pork	4 0 to 5 0	3 2 to 4 2	3 2 to 4 0

Newgate and Leadenhall markets have been well supplied with each kind of meat, in which rather an extensive business has been doing. Beef has sold at from 1s. 8d. to 3s.; mutton, 2s. 4d. to 3s. 8d.; lamb, 4s. to 5s. 2d.; veal, 2s. 8d. to 3s. 4d.; and pork, 2s. 10d. to 4s. per 8lbs. by the carcass.

AGRICULTURAL INTELLIGENCE, FAIRS, &c.

ABERYSTWITH FAIR.—The horses were of a better class than has been usually seen, and some met with purchasers at moderate prices. There was but little demand for cattle; those disposed of realized a low figure, and many remained unsold. The reason assigned for this state of affairs is the bad times.

BASINGSTOKE FAIR, Wednesday, was well supplied with horses, cows, &c., many remaining unsold, from the thin attendance of buyers. The half-yearly cheese fair was held on Thursday, when about the usual quantity was pitched, and trade was anything but brisk.

BAWTRY FAIR was largely supplied with all descriptions of stock, for which however the demand was by no means brisk, and many were left unsold.

BEDALE FORTNIGHT FAIR, May 21.—We had a very thin supply of beef, which found ready sale at an advance of 6d. per stone. An average quantity of mutton and holding-stock was shown, but it met with slow sale at the rates of last fortnight. Beef, 5s. 3d. to 6s. per stone; Mutton, 4½d. to 5½d. per lb.

BINNEGAR FAIR was held on Wednesday last, when there was a middling attendance of farmers and dealers. Gloom and depression hung over the fair all day, consequently sales were "not very gay." Free-trade has deprived the farmer of his means, and forces the stock of the more needy on the market; and as there is no immediate prospect of improvement, dealers are in no hurry—waiting for still worse times to come; whilst those farmers who still possess a little capital hold as long as they can. The oxen and hareners came to fair in bare condition. In consequence of the backward spring and the shortness of grass, the business with the oxen and steers ruled very inactive, a great number remained unsold, prices varying from £13 to £15. Barreners meat met a very dull sale; two-year-old heifers, £3 10s. to £5; yearlings, £1 15s. to £2 10s., and not a good sale; good heifers and calves were inquired for, and some sold at better prices. In the sheep fair couples fetched 28s. to 35s.; two-teeth Dorset wethers, 21s. to 24s.; Down wethers, 16s. to 20s. There was not much mutton in the fair, and it met a dull sale at 4½d. to 5d. per lb. Beef from 8s. to 9s. per score: not a great quantity there, but more than could find purchasers. Fat lambs scarcely averaged 6d. per lb.; some few were sold at 7d. per lb. The horses, however, formed the principal feature at this fair. Upon the present occasion there was a pretty good supply of useful three-year-old cart colts, and a middling show of nags, but no demand; sales very flat. We can hardly venture to quote prices at all. Prices of best cart colts 20 per cent. less than in 1849, viz., £25 to £30. The Bristol and Wells dealers made a good show. A few sales and some chops were

effected, but, almost without exception, the business was confined to the dealers. The farmers have no money to buy nags, nor use for the cart colts, with present prospects.—*Bristol Mirror.*

BROMYARD FAIR was but scantily supplied either with beasts or buyers; a tolerable supply of sheep, couples ranging from 22s. to 37s. Pigs in request, and sold pretty well. As for horses, there were scarcely a score on offer, and those of middling quality.

CARNARVON FAIR.—A large attendance of farmers and drovers. The cattle are generally very inferior, and of the many shown there were but few really good beasts. Prices low, and comparatively few had changed hands at the close of the day. Some were compelled to sell at the prices offered, owing to scarcity of provender. A few choice cows fetched from £6 to £7, but the generality brought only £5, £4, and so low as £3. Three-year-old cows with calves, £3 10s. to £4. Two-year-old heifers, £2 10s. to £3 5s. Three-year-old oxen £5 5s. (best) down to £3 10s. In the horse fair there were some excellent animals shown, with several good stallions: prices, £20 to £31. Bargains, however, were principally confined to inferior ones. The show of pigs was large, but one of the poorest as to quality we have witnessed at these fairs. Stores, 30s. to 35s.; sucking pigs, 7s. to 9s.

CHIPPENHAM FAIR was largely supplied with cattle; but trade ruled dull, and it was late in the day before a clearance was made.

DRIFFIELD, (Wednesday last.)—A short supply of both Beasts and Sheep, all of which were sold. Prices: Beef, 5s. 6d. to 5s. 9d. per stone; Mutton, 4½d. per lb.

DUN'S MUIR CATTLE TRYST.—There was about an average supply of cattle, and, notwithstanding the backward state of the pastures, much business was done. Fat stock sold on fully better terms than at Edzell tryst, on Monday week; and the Muir was early cleared of the best lots in this class of beasts, at prices ranging from 5s. 6d. to 6s. 6d. per Dutch stone, to sink the offals. Small drove beasts were difficult to sell on any terms. Two-year-old stots and queys brought from £5 10s. to £8, and year-olds from £3 to £5. The supply of cows far exceeded the demand, for many of them not a single offer was made, and a large number were driven away unsold. The north country cattle were also difficult to sell, and the owners complained that they were not paying. The show of sheep was limited to a few lots; and prices were much the same as at Edzell. Mr. James Duke, cattle-dealer, Dalchestne, bought a lot of hogs at 8s. a-piece; and Mr. George Kinnear a lot of small ewes, at 9s. for the ewe and lamb.

DUNSE HOG TRYST.—The inclement state of the weather

has kept the grass back, and in consequence of which the market was dull. The show was not very great. Prices may be quoted for half-bred from 19s. to 26s.; Cheviot from 14s. to 18s.; gray-faced from 13s. to 16s. Few sales were made up to 12 o'clock. There were four lots of ewes and lambs, but no sales. In this market very little business was done.

EVESHAM FAIR was well supplied with beef, mutton, and lamb. Buyers were numerous, and most of the stock sold at the following prices:—Beef, 4½d. to 5d.; Mutton, 4d. to 5d.; lamb, 7d. Horses were numerous, and a tolerable amount of business done. The pig fair was but poorly supplied, and little business done.

FORFAR CATTLE MARKET.—Fat realized from 5s. to 6s. 6d., Dutch. Mr. Soutar, Lowrie, sold twenty at £15 5s.; Mr. Jarron, Mains of Melgund, ten at £15; Mr. Johnstone, Seryne, eight at £13 10s.; and Mr. Lindsay, Brighton, a lot at £12 15s. Two year-olds brought from £6 to £9; one lot realized £12. Year olds varied from £1 10s. to £3. Ewes and lambs met a dull sale at from 12s. to 15s. per head.

GISBURNE FAIR, May 20.—We have only a small quantity of fat stock, not so many as were wanted; the best made 5l. per lb. We had a large show of present calves, which could not all get sold at any price, and a great deal turned out. A large show of lean cattle; a great number sold; but many of the Irish left unsold.

