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*J. B. Bantock*

# THE FARMER'S MAGAZINE.

VOLUME THE FIFTEENTH.

(SECOND SERIES.)

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JANUARY TO JUNE, MDCCCXLVII.

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# THE FARMER'S MAGAZINE.

JANUARY, 1847.

No. 1.—VOL. XV.]

[SECOND SERIES.

## PLATE I.

### PORTRAIT OF LORD GEORGE BENTINCK, M.P.

ENGRAVED BY J. B. HUNT, FROM A PHOTOGRAPH BY M. CLAUDET.

## PLATE II.

### BIRTHDAY; A SHORT-HORNED COW.

Birthday, white, calved May 20, 1841, bred by and the property of John Booth, Esq., Killerby, near Catterick, Yorkshire; got by Lord Stanley (4269), d. (Bracelet) by Priam (2452), g. d. (Toy) by Argus (759), gr. g. d. (Vestal) by Pilot (496), gr. gr. g. d. by (Vestris) by Remus (550), gr. gr. gr. g. d. (Valentine) by Blucher (82), gr. gr. gr. gr. g. d. (Countess) by Albion (14), gr. gr. gr. gr. g. d. by Shakespeare (582), gr. gr. gr. gr. gr. g. d. by Easby (232).—Vide "Coates's Herd Book," vol. vi., p. 271.

The career of Birthday as a prize cow has been eminently successful, commencing in 1843, at the meeting of the Yorkshire Society, at Doncaster, where she obtained the second prize, as the best two-year-old heifer, being beaten by her half-sister Ladythorn; at Northallerton, Richmond, and Durham (County) Shows in 1844, and at the meeting of the Royal Agricultural Society of England, held at Southampton, she obtained the first prize for the best cow in milk; as also the first prize for the best three-year-old heifer at the meetings of the Yorkshire Society at Richmond, and at Northallerton, and County of Durham (held at Stockton). The first prize at the Beverley Meeting of the Yorkshire Society in 1845, for the best cow in milk; and the first prize at the County of Durham Show at Sunderland. In 1846 a prize as extra stock, at the meeting of the Royal Agricultural Society of England, at New-castle-upon-Tyne; and the Silver Medal, at the Wakefield Meeting of the Yorkshire Society.

By reference to the foregoing pedigree, it will be seen that Birthday is from the far-famed prize cow "Bracelet," which obtained first prizes at meetings of the Royal Agricultural Society of England, Highland Society of Scotland, Yorkshire, and numerous other county and local shows in the north. Necklace, her twin sister, after following in her path, finished her brilliant career as a prize cow, at the late meeting of the Smithfield Club, where she obtained the first prize of her class, and the Gold Medal as the best animal exhibited in any of the cow or heifer classes.

## MEMOIR OF LORD GEORGE BENTINCK, M.P.

"Although the wealth of England excites the astonishment of all foreigners, yet the British people, during the lapse of ages, have amassed what is infinitely more valuable than their gold—namely, a character for honesty and plain dealing. . . . In their own country, by every grade of society, an honest man is respected . . . It is evident, therefore, that the British nobleman cannot afford to lose this character for the sake of supporting the political views of any individual states-

man, however brilliant may be his talents."—SIR FRANCIS B. HEAD.

"Justum et tenacem propositi virum,  
Non civium ardor prava jubentium,  
Non vultis instantis tyranni,  
Menti qualis solidâ."—HORACE.

With a plain, straightforward sincerity of purpose, and a thoroughly consistent line of conduct to support his great natural abilities, few men could

OLD SERIES.]

B

[No. 1.—VOL. XXVI.



show more general claims to the sympathy and respect of the British farmer than that nobleman who, of late, has laboured so energetically on the yeoman's behalf. Indeed, as the tried and approved champion of the agricultural interest, we should consider it a palpable neglect did we any longer delay publishing the portrait of a nobleman whose name and fame must be already so well known to our readers. We shall then, consequently, at once proceed to a brief sketch of the past life of Lord George Bentinck, commencing with a passing glance at that old and noble family of which his lordship has proved himself so worthy a member.

In attempting this we can do no better than avail ourselves of the following notice of the Portland family from Lodge's "Genealogy of the existing British Peerage":—

"Henry Bentinck, Heer von Diepenham, in Overyssel, where his family had flourished for many ages, had three sons—Henry, his heir; Joseph, a general in the service of the States-general; and William, who was page of honour to William III. when Prince of Orange, and accompanying that king into England, held the first place in his personal confidence and favour. He was created, in 1689, Baron of Cirencester, county Gloucester; Viscount Woodstock, county Oxford; and Earl of Portland, county Dorset; was made a Knight of the Garter, and Groom of the Stole to the King. He commanded a Dutch regiment of horse-guards, with which he attended William to Ireland in 1690, and was his lieutenant-general at the battle of the Boyne; was with him in all his wars, and constantly employed in public business throughout his reign, and was the last person that king spoke to at his death. The Earl afterwards led a retired life, and died in 1709. Besides two sons, named William, who died infants, he had three sons who survived him—1st, Henry, his successor, second Earl and first Duke of Portland. 2nd, The Hon. William, created a Count of the Empire 1732; married, 1733, Countess Charlotte Sophia Hedwige Eleonora, only daughter and heir of Anthony, Count Aldenburgh. 3rd, Charles John, Count Bentinck. Henry, the second Earl, was created, in 1716, Marquis of Titchfield, county Southampton, and Duke of Portland."

To proceed to the more immediate subject of our memoir, we find that William George Frederick Cavendish Bentinck, more commonly known as Lord George Bentinck, was born at Welbeck on the 27th February, 1802, and is second surviving son of William Henry Cavendish Scott Bentinck, fourth Duke of Portland, by Henrietta, eldest daughter and co-heiress of the late Major-general Scott, of Balconie, county Fife, and sister of the Dowager Lady Canning.

Contrary to the usual custom, more particularly of that period, Lord George was entered at no public school or college, but proceeded with his studies in private up to the age of seventeen, when he joined the army as a cornet in the Tenth Hussars. From this regiment he exchanged, in the same year, to the Grenadier Guards, and was shortly afterwards reduced to half-pay at the general reduction in 1818. He soon, however, again went on active service, as a cornet in the Ninth Lancers, where his lordship continued until 1822, when at a second general reduction we trace him as purchasing a half-pay company in the Second West India Rangers; from which, the next year, he exchanged to the full-pay of the Forty-first, with a view of going out to India as military secretary to the Governor-General, the late Mr. Canning—his uncle by marriage with the Duchess of Portland's sister, the late Viscountess Canning. This appointment, though, was fated never to be taken up, for almost on the eve of sailing in the "Jupiter" frigate—on board which the luggage of uncle and nephew was already packed—Mr. Canning was called on by George IV. to assume the seals of the Foreign Office, and to act as leader of the House of Commons. A change no less important than unexpected, and that had its origin in the melancholy termination of Lord Castlereagh's career. In this alteration, moreover, Lord George Bentinck so far participated as to become private in the place of military secretary; without, however, receiving any pay, the emolument of the appointment being transferred to the late Mr. Backhouse, with whom his lordship divided the duties of the office until 1825. In this year we have him resuming his original profession by exchanging once again from half-pay to the Second Life Guards, with whom he continued until the end of 1826; when his Royal Highness the Duke of York, in that graceful and handsome manner which so generally distinguished him, said he had an unattached majority at Lord George's service. The acceptance of it, of course, again led to half-pay, on which his lordship remained until 1835, when, there being no chance of further practice in arms, he sold out and retired altogether.

There are but few collateral circumstances connected with Lord George's life up to this period that call for observation. The chief, perhaps, is his want of ambition as a politician or statesman; he having, during his honorary campaign with Mr. Canning, three times refused the office of Under-Secretary of Foreign Affairs—first, when Lord Howard de Walden was to have been his coadjutor, again when he would have served with Lord Conyngham, and a third time with the offer of the undivided appointment. The same determination, in fact, has

since characterised his course of conduct; for to the repeated solicitations of Lord Stanley, and the pointed invitation of Sir Robert Peel in 1841, his lordship showed himself equally unwilling to accede. His other pursuits, about the time above alluded to, bore more on his reputation as a sportsman. Passionately addicted to the chase, he soon became a fine and steady rider to hounds; took a good standing, too, as a fair "fair-play" shot; and indulged occasionally in that leading pastime to which, in after life, his energy and ability gave so great an assistance.

Having thus given the heads of Lord George Bentinck's acts and opinions out of the House, we come to consider, may be a little more at length, his doings in it. In 1827, after the prorogation of Parliament, Lord William Bentinck, at that time member for King's Lynn, was made Governor-General of India, and by his acceptance of the appointment, at once (in fact) vacated his seat. This vacancy, however, by law could not be properly effected until the meeting of Parliament in 1828, when a new writ was granted, and Lord George returned in his stead.\* Here the latter's line of proceeding was quickly decided on, and we trace up his name as an Opposition member in all the majorities on the Corporation and Tests Acts, and Catholic Emancipation Bill, which ultimately drove Sir Robert Peel to concede those measures. The late Premier and Lord George Bentinck would seem, indeed, at their first meeting on the floor of the House, to have occupied very similar positions as regards each other to what they do at present; so long as Sir Robert continued in power, Lord George was against him, and in 1830 we have the latter voting on nearly every one of those divisions that ultimately led to the minister's resignation. Still, during all these inviting opportunities for the young orator to distinguish himself, and for a very considerable period afterwards, Lord George seldom rose to address the House, but rather appeared to be following the advice of Wilberforce, and "not to seek occasions for display, but to attend to business, and let speaking take care of itself." The only times on which, we believe, his lordship did address the House were, first, in a well-considered speech against the disfranchisement of the forty-shilling freeholders in Ireland—although, as we have said, favourable to the great principle of

Catholic emancipation; next, in one of his own manly and effectual appeals on the subject of the pension to Mr. Canning's family; and thirdly, in an equally warm and natural outburst of feeling against the attempt to disfranchise the freemen of Liverpool—an act that would, as his lordship clearly proved, have had the effect of punishing the poor, and consequently least culpable, while it let those escape who not only took most money for their votes, but had the worst excuse for such corruption. This contest, most assuredly, was a vestige of the good old days of electioneering, for it cost one candidate £90,000, and the other £110,000, while the last tally brought alone a thousand clear! In this, the early part of his political career, Lord Bentinck also brought in the Weights and Measures Act; but the object of the bill was too just to cause much hostility, and so required but little call for argument.

With his own constituents Lord George Bentinck stands on very different terms from those just alluded to as once existing between Liverpool and its chosen; fairly speaking, we do think, from all we have heard, nobody of electors preserve a higher character for purity of purpose than the men of King's Lynn. And as they are, so undoubtedly are they represented—a mutual and thoroughly-independent spirit of confidence, springing from no local power of large estate on the one hand, or force of circumstance on the other, is seen alike in the member and his supporters. As his predecessor, Lord William, acquired this influence, has Lord George continued and increased it—by a becoming and constant attention to the interest of the borough itself. This has been strikingly exemplified in his lordship's successful opposition to the Bedford Level Corporation, and by the £200,000 compensation forced through his exertions from the Eau Brink Commissioners for damage done to the Port of Lynn by the Eau Brink Cut. And the people of Lynn, moreover, have well shown their sense of this good and happy endeavour to protect them by a public testimonial to it, as now hanging in their Town Hall. Two hundred guineas were immediately subscribed, and expended in a portrait of their member—another still of that noble family on whom they have so long relied, and by whom as yet they have never been disappointed.

For a period of eighteen years, then, the subject of our memoir was scarcely ever heard, except when presenting a petition, defending a friend, or raising his voice in favour of or against any measure of interest to his constituents; nor was it until the leader of the most powerful party in the country had deserted his colours, that the honourable—in every sense honourable—member for Lynn conquered his distaste for speaking, and

\* It may be recollected that Lord George Bentinck has been charged by Sir Robert Peel with being present during the violent debates in the early part of the session of 1828, touching more immediately the conduct of Mr. Huskisson and "the deystroyers of Mr. Canning." But dates will show that the new member for Lynn was not elected at the time.

burst forth as a most brilliant political luminary. Speedily was his lordship hailed and adopted as the champion and leader of the protectionists; and then every other consideration, both private and public, save the cause of his party, was thrown into the shade. He denounced in his place in Parliament those who, returned in 1841, pledged to support the then-existing corn laws, had followed Sir Robert Peel in advocating the principles of free trade. He exposed the self-contradiction of their argument; proved step by step the subtle character of their proceedings; and, in short, to adopt the words of Waller, "broke out, like the Irish rebellion, three-score thousand strong, when nobody was aware, or in the least suspected it." Certainly, few speeches ever produced so startling an effect, or acquired such eulogiums both within and without the walls of Parliament, as did his upon the corn laws. During the entire debate upon that all-absorbing topic, Lord George fought the question inch by inch, and no man ever stood up more gallantly in support of his cause than did the honourable member for Lynn. In and out of the House, night and day, he continued equally indefatigable in his object. At King's Lynn, Chelmsford, and other public meetings of the friends of agriculture, he still showed that if the enemy had gained a temporary advantage, he was determined to place himself in the breach, open at a proper season the campaign anew, and rally round him all he could to defend it to the last. He pointed out the course his allies should pursue; he declared that none but good men and true should be enrolled in the corps; and stated openly and candidly the tactics his party would adopt.