GLOUCESTER MONTHLY MARKET (Monday last) was tolerably well supplied with both beef and mutton, and sales were effected at about the same prices as last month, viz., beef from 4½d. to 5d. per lb., mutton 4½d. to 5½d. per lb. Some very nice Down wethers fetched 6d. Lambs 6d. to 6½d.

HINCKLEY FAIR was thinly supplied with cattle, and although prices were maintained, there was little business done. There was a tolerable show of horses, most of which, however, remained with their exhibitors.

MELSTON FAIR.—In consequence of the weather in the morning being unfavourable, the fair was but very thinly supplied with cattle of all descriptions. There were very few fat beasts, the major part of which were sold at from 43s. to 46s. per cwt. A few bargains were struck with the drovers. Lean beasts were not much in demand, but those sold reached from 26s. to 30s. per cwt. A few cows and calves were sold.

HELDON, (Monday last.)—A short supply of both beasts and sheep, all of which were sold. Prices:—Beef, 5s. to 5s. 6d. per stone; mutton, 4½d. per lb.

HLSLEY FORTNIGHTLY MARKET.—The supply of sheep was moderate, the attendance was numerous, the trade brisk, and a good business was transacted at from 1s. to 2s. per head higher than the market that day fortnight.

KELSO FORTNIGHTLY MARKET.—There was a limited supply of fat cattle, the number being only about 100, and there being a good attendance of buyers, almost the whole were readily sold; indeed almost three times the number could have been disposed of. Prices of fat were from 5s. to fully 5s. 6d. per stone. The number of grazing cattle was about 50. Two-year-olds were selling at from £6 10s. to £8 5s. There were 58 cows in the market, for which sales were dull. In the sheep market the number was nearly 500, all clipped, for which there was a fair demand. Mutton may be quoted at from 4½d. to nearly 5d. per lb. A lot of bred hogs, clipped, belonging to Mr. Buckholm, Kersmains, considered the best in the market, sold at 33s. 3d.; and other lots may be quoted at from 29s. to 32s.

KESWICK FAIR.—The attendance was very scanty, and sales were difficult to effect, except at ruinously low prices. Some descriptions of stock were fully 30s. per head lower than at the last fair, which took place only a fortnight ago. A number of tups were also shown, amongst which were several splendid animals. The crack cow, however, belonged to Mr. Isaac Stamper, of Millbeck, of the Herdwick breed, three years old, and was from the celebrated stock of Mr. Cockburn, of Threlkeld.

LANE FAIR.—There was a good show of stock, but very few beasts were sold.

LINCOLN FORTNIGHT MARKET.—There was an unusually large show of beasts. The trade was not so brisk, and prices were lower. The sheep trade was also duller, and prices lower than hitherto. Beef made 5s. 3d. to 5s. 6d. per stone. Mutton, 4d. to 4½d. per lb.

LEEDS FORTNIGHT FAIR, May 22.—Buyers were numerous, but the trade was dull in the early part of the day,

yet towards the close nearly all changed hands at from 5s. to 6s. per stone of 16lbs. Of sheep and lambs there were 4,200, all of which sold. Mutton, 4d. to 4½d.; lamb, 7½d. to 8d.

MAENTWROG FAIR was well attended by graziers and others. A number of beasts changed hands; whether for bullion remains a question. The dealers appeared to want cash, and the graziers the like together with that important article hay, which has become hereabout a scarce commodity; hence then the desire of the farmers to dispose of their cattle was manifest. It is to be feared there were but few legitimate sales effected.

MELTON FAIR.—There was an average attendance. A large number of horses and cattle were brought to the fair, but sales were limited.

MORETONHAMPESTEAD GREAT MARKET.—As regards bullocks there was a good show, but of sheep there were very few; all, however, looked well and in pretty good condition. Of fat bullocks there was a small supply, but these were of a gay description, and some sales were effected at about 8s. per score. Of the cows and calves exhibited, also several sales were effected at prices varying from £8 to £12. Good barreners—in this article several sales took place at about 6s. per score; some fine steers also changed hands at from £7 to £11 each. There were also exhibited in the market two steers and a heifer, which for beauty, fatness, size, and quality, scarcely ever were equalled; they attracted general attention, and were admired by all who saw them; the heifer was estimated to be 60 score, and the steers about 14 score per quarter, the property of Mr. Courtier, of Wray, in this parish. Among the sheep shown were some good fresh wethers, which were sold at from 20s. to 30s. per head; there were likewise some couples, for which 30s. per couple was asked, but this was deemed too high a figure, and in this article no sales were effected. It was far from what may be termed a brisk market.

MELTON MOWBRAY FAIR.—The attendance of cattle was larger than we have seen for many years at this season. Some good Scotch beast, which looked remarkably well, went off at prices ranging the same as last year. Milking cows also fetched a good price; altogether we may term it a good business fair.

NEWARK FAIR.—There was a good supply of sheep. A thin show of heasts and horses, but considerably more than could be sold, even at bad prices. Beef from 5s. to 5s. 6d. per stone; mutton, 4d. to 4½d. per lb. Good horses could be sold, but not indifferent ones.

OXFORD MONTHLY MARKET.—The supply of both sheep and cattle was large, and there was an air of briskness about the affair which had been wanting of late. A large number of sheep changed hands, at prices a shade better than in April, and but few, we understand, returned unsold. We may say much the same with regard to cattle.

PETERBOROUGH FAT STOCK MARKET (Wednesday).—Beef in moderate supply at 5s. 9d. to 6s. per stone. Pigs made less money. There were 540 Sheep and 50 Lambs, with a slender attendance of buyers; consequently many remained unsold. Mutton must be quoted quite 0½d. per lb. lower—indeed, in some instances barely 4½d. was realized. Lambs were purchased at 15s. 6d. to 19s. each. On Saturday (store stock) we had a considerable falling off in the quantity of Sheep (more than 800), which, joined with recent heavy rains, raised the price of Lamb Hogs 1s. to 2s. each. A full supply of Beasts, but many of them small Lancashire or Irish bred things, fetching about £3 10s. each. Fewer Pigs, without improved demand.

TRURO FAIR.—There was rather a small supply of stock, but a tolerable attendance of farmers and dealers. For fat cattle there was a little more demand than of late, and somewhat improved prices were realized, best beef selling at from 42s. to 46s. per cwt. There were very few good working oxen, their price being about 30s. per cwt., and lean heifers and cows from 25s. to 30s. per cwt. The supply of sheep was small; fat sheep fetched from 5d. to 5½d. per lb., and ewes and lambs from 28s. to 32s. the couple.

TOLLERDOWN FAIR was well supplied with stock, and there was a tolerable amount of business done at the prices which have been obtained at late fairs. Old ewes fetched from 28s. to 34s. each; wethers, 30s. to 38s. each; lambs, 10s. to 13s.; calves, 30s. to 40s.; fat beasts, from 7s. 6d. to 9s. per score; barreners, from £7 to £9 each; cows and calves, from £8 to £12.

METEOROLOGICAL DIARY.

BAROMETER.		THERMOMETER.			WIND AND STATE.		ATMOSPHERE.			WEATH.	
Day.	8 a.m.	10p.m.	Min.	Max.	10p.m.	Direction.	Force.	8 a.m.	2 p.m.	10p.m.	
	in. cts.	in. cts.						8 a.m.	2 p.m.	10p.m.	
Apr. 21	29.50	29.80	44	56	46	N. by E., E. by S.	gentle	fine	fine	cloudy	rain
22	29.90	29.93	43	53	47	N. by W., by E.	variab.	fine	sun	fine	dry
23	29.97	29.96	42	51	47	N. by W., by E.	gentle	cloudy	cloudy	fine	dry
24	30.04	30.10	36	55	46	N. by W., by E.	gentle	fine	sun	fine	dry
25	30.10	29.95	42	56	44	S. by E., East	lively	cloudy	cloudy	fine	dry
26	30.06	30.10	42	59	48	N. East	lively	cloudy	sun	fine	dry
27	30.10	30.15	43	57	46	E. by North	brisk	fine	sun	fine	dry
28	30.14	30.30	42	56	42	E. by North	variab.	fine	sun	fine	dry
29	30.29	30.29	36	57	46	E. by North	gentle	cloudy	sun	fine	rain
30	30.22	30.14	39	57	46	N. East	lively	cloudy	sun	fine	dry
May 1	30.09	30.08	42	48	43	N. Easterly	lively	cloudy	cloudy	cloudy	sprinkling
2	30.14	30.27	35	56	41	Easterly	gentle	cloudy	sun	fine	dry
3	30.27	30.14	35	54	47	Westerly	gentle	fine	sun	cloudy	dry
4	30.00	29.80	36	56	47	W. by N., by S.	gentle	fine	cloudy	cloudy	showery
5	29.66	29.57	39	54	46	Var., N. by E.	gentle	cloudy	cloudy	cloudy	dry
6	29.57	29.55	42	45	43	N. East	strong	cloudy	cloudy	cloudy	rain
7	29.49	29.44	41	47	47	Easterly	variab.	cloudy	haze	haze	small rain
8	29.37	29.56	43	47	42	N. West	idem	fog	cloudy	cloudy	rain
9	29.67	29.90	41	54	43	N. N. East	gentle	fine	sun	fine	dry
10	29.97	29.97	36	56	47	S. West	lively	fine	sun	fine	dry
11	29.99	29.99	45	57	51	S. West	lively	fine	cloudy	cloudy	dry
12	29.99	30.03	48	63	51	W. by N., N.	gentle	fine	sun	fine	dry
13	30.09	30.14	42	61	48	N. by W., Var.	gentle	haze	sun	cloudy	showers
14	30.10	29.90	41	53	49	N. Westerly	gentle	fine	fine	cloudy	dry
15	29.90	29.90	45	52	43	N. by East	lively	cloudy	fine	cloudy	hail
16	29.90	29.91	35	56	48	N. by E., by W.	gentle	fine	fine	cloudy	dry
17	29.91	29.91	43	57	51	N. W., W. S. W.	gentle	cloudy	cloudy	cloudy	hint of rain
18	29.80	29.77	43	60	50	W. by South	lively	fine	sun	fine	dry
19	29.77	29.77	53	70	54	S. W., N. E.	gentle	fine	sun	fine	dry
20	29.77	29.70	49	70	56	Easterly	g. calm	cloudy	sun	fine	dry

ESTIMATED AVERAGES OF MAY.

Barometer.		Thermometer.		
High.	Low.	High.	Low.	Mean.
30.38	29.160	70	33	54

REAL AVERAGE TEMPERATURE OF THE PERIOD.

Highest.	Lowest.	Mean.
55.76	41.4	48.40

WEATHER AND PHENOMENA.

April 21 — Showers; gleams. 22 — Showers. 23 — Gloomy; overcast. 24 — Rime on the grass. 25 — Cloudy, but dry. 26 — Drying; airy. 27 — Hot sun, cold wind. 28 — Same; frosty night air. 29 — Masses of cloud. 30 — Fine; lull of wind at sunset, as of late.

LUNATION.—Full moon, 26th day, 11h. 20m. forenoon.

May 1—Cold, with heavy clouds. 2—Very fine. 3—Frosty in places. 4—A shower, then cold: some forward potatoes frosted. 5—Changeable. 6—Quite wet. 7—Small rain. 8—Hazy and moist. 9—Smoky hazy; change of wind. 10—

Fine. 11—Overcast. 12—Fine and genial. 13—Smoky haze; faint. 14—Gleams; heavy clouds. 15—Bitter wind; black rays at sunset. 16—Frosty air at sunset. 17—Masses of smoky clouds. 18—Balmy and clear. 19—Change of wind to E. after a warm day. 20—Easterly current; clear day; red sunset: some solar spots about this time.

LUNATIONS.—Last quarter, 4th day, 10 h. 46 m. forenoon; new moon, 11th day, 11 h. 9 m. night; first quarter, 18th day, 3 h. 52 m. afternoon.

REMARKS REFERRING TO AGRICULTURE.—The period, as a whole, has been decidedly cool; some degrees below the average of years: there have also been a few morning frosts, yet the grass and forage crops are rich, verdant, and plentiful. All things are looking well, and there has been a capital balance of dry and moist weather; no redundancy of spring rains as in 1849, nor any of the aridity which prevailed in the May of 1847 and 1848. Those who complain do not duly reflect upon the vast promise of general abundance, and the great benefit which results from a cool May!

Croydon.

J. TOWERS.

REVIEW OF THE CORN TRADE DURING THE MONTH OF MAY.

Until nearly the close of April the general character of the season was decidedly auspicious; the winter, though protracted and rather severe, was not so cold as to cause any apprehension to be felt in regard to the seed in the ground. March proved dry and open, and the sowing of spring corn was commenced and concluded under highly favourable auspices; in the early part of April we had frequent genial showers, and the reports from all parts of the kingdom were, up to that period, of the most promising and encouraging nature; but before the close of the month a change occurred, and during the latter part of April the weather became so cold as to check vegetation materially. May commenced auspiciously, but the wind soon veered to the eastward, and continued in that quarter and from the north for nearly three weeks, the temperature frequently falling below freezing point in the night time. We are, however, inclined to think that no serious injury has been done to the grain crops, though it must be admitted that vegetation has been so much retarded as to render an early harvest improbable, which alone is sufficient to give rise to some uneasiness. The growth of grass has been very slow, and the prospects for the hay harvest are, to say the least, by no means promising.