Coming forth so unexpectedly as Lord George Bentinck did, it is wonderful how well he sustained the position to which he was elevated. With indefatigable labour and the deepest investigation, he made himself master of every subject connected with native industry; and there is no man in the House of Commons that can surpass him in these statistical details. Every argument that has ever been brought forward has been carefully investigated, and information received from those most competent to furnish it. Correct, then, in his own statements, his lordship is ever ready to detect in others any false reasoning or fallacious doctrine; and should some unhappy senator, from the Prime Minister down to the last importation from college, commit any wilful error in figures, facts, or calculations, down comes the sledge-hammer of his lordship to pound them to atoms. Lord George is what Sir Francis Head, in his last most valuable work, calls "a dealer in figures and in facts." He is a most formidable opponent, a listener upon whom illegitimate theories and false deductions cannot be

palmed off; and one who is ever ready to defend the policy he supports by arguments, as well considered as forcibly applied. He never allows any flights of fancy to divert him from the immediate matter before him; he makes no attempt to soar into the regions of metaphor; but with good sound sense, plain and simple language, and practical knowledge of his subject, he commands a general attention, and argues with an admirable effect.

In the mere line and rule etiquette of the forum, and the "nice conduct" of the declaimer, Lord George has perhaps not studied quite so hard to please. It must, however, be remembered, in considering the charge made against him of violent language, the provocation he and his party had for plain-speaking. As an honest and independent member of Parliament, returned by his constituents to protect native industry, his lordship viewed with dismay the declarations made in favour of free trade; and when he found, among the ranks of those who followed their chief in his Protean movement, men that had solemnly pledged themselves upon the hustings to support the then existing laws, he denounced them, with good reason, as apostates. A more experienced debater would, with a saccharine smile and a honied tongue, have couched his phrases in more palatable terms; but the leader of the protectionists, like the hero of the Scotch tragedy, was one "who had been accustomed all his life to hear and speak the simple truth," and who, conscious of his own public as well as private integrity, "did not borrow friendship's tongue to speak his scorn," but gave vent to the feelings which the conduct of his former allies had produced upon his mind. Indeed, were our readers to study the annals of both Houses of Parliament, they would easily find among the speeches of statesmen, hereditary legislators, and senators, both of the present day and by-gone years, language a hundred-fold more violent, although not more pungent, than that complained of, without even the palliative circumstances that attended it. We would not unnecessarily bring forward the names of those of our own times who have been repeatedly called to order for words most unparliamentary both in spirit and substance; but we may cite a case or two in precedent, from what are generally allowed to be the more brilliant times of the Commons' House. Did the celebrated William Pitt, in his reply to Sir Robert Walpole, hesitate in giving full expression to what he felt? Did his son, the mild and tranquil, always preserve that character in attack? and, if so, how came his duel with Mr. Tierney? Was Sheridan, with all his humour and elegance of diction, never driven to personalities and home-truths? Was Wyndham marked for any great refinement in invective? or

even Curran and Grattan content with silent contempt for their opponents, or the more indirect instrument of polished eloquence? It would rather seem that men of high ability and aim have, in all ages, more or less, been unequal to the shackles of mere outward form and hollow courtesy; and that, in offending on this head, Lord George Bentinck has but broken down a barrier that the best and greatest of our orators had disregarded on similar occasions.

Another and still less weighty objection to Lord George Bentinck as a statesman is his well-known passion for the turf—a *national* pastime, by the way, which solely, through his lordship's endeavours, has been almost entirely freed from the impurities and mismanagement that were so rapidly telling against it. His lordship was the first, at a considerable cost both of time, labour, and purse, to expose the infamy of those black sheep of the race-course and ring, who had brought one of our most popular amusements into the greatest disrepute; and the Bentinck testimonial, which was subscribed to by all the leading men upon the turf, fully proved the high estimation in which his lordship is held. With a nobleness of character that reflected the greatest honour upon the subject of our memoir, he accepted the flattering testimonial as far as the verbal compliment went, but handed the money subscribed over to a fund for the benefit of decayed and deserving trainers and jockeys. Lord George has been called the leviathan of the turf; while, to judge of both the quality and quantity of his stud, the title was well merited. And here again we may class him, if the *sunt quos curricula* be a crime, as sinning in the best of senatorial company. Was not Fox, one of the greatest statesmen England ever produced, summoned off Newmarket Heath to attend the councils of his country? Was not Wilberforce, by his own confession, a heavy player? Sheridan, a dramatist? and Wyndham the advocate of bull-baiting and cock-fighting? Did not Sir Robert Walpole, again, retain his strong attachment to the trigger through all the turmoil of office; and is not the Duke of Wellington almost equally sincere in his love of the chase? There never was a greater error than the supposition that a proficiency in field sports weakens the powers of the mind, or that a natural turn for amusement is incompatible with the achievement of greater things.

Having so far and, as we trust, so fairly considered the "aye" and "no" of Lord George Bentinck's actions as at present appreciated, we shall finish our sketch with a few words of a more personal character. As a speaker he is occasionally nervous and hesitating; but, when once

warmed with the subject, he is animated and powerful, replete with sterling sense and energy of expression. He seldom leaves any point of the question unnoticed: while in reply he is quick and happy in exposing the errors of his opponents. In appearance his lordship is extremely prepossessing, uniting a fine manly figure with a handsome and intelligent countenance; and preserving in his dress an exquisite neatness and absence of all eccentricity or dandyism.

His habits of life are most temperate: he is an early riser, and devotes that portion of the morning to business which many of his order sacrifice to sleep and sloth. We have heard, for instance, that, during his late memorable campaign in the House of Commons, he has risen shortly after daylight, and from that time has been employed for nearly twenty hours in the service of his country. We may, consequently, fairly conclude that the brilliant success which has attended his career is to be attributed not alone to his varied attainments and talents, but to his unwearied habits of business. Allowing no private pursuit or pleasure to interfere with his public duties, Lord George has set an example which it would be well for politicians who aspire to high honours to emulate; and although few may be fortunate enough to reach the eminence he has so rapidly attained, they will, by adopting such a course, secure to themselves the approbation of their fellow-men, and the inward satisfaction of having nobly done their duty to their country and their constituents.

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TESTIMONIAL TO MR. MILBURN.—At the dinner of the Yorkshire Agricultural Society, given on occasion of the trial of implements at Wakefield, on the 27th of last October, the following resolution was agreed to, and signed by all the implement makers present:—"We, whose names are hereunto subscribed, being implement manufacturers or exhibitors, and for several years in the habit of attending the Great Yorkshire Agricultural Society's meetings, at each of which we have always met with great attention and kindness, in return for this we have at several times felt anxious to subscribe some token of our esteem and regard for Mr. Milburn. A favourable opportunity now occurring, namely, the trial of implements at Wakefield, October 22nd, 1846, and it being the wish of all present that a subscription should be entered upon, we readily avail ourselves, and commence forthwith. The amount of subscription to be presented to Mr. Milburn on the 1st of January, 1847, under a name to be hereafter decided upon by the committee. Treasurer, Mr. Barrett, Hull."

## ON THE IMPROVEMENT OF THE COTTAGES OF THE AGRICULTURAL LABOURERS.

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

*(Continued.)*

One great defect in cottages, to which the owner should direct his early attention, is their improved means of ventilation; since, from an absence of proper openings in the windows, the small rooms of which such cottages consist, cannot possibly be sufficiently healthy for their commonly numerous inmates. A few facts which have been noted, of the ill effects of a want of ventilation in the case of animals, will place the dangers of inhabiting ill-ventilated rooms in its true light.

"I think," said Dr. Arnott (Rep. p. 51), "it would still be desirable to command thus far (referring to some suggested legislative interference) that there should be, near the upper part of every room, an opening, to be used on proper occasions, to allow the hot breath, and other impure air which rises to the ceiling, to escape there. It is impossible to ventilate aright a room containing a number of persons, except through an opening near the top of it; and the great defect of all our arrangements now is the want of such an opening. When I visited Glasgow with Mr. Chadwick, there was described to us one vast lodging-house, in connexion with a manufactory there, in which formerly fever constantly prevailed, but where, by making an opening from the top of each room, through a channel of communication to an air-pump common to all the channels, the disease has disappeared altogether. The supply of pure air obtained by that mode of ventilation was sufficient to dilute the cause of the disease, so that it became powerless." "We had a remarkable instance, a year or two ago," adds Dr. Arnott in another portion of his valuable evidence, p. 52, "which serves to show the degree of knowledge that exists amongst the public at present on this subject. In the Zoological Garden in the Regent's Park, a new house was built to receive the monkeys; and no expense was spared which, in the opinion of those entrusted with the management, could ensure to these natives of a warm climate all attainable comfort and safety. Unhappily, however, it was believed that the objects would be best secured by making the new room nearly what an English gentleman's drawing-room is. For warming it, two ordinary drawing-room grates were put in, as close to the floor as possible, and with low chimney openings, that the heated air in the room should not escape by the

chimneys, while the windows and other openings in the walls above were made as close as possible. Some additional warm air was admitted through the openings in the floor from around hot water-pipes placed beneath it. For ventilation in cold weather, openings were made in the skirting of the room close to the floor, with the erroneous idea that the carbonic acid gas produced in the respiration of the animals, because heavier than the other air in the room, would separate from this and escape below. When all this was done, about sixty healthy monkeys, many of which had already borne several winters in England, were put into the room. A month after more than fifty were dead, and the few remaining ones were dying. This room, open only below, was as truly an extinguisher to the living monkeys, as an inverted coffee-cup held over and around the flame of a candle, is an extinguisher to the candle. Not only the warmth from the fires, and the warm air allowed to enter by the openings in the floor, but the hot breath, and all the impure exhalations from the bodies of the monkeys, ascended first to the upper part of the room, to be completely incorporated with the atmosphere there, and by no possibility could escape except as a part of that impure atmosphere gradually passing away by the chimneys and the openings in the skirting; therefore, from the time the monkeys went into the room until they died, they could not have had a single breath of fresh air. It was necessary only to open, in the winter, part of the ventilating apertures near the ceiling, which had been prepared for the summer, and the room become at once salubrious. The day after I saw the monkey-house just mentioned, I was sent for to visit a young gentleman, at a respectable school in the neighbourhood of London, where there were about forty boys: the boy I went to see was thought to be falling into consumption, and I learned that others of the boys were also ill. On examination, I found the cause to be only a less degree of the error which had destroyed the monkeys. The two cases struck me forcibly, as illustrations of the little knowledge on the important subject of the essentials of health possessed by persons otherwise highly accomplished. A new school-room had been built at the back of the dwelling-house, in which room the forty boys spent



much of their time, and there was no opening by which their breath could escape from the room, except through the *low* fireplace. There was indeed a skylight above with sashes, which might be opened; but the schoolmaster told me that he took care never to open these when the boys were present, because, having done it once, a boy got severe inflammation of the lungs in consequence of the cold air rushing in upon him. This gentleman had gone to a great expense to secure, as he thought, the health and comfort of his scholars; but, from want of knowledge on the subject, had missed his aim, just as had happened in the case of the monkey-house." In answer to the question by the commissioners—"Do you think it would be desirable, in order to ensure the general adoption of these principles (of ventilation, &c.), to comprehend them in the course of instruction in primary schools?" Dr. Arnott replied "Yes: it really is a most important part of every man's education to learn a little of physiology in its applications to the preservation of his health, and I have no doubt that in a few years this kind of knowledge will be much more common."\*

"It is known," adds Dr. Arnott (*ibid.* p. 61), "that a canary bird, suspended near the top of a curtained bedstead in which people have slept, will generally, owing to the impurity of the air, be found dead in the morning; and small close rooms, in the habitations of the poor, are sometimes as ill-ventilated as the curtained bedstead."

Mr. Edwin Chadwick, the excellent secretary to the Poor-Law Commissioners, in his able supplementary report upon the sanitary condition of the labouring classes, gives some striking facts in illustration of the ill effects of bad smells upon the health of small birds. He says (p. 10):—"In the course of some inquiries which I made with Professor Owen, when examining a slaughterman as to the effects of the effluvia of animal remains on himself and family, some other facts were elicited illustrative of the effects of such effluvia on still more delicate life. The man had lived in Bear-yard, near Clare Market, which was exposed to the combined effluvia from a slaughter house and a tripe factory. He was a bird fancier, but he found that he could not rear his birds in this place. He had known a bird, fresh caught in the summer time, die there in a week. He particularly noted, as having a fatal influence on the birds, the stench raised by boiling down the fat from the tripe offal. He said, 'You

may hang the cage out of the garret window, in any house round Bear Garden, and if it be a fresh bird it will be dead in a week.' He had previously lived for a time in the same neighbourhood in a room over a crowded burial-ground in Portugal-street. At times in the morning he had seen a mist rise from the ground, and the smell was offensive. That place was equally fatal to his birds. He had removed to another dwelling-house in Vere-street, Clare Market, which is beyond the smell from this particular place, and he was now enabled to keep his birds. In town, however, the ordinary singing birds did not actually live more than about eighteen months. In cages in the country such birds were known to live as long as nine years or more, on the same food. When he particularly wished to preserve a pet bird he sent it for a time into the country; and by repeating this removal he preserved them much longer. The fact of the pernicious effect of offensive smells on the small graminivorous birds, and the short duration of their life in close rooms and districts, was attested by a bird dealer. In respect to cattle, the slaughterman gave decided reasons for the conclusion, that, whilst in the slaughter-house, they lost their appetites and refused food from the effect of the effluvia of the place, and not, as was popularly supposed, from any presentiment of their impending fate."