The trade in wheat, which remained dull till near the close of last month, became more active in proportion as the chances of an early harvest decreased, and in the period of about three weeks prices rose fully 5s. per qr. in all the leading markets of the country. After the advance was established the weather assumed a more propitious character, and since the 15th inst. part of the improvement has again been lost. The future range of quotations must be so wholly dependent on the weather that it would be rash to venture on predictions; but we have no hesitation in giving it as our opinion that there is nothing in the present position of affairs to justify the expectation of a rise in the value of agricultural produce, should nothing occur to create alarm, or at least uneasiness, relative to the growing crops. We have all along asserted, and still maintain, that the extremely low point to which prices have been reduced has been caused by free trade. That we should have had moderate prices if the Corn Laws had not been interfered with was to be expected from the generally favourable result of the harvest of 1849; but the value of agricultural produce would not have been

beaten down below the cost of production, if anything like a fair protection had been afforded to farmers. The free traders have, however, endeavoured to account for the depreciation in another way; they ascribe it to a senseless panic on the part of the growers, and have been predicting that, this once got over, matters would mend, and the British agriculturist would find no difficulty in competing with the comparatively untaxed foreign corn grower. They consequently viewed the late temporary improvement with great satisfaction, not from any wish to see the farmer benefited, but as a means of quieting the growing agitation in all parts of the country for relief, or at all events for an investigation of the evils under which those engaged in the cultivation of the soil were acknowledged to be suffering. The very fact of the advocates of free trade being placed in a position to write and speak in favour of a rise in prices is a proof of the error of their policy. The very object of the commercial changes brought about by them was to render bread cheap; but no sooner are their efforts crowned with the fullest success, than they employ all their energies to argue that it is all a mistake—that corn will be just as high in this country, with the surplus growth of all the world pouring into our markets, as it would have been had a wholesome restraint to excessive imports been provided for. The experiment must, however, we suppose, have a full trial; but that the free admission of foreign corn into this country must have the effect of permanently lowering prices here to the continental level, or, in other words, rendering it impossible for our farmers to derive a profit by their occupation, is, we think, already too clearly proved to leave a doubt on the mind of any unbiassed or reflecting individual.

The late rise was caused entirely by the ungenial weather, and the rise which has taken place in the temperature within the last eight or ten days has not only had the effect of checking the upward movement, but already a reaction of 2s. to 3s. per qr. has occurred in all parts of the kingdom. At this period of the year we must naturally calculate on fluctuations in prices, but these changes do not in any way affect general principles. We maintain that with fair average seasons the foreign grower can afford to pay freight and other expenses, and still greatly undersell the English farmer in the British markets, and that is a state of things under

which agriculture cannot flourish in this country.

The importations from abroad have recently fallen off more or less, which may, however, be easily accounted for. The upward movement here caused considerable excitement at most of the continental markets, and prices were run up faster than the rise here warranted, rendering the execution of the orders which from time to time came to hand almost impossible. It is yet too soon to know what effect has been produced by the reaction in our prices, but that the rise which has taken place at the leading shipping ports in the Baltic and elsewhere, on the strength of the temporary advance here, will cause supplies to be received from the interior, cannot be questioned; and we think that it may be regarded as equally certain that these supplies will, in the end, find their way to this country. Meanwhile we have reason to believe that the quantity of wheat remaining in the hands of our farmers is quite as large as is usual at the corresponding period of the year, and we therefore repeat what we have already stated in the commencement of this article, that with tolerably auspicious weather during the summer months, no rise can be expected in prices. This opinion must, however, be understood to be wholly conditional, as with quotations so low as they now are, and money abundant and wanting profitable employment, very little encouragement would suffice to give rise to speculation in corn. Even if nothing should occur to cause uneasiness in reference to the next harvest, a recurrence of the potato disease in Ireland, or political troubles, such as might arise out of the misunderstanding between Great Britain and France in consequence of the Greek affair, would probably have the effect of greatly influencing business in grain. Having said thus much in reference to the future, we shall proceed to give a detailed account of the fluctuations which have taken place in the various kinds of grain, by reporting what has occurred at Mark Lane during the month.

Though the deliveries of wheat increased materially at most of the markets in the agricultural districts in proportion as farmers were induced by the rise in prices to bring forward supplies, the receipts of home-grown wheat into the port of London have been decidedly short. On the first Monday in the month, the 6th inst., the show on the Essex and Kent stands was very small, and there was little offering from Lincolnshire, Cambridgeshire, or that neighbourhood. The millers who had for some days previous manifested a desire to increase their stocks, came forward freely, and sales were made without difficulty, at an advance of 1s. to 2s. per qr. on the rates current on that day se'night.

Even this rise failed to draw a better supply, and the stands were not much better provided on the 13th than had been the case previously. No improvement having meanwhile occurred in the weather, sellers again raised their pretensions, and a further enhancement of about 2s. per qr. was established. This was the highest point attained, and if we add the advance which took place the last week in April, the total rise from the lowest point will be found to have amounted to 5s. per qr.; fair runs of Kentish red, which were at one time sold at 37s. to 38s., being on the 13th May currently worth 42s. to 43s. per qr., and Lincolnshire about the same. From this time the reaction commenced; during the subsequent week buyers became more cautious, and on the 20th inst., about 2s. per qr. of the advance was lost without inducing the millers to clear the Essex and Kent stands. On Monday last, the 27th May, renewed firmness was displayed by factors, and having a smaller quantity of wheat to dispose of than on that day week, the downward movement was arrested; the millers were, however, unwilling to take more than needed for immediate use, and from the cautious manner in which they conducted their operations, it was easy to see that very little excess of supply would have caused a decline in prices.

The arrivals of wheat from abroad have been comparatively moderate during the month, having amounted to only 50,000 qrs. Importers were not slow to take advantage of the upward movement in prices of English, but the quantity on the market being altogether rather large, and the country demand having at no time been particularly active, the rise on foreign wheat was not quite equal to that established on English. A moderate extent of business was done the first fortnight in May, principally in the finer kinds of red, and prices gradually crept up 2s. to 3s. per qr. For fine Rostock as much as 44s. per qr. was at one period paid, whilst other kinds of Baltic red wheat brought from 38s. to 42s. per qr., according to quality. These rates could, however, be no longer obtained; on the 20th and on Monday last, the very finest sorts were offered at 42s. per qr., and other descriptions at a corresponding reduction. A considerable proportion of the late importation has gone direct to the millers, who have consequently good stocks on hand, and would therefore be little inconvenienced if the receipts from abroad should for a time be small. Most of the country millers have lately been drawing supplies from the growers in their own immediate neighbourhood, and as there are stocks of foreign at many of the out-ports as well as in London, the metropolis is not called upon to furnish supplies to so large a circle as has frequently been the case in former years.

During the first week or two in May, the bakers bought flour rather freely, but the demand was not sufficiently active to allow the top price of town-made to be advanced, and the enquiry having since slackened, quotations have remained precisely as they were when we last addressed our readers, say 31s. to 32s. London manufactured households, and 37s. per sack the best whites. Country marks and some kinds of French flour rose about 1s. per sack in the beginning of the month, but this improvement has since been lost, and prices are now much the same as they were at the close of April. Not a week has elapsed without arrivals from France, and there can be little doubt that many parties have embarked in the milling trade in that country under the impression that they will derive permanent employment for their capital in manufacturing for the English markets.

Supplies of English barley have almost ceased to come forward, the arrivals coastwise having for some time past amounted to only a few hundred quarters per week. Notwithstanding the advanced state of the season, there have been buyers from time to time of malting barley, and the quantity on sale having been so insignificant, sellers have been enabled to realize full terms, say 26s. and even 27s. per qr. for choice parcels, being a slight advance on the rates current when we last addressed our readers. Foreign barley has come to hand less freely than earlier in the year, and the previously received supplies having been either cleared off the market altogether, or being in the hands of parties entertaining favourable views as to the probable future value of the article, no anxiety to press sales has been manifested, and prices have gradually crept up. Fine heavy Danish, in good condition, has for some weeks past been held at 19s. to 20s. per quarter, and needy buyers have been compelled to pay the rates asked. The commoner sorts have risen in the same proportion; and as there seems to be little chance of very large imports from abroad at present, the improvement is likely to be maintained; indeed, barley is, notwithstanding the rise, still one of, if not the, cheapest article which can be employed for feeding purposes, taking weight into account.

Though the inquiry for malt has been of quite a retail character, its value has almost imperceptibly risen 1s. to 2s. per qr. since our last.

The supplies of home-grown oats have, throughout the month, been trifling in the extreme; and as the deliveries from the growers have fallen off materially at all the country markets, it is reasonable to suppose that the last crop is nearly exhausted. From Ireland we have been without arrivals of any consequence for months past, and advices from thence state that there is no prospect of shipments

being made from the sister isle between this and harvest; it appears, therefore, that we shall, during the next three or four months, have to depend principally on receipts from abroad for our supplies. The very low price of the article has unquestionably caused a large consumption; and, notwithstanding the enormous imports in April, and good arrivals since, the market is by no means over-stocked at present. Until nearly the close of last month the large London dealers refrained from buying; but in the early part of May they came into the market rather freely, and the purchases made during the first fortnight caused a rise in prices from the lowest point, of fully 1s. 6d. per quarter. Since then the demand has again fallen off materially, and a reaction of about 6d. per quarter has occurred. Still prices are at least 1s. per quarter above what they were at this time last month. The future range of prices will depend entirely on the extent of the foreign arrivals. At present there is certainly no want; for though the greater part of the large imports has passed out of first hands, it has not gone into consumption, the principal dealers holding sufficient stocks to carry them on for some time. We are, however, on the whole, rather inclined to think that oats must rise more or less in value, as the near continental ports have been pretty well drained already, and we do not hear of very large shipments from Archangel, Riga, or other Russian ports.

The arrivals of beans, of home growth, into the port of London, have been very small since our last, and the supplies from abroad much less plentiful than previously. Prices began to tend upwards before the close of April, and have since steadily advanced, being now 2s. to 3s. per quarter higher than they were at the extreme point of depression.

English peas have been in steady request, and the supplies having fallen short of the demand, enhanced terms have been realized, fine boilers having lately commanded 27s. to 28s. per quarter, and other descriptions proportionate rates. Foreign peas, for grinding, have been influenced by the upward movement in the value of other articles used for feeding purposes, and have crept up 1s. to 2s. per quarter in price.

Indian corn has excited a good deal of attention, owing to an extensive demand on Irish account. Comparatively little business has, however, been done at this port, in consequence of the want of stocks and the paucity of free on board offers. At Liverpool large purchases have been made by Irish buyers during the month at gradually advancing prices, 30s. to 32s. per qr. having been realized for good to fine heavy qualities. That Ireland is likely to require considerable supplies of

the coarser sorts of food, between this and harvest, appears almost certain, and this must unquestionably be felt on this side of the Channel. Wheat will not, perhaps, be affected so much as other articles, the purchases being principally confined to low-priced commodities.

Before concluding, we shall take a short review of the position of the grain trade abroad. Prices are just now relatively higher in most of the foreign markets than in this country, and it is therefore more than probable that supplies will for a time be small. Before the close of the navigation last autumn most of the old stocks of wheat had been shipped from the different continental ports to this country, and we are inclined to believe that the new crop was begun upon earlier than usual; but as the harvest of 1849 was generally productive over the greater part of Europe, there can be little doubt that a large surplus was grown for export, which will, sooner or later, find its way to this country.

The absence of large stocks at the leading ports in the Baltic, and the fact that the growers have, till quite recently, brought supplies forward but sparingly, prevented prices giving way much, when our quotations were falling week after week; and no sooner was there an appearance of a rise here, than the value of the article was run up rapidly, by speculators taking all that was offered. The upward movement had, however, according to the most recent advices, again received a check, owing to the less encouraging accounts from hence.

At Danzig a very large business was done during the week ending 15th inst., nearly 2,000 lasts, or upwards of 20,000 quarters, having changed hands in that period. So extensive a demand had naturally had the effect of causing a rise in prices, and the last rates paid had been 43s. to 43s. 6d. for the finest 62lbs. Upper Polish, 41s. to 42s. for good high-mixed Lower and Upper Polish, and 36s. to 35s. per qr. free on board for common runs of mixed weighing 60 to 61 lbs. per bushel. Freights had rather risen, still vessels of convenient size were procurable at 2s. 9d. to 3s. per qr., for wheat, to London or East Coast, 3s. 6d. to Liverpool, and 4s. 3d. to Ireland. The weather had in the early part of the month been very cold; and fears were entertained that the severe night-frosts experienced on different occasions might have injured the rye crop. The latter article had, consequently, risen to 15s. to 18s. 6d. per qr., free on board. The temperature had, however, then become mild; and it was thought that a favourable summer would probably remedy any evil which had been done to the crops by the backwardness of the spring.

From Königsberg we learn, under date of the 15th, that a good steady business had been done

in wheat, but that holders had manifested a disposition to meet the demand, and that prices had not varied much. Fine highmixed qualities were then quoted 38s. 6d.; mixed, 36s.; and red, 34s. to 34s. 6d. per qr., free on board. Supplies of spring corn had fallen off materially; and barley, oats, &c., had been held at full terms. The demand for rye had rather fallen off, owing to an improvement in the weather.

Letters from Stettin of the 20th May state that it was then still very cold in that neighbourhood for the advanced period of the year; and this fact had had the effect of preventing any retrograde movement in prices, though the more flat English accounts had checked the disposition to speculate. Holders of fine 62lb. Pommeranian had insisted on prices equal to 37s. to 37s. 6d.; and for 61½lb. Uckermark 36s. to 36s. 6d. per qr., free on board, had been asked. The commoner sorts had been held at corresponding rates—say 34s. 6d. to 35s. 6d. for 61lb. red Stettin. Pommeranian barley was then in fair demand, and good 52lb. samples were worth 16s. to 16s. 6d. per qr., free on board.

From Rostock we learn that the purchases made there from time to time on British account had reduced stocks into a very narrow compass, and fine 62 to 63lb. parcels had been run up to 38s. to 39s. per qr., free on board.

At the neighbouring ports of Greifswald, Stralsund, and Anclam, stocks were also small; but the prevailing impression was that the start which prices had everywhere taken would have the effect of drawing good supplies from the farmers, and, if nothing further occurred to cause a belief that England would require imports, that matters would after a while settle down more quietly.

At the nearer continental ports, within a few days' post of England, the upward movement in prices had been checked by the fall at Mark-lane on the 20th inst.