*Ventilation of Animals.*—"The spread of the knowledge of the fact that animals are subject to typhus, consumption, and the chief of the train of disorder supposed to be peculiarly human," remark the commissioners in another place, "will, it may be expected, more powerfully direct attention to the common means of prevention." (*Report*, p. 103.) The following extract from a report on the labours of the Board of Health, at Paris, will show the effect of bad ventilation on cattle:—"The *epizootie* are in many respects less serious than the epidemics: nevertheless, as they often effect the animals which serve for the nutriment of man, and that, apart from this consideration, they may have grave consequences for the public health, they have constantly engaged the care of the council. In 1834 an *epizootie* was reported to the administration, which prevailed amongst the cows of the communes round Paris, and which caused a great mortality. The researches of the council established that this *epizootie* was only a chronic disease, a true pulmonary phthisis, to which has been given the name of *pommelière*, and by which the greater part of the cows had been attacked which fill the stables of the milkmen of Paris and its environs. According to the council, the principal cause of the evil was to be attributed to the vicious regimen to which this animal is subjected. It is known that they pass a

\* From a conviction of their importance to the health of every person, the author has endeavoured in "The Rural Spelling Book," to enforce and explain these questions in language suitable to youth. See the subjects "good air," "good water," and "drainage," &c., pp. 41, 42 of the Spelling Book.

part of the year in stables perfectly closed, in which the space is not proportioned to the number of inmates, in which the vitiated air renews itself with extreme difficulty, and in which the heat is sometimes suffocating. It is known also that they pass suddenly from the food of the stable to pasture, and that in this change they go from the hot and humid atmosphere of the stable to a sudden exposure to the continued variations of the external air. This alternation of food, and of heat and cold, operates as a powerful cause of disease. But as the evil does not announce itself in a violent manner, as its progress is not very rapid, as there is even a period in the disease in which the animal is disposed to get flesh, the cow feeder, who knows to what point to keep her, sells her when she is ready to calve. It is a radius of thirty leagues from the capital that cows of this kind are purchased by the jobbers, who supply the milkmen of Paris. With these last they still hold out a certain number of years if they are properly cared for, but in general they are kept in stables, which are neither sufficiently large nor sufficiently airy, where they are exposed to the same causes which gave birth to the malady. The phthisis arrives insensibly at its last stage, and carries off every year, from Paris and its neighbourhood, a great number of these cows."

A similar discovery was only lately made as to the effect of defective ventilation on the cavalry horses in some of the government barracks in England; and, it is stated, that a saving of several thousand pounds per annum was effected by an easy improvement of the ventilation of the barracks near the metropolis. An agriculturist had a large number of sheep housed to feed them on mangel wurzel, but a great number of them sickened and died, and he declared that it was the food which had killed them. A veterinary surgeon, however, who happened to be aware of the consequences of defective ventilation, pointed out the remedy—a better ventilation for the sheep, which were overcrowded. The defect was remedied, the sheep ate well, and thrived upon the mangel wurzel.

*The Supply of Water.*—A copious supply of good, wholesome water, from either a well or by

collecting the rain water from the roof, or from both sources, is an essential too seldom provided for in the arrangement of a labourer's cottage; and yet there are few things that more conduce to the health and comfort of its inmates than a copious supply of soft, sweet water. I would never let the indwellers be destitute of an abundant supply of spring or well water wherever it can be possibly obtained; but I would never omit to provide for collections of rain water, which for many culinary purposes is the sweetest and best of all waters. It is only needful to provide a few open eave-troughs for its collection, and a good sized tank for storing it, and if leaves or soot, or other mechanically suspended matters are removed by making the rain water pass through some coarse sand or gravel in its way to the tank, the water will keep sweet and good for any length of time. I will here repeat what I have in another place (*Rural Spelling Book*, p. 42) had occasion to remark upon this very important head, since the extent and the quality of the supply in England of rain-water is much too rarely considered. It is well known that some waters are called "hard," and are unfitted for the purposes of washing and brewing. This is owing to such waters holding, dissolved in them, either chalk or gypsum (carbonate of lime, and sulphate of lime), either of which, by decomposing, renders more expensive the use of the soap, and materially retards the extraction of the saccharine matter from malt. Rain water, from the total absence of these two substances, is the "softest" and best of all water for washing and brewing; and if proper care is taken in its collection and storing in tanks, no family need be without an abundant supply of it; for it has been determined, that sufficient rain falls on every house in England for the use of its inhabitants. Although this varies in amount in different districts, yet the average annual depth which falls in England is about 24 inches, or more than 12 gallons upon every square foot of the roof (a gallon contains 277.274 inches); so that, supposing the roof to be 15 feet square only, more than 2800 gallons of water, or about 8 gallons per day, fall upon it in rain every year.

(To be continued.)

#### BURTON-ON-TRENT FARMERS' CLUB.

The committee, in presenting a report of the state and proceedings of the club during the past year, have great pleasure in being able to congratulate the members on its continued prosperity.

It is in itself a sufficient proof that our club has

not been quite useless, that we now meet in undiminished numbers, and in perfect agreement, on our sixth anniversary; though we have not shrunk from the duty of canvassing freely those subjects which seemed on first view to be fraught with

some danger to the cordial understanding among us. It must be very obvious to every one that the interests of all connected with land—of proprietors, farmers, and labourers—are one and the same; that the landlord is benefited, the farmer's profit raised, and the labourer's field of employment enlarged by those improvements of the staple of the land, and the modes of cultivation which it is the special object of our club to enquire about; and that whatever tends to make such improvements easier of adoption, or throws impediments in their way, should be made the subjects of our enquiry.

The committee indulge the hope that the club will every year attract the labours of a greater number of its members, to make their discussions more and more useful, in diffusing sound, practical information on agriculture. That such societies are capable of rendering great benefit, and that the circumstances of the time peculiarly require them, the experience of every day confirms. There is, undoubtedly, a great deal of new and valuable truth to be learnt now-a-days; but there are also a great many new errors which it behoves farmers not to fall into. The most judicious man has need of all his caution in acting upon even the true theories which science has furnished; and before the great body of farmers adopt new methods, they must learn that they have been tried and found good by the more adventurous and more sagacious of their members. But little that is new can be expected from small local societies, but it is an immense benefit if they introduce into each district the improvements which have been tried in others; and it is precisely the trite and well ascertained facts, that may seem to many uninteresting, which it is most useful to sanction by the opinion of their members. The subjects discussed at the monthly meetings during the year, have been all interesting to the practical farmer; and the opinions expressed by the club have uniformly tended, as in former years, to the approval of that system of farming which causes the land to yield the largest amount of produce whether in arable or pasture.

At the first meeting in December, the late secretary of the club, Mr. John Greaves, read a paper on the expediency of growing an intervening green-crop between the corn and turnip-crop. His opinion was wholly in favour of the practice, and he recommended tares and rye to be grown before the white, but rye alone before the Swede, as being the only plant that would yield a sufficient amount of keep to repay the culture when eaten off early enough, to be followed by that kind of turnip. In ordinary seasons, he reckoned that if eaten off by the first week in May, an acre of early rye would furnish keep for one month to ten sheep, the value of which would, at the lowest estimate, be worth £1,

while the land would be benefited considerably by the manure rendered to the land in eating it off. This would sufficiently repay the cost of its culture, because, as the land must necessarily be cleared in autumn, no part of the expense, except just the seed and labour of sowing and harrowing in the seed, ought to be set down against the value of the crop. This would not amount to more than 12s. 6d. per acre. But when the corn crop was gathered early, so as to permit the rye to get a good head before the winter, or when the spring was warm and forward, the produce of the crop would be double or treble the amount set down. In advocating the practice of thus growing a light crop for very early spring feed, Mr. Greaves laid most stress on the argument that it was very much more important than is commonly thought, to provide early food for sheep, instead of letting them run over pasture ground in the spring. Farmers did not, as he thought, sufficiently attend to the fact, that grass, clover, and indeed all herbaceous plants yield a much greater bulk of produce in a given time, after they have attained a good head, than in the early part of their growth. Thus, if a piece of clover be cut at three different times in six weeks, it will not yield one fourth of the bulk as it would if the whole six weeks' growth be cut at once. He quoted such an experiment recorded in Von Thaër's work on agriculture, and adduced other instances in proof of the general principle; especially he adverted to the fact that by mowing off grass and green crops, and soiling with them, in sheds or yards, twice or thrice the quantity of keep was yielded as when the crop was eaten on the ground, and accounted for it on this principle—very great loss was consequently sustained whenever crops were eaten off while the plant was still small, and the value of spring-keep, which prevented such waste, was proportionately more valuable. In the subsequent discussion it was objected to the practice of growing rye before the turnip, that the sowing was inconvenient because it would interfere with wheat-sowing; that the land would be difficult to work in the spring, and the eating off the rye would not benefit the land. The common opinion, however, of the members present, was, that the sowing of the rye would commonly be earlier than the wheat-sowing; that the land filled with the roots of the rye would be easier worked in the spring; and that a crop eaten on the ground must necessarily add to its fertility: and though the growing of a crop before the Swede was not thought profitable on any but the lighter soils, and on them only when they required but little cleaning in the spring, the practice was sanctioned by the opinion of the club.

At the meeting in January, Mr. Harding was

unable to attend and Mr. Greaves supplied his place.

The subject of discussion was, the "Management of Dairy Cows, with special reference to the question, whether it is better to keep them on strong food and prolong the flow of milk, or to give a less expensive diet, and let them dry earlier."

Mr. GREAVES first appealed to the fact which cannot be too often called to mind by the farmer, that "Whether the stock be store and growing, or feeding, or milking, that portion of food it eats, and which does not add to its growth, or become converted into fat or milk, is an absolute loss." If you give to a cow  $1\frac{1}{2}$  cwt. of hay per week, or its equivalent in other nutritious food, the beast will live, indeed, but will not yield any produce: but if you add to that meagre diet another three-fourths of a cwt. per week, the beast will yield in increase of size, or fat, or bulk, not only a return for the additional three-fourths of the cwt., but for its whole diet. This is a fact commonly recognized by good farmers, in every other instance but in the case of milking cows; it is still a very usual practice to make straw the chief ingredient in their food during the winter, and to cease milking them for three, four, or even five months. Mr. Greaves shewed by strict calculation of the rate of profit on the two different systems, that that of feeding high and milking ten or eleven instead of seven to nine months was the best, and he detailed his own dairy management to prove that cows could easily be made to prolong their milk for any length of time that was thought advisable. His practice was to shed his cows very early in the autumn, and to begin with turnips or cabbage, as soon as the pastures in the least degree failed. With warmth, and a liberal diet of steamed hay, turnips, grains, and sometimes corn or oilcake, he had known but few instances in which cows would not return sufficient yield of milk through the winter to repay their keep, and when suffered to be dry five or six weeks he had found no difference in their milking after calving. Sometimes he milked them up to the time of calving, but though after a month or six weeks they milked as freely, yet at first their yield was less, and on the whole he thought it best to let them dry for six weeks. Mr. Greaves admitted that there were some cows that would not milk freely for so long a time as he had stated, but such instances were the exception; they were either beasts which had been bred too much with a view to feeding, or in the other extreme, had been bred from a poverty-stricken race, and had themselves been ill-reared. He ended by calling the attention of the club to the necessity of choosing such cows for the dairy as had been bred from good milking stock; and contended that the

milking, like the feeding properties, of cattle might be improved by judicious breeding, on the principle that like produces like.

These views of Mr. Greaves were entirely approved of by the club.