From Hamburg our advices reach to the 24th inst. Fine weather, and the dull reports from hence, had checked the upward movement in prices; indeed, a reaction of quite 1s. per qr. had occurred since the previous post-day, good 60½lb. red Upland wheat having been offered at 35s. per qr., free on board.

In most of the French markets prices of wheat rose 2s. to 3s. per qr. in the early part of the month; but according to the most recent advices from Rouen, Nantes, Bordeaux, &c., we learn that the less encouraging advices from hence had caused the demand to slacken, and prices had again receded 1s. per qr. from the highest point.

The accounts from Holland and Belgium are of a similar character; and it appears tolerably evident that, unless we come forward as buyers, the

value of grain will again gradually recede abroad until it reaches a point leaving a margin on importations into Great Britain.

From the Mediterranean ports we learn that the enquiry for wheat for export had been sufficiently active to cause some improvement in prices at a few of the leading markets, as much as 34s. to 35s. per qr., free on board, having been paid for good qualities of Polish Odessa.

We have advices of recent dates from the other side of the Atlantic, from which it appears that there is little chance of supplies reaching us either from the United States or Canada, the stocks of wheat and flour at the ports on the seaboard being moderate, and supplies from the interior coming forward but slowly.

At New York flour was as dear as at Mark-lane—say Western Canal, 20s. to 23s. per barrel; and at Montreal nearly as high prices were insisted on.

May 31.

CURRENCY PER IMPERIAL MEASURE.

	Shillings per Quarter.	
	OLD.	NEW.
WHEAT, Essex and Kent, white	40 to 47	40 to 47
Ditto, fine selected runs	—	46 48
Ditto, red	37 38	39 41
Ditto, extra	33 40	41 42
Norfolk, Lincolnshire and Yorkshire.	—	37 40
Ditto, white	—	40 42
BARLEY, English, malting and distilling.	—	23 25
Ditto, Chevalier.	—	26 27
Ditto, grinding	—	19 21
MALT, Essex, Norfolk and Suffolk	43 45	44 48
Kingston, Ware, and town made	45 52	48 54
OATS, Essex and Suffolk	—	16 17
Lincolnshire and Yorkshire (Polands)	—	16 18
Ditto, feed	—	15 17
Devon & West Country, feed	—	14 16
Northumberland and Scotch, feed	—	17 22
Dundalk, Newry, and Belfast, potato	—	16 17
Limerick, Sligo, and Westport, potato	—	16 18
Ditto, feed	—	15 16
Cork, Waterford, Dublin, Youghal, and Clonmel, black	—	14 14
Ditto, white	—	14 15
Galway	—	12 13
BEANS, Mazagan	24 26	22 24
Tick	24 27	24 26
Harrow	29 31	27 28
Pigeon, Heliogland	31 36	28 30
Windsor	—	24 26
Long pod	—	24 27
PEAS, non-boilers	—	23 24
White, Essex, and Kent, boilers	—	25 27
Ditto, fine Suffolk	—	26 28
Maple	—	24 26
Hog and grey	—	23 25
FLOUR, best marks (per sack of 280 lbs.)	—	32 37
Norfolk and Suffolk, ex-ship.	—	27 32
RYE	—	20 22

FOREIGN GRAIN.

WHEAT, American, white	37 to 41
Canada	33 41
Dantzic and Konigsberg	43 45
Dantzic, fine white, extra quality	45 49
Stettin and Hamburg	37 39
Danish	33 37
Rostock, Pomeranian and Rhine	33 42

	Shillings per Quarter.	
BARLEY, malting	20	22
Grinding and distilling	17	18
Hamburg, Dantzic, Konigsburgh, and Riga	17	19
Danish, Mecklenberg, and Pomeranian	17	18
OATS, Dutch, brew. Poland, Friesland, and Groningen	17	19
Danish and Swedish	15	17
Russian	15	17
BEANS Small	22	26
Egyptian	18	20
PEAS, white boilers	21	24
Yellow ditto	24	27
Non-boilers	23	24
MAIZE, white	29	30
FLOUR, American, sweet	21	23
Ditto, sour	20	22
Canadian, sweet	21	23
Ditto, sour	20	21
French, per sack	27	32
RYE MEAL (per ton)	£6 6s.	to £6 10s.
INDIAN CORN MEAL (per bl. of 196 lbs.)	nominal.	

IMPERIAL AVERAGES.

FOR THE LAST SIX WEEKS.

WEEK ENDING:	Wheat.		Barley.		Oats.		Rye.		Beans		Peas.	
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
April 13, 1850..	38	5	22	11	15	3	20	8	23	9	26	3
April 20, 1850..	37	10	22	8	15	3	21	6	23	9	24	9
April 27, 1850..	37	1	22	1	15	0	21	8	23	8	25	1
May 4, 1850..	36	11	22	0	14	7	19	11	23	11	24	9
May 11, 1850..	38	0	22	0	15	3	19	1	24	8	24	9
May 18, 1850..	39	7	22	5	15	5	21	7	25	6	24	11
Aggregate average of last six weeks	38	0	22	4	15	1	20	9	24	3	25	1
Comparative avge. same time last year	45	3	28	8	17	3	24	8	29	4	30	1
DUTIES	1	0	1	0	1	0	1	0	1	0	1	0

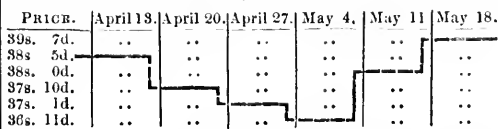
LONDON AVERAGES.

	£	s.	d.		£	s.	d.				
Wheat..	3,224	qrs.	2	4	7	Rye...	56	qrs	1	2	10
Barley..	696		1	4	0	Beans ..	316		1	7	8
Oats ..	545		0	16	1	Peas ..	66		1	6	1

COMPARATIVE PRICES AND QUANTITIES OF CORN.

Averages from last Friday's Gazette.	Av.		Averages from the corresponding Gazette in 1849.		Av.	
	Qrs.	s. d.	Qrs.	s. d.	Qrs.	s. d.
Wheat ..	89,999	39 7	Wheat ..	71,204	44	9
Barley ..	17,652	22 5	Barley ..	10,766	23	0
ats ..	13,975	15 5	Oats ..	17,735	17	8
Rye	105	21 7	Rye	115	25	9
Beans ...	5,008	25 6	Beans ...	3,059	30	7
Peas	486	24 11	Peas	560	29	11

DIAGRAM SHOWING THE FLUCTUATIONS IN THE AVERAGE PRICE OF WHEAT DURING THE SIX WEEKS ENDING MAY 18, 1850.



QUANTITY OF FOREIGN GRAIN ENTERED FREE FOR HOME CONSUMPTION DURING THE WEEK ENDING MAY 25.

Wheat, Foreign.	qrs.	11966	Beans	qrs.	887
Barley.	"	5071	Peas	"	27
Oats	"	25599	Flour	"	9978

PRICES OF SEEDS.

The operations in the seed market were altogether unimportant, and scarcely any alteration occurred in quotations. Canary Seed was certainly less enquired for than last week, and the extreme rates then paid were no longer obtainable.

BRITISH SEEDS.

Cloverseed, red 35s. to 40s.; fine, 45s. to 50s.; white, 35s. to 50s.
 Cow Grass (nominal) —s. to —s
 Linseed (per qr.).. sowing 54s. to 56s.; crushing 40s. to 42s.
 Linseed Cakes (per 1,000 of 3lbs. each) .. £8 0s. to £9 0s.
 Trefoil (per cwt.) 14s. to 18s.
 Rapeseed, new (per last) £35 to £38
 Ditto Cake (per ton)..... £4 15s. to £5 10s.
 Mustard (per bush) white.. 6s. to 9s.; brown, 8s. to 11s.
 Coriander (per cwt.)..... 16s. to 25s.
 Canary (per qr.) new 80s. to 90s.
 Tares, Winter, per bush., nominal; Spring, 3s. 0d. to 4s. 0d.
 Caraway (per cwt.)..... 28s. to 29s.; new, 30s. to 32s.
 Turnip, white (per bush.) —s. to —s.; do. Swedish, —s. to —s.

FOREIGN SEEDS, &c.

Clover, red (duty 5s. per cwt.) per cwt. (nominally) 33s. to 50s.
 Ditto, white (duty 5s. per cwt.) per cwt. „ 24s. to 42s
 Linseed (per qr.) .. Baltic 38s. to 44s.; Odessa, 42s. to 46s.
 Linseed Cake (per ton)..... £5 10s. to £7 10s.
 Rape Cake (per ton)..... £4 10s. to £5 0s.
 Hempseed, small, (per qr.) 32s. to 33s., Do. Dutch, 33s. to 34s.
 Tares, (per qr.)..... small 21s. to 24s., large 25s. to 30s.
 Rye Grass (per qr.)..... —s. to —s.
 Coriander (per cwt) —s. to —s.

BOROUGH HOP MARKET.

Fine yearling Hops are scarce, and inquired for at a trifling improvement upon last week's rates. In other descriptions we have no change to notice.

HORTON AND HART.

MADSTONE, May 23.—Within the last three or four days the wind has veered round to a more genial quarter, producing bland and growing weather, assisted by warm and gentle showers. The bine has recovered its colour, and is now growing apice; there are, as usual, a few complaints of damage from the flea, but with weather like the present the bine will soon outstrip such assailants.

OTFORD, May 23.—The hops have improved very much in appearance during the past week, but some gardens are infested with the flea.

SEAL, May 22.—The state of the hops differs materially at present in this parish. In some gardens they look healthy and green, in others yellow and sickly. In one garden the bine is being destroyed by the slugs, and salt in large quantities has been applied to the hills for the purpose of destroying them.—*Sussex Express.*

WORCESTER, May 22.—We have to notice a considerable improvement in the hop trade the last week; the present low prices having brought many buyers to market; and as the stocks in the hands of consumers are very low, we anticipate a good steady demand through the summer. The reduced acreage in plant is also much in favour of prices, the probability of only 42,000 acres producing a heavy crop being very remote. The London market is 2s. per cwt. higher this week.—*Worcester Journal.*

POTATO MARKET.

SOUTHWARK, WATERSIDE, May 27.

The arrivals the past week have been limited, both coastwise and continental; but the demand, from the mild weather and holidays, not being great, it has been equal to our wants. The following are this day's quotations:—

Yorkshire Regents 80s. to 160s. per ton.
 Scotch cups 65s. „ 80s. „
 Scotch whites 50s. „ 60s. „
 French 40s. „ 70s. „
 Rhenish 50s. „ 75s. „
 Belgian 60s. „ 70s. „
 Dutch 45s. „ 55s. „

COUNTRY POTATO MARKETS.—YORK, May 18.—A fair supply at 8d. per peck. MALTON, May 18.—A fair supply at 8d. per peck. RICHMOND, May 18.—4s. per bushel. MANCHESTER, May 21.—10s. 6d. to 16s. per 252lbs. LIVERPOOL.—A great change in this market has taken place within the last few days in favour of the seller. Inverness cups are now worth 4s. 6d. per measure. Wigtownshire and other cups 3s. 8d. to 4s., while pay-the-rents are 2s. 8d. to 3s. The market is bare, and the demand both for Liverpool and the country continues brisk. NEWCASTLE, May 23.—Red 12s., white 12s. to 13s. per load of 20 stons. LEEDS, May 21.—Our supply is very short, and prices are wholesale 11d. to 1s.; retail 1s. to 1s. 1d. per 21lbs. DURHAM, May 18.—A good supply at 9d. per peck. CARLISLE, May 18.—A very short supply at 7d. to 9d. per stone of 14 lbs. NEW POTATOES.—The *Cornwall Gazette* says, that about 100 baskets of new potatoes were sent to Bristol from St. Mary's, Scilly, by the Cornwall steamer, for the London market, on Tuesday last.

ENGLISH BUTTER MARKET.

MONDAY, May 27.

We note a very dull trade, although the price of the best Dorset is tolerably well supported, that is at a reduction of 2s. per cwt. from last week. Inferior qualities of Dorset and Devon are rendered unsalable by the low price of fresh Butter, with which the market is glutted.

Dorset, fine weekly 76s. to 78s. per cwt.
 Ditto, middling..... 60s. to 70s.
 Devon 60s. to 70s.
 Fresh 6s. to 10s. per doz. lbs

BELFAST, (Friday last.)—Butter: Shipping price, 65s. to 75s. per cwt.; firkins and crocks, 6½d. to 7½d. per lb.; Pork sells at from 35s. to 36s. for lots, and 35s. to 37s. 3d. per 120lbs. for country pigs. Bacon, 37s. to 40s.; Hams, prime, 65s. to 70s. per cwt.; second quality, 56s. to 58s.; Mess Pork, 57s. 6d. to 60s. per brl.; refined American Lard, in bladders, 40s. to 44s.; kegs and firkins, 38s.; Irish Lard, in bladders, 42s. to 46s.; kegs or firkins, 41s. to 42s. per cwt.

May	Butter,			Bacon,			Dried Hams,			Mess Fork						
	per cwt.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.					
24.	84	0	87	0	45	0	47	0	54	0	60	0	58	0	62	0
1847	93	0	94	0	64	0	74	0	75	0	86	0	77	0	82	0
1848	86	0	88	0	58	0	62	0	66	0	72	0	80	0	84	0
1849	65	0	78	0	48	0	50	0	68	0	75	0	77	0	80	0
1850	67	0	77	0	38	0	40	0	68	0	70	0	57	0	60	0

HAY MARKETS.

SATURDAY, MAY 25.

SMITHFIELD.—A full average supply, and a heavy demand.
 CUMBERLAND.—Trade dull, at late rates.

WHITECHAPEL.—Supply good, and trade dull.

At per load of 36 trusses.

	Smithfield.		Cumberland.		Whitechapel.	
	48s	70s	50s	72s	48s	70s
Meadow Hay	60s	90s	60s	86s	60s	02s
Clover Hay	22s	28s	22s	29s	21s	28s

FLAX.