At the February meeting, Mr. Lyon read a paper on a subject which had before been discussed by the club, namely, "The question under what circumstances it was advisable to sow and plant thick or thin." He thought that as a general rule no other could be given than that the best soil, and that best suited to the nature of the special crop, should have the fewest, and soil with opposite qualities the most plants or seeds; because, as was very obvious, the plants being larger on the good soil, the same number could not thrive on the same space as of smaller. Whatever, therefore, tended to make a soil richer, or of a more favourable texture for the growth of plants, as manuring, deep and careful tillage, or frequent hoeing around the plants, rendered less seed necessary. The crops which rendered a single plant for each seed, as turnip, cabbage, beans, &c., offer the most striking illustration of this principle; but it is equally apparent in corn-crops, which multiply their stems by tillering. To a certain degree it is immaterial as regards the attainment of a large crop, whether the plants be more or less thin, because the smaller number of plants will gain in size, and equal in bulk the larger number. The main reason for setting plants at large distances, is to give room for stirring and cleaning the land while the crop is growing; and it is especially important to keep in view the principle which regulates the proper distance of plants, lest we fall into the mistake of expecting a large crop at wide distances, on land that is neither fertile nor carefully cultivated. As to the question of thick or thin sowing of corn, on which there has lately been so much dispute, Mr. Lyon thought that the best practice was to avoid both extremes. He agreed that so large a quantity of seed as three bushels of wheat was certainly unnecessary, except on the supposition that the greater part of the plants would die. On well drained land, well tilled, and with a favourable seed time, fewer plants would die in the winter; and as, whether thick or thin sown, the plants would tiller more or less, there must necessarily be a great destruction of plant, merely from overcrowding, where so large a quantity of seed was used in a favourable soil. More careful sowing also by drilling, dibbling, or pressing, prevented the death of much plant, because more of the seed would be placed at a proper depth. On the other hand, if the seed was so scanty as to give every plant room to tiller freely, there must needs be unoccupied spaces left wherever the plant

failed or died. For these reasons he thought it dangerous to trust wholly to the tillering process, or to crowd the plants so much as to forbid it altogether. While on poor and cold soils, it might be necessary to adhere to the old practice of sowing large quantities of seed; it was not only useless but injurious to sow more than six or seven pecks on good and well managed soils. He had tried the middle way of sowing, neither thick nor thin, and had found it the most successful. There was no difference of opinion among the members present, as to the principle that less plants or seed was necessary on good and well tilled soils, and though some of the members thought the quantities of the seed corn should be larger than recommended by Mr. Lyon, his opinion on this point was also generally approved.

March 12th.—Mr. Hassall was not able to attend the meeting, but he sent to the secretary a paper on the subject which he had engaged to bring before the notice of the club. The subject of it was "The principle that should guide the farmer in the choice of seed, with regard to its quality, and the situation from which it should be derived." Mr. Hassall's opinion was that it was as important to choose the most perfect seed to continue the stock of corn, as it was to choose the most perfect parents in breeding cattle or sheep. Unless bold and full seed was used, the plants it produced were liable to decay at the period when the nutriment of its kernel was exhausted, and before the roots could lay hold of the ground. He thought also that when used too long on the same land, the seed was apt to degenerate, and he therefore recommended a change of seed every three or four years. In the case of turnips, he had avoided much loss by growing his own seed from healthy and fine plants, instead of trusting to bought seed.

The practical question whether it was essential to use the very best corn for seed, and whether it was best to change it frequently, were rather differently viewed by some of the members present. It was the general opinion that light seed, or that which had not ripened kindly, or what had been subjected to damage, either in the field, or afterwards in the stack by heat or damp, was entirely incapable of yielding a perfect crop. As regarded the change of seed most of the members thought that a change was good, but that it was only necessary where the land was not fitted to grow the plant to perfection. As in cattle the progeny of the best parents will degenerate if it be not well reared, so the most perfect seed, grown on the most kindly soil, will in each successive year lose something of its good qualities, and it is therefore necessary to supply ungenial land with seed grown on that which is favourable to its attainment of the best qualities.

It was argued, therefore, that a change was alone good when the new seed was derived from better land or better situations, and had been better preserved or ripened.

For the meeting in April another subject had been set down, but in consequence of a communication from the London Farmer's Club, inviting this society to gather the opinions of its members on the question of "Tenant right," it was thought advisable to postpone other subjects, and to give precedence to that important topic.

In accordance with the wishes of a meeting called for the purpose, a committee was appointed to draw up a report, which was presented and approved by the members present at the meeting on the 9th of April.

Nothing can better demonstrate the benefit which the diffusion of Farmers' Clubs and other kindred societies have rendered, than the progress of the question of "Tenant-right." When first mooted, it was viewed with disfavour by many because it seemed that the rights of landlords were in some way endangered if the tenants should acquire a title to compensation for improvements of which their limited occupation did not permit them a fair return of their capital. We have now the satisfaction of knowing that the great body of landlords are become perfectly aware that their rights and interests, and the feeling of mutual confidence and esteem between them and their tenants, would be best served by the definition of the tenant's just rights, and by securing them to him by agreement beforehand. There happily seems no backwardness to grant what is fair, but the previous question what constitutes fairness, is not at present settled to the satisfaction of all. At a meeting in a previous year, our club had agreed that a lease or some similar agreement was the best mode of meeting the difficulties of adjusting the relative claims of landlord and tenant; and in the report the committee on the tenant-right still assume that such private arrangements are the best; but they agree that giving the tenant a legal title to compensation in all cases where it was not specially stipulated by private agreement that he should receive it, would at once render such special agreement the common practice, instead of being the exception. It is manifest there are two ways in which a tenant-right can be defined. Either the tenant must be allowed a certain number of years' enjoyment of specified improvements, and should he vacate the farm, be allowed a proportion of their actual cost, according as more or fewer years have elapsed since these improvements were made; or, on the other hand, competent valuers must decide on what is due to him on a fair estimate of the actual increase of value which the land had received from his expen-

diture, and of the time which he shall be allowed to recover back his capital. On this latter plan the valuers would allow just what an intelligent farmer would claim if his amount of remuneration had been a matter of previous agreement. In their report the committee recommended this plan, and it is the one which the most intelligent agriculturists now seem to approve, as being attended with fewer difficulties than any other. But it was justly observed at our meeting, that either plan was better than none; and if a tenant be obliged to declare beforehand the kind of improvements he was about to make, and no title to claim for any others, then there would be little danger that the landlord should be called on to pay for professed improvements, which really had injured the land. The following resolutions proposed by the committee were passed by the club at the meeting:

RESOLVED, "That the Burton-on-Trent Farmers' Club is of opinion that a tenant of land from year to year ought to enjoy a legal claim to compensation for such improvements as he shall have made during his tenancy, and for which he shall not have received the whole benefit which he is fairly entitled to claim. That the tenant has under a tenancy at will a fair claim to the enjoyment of his improvements for as long a period as a good farmer would require, if the length of his occupancy were made a matter of agreement beforehand. That impartial arbitrators, chosen mutually by the landlord and tenant, would without difficulty form a correct estimate as to what belonged to the tenant on this principle of adjustment. That it appears to the club to be advisable for the general body of farmers to join in petitioning the legislature to make a law which would give to the tenant a legal right to recover from the landlord such compensation for improvements made by him as impartial and competent arbitrators would decide to be his equitable right."

The subject appointed to be discussed in May was not entered upon, because the member who stood engaged to bring it forward was not able to attend.

June 4th, the subject considered was the "Culture and preservation of the potato," on which Mr. S. Ward read a paper, recommending careful attention to three essential points, the neglect of which was, he thought, the usual cause of defective crops. First, to defend the seed through the winter from cold, and from undue heating; to plant early, before the root had wasted itself by chitting, and to use whole potatoes instead of sets, as being less likely to decay. Secondly, to render the land porous and friable by deep and good tillage. Thirdly, to plant at sufficiently wide distances to allow of the free circulation of air around every plant. Mr. Ward made some remarks on the preservation of the diseased potatoes; but though a careless treatment may make them decay sooner, we seem yet to be wholly in the dark as to any means of preventing their decay, as we are to any just knowledge of the nature of the disease, or the means of averting it. We are forced to submit to the evil, as we are to those effects of bad seasons which Providence has taught us no way of avoiding. Mr. Ward's rules for cultivating potatoes were approved by the few members present.

September 3rd, no subject was discussed, the member who was to have introduced it not being able to attend.

October 1st.—There were but few members present, but Mr. G. Greaves read some remarks on the subject appointed to be considered:—"The expediency of adopting an uniform system of weights and measures;" but in consequence of the few members present, the merits of the subject were not gone into.

The committee have thought it well to give at rather greater length the abstract of their discussions, and trust that it will shew that questions of interest are discussed at their meetings, and that there only wants a little more zeal in the members generally, to make the club all that its best friends desire to see it.

## COMMON SALT IN FEEDING ANIMALS.

BY J. TOWERS, MEMB. R.A.S., H.S. OF LONDON, &c.

A twofold view has for a considerable period been taken on this subject. It has been observed that horned cattle and sheep feed and fatten well when salt is administered to them in moderate proportions; and there are accounts which go to prove that cattle, in a wild or semi-domesticated state, wander, as by instinctive prescience, in search of naturally exposed salt; which, when reached, they are said to take up pure as it is, with great avidity.

We know by experience that cows in stalls indicate, in many instances, a partiality for salt; it has then been reasonably concluded that salt must at least be innocuous, if it do not act beneficially in the animal system.

The French have taken up the subject, and the Académie des Sciences, in the sitting of November 23, heard the report of an experiment, read by M. Boussingault, which he had undertaken to ascertain

the influence of common salt in point of nutrition. when it is added to the food of cattle.

It is now pretty extensively believed that salt is a compound of the alkali soda and the muriatic acid; to which, considering its apparent constituents, the reformed chemical nomenclature first assigned the name of muriate of soda. Modern chemistry considers dry salt as a combination of chlorine (not of muriatic acid) and the metal sodium; hence the adoption of the term chloride of sodium, which is now generally adopted by the writers on agricultural chemistry, in reference to analytic investigations of animal or vegetable products. The position assumed by M. Boussingault is of great practical importance to the farmer, considering that chloride of sodium contains the alkali soda as its base, and that it is found in all animal fluids. He admits, in a physiological point of view, that a salt of soda is necessary, or even indispensable to nutrition, and also that it is natural to use this salt in moderate proportions as an article of diet; but he does not agree with the exaggerated opinions that have been promulgated on the alimentary properties of salt. He therefore attempted to ascertain by direct experiment what influence salt exercises in the nutrition of cattle. He chose for this purpose ten young oxen of about the same age and weight, divided them into two sets, which were fed with equal quantities of food. To one set was given daily 34 grammes (French) of common salt to each ox—a quantity (the gramme being 15.4336 grains) which, by English calculation, amounts, within a very trifling fraction, to 525 of our grains, or one ounce 45 grains Troy weight.

The quantity is very trifling in itself, and is little more than the animal could lick up at once with its tongue, and that certainly could not avail anything either nutrimentally or medicinally. Be this as it may, it appears to have been the weight adopted by the chemist with one set of five, while from the other set salt was entirely withheld. According to his observations, "the salt produced no effect in the increase of the weight of the animals or otherwise, except (as might be foreseen) those which consumed the salt drank more than the others to whom it was not given."

To stop here, while offering a few very simple remarks, I would observe that any neutral salt, when taken entirely pure, or in a state of strong solution, acts upon the stomach primarily, by the affinity it exerts in abstracting watery fluids; and hence the injury and pain produced, if salt particles be taken incautiously into the human stomach: hence, also, the greater efficacy and far more comfortable operation of a saline medicine when largely diluted. I have seen two-ounce black draughts sent out with a quantity of undissolved or granu-

lated salt deposited at the bottom of the phials to the extent of one-third of the depth. This is a digression, but certainly not a needless one, as great and durable suffering has been thus incautiously produced. With animals which ruminant, the case may be different; but if common salt produce thirst in the ox, one would naturally suppose that a quantity so small as a dessert spoonful, masticated with hay or green food, especially when returned again for a secondary mastication, could hardly have induced any altered condition whatever.

The report goes on to state that "a point of great importance in the fattening of beasts is to make them eat their food as rapidly as possible. It was important to ascertain, therefore, if the beasts to whom the salt was supplied ate their food with greater rapidity than those to whom it was not given. The result of the experiments showed that salt excited a greater appetite, and we may thence imagine how salt added to the food may exert a favourable influence on the fattening of beasts."

We were told in the commencement of the paper that one of the two sets of animals had an equal quantity of food allotted to them; but here, in this latter paragraph, it is said that the salt excited a greater appetite. What is to be understood by this expression? By the word *appetite*, are we only to suppose that greater relish was occasioned, followed by increased rapidity in feeding? In its ordinate application, we should presume that a larger quantity of food was consumed; but this does not appear to have been the fact, and therefore the conclusion is not altogether satisfactory.

I have been indebted to the *Pharmaceutical Times* for the foregoing valuable portions of M. Boussingault's communications, which are in some degree abbreviated for the sake of conciseness. It remains to add the closing remarks:—

"Although we all allow the necessity of the presence of a salt of soda in the food, we are ignorant of the limits at which it becomes insufficient. Now the proper quantity may be exactly that which exists among the inorganic constituents contained in the food, and this will then be sufficient for the purpose of digestion, especially when we do not need to excite the appetite as in fattening."

In examining the merits of this suggestion, we may safely refer to some analytic results obtained by M. Boussingault himself; thus the dry turnip was stated to consist of

	Carbon . . .	429
	Oxygen . . .	423
Organic	Hydrogen . . .	55
	Nitrogen . . .	17
Inorganic matter . . .		76
		<hr/>
		1000

while again, 100,000 parts of dry turnip were found to comprise 6226 parts of inorganic matters, namely,—

Potassa . . . . .	2610
Soda . . . . .	317
Lime . . . . .	844
Magnesia . . . . .	333
Alumina and oxide of iron	93
Silica . . . . .	496
Sulphuric acid . . . . .	844
Phosphoric acid . . . . .	465
Chlorine . . . . .	224
	<hr/>
	6226

Here are discrepancies, but such must be expected in all organic products.

Good meadow hay contains, according to the same authority, 547 parts in 10,000 of inorganic matter—

Potash . . . . .	130
Soda . . . . .	10
Lime . . . . .	107
Magnesia . . . . .	43
Oxide of iron . . . . .	5
Silica . . . . .	189
Sulphuric acid . . . . .	16
Phosphoric acid . . . . .	32
Chlorine . . . . .	15
	<hr/>
	547

Professor Johnston, in his "Agricultural Catechism," states that, besides its chief constituents—sand, clay, and lime—soil contains small quantities of potash, soda, magnesia, oxide of iron, oxide of manganese, sulphuric acid, phosphoric acid, and chlorine.

The chemist knows full well that these elements are not found in plants or soils, *pure* as here detailed; but that they exist in a state of chemical union as salts, the alkaline or earthy bases being united with equivalents of some neutralising acids or elementary principles. Therefore, when soda is said to enter into the composition of the turnip, or of hay, it may generally be assumed that it exists in the form of common salt (chloride of sodium), and as 24 parts of the base sodium require 36 parts of the acidifiable element chlorine to produce common salt (which correspond with two-thirds, or 40 per cent. of the former), so the 10 parts of soda (oxide of sodium) correspond pretty nearly with the 15 parts of chlorine cited above. The phosphoric acid must be united with a portion of the lime; hence the philosophy of bone manure for turnips and grass; and the sulphuric acid is proportionally distributed between the potash, lime, and perhaps alumina, though some writers assert the last named earth is not found in the organism of plants.

Without attempting to look far into the chemistry of the subjects under consideration, we may per-

ceive that a very small proportion of common salt exists in hay (25-10000ths), but a larger proportion of it in turnips when dried; and thus the food of the ox may furnish a sufficient supply for the natural health of the animal. Still the question recurs—"Of what avail is salt when artificially administered?" and further experience is required to give a satisfactory reply. Salt is inimical to worms, and therefore acts medicinally, but whether as food or physic, the trial instituted appears to be made with quantities too small to determine the results at which it is desirable to arrive. One fact we would mention as scarcely admitting a doubt. Too much stress is laid upon the great importance of *fat*. Time, means, and a vast superfluity of food are wasted in endeavouring to produce monsters, and those in a state incompatible with the health either of the animals themselves, or of the consumers of such unnatural flesh. It is devoutly to be wished that before long every nerve may be strained to raise and exhibit animals in the soundest condition of health, perfection of form, and proportion. There are already signs of a change.

**PRACTICAL DRAINING.**—On Wednesday, Dec. 16, Mr. Bullock Webster gave his second lecture on practical draining, in the theatre of the Royal Polytechnic Institution; on which occasion he confined himself exclusively to the method of draining strong clay soils for surface water only—not where the subsoil itself was filled with water, but where the injury arose from the water resting on an impervious bed of clay. He urged that very deep draining on that kind of soil had been tried, and failed, years ago; and he mentioned the names of several persons who had proved this, amongst whom, we observed, was Lord Portman. He also said that, in the strong lands in the Weald of Kent, they were returning to the old system of thirty inch drains. There, however, were, he stated, circumstances under which deep draining may have answered—viz., where there had been a great deal of water under the subsoil which could not get away. He thought that drains at a depth of four or five feet in clays could certainly do no harm if filled in with a porous material; but he conceived that it would add much to the expense without adequate advantage, and he warned his hearers not to form conclusions too hastily. In the course of last year, he said, he had travelled about 10,000 miles in search of the data upon which he had based his reasoning; he had examined draining which had been done in various parts of the country within the last thirty or forty years, and he found in all instances he was fully borne out in his own opinion on the subject. He then touched upon the subject of the different tiles with much sound philosophy, and concluded by expressing his belief that the cylindrical tile divided horizontally was preferable to the flat sole and tile, as giving a more effective current, and consequently a greater capability for clearing the drain.



## DALTON IN FURNESS FARMERS' CLUB.

The annual meeting of this important and useful institution was held at Dalton, on Wednesday, 25th November, when there was a numerous attendance of the principal farmers and agriculturists of the district present. The society, which was formed a very short time ago, has greatly increased in the number of its members. It has for its object the diffusion of knowledge upon agricultural matters, by means of periodical and other works; also through essays by the members, consisting of their practical experience and observation of matters connected with this important science.

The chair was taken by George Drewry, Esq., Lord Burlington's steward; and Mr. Thomas Ashburner, Gleaston Park, the vice-chair. After the several loyal and other toasts were drunk and ably responded to by the members, the subject for the evening's discussion—"The General Utility of the Plough"—devolved on Mr. Bryers, of Leece, who said,—

It must be known to every thinking man that without good implements the productiveness of the soil must be retarded. I would ask any man if he could write well with a bad pen, or shave easily with a rusty razor. I dare answer for him in the negative. So it is with the plough, which is to agriculture what the first letter in the alphabet is to reading. The way to have good ploughs is to employ men who profess implement making. The making of fallows is a very important item in good farming; indeed it cannot be called good farming without the fallows be cut up eight inches deep or more. I have made fallows ten and twelve inches deep. If I were able to explain the merits or demerits of the plough, it would be opening too wide a field for one evening's discussion; or if I were to describe all the varieties of ploughs that have been in use from the time of the Greeks, who tied the tails of their oxen to the plough, it would be nonsense. However, we have three kinds of ploughs which are well known, and have been in use in this country for a few years past, and are likely to continue so. These ploughs are distinguished by figures. The first is called No. 2, the second No. 3, the third No. 5 or 6; all very good sorts indeed, and well adapted to all soils. When all the particulars which ploughmen have to attend to in executing their work, such as keeping their plough-irons in a proper state of repair, and tempering them according to the kind of ploughing to be executed, together with guiding their horses and ploughing the land in a good

method, are considered, it ceases to excite surprise that so few ploughmen should be first-rate workmen. Good ploughmanship requires greater powers of observation than most young ploughmen possess, and greater judgment than most will take time to exercise. To become acquainted with all these particulars, and to use them to the best advantage, imply the possession of talent of no mean order. The ship has been aptly compared to the plough, and the phrase "ploughing the deep" is as familiar to us as ploughing the land. To be able to put the ship in proper trim is the perfection aimed at by every seaman; so in like manner to temper the plough is the great aim of the good ploughman; and to be able to do it with judgment, to guide horses with discretion, and to execute ploughing correctly, imply a discrimination akin to that required in sailing a ship. The utility of deep ploughing at all seasons of the year, especially before and during winter, appears to be now admitted by some farmers; but the importance of more frequently practising it cannot be too often urged upon their attention. One of the most essential rules of good husbandry inculcates the necessity of ploughing stubble land intended to be green cropped the ensuing season, as deep and as early after harvest as possible, that the powerful agency of frost in mellowing the soil during the winter and early spring months may not be lost. And it is obvious that unless the land be ploughed in proper time, and to a sufficient depth, the full benefit derivable from the influence of atmospheric changes cannot be secured. There seems to be some dislike to deep ploughing in many districts, from a dread of deteriorating the surface soil, by bringing up something noxious from below; but in most cases no apprehensions need be entertained of injuring the land by bringing a portion of the subsoil to the surface before winter, as it will eventually improve the texture of the soil, and tend to increase its productive powers. The roots and the fibres of grain penetrate far deeper into well-cultivated soil than some farmers are aware of. The roots of the wheat plant have been traced to a depth of eighteen inches, and it is not unlikely that the roots of our other grain crops extend equally far. The fibres from the roots of turnips, beans, and clover, have also been traced to a considerable depth, which proves the utility of drainage and deep cultivation. Deep ploughing materially tends to increase all our cultivated crops, by allowing them to extend their

roots and fibres in search of the requisite nourishment. But there are some plants for which it is more necessary than others, such as beans, carrots, &c., whose roots descend perpendicularly into the soil; and hence when these are to succeed, the stubble should be ploughed with as deep a furrow as possible. But even in ploughing stubble ground in the ordinary way, the depth of the furrow should never be less than eight inches in good land, though in deep fertile soils a furrow of ten and even twelve inches may be taken with advantage. The difference between good and bad ploughing is most apparent after the young corn plants have attained to some height above the ground. Where the furrow-slices have been accurately turned over in straight parallel lines, the plants grow up in regular rows as if the seed had been deposited with a drilling machine. The characteristics which denote correct ploughing are well summed up in the following extract from "Stephens's Book of the Farm":—"The furrow should be quite straight, for a ploughman that cannot hold a straight furrow is unworthy of his charge. The furrow slices should present to the eye a similar form of crest, and equal surface. But whatever system of ploughing the land is subjected to, no exertion should be spared to execute the operation in as perfect a style as possible, for undoubtedly very much of the value of the crop will depend on the manner in which the ground has been ploughed. The importance of correct ploughing cannot be over-estimated; and yet there are few departments of rural affairs to which so little attention is paid. While other arts have been fast advancing towards perfection, this, the most important of them all, has remained for ages almost stationary. When the land has been made porous to a considerable depth by deep ploughing, the rain water in wet weather rapidly sinks through the loose soil into the drains, should any have been previously formed; while in the season of continued dry weather, the deep ploughed land retains a large supply of moisture, which is so essential for the healthful growth of plants: thus deep cultivation has the effect of drawing off from the roots the superabundant water consequent upon heavy rains, and of retaining a supply of that valuable substance when it is most required; whereas, if the soil be only loosened to a few inches in depth, it readily gets into a state very unfit for healthy vegetation during the continuance of wet weather, the water standing on or near the top of the surface, until the soluble matter in the soil is either washed out or rendered inactive by being so thoroughly saturated with water as to exclude the atmosphere. From what has been already said, it is obvious that whatever depth has been determined upon, it must have a corresponding breadth to ensure accurate and

efficient work. It is certain that when the furrow-slices are laid over at an angle of  $45^\circ$ , the largest extent of fresh surface is exposed to the action of the air, and greatest quantity of earth raised up on the form of ribs, and placed in the best position for being acted upon by the harrows. Too much attention cannot be paid to the ploughing of ley land; if it be imperfectly executed, the plants grow and ripen very irregularly. The furrow-slices should be closely packed together, otherwise some of the seed is likely to be buried to such a depth as to prevent it growing equally with the rest, and in some cases that it cannot vegetate." Before I conclude, I beg leave to offer a few more observations on the subject; and I hope no one will take offence at what I am going to say, as I feel some truths working within me. I know it has been the prevailing opinion amongst some farmers of this district, and I thought the same myself at one time, that a man with a pair of horses should plough a customary acre or more in one day: this acre is pulverized four inches deep. Well, I go and plough one half of an acre: this half acre is pulverized eight inches deep. Which of the two portions would contain most nutriment for the plants to live upon? The answer is obvious. If, in the case of two families, the one has only half food, and the other enough and to spare, I ask you which of the two would fare the better? The one that has enough. So it is with the land. If we neglect the land, the land will neglect us. It is not from imagination only that I state these facts. They have been tested over and over again. Are we not told, too, by the Scotch farmers, what a great benefit they have derived by deep pulverization? Have we not been told, also, by Mr. Mechi, what a large amount of money has been lost by shallow ploughing? Do we know the capabilities of the soil? Gentlemen—no. How may we know them? By reading these books! How are we to unite practice with science? By reading these books!\* Mr. Bryers concluded by hoping that as the objects of the society became more generally known, it would be joined by a still greater number of tenant farmers, and by thanking Mr. Drewry, agent to the Earl of Burlington, for coming a distance of ten or twelve miles to take the chair at each meeting of this society.

Several of the other members then expressed their opinions on the subject, the feeling in favour of deep ploughing appearing to be on the increase. The subjects of discussion for the ensuing year were then fixed upon to be—The best manner of draining; of making fences, &c.

\* Alluding to a present of 22 volumes, on agricultural subjects, made to the society by the Right Hon. the Earl of Burlington.

## ON THE CULTIVATION OF WHEAT.

BY THOMAS SULLIVAN.

As the cereal grains commonly cultivated in this country, viz., wheat, barley, oats, and rye, require but comparatively little preparatory tillage of the soil, and scarcely any after culture or attention during their growth, except the eradication of such weeds as may make their appearance among the plants, their culture is generally regarded as one of the simplest and least difficult branches of husbandry; a circumstance which accounts for the fact that they have not yet received that degree of attention from agriculturists to which their importance entitles them. The improvement of the various breeds of live stock, and the discovery by experiment, and otherwise, of the quickest and most economical means of fattening them for the market, and the cattle-shows, have been, and are, studied with great judgment and perseverance; and unquestionably the exertions of our breeders have been eminently successful in rearing animals, distinguished alike for their symmetry and their aptitude to become fat at an early age; but certainly it is of no less importance to the interests of agriculturists and of the nation at large, that similar attention should be devoted to the determination of which are the most valuable varieties of the different species of grain, and what the most judicious methods of cultivating them. That there exists very ample room for investigation and improvement in this department of husbandry is abundantly attested by the conflicting opinions that prevail among practical agriculturists respecting particular points, such as the most productive and nutritive sorts of wheat, oats, and barley—the varieties best adapted for different soils—the most proper quantity of seed, and the most judicious mode of sowing, whether broad-cast, drilling, or dibbling—the best manures to apply, and the proper state of ripeness for reaping. The most contradictory statements are daily advanced in reference to each of these subjects; and considering that at no previous period in the history of British agriculture was correct information so essential to the farmer as it is at the present time, it is much to be desired that numerous experiments in the field, conducted under different circumstances, and on every variety of soil, as well as chemical investigations in the laboratory, would immediately be instituted, in the hope of establishing such facts as may unerringly guide our future practice. As farmers are now more or less engaged with the sowing of wheat, it is hoped

the following observations on its culture will not be altogether devoid of interest.