BELFAST, (Friday last.)—Fine, 70s. to 80s., good, 65s. to 70s.; good middling, 50s. to 65s.; middling, 58s. to 65s.; mid., 46s. to 56s.; coarse, 44s. to 45s. per cwt.

OILS.

Linseed, 30s. 0d. per cwt.; Rapeseed, English, refined, 37s.; do. brown, 38s.; Gallipoli, per tun, 44l.; Spanish, 43l.; Sperm, 83l. to 84l.; do. bagged, 83l.; South Sea, 34l.; Seal, pale, 37l.; do. coloured, 33l.; Cod, 35l.; Cocoa Nut, per ton, 38l. to 40l.; Palm, 32l.

BARK.

Per load of 45 cwt.

English, Trec	£13	0	0	£15	0	0
Corpicce	14	0	0	16	0	0

HIDE AND SKIN MARKETS.

	s. d.	s. d.	per lb.
Market Hides, 56 to 64lbs.....	0 1½	to 0 1½	
Do. 64 72lbs.....	0 1½	0 1½	
Do. 72 80lbs.....	0 2	0 2½	
Do. 80 88lbs.....	0 2½	0 2½	
Do. 88 96lbs.....	0 3	0 3½	
Do. 96 104lbs.....	0 3½	0 3½	
Do. 104 112lbs.....	0 4	0 0	
Calf Skins, light	2 6	3 6	each.
Ditto, full	6 0	0 0	
Horse Hides	6 6	0 0	
Polled Sheep	5 6	7 0	
Kents and Half-breds.....	4 6	5 8	
Downs.....	4 0	5 0	
Lamb Skins.....	1 6	2 5	
Shearlings	0 8	0 9	

TIMBER.

	£ s. d.	£ s. d.
Baltic Timber, per load of 50 cubic feet..	2 15 0	to 3 10 0
Yw. Deals, per standard hundred	10 10 0	15 10 0
Deck Deals, per 40 feet 9 in.	0 16 0	1 2 0
Pipe Staves, per mille	115 0 0	130 0 0
Lathwood, per fm. of 6 feet	9 0 0	10 0 0
Petersburgh, Riga, and Archangel	12 0 0	15 0 0
White.....	9 0 0	10 0 0
Yw. Battens.....	12 0 0	14 0 0
Riga Logs, for 18 feet cube	2 15 0	3 15 0
Stettin Staves, per mille of pipe.....	100 0 0	140 0 0
Swedish Timber, per load	2 15 0	2 17 6
Gothenb. Yw. Deals, per 100 12½ in. 3 in.	17 0 0	22 0 0
White ditto	15 0 0	18 0 0
Yw. Battens, per hd. 12 ft. 2½ in. 7 in.	11 0 0	14 0 0
Christiania Yw. Deals, per hd. 12 ft. 3 in. 9 in.	23 0 0	24 0 0
White ditto	20 0 0	21 0 0
Quebec and St. John's Spruce Deals.....	13 0 0	16 11 0
1st qual. yw. Pine Deals, per st. hd.	12 0 0	16 13 0
Second do. do.	8 10 0	10 0 0
Third do. do.	7 10 0	8 0 0
Red Pine Deals, per hd. 12 ft. 3 in. 9 in.	15 0 0	20 0 0
Red Pine Timber, per load	2 15 0	3 10 0
Yw. ditto	2 10 0	3 15 0
Birch ditto	3 10 0	4 10 0
Elm ditto	3 0 0	3 5 0
Oak ditto	3 15 0	4 10 0
Standard Staves per mille standard	50 0 0	70 0 0
Puncheon Staves, per mille	12 0 0	16 19 0

MAHOGANY, &c.

Mahogany, St. Domingo	6½ d. to 1s. 9d.	per foot.	
Cuba	5½	1 6	
Honduras	4½	1 0	
African	0	0 0	
Cedar	Havana	5½	0 6½
Rosewood, Rio	12.	20f. per ton.	
Bahia.....	9f.	14f.	

WOOL MARKETS.

BRITISH WOOL.

LEEDS, May 24.—No great amount of business has been done in this market since our last report, but prices remain firm at late quotations, and on the whole the trade may be regarded as in a very healthy state.

LIVERPOOL, May 25.

SCOTCH.—The near approach of the new clip pre-

vents anything like active demand, and our present rate may in some measure be considered nominal.

	s. d.	s. d.
Laid Highland Wool, per 24lbs....	7 6	to 8 6
White Highland do.....	9 6	to 10 6
Laid Crossed do...unwashed	9 6	to 11 0
Do. do...washed	10 6	to 12 6
Laid Cheviot do...unwashed	11 0	to 14 0
Do. do...washed	14 9	to 17 6
White Cheviot do... do.	22 0	to 24 0

FOREIGN.—Since the close of the sales in London there has been more inquiry here for all kinds of Wool, and if the choice was better there would be more doing. There are some East India Wools to be sold here on the 30th, and a good assortment of Buenos Ayres and other sorts on the 13th of June.

FOREIGN WOOL.

LEEDS, May 24.—There has been rather a better feeling in these markets this week, although without any material increase in sale.

BRESLAU, May 21.—No alteration in the demand and prices of old Wools; fresh ones in good request at the former advance. Many flocks of the new clipping are already arrived, which show a beautiful wash and condition.

GUNSBURGH, Wool-broker.

PRICES OF MANURES.

LONDON, MAY 27.

GUANO.—No arrivals having taken place since our last, purchases in immediate want are obliged to pay more money.

LINSEED CAKES.—The demand still continuing, prices have an upward tendency.

NITRATE SODA.—Dull at our quotations.

SUPERPHOSPHATE LIME continues in good demand.

PRICES CURRENT OF GUANO, ARTIFICIAL MANURES, OIL CAKES, &c.

Guano, Peruvian	per ton	£0 0 0	to	£9 5 0
„ In quantities under 5 tons	„	0 0 0	to	9 10 0
Potter's Guano	„	0 0 0	to	7 0 0
Nitrate Soda	„	15 10 0	to	16 0 0
Nitrate Potash or Saltpetre	„	28 0 0	to	30 0 0
Superphosphate of Lime	„	0 0 0	to	6 6 0
Soda, Ash or Alkali	„	0 0 0	to	10 0 0
Gypsum	„	1 10 0	to	1 15 0
Coprolite	„	3 0 0	to	3 5 0
Sulphate of Copper, or Roman Vitriol for Wheat steeping....	„	27 0 0	to	29 0 0
Salt	„	0 0 0	to	1 5 0
Bones, ½ inch	per qr.	0 0 0	to	0 14 0
„ Dust	„	0 0 0	to	0 16 0
Oil Vitriol, concentrated.....	per lb.	0 0 0	to	0 0 1
„ Brown	„	0 0 0	to	0 0 ¾
Rape Cakes.....	per ton	4 0 0	to	4 5 0
Linseed Cakes—				
Thin American in barrels or bags	„	7 0 0	to	7 10 0
Thick ditto round.....	„	6 0 0	to	6 5 0
Marseilles	„	6 0 0	to	6 5 0
English	„	6 5 0	to	6 10 0

END OF VOLUME XXXII.