Wheat is by far the most important of the cereal grains cultivated in the United Kingdom, the flour obtained from its seeds being, on account of the large quantity of gluten in its composition, peculiarly adapted for the manufacture of bread: wheaten bread is universally held in the highest estimation as an article of human food, and at the present time it is used to a greater or less extent in all civilized countries. The consumption of wheat, and the extent of land appropriated to its culture, in Great Britain have been rapidly increasing for some years past. Even what are commonly regarded as the inferior classes of soils are now being fitted for its profitable production, by means of drainage and improved cultivation; and it is grown to some extent in most parts of the kingdom not higher than six hundred feet above the level of the sea.

The early history of wheat is enveloped in the most profound obscurity; it is now, therefore, quite impossible to ascertain in what country it is indigenous, or how its culture has extended over so large a portion of the globe. It is at present found growing in a great variety of climates, both in the temperate and the torrid zone (with the exception, perhaps, of some parts of the south of Africa); but it is in the temperate zones that it is most successfully and extensively cultivated. It has been grown in Britain from time immemorial; and wheaten bread is now used more or less by all classes of the people, and is likely to be henceforth more accessible to the humbler portion of the community than it has hitherto been.

The value of wheat as an article of human food will be best illustrated by contrasting its nutritive properties with those of the other grains. It is, perhaps, unnecessary to premise that the relative value of all kinds of grain, as food for man, is estimated chiefly by the proportion of starch and gluten they respectively contain. Gluten is identical with, and capable of being converted into, *fibrine*, or the substance of muscle; hence its use in supplying the waste of the animal body. It is this substance which gives to the mixture of flour and water its ductility and tenaciousness, and constitutes the nourishing property of bread. When dough is subjected to the *panary* fermentation, a considerable volume of carbonic acid gas is

evolved, but is retained in the mass by the tenacity of the gluten. In the following table are given the nutritive products of the cereal grains, as ascer-

tained by Sir H. Davy, the quantity analyzed of each sort being 1000 parts:—

NAMES.	Starch.	Sugar.	Gluten.	Whole quantity of soluble or nutritive matter.
Middlesex wheat, average crop . . . . .	765	..	190	955
Spring wheat . . . . .	700	..	240	940
Mildewed wheat of 1806 . . . . .	178	..	32	210
Blighted wheat of 1804 . . . . .	520	..	130	650
Thick-skinned Sicilian wheat of 1810 . . . . .	725	..	230	955
Thin-skinned Sicilian wheat of 1810 . . . . .	722	..	239	961
Wheat from Poland . . . . .	750	..	200	950
North American wheat . . . . .	730	..	225	955
Norfolk barley . . . . .	790	70	60	920
Oats from Scotland . . . . .	641	15	87	743
Rye from Yorkshire . . . . .	645	38	109	792

The quantity of gluten in wheat is found to vary very much with the soil, mode of culture, and other circumstances; and this must also be the case with that in other kinds of grain.

	Starch.	Gluten.
Wheat flour . . . . .	55 lbs.	10 to 15lbs.
Barley . . . . .	60	12
Oats . . . . .	50	14½
Rye . . . . .	60	14½
Indian corn . . . . .	50	12
Beans . . . . .	40	28
Peas . . . . .	50	24*

According to Professor Johnston, the above table

exhibits the best approximate view chemists are yet able to give of the *average* proportions of starch and gluten contained in 100lbs. of our common grain crops as they are met with in the market.

It may be interesting to give now the results of the analysis of wheat and flour by Vauquelin, as quoted in Thomson's Organic Chemistry. It will be observed that the wheat and flour subjected to this analysis were of foreign growth; the results are given in the subjoined table—the gluten mentioned is a mixture of gluten and albumen.

COMPOUNDS.	French wheat.	Odessa hard wheat.	Odessa soft wheat.	Ditto.	Flour of Paris bakers.	Ditto of good quality.	Ditto inferior kind.
Starch . . . . .	71.49	56.50	62.00	72.00	72.8	71.2	67.78
Gluten . . . . .	10.96	14.55	12.00	7.30	10.2	10.3	9.02
Sugar . . . . .	4.72	8.48	7.56	5.42	4.2	4.8	4.80
Gum . . . . .	3.32	4.90	5.80	3.30	2.8	3.6	4.60
Bran . . . . .	..	2.30	1.20	..	..	—	2.00
Water . . . . .	10.00	12.00	10.00	12.00	10.0	8.0	12.00
	100.49	98.73	98.56	100.02	100.0	97.9	100.20

Wheat is of the natural order *Graminae*, and the genus *Triticum*, of which only two species are cultivated to any extent in this country. These are *Triticum hybernum* (winter or Lammas wheat), and *Triticum aestivum* (spring or summer wheat. Besides these, botanists enumerate eight or nine other species, which are, or may be, cultivated for their seeds; those partially grown in Britain, as subjects of experiment or curiosity, being the following, viz., *Triticum compositum* (Egyptian wheat), *Triticum turgidum* (turgid wheat), *Triticum spelta* (spelt wheat), *Triticum Polonicum* (Polish wheat). It

would not, I conceive, serve any useful purpose to advert here to the minute botanical characteristics whereby the foregoing species are distinguished from each other, particularly as some eminent botanists are of opinion that most of them are not really distinct species, but varieties; besides, the only wheats in which the agriculturists of Britain are interested are the first-mentioned two, namely *Triticum hybernum* and *Triticum aestivum*, which are also considered by many to belong to the same species.

The existing varieties of wheat are exceedingly numerous. Eighty-three distinct kinds are enumerated and described in Lawson's "Agriculturist's Manual;" and Colonel Le Couteur, of Jersey,

\* Elements of Agricultural Chemistry and Geology; third edition, page 184.

mentions having in his possession, in 1836, no fewer than one hundred and fifty varieties. There is, in fact, scarcely a limit to the number of kinds which the difference of climate, soil, and culture is calculated to produce. Many of our most esteemed varieties, such as the Chidham, Hopetoun, Fenton, &c., have been propagated from a single ear discovered in such situations as a hedge, a stone-quarry, or the road-side; and new kinds may be obtained almost *ad infinitum* by artificial hybridizing, and continued careful selection. The varieties at present in cultivation throughout the kingdom are very numerous, but it is now difficult to find any of the old esteemed kinds in a pure state; even those commonly regarded as the most genuine are generally more or less mixed with other sorts. A farmer, on entering a field of wheat approaching maturity, cannot fail to perceive that the ears of some of the plants are considerably superior in size and other good qualities to the majority of those growing around them. Several of our most esteemed sorts have been obtained by intelligent agriculturists taking the pains to select remarkably superior ears, such, for example, as possessed the greatest number of plump and well-shaped grain, thinnest chaff, stiffest straw, a tendency to early maturation, or other desirable properties, and after picking out the plumpest and best grains, had grown them by themselves in a suitable spot of ground; the choicest ears were again selected from the produce when ripe, and from these the finest grains for sowing the ensuing seed time; and so on until a considerable quantity of the new variety had been obtained. In this way several of our most approved kinds of wheat, such as the Hunter's, Hickling's prolific, &c., have been propagated; and every skilful cultivator of the grain has it in his power, and should frequently endeavour, by the same means, viz., continued and judicious selection, to procure new and improved sorts. We have already a great number of varieties of wheat, many of which possess excellent qualities, and are well adapted for the soil and climate of the localities in which they are respectively esteemed; but, nevertheless, it is quite possible to increase the good properties of even the best, to render them more productive and more nutritive, by careful selection or skilful hybridizing, and the originator of any really valuable kind is sure to be amply compensated for his trouble and attention.

The varieties of wheat now cultivated to a greater or less extent throughout the kingdom being so very numerous, it would certainly be of no small consequence to have them classified in so plain and intelligible a manner that farmers could experience little difficulty in distinguishing and describing them. Accordingly various attempts have from

time to time been made to introduce a classification of wheats, by means of which the different kinds commonly grown may readily be recognised by some external and obvious characters in the ear and in the grain. The botanical distinctions between so many varieties of only a few species are so unimportant, and so hard to be recognised and remembered by the great mass of farmers, that any description in scientific phraseology of their individual characteristics would be of little practical utility. With the view of obviating this difficulty, and of establishing a mode of classification expressed in such plain and intelligible terms that unscientific farmers may be enabled to distinguish the different kinds, Colonel Le Couteur, who for a number of years has devoted great attention to the propagation, improvement, and culture of several sorts of wheat, divides all the existing varieties into two classes, namely the *beardless* and the *bearded*, corresponding with the *Triticum sativum imberbe* and the *Triticum sativum barbatum* of botanists. He next subdivides beardless wheats into white, red, yellow, and liver-coloured, smooth-chaffed and velvet chaffed; and the bearded kinds he divides in the same manner. This method of classification cannot, however, be regarded as perfect, inasmuch as some bearded wheats are known to lose their beards by continued cultivation on good land; while, on the other hand, some beardless kinds are apt to become bearded when grown for a number of years on inferior soils and exposed situations. It is well known that even the potato oat manifests a tendency to this species of degeneracy, by assuming a beard when grown for any length of time on poor land. The downiness of the chaff is also more or less affected by the nature of the soil, so that this cannot be regarded as a permanent distinguishing characteristic.

Mr. Stephens, author of the "Book of the Farm," has proposed a classification of wheats founded on external characters in the ear and in the grain. He adopts two separate classifications, one by the ear, the other by the grain, so that the ear and grain may be described by their respective characteristics, and, if necessary, either can be illustrated by the characteristics of the other; by this means confusion would be avoided between the characters of the ear and those of the grain. The farmer who grows the wheat in the ear and sells it in the grain should be acquainted with both; but the baker who is acquainted only with the grain, knows nothing by the ear. Were he, however, to receive an ear of each variety of grain he purchased, he would be able to describe at once to the farmer what particular variety afforded him the flour best suited to his purpose. Mr. Stephens divides wheat according to the ear into three classes. In

the first the ear is *close* or *compact*, as in Hickling's prolific. In the second class of ears the spikelets are of *medium* length and breadth, and placed just so close upon the *rachis* as to screen it from view; the chaff also is of medium length and breadth: Hunter's white wheat is a specimen of this class. In the third class the spikelets are set *open*, or so far asunder as to permit the rachis to be easily seen between them; the chaff is long and narrow: Bellevue Talavera white wheat is a specimen. These three classes comprise all the beardless kinds of cultivated wheat. The bearded varieties are generally distinguished by the long shape of the chaff, and the open position of the spikelets, and therefore come under the third class. But it is to be observed that cultivation has not only the effect of diminishing the strength of the beard, but also of setting the spikelets closer together, as in the Tuscany wheat, which is considered the most compact-eared and improved variety of bearded wheat.

In classifying wheat by the grain, Mr. Stephens\* again adopts three classes. In the first the grains are short, round, and plump, with the bosom distinctly enough marked, and well filled up. All fine wheats belong to this class, and they are enclosed in short, round, and generally white chaff, which when ripe becomes so expanded as to endanger the shedding of the grain, particularly in high winds. Very few red wheats belong to this class: the Hungarian white wheat is a good specimen. In the second class the grains are long and of medium size, that is longer and larger than the grains of the first class; the chaff also is medium sized; most of the red wheats belong to this class of grain, though many of the white medium-sized, such as Hunter's white, also belong to it. The third form of grain is *large* and *long* to a greater degree than the last class: its chaff is long; and in reference to the ear, the spikelets are generally open. No direct relation exists between the ear and the grain: the compact ear does not always produce the round grain, nor the white wheat; in the medium ear is not always found the medium-sized grain; and the open ear does not always produce the large, long grain. But still there exist coincidences which connect the chaff and the grain—for example, the length of the chaff indicates the length of the grain, upon whatever sort of ear it may be found; and, generally, the colour of the chaff determines that of the grain; as, also, the open spikelet bears grain of coarser quality than the compact. On wishing, therefore, to determine the sort of grain which any number of ears of different kinds of wheat may contain, it is the form and colour of the chaff that determines the point, and not whether the ear car-

ries compact, medium, or open spikelets, or whether it be bearded or beardless, or whether it be woolly or smooth.

The division of the different varieties of wheat into *white* and *red* has long been familiar to farmers; each includes numerous kinds distinguished by local terms. Different sorts of both white and red wheat are again distinguished by their spikelets being smooth or downy, the one being termed thin or smooth chaffed, the other thick or woolly chaffed. The Hungarian white wheat is considered to be among the purest specimens of the white, and the blood-red of the other. But there are wheats possessing various shades of colour intermediate between white and red. The white wheats are superior in the quality of their produce, yield the largest proportion of flour, and are therefore preferred by the baker; they require, however, the best descriptions of land, and the most favourable situations to grow them to perfection. The red kinds, on the other hand, are better adapted than the white for cold inferior soils, and exposed or elevated localities, owing to their greater hardness and earlier maturation; they are also the best suited to strong retentive clays. In general the thin and smooth chaffed are preferable to the woolly and thick chaffed.

Another common division of the varieties of wheat is derived from the season in which they are sown. Those sown immediately previous or during winter being termed Lammas or winter wheats, while those sown in spring are named spring wheats. As the former kinds are merely the produce of seed sown for a number of years before winter, and the latter that of seed sown in spring, this division of wheat is not dependant on any permanent botanical distinction in the ear or in the grain. In fact winter wheat may be converted into spring wheat, and *vice versa*. It is a well known, but somewhat singular circumstance, that when winter wheat is sown in spring the produce changes its habit in relation to the period of attaining maturity, and acquires the property of ripening earlier than the same kind sown in autumn; and that in like manner by sowing spring wheat before winter, the produce in a few years loses its characteristic habit of early ripening. Hence the propriety of confining each class to its proper season, by always sowing in autumn the produce of seed sown before winter, and in spring the produce only of that which had previously been sown in spring.

Among the most esteemed of the winter wheats may be mentioned the following, viz.—Hunter's white, Hopetoun, Chiddham, Eclipse, Pearl, Fenton, Hickling's prolific, Golden drop, Talavera, Blood-red, Lammas red, Yellow Lammas, Dantzic, Pome-

ranian, and White Cluster. The following are commonly sown in spring, viz.—Gregorian, Brodie's white, Odessa white, Flanders white, and the various bearded wheats. To make any remarks on the individual characters of the varieties of wheat now enumerated would extend this article beyond due limits; some of them are held in high repute in different parts of the country, on account both of their productive and their nutritive qualities: but numerous experiments are still required in order to place beyond question the comparative merits of the kinds most commonly cultivated. It may not, however, be uninteresting to notice very briefly a few of the varieties most approved of north of the Tweed.

Hunter's white wheat is certainly that which is most esteemed and most generally grown in the wheat-growing districts of Scotland. It was propagated several years ago in East Lothian, and has since maintained a high degree of reputation; it is prolific in grain, and much prized by the baker; but it is now difficult to find it in a pure state. The Hopetoun is another excellent winter wheat, which was also propagated by an East Lothian farmer—Mr. Patrick Shirriff, late tenant of Mungoswells;

some farmers prefer it to Hunter's, on account, chiefly, of the larger proportion of straw. The Fenton wheat is also much esteemed for its productiveness; and the straw being short and stiff, it is peculiarly adapted for soils considered unable to produce strong straw. The Pearl and Chiddham have been found well suited to the soil and climate of East Lothian and Berwickshire.

The productive qualities of different kinds of wheat or other grain may be ascertained experimentally by the farmer; but their absolute or relative nutritive properties can be determined only by the chemist. It is certainly an object well worthy the attention of our national agricultural societies to ascertain the particular varieties of grain most deserving of cultivation, which can be accomplished only by careful analyses in the laboratory, and numerous and repeated experiments in the field, conducted on various soils and under different circumstances. The Royal Agricultural Society of England has already recognized the importance of such experiments, and it is to be hoped that many of them will henceforth be conducted under its auspices, as few private individuals can be expected to incur the expense and trouble neces-

NO.	KINDS OF WHEAT.	Produce of 5			Produce of 5			Produce of			Produce of		
		perches of drill, in straw and grain.			perches of drill, in grain.			straw per Irish acre.			grain per Irish acre.		
		st.	lbs.	oz.	st.	lbs.	oz.	cwt.	qrs.	lbs.	brls.	st.	lbs.
1	Dwarf cluster . . . . .	2	5	6	0	8	5½	89	0	16½	11	18	0½
2	Belgian red . . . . .	2	0	4	0	5	14½	100	3	16	8	2	2
3	Scotch pearl . . . . .	1	5	6	0	5	4	59	0	22	7	9	13
4	Oxford prize . . . . .	1	8	11	0	5	3½	81	0	3	7	8	7
5	White velvet . . . . .	1	10	14	0	6	11¾	88	3	10	9	12	7
6	Hunter's . . . . .	2	3	14	0	7	4¾	113	3	10	10	7	10
7	Hopetoun . . . . .	2	8	10	0	9	14¾	137	3	32	13	12	2
8	Smooth chaff white . . . . .	1	10	11	0	4	10	88	0	19	7	7	2
9	Clover's red . . . . .	2	12	6	0	8	6½	144	0	22	14	18	12
10	Rough chaff white . . . . .	2	3	13	0	9	15	113	2	3	13	13	8½
11	Chiddam . . . . .	2	1	3	0	7	14	103	3	5	11	4	12½
12	Spalding's prolific (imported seed) . . . . .	2	11	9	0	9	1	141	1	5	12	19	0½
13	Pomeranian . . . . .	2	7	12	0	5	15¼	127	2	20	8	2	3
14	Brown Kent . . . . .	2	3	4	0	7	13	111	2	12	11	3	3
15	Burwell red . . . . .	2	7	12	0	7	7½	127	2	20	10	12	11
16	Zealand white . . . . .	1	11	11	0	7	7¾	91	2	27	10	14	1
17	Taunton Dean . . . . .	1	11	14	0	7	8¾	92	1	18	10	15	8½
18	Yellow prolific . . . . .	2	4	14	0	10	15¼	117	1	18	15	13	1¼
19	Red Lammas . . . . .	2	7	7	0	9	9½	126	2	7	13	14	3
20	Golden cluster . . . . .	2	5	14	0	7	12¼	120	3	26	11	2	0
21	Dwarf cluster white . . . . .	2	7	14	0	11	3¼	128	0	14	16	0	4
22	Fenton . . . . .	2	1	8	0	13	2¾	141	0	8	8	16	2
23	White Essex . . . . .	2	5	1	0	10	8½	120	1	7	15	0	13
24	Red Kent . . . . .	2	6	15	0	10	3	124	3	3	14	11	2
25	White Lammas . . . . .	2	4	14	0	8	14½	117	1	18	12	14	5
26	Spalding's prolific (old seed) . . . . .	2	10	7	0	12	13	137	1	3	18	6	1
27	White Kent . . . . .	2	11	3	0	9	6¼	114	3	23	13	8	3
28	White Irish . . . . .	2	5	1	0	10	8½	120	1	7½	15	0	13
29	Red Irish . . . . .	2	13	13	0	12	3¼	149	1	9	15	19	8
30	Red chaff, white . . . . .	2	7	3	0	8	12¾	125	2	19	12	11	4
31	Woolly-cared . . . . .	3	3	12	0	8	15	163	1	16	17	14	0

sary to insure results from which just conclusions can be drawn. The reader will find some interesting details of the comparative merits of several kinds of wheat in the report of the experiment conducted by Mr. Miles, published in the second part of the sixth volume of the Royal Agricultural Society's Journal, and in the "Farmer's Magazine" for September last. An experiment, which appears to have been conducted with much care, was recently made by Mr. Wm. Kelly, steward to Mrs. Evans, Portrane, Ireland, with the view of ascertaining the comparative productiveness of various kinds of wheat. The result was reported in the "Irish Farmers' Journal," from which the subjoined table is extracted. Thirty-one varieties were sown in drills twenty-one inches apart, along-side each other—quantity of seed, half a pound to ten perches of drill. Five perches only of drill of each variety was weighed for the result of the experi-

ment; the crop on the whole field (being sheltered, and very heavy) suffered considerably from the severe weather. In the tabular statement of the result, in the preceding page, the Irish plantation measure only is given, which though not much known on this side of the channel, will answer well enough to convey an idea of the comparative productiveness of the different kinds.\*

The only systematic attempts with which I am acquainted, that have yet been instituted to determine the nutritive qualities of different varieties of wheat, have been made by Sir George S. Mackenzie, of Coul, with the view of ascertaining their relative value for the manufacture of bread. The following table exhibits the analyses of certain wheats made under the superintendence of Professor Gregory, and may be relied on as affording an accurate comparison of the different varieties.

WHEAT.	Husk.	Gluten.	Albumen.	Starch.	Salts.	Sugar and Gum.	Moisture.	Loss.
Wolgast . . . . .	12.5	8.6	1.7	57.2	2.0	4.3	11.0	2.7
Tremois . . . . .	15.6	12.0	2.4	51.6	1.7	3.4	13.1	0.2
Finest Silesian . . . . .	11.7	8.8	3.3	55.4	1.15	6.5	12.6	0.55
Talavera . . . . .	10.9	9.3	1.7	60.2	2.5	3.4	12.0	..
Finest Dantzic . . . . .	10.2	9.5	1.2	56.9	2.5	4.3	12.5	2.9
Coul . . . . .	9.5	12.8	9.0	54.0	1.4	5.6	15.5	0.3
Hunter's . . . . .	11.6	7.7	1.5	49.9	..	4.5	12.9	..
Ducksbill . . . . .	11.18	9.20		57.62	..	4.5	12.9	..

The following table shows the comparative value of these wheats for the ordinary process of baking.

	Gluten and Albumen.	Sugar and Gum.
Silesian . . . . .	12.1	6.5
Coul . . . . .	21.8	5.6
Hunter's . . . . .	9.2	4.5
Ducksbill . . . . .	9.2	4.5
Dantzic . . . . .	10.7	4.3
Wolgost . . . . .	9.3	4.3
Tremois . . . . .	14.4	3.4
Talavera . . . . .	11.0	3.4

I shall conclude this branch of our subject with the following very just observation transcribed from Sir George Mackenzie's papers:—"A wheat may be of superior appearance and weight, and be an early and productive variety, and yet be unfit for the ordinary process of baking, and improper for being used in the patent process. External characters are not to be depended on: chemical analysis is the only test on which we can rely, and yet it is not resorted to. A more interesting and valuable investigation cannot be conceived than that which would ascertain the value of all the wheats known, and after a selection of the best—that is, of those which yield the

largest amount of nutritive matter—ascertaining their suitability to various soils and climates, and what kind of manure renders them most productive. When a selection of varieties of grain has been made, after a comparison of their qualities on a single soil, each should be sown on different soils, so that it may be known in what soil each thrives best, and the deficiencies of those soils in which the best sorts of grain do not thrive may be discovered. Such investigations would do more good than public shows, competition for premiums, and dinners, because they bear directly on the chief object to be attained by agricultural skill—the largest proportion of nutriment in a given bulk of grain of any kind. Agricultural chemistry is in everybody's mouth; but the really useful applications of that science are yet to be seen."†

The proper period to sow wheat is dependant on several circumstances. The season for sowing the autumn or winter wheats commonly extends from the middle of September to the end of November

\* One Irish acre is equal to 1 A. 2 R. 19 P. English statute measure. The barrel of wheat is twenty stones.

† Agricultural Gazette, Sept. 6, 1845.



When, however, the land is dry, and suitable weather for sowing occurs, the winter varieties may be sown during December and January, although the former month is not considered a good one to commit seed to the ground. The spring wheats are usually sown from the beginning of February to the middle or end of March. In the Lothians, Berwickshire, and other parts of the south of Scotland, it is now a customary practice to sow wheat after turnips, the extent of land subjected to bare-fallowing having been of late years much diminished, in consequence, chiefly, of the beneficial influence of thorough draining on the more tenacious class of soils; and the crop is sown from the beginning of November to the beginning and sometimes the middle of March, as the ground can be prepared for the reception of the seed.

There being thus two seasons in which wheat may be sown, it requires some consideration on the part of the farmer to determine whether it is more advisable, under the circumstances, to sow in autumn or in spring. This must in a great degree be regulated by the condition and quality of the land, the crop immediately preceding, and the character of the climate. Winter wheat is always sown on land that has undergone the process of summer fallowing during the preceding summer, and commonly also after peas and beans, potatoes, vetches, and such other green crops as are removed off the ground sufficiently early to allow it to be ploughed in due time for the seed. Spring wheat, on the other hand, is usually sown after turnips that have not been removed off the field or consumed on the ground before the beginning of January, and in all cases where the land could not with propriety be sown with any of the winter varieties.

Now, with regard to the comparative advantages of autumn and spring sowing, very much must, as already observed, depend on the nature of the soil, climate, and season. In general, the early sown crop is most likely to yield a large produce, and in the majority of years to remunerate the farmer; besides, it is an important consideration in favour of autumn sowing, that it serves to divide the labour of the farm, leaving less to be done in spring. But although autumn-sown wheat is in general more productive and remunerating than that sown in spring, the latter not unfrequently turns out a better sample and a more valuable crop, as in dry and warm seasons. Nevertheless the autumn should always be preferred, when it can be done; and the earlier after the last week in September that the seed can be committed to the ground, the more likely will it be to yield a remunerating produce. Throughout the south of Scotland generally, the month of October is considered to be the best period for sowing wheat.

In the case of naturally dry or well-drained land

no hazard can attend the sowing of wheat at any period during the autumn and winter, as the soil is always in a workable condition; but on undrained retentive clays this is often a very precarious operation, in the changeable climate to which most parts of the country are subject. In wet, unsettled weather, or even after a few days' rain, such land becomes so saturated with moisture that it cannot, without sustaining considerable injury, receive the necessary tillage to prepare it for the crop; and many of the seeds are sure to perish in the soil, or to come up weak and stunted. In the event, then, of unpropitious weather setting in, it is advisable to defer the sowing of wheat on undrained land until the month of February, rather than run the hazard of having a deficient crop in consequence of working the land in a wet state. Spring wheat, if the soil is of good quality, and the situation not too much elevated or exposed—otherwise, either barley or oats—may reasonably be expected to remunerate the farmer better than wheat sown during winter under such unfavourable circumstances. On wet clay soils, too, the roots of the young plants are apt to be loosened and thrown out of the ground by the action of alternate frosts and thaws; an accident from which spring-sown wheat is, of course, exempt. The finer spring wheats, however, require not only to have the soil rich and in the highest state of cultivation, but also a warm and early climate to bring them to perfection; and in late and exposed or elevated situations they should not be at all sown. The bearded varieties are sometimes advantageously grown on soils deemed unfit for the production of the finer spring wheats; they can be sown till the middle of April, and often yield a much more profitable crop than would be obtained by sowing oats or barley.

The soils best adapted for the production of wheat are those that contain a large proportion of clay in their composition, with such a quantity of sand and lime as may render them sufficiently friable, and a proper intermixture of *humus* or decomposing vegetable matter. It is well known that wheat requires the soil to possess a considerable degree of coherence, which can be produced only by the presence of a large proportion of clay. Lime and sand serve to correct the natural tenacity of pure clay, rendering it more friable, more easily cultivated, and more permeable to the atmospheric air. The better class of wheat soils generally contain from five to eight per cent. of decomposing organic matter. So peculiarly are the heavy rich clays adapted to the production of this grain, that they have obtained the appellation of *wheat soils*. Rich heavy, or deep alluvial loams are likewise eminently suited to the growth of this crop. But although these soils—namely, rich clays and heavy

loams—are undoubtedly the best calculated for producing large crops of wheat, yet they are by no means the only kinds of land on which it is now advantageously grown. Formerly, indeed, heavy clay land was alone considered suitable for the profitable growth of wheat; and at that period the crop was most generally preceded by a course of summer fallowing, to prepare the ground in a proper manner; but since the culture of turnips and thorough-draining became extensively and universally practised, not only has bare fallowing been to a great extent abandoned, but the wheat crop has been profitably grown on large tracts of land which had previously been unfit for its culture. It has now, therefore, a much wider range of soil; and with judicious management and the application of suitable manures, even sandy land is known to yield good crops of this valuable grain. In fact, some of the finest crops of wheat I have ever seen were grown on a light sandy soil a few years subsequent to its reclamation from a rabbit warren. The application of lime to sands communicates coherence and absorbent powers to them, which enable them the better to resist the effects of continued drought, and to sustain the healthful growth of the plants. In short, when the climate is suitable, there is hardly any kind of soil but may, by means of drainage (if necessary), suitable manuring, and judicious cultivation, be rendered capable of growing remunerative crops of wheat.

As all intelligent agriculturists are now more or less cognizant of the intimate relationship that

subsists between the soil and the plants that grow upon it, it will not be improper, in considering the soils best adapted to the culture of wheat, to advert to the composition of its ash, as ascertained by chemical analysis. The following is Sprengel's analysis of the ash of wheat: 1000 lbs. of wheat leave 11.77 lbs., and of wheat straw 35.18 lbs. of ash, consisting of—

	Grain of Wheat.	Straw of Wheat.
Potash . . .	2.25 lbs.	0.20lbs.
Soda . . .	2.40	0.29
Lime . . .	0.96	2.40
Magnesia. . .	0.90	0.32
Alumina, with a trace of iron . . .	0.26	0.90
Silica . . .	4.00	28.70
Sulphuric acid . . .	0.50	0.37
Phosphoric acid . . .	0.40	1.70
Chlorine. . .	0.10	0.80
	11.77	35.18

Sir H. Davy's analysis of a good wheat soil gave the following results:—

Siliceous sand . . .	150 parts.
Finely divided matter.	
Carbonate of lime. . . . .	28
Silica . . . . .	32
Alumina . . . . .	29
Animal or vegetable matter and moisture . . . . .	11
	100

This soil was firm and coherent in its texture.

According to Von Thaer, the following soils are best calculated for wheat:—

No.	Clay.	Sand.	Carbonate of Lime.	Humus.	Value.
	74 per cent.	10 per cent.	4½ per cent.	11½ per cent.	
1 } First class of	81	6	4	8½	98
2 } strong wheat					
3 } soils.					
4 } soils.	79	10	4	6½	96
5 } Good wheat	40	22	36	4	90
6 } land.	58	36	2	4	77
7 } Ordinary do.	56	30	12	2	75
8 } Ordinary do.	60	38	small	2	70
9 } Ordinary do.	48	50	quantity.	2	65
	68	30		2	60

Nos. 1, 2, and 3 are alluvial soils of the richest quality; and from the large proportion which they contain of vegetable matter or humus, they are not so stiff as the quantity of clay which they contain would seem to indicate.

The analysis of the grain and straw of wheat satisfactorily explains why a soil may, as it not unfrequently does, produce luxuriant straw, and yet be unable properly to fill the ear; and, on the other hand, why a plump grain and well-filled ear are occasionally seen where the straw is weak and deficient in bulk. In the former instance, the silicates are abundant, while the phosphates are deficient; in

the latter the reverse must be the case. Hence we arrive at the conclusion, that in order to obtain a good crop of wheat (both grain and straw), the presence of phosphates and silicates in sufficient quantity is indispensable.

The climate required to bring wheat to perfection must be such as usually affords a dry and warm season for the blossoming and ripening of the ear, otherwise the grain will be deficient in gluten—the substance on which its value mainly depends. When sown on dry and well-drained land, wheat will endure a great deal of cold during winter without injury, particularly if protected by a covering

of snow before the frosty, nipping winds come on, as is proved by the fact that as good crops of wheat are produced in Morayshire, in the north of Scotland, between latitude  $57^{\circ} 10'$  and  $57^{\circ} 40'$ , as in any other part of that country (East Lothian, perhaps, excepted), which is owing to the quality of the soil, and the dry warm summers that are there usually enjoyed. Nevertheless, the mild and warm temperature which is afforded for maturing the grain in the more southern climes renders the wheat there grown more valuable for the purpose of the baker. Sir Humphry Davy states that in general the wheat of warm climates abounds more in gluten and in insoluble parts; it is of greater specific gravity, hard, and more difficult to grind. Moderately moist weather before the flowering period, and after the grain is set or formed, is favourable to wheat; but continued hazy rains immediately after the flowering season has begun, are highly inimical. The crop is often seriously injured by the cold, dry, withering winds of February and March. Sultry winds and fogs sometimes produce mildew; and blight is caused by the occurrence of hoar frosts when the plant is in the ear;\* cold and heavy rains occurring at the blossoming and ripening season are most prejudicial, and cause the grain to be deficient in gluten, and of inferior quality. The elevation above the level of the sea at which wheat may be grown with a chance of success depends in a great degree on the latitude, exposure, distance from the sea, and other obvious circumstances. In the north of Scotland wheat cannot be expected to thrive at a greater elevation than 400 feet; and at even this height it requires a favourable season to insure a remunerating crop. The highest elevation at which the culture of wheat is attempted in the north of England is not above 1,000 feet. Taking the whole kingdom, there are probably few localities in which wheat will succeed at a greater elevation than 600 feet.

The most fitting place for wheat in the rotation is on land that has undergone the process of summer-fallowing; then the ground is, or should be, in the highest state of cultivation, perfectly clean, and in good heart; in short, in the condition in which it can most properly be sown down to grass. It has been already mentioned that wheat is also with propriety and advantage grown after potatoes; indeed, some of the best crops, both as regards quantity and quality, are obtained after that root. But it has frequently been observed that the clover plant comes up very thin and stunted after potatoes, at least on clay land. Apprehensions have been entertained that it might be unsafe to

sow wheat on land where potatoes have been rotted by the prevailing disease; but the experience of the past year proves that the crop may be sown on such land without the slightest risk.

In not a few districts the best and most abundant crops of wheat are obtained after grass, especially where the soil is of comparatively light texture. The plant, from the nature of its spreading roots, requires a firm hold of the ground; which must, therefore, possess a considerable degree of consistency; and this it naturally acquires on lying for a year or two in grass. We are informed that in East Norfolk wheat rarely follows any other crop than clover; the seed being sown by the drill-machine generally in the month of October. The land usually receives a slight dressing of dung, or a compost of marl or clay with dung, or of marl and clay alone.

It is only within a recent period that the practice of sowing wheat instead of barley after turnips has been to any extent adopted, which is attributable chiefly to the opinion which, until lately, prevailed among farmers, that the turnip crop could not with safety be taken up and stored before the severity of the winter sets in, the general practice having been to remove the bulbs from the field only as required for consumption by the stock. It has now, however, been abundantly proved by experience that both Swedish and yellow turnips may, with the greatest propriety and advantage, be drawn and stored up for future use in some convenient situation near the farm-steading, as opportunities of suitable weather occur after the middle of November. Swedish turnips, taken up towards the end of that month, and stored in narrow, oblong heaps, carefully thatched with straw, will retain the greater proportion of their nutritive properties till the beginning of June. It is not, of course, expedient to preserve yellow turnips for so long a period, though they lose comparatively little of their nutritive qualities by being stored for a few months; and it is certainly a great advantage to have them always at hand, and in good condition for the stock, whatever weather may occur. No turnips, except those in course of being consumed on the ground by sheep, should be left unpulled after the beginning of February. The bulbs then commence to shoot forth their flower stems, which greatly exhaust the soil, while depriving the turnips of much of their nutritive juices. After the removal of the crop, the land should at once be ploughed up, either to be immediately sown with wheat, or to be meliorated by the action of the frost for the sowing of barley the following spring. The leaves should, in every case, be ploughed in as soon as possible after their separation from the bulbs, as their saline and earthy constituents render them a powerful

\* See "Loudon's Encyclopædia of Agriculture," p. 815.

manure: the large proportion of phosphate of lime they contain readily accounts for their striking effects on the wheat crop when ploughed in with the seed furrow; and in proof of their powerful efficacy as a manure for oats, I shall here introduce the result of an experiment which was recently made by a friend, and abundantly confirms the propriety of the practice here recommended. The soil consists of a light clayey loam, incumbent on

a loose gravelly substratum. After the removal of the bulbs, the tops on one-fourth of a statute acre were ploughed in, with the view of ascertaining the advantage thereby gained over an adjoining plot of the same extent, from which the whole of the crop was removed. The oats were of the Hopetoun kind, sown on the 4th of April, and reaped on the 1st of October. The following is a tabular statement of the result:—

		Produce of one-fourth acre.								
Plots.		1st quality of oats.			Weight per bush.	2nd quality of oats.	Weight per bush.	3rd quality or "shillocks."	Straw.	
		qrs.	bush.	pkts.	lbs.	bush pkts	lbs.	lbs.	tons.	cwts.
1	With turnip tops.	1	5	2	39½	2 0	35	39	0	10½
2	Without do. . . . .	1	2	0½	38¼	2 1	34	32	0	9
	Increase per ¼ acre.	0	3	1½				7	0	1½
	„ per acre.	1	5	2				28		6

Whatever may have been the preceding crop, or whatever may be the nature and composition of the soil, when intended to be sown with wheat, it is of the first importance that it should be perfectly dry, and in the best condition as regards fertility and cleanliness. As wheat is the most valuable of our cerealia, so it requires a better soil than either oats or barley to produce it in perfection. Undrained retentive land, though it may naturally possess good stamina, very rarely, except in unusually favourable seasons, grows a fine quality or a large crop of wheat. Many of the seeds perish in the ground; and the power of *tillering*, which is peculiar to culmiferous plants, is greatly diminished; so that the crop looks thin in spring, though a large quantity of seed may have been sown. Besides, the wheat plant, when sown before or during winter, is very liable to be thrown out of the ground in consequence of the frequent contraction and expansion of the soil by the alternation of frost and thaw, which arises from the superfluous moisture existing beneath the surface becoming frozen, and subsequently thawed by an elevation of temperature.

The selection of seed wheat is a most important matter, and one which demands all the circumspection of the farmer. Even after he has determined on the particular variety which is likely to succeed best on his land, and the time of sowing, no little judgment must be exercised in selecting the best and purest sample of the most approved kind. In the first place it is desirable to make a judicious change of seed from a different soil or a different locality, the policy of which is so well understood by agriculturists in general, and has been so long sanctioned by the practice of the most intelligent wheat-growers, that it would be quite superfluous

to dilate here on its advantage. In making a change of seed, it is obvious that the nature of the soil, as well as the character of the climate of the district or farm whence it is intended to be introduced, must be taken into consideration. For sowing in comparatively late situations the seed should be brought from an earlier district, as the produce will attain maturity from six to ten days before that of seed raised in the locality itself, and sown at the same time. Wheat that has been grown on light soils forms a suitable change for strong clay, and *vice versa*; while that from the vicinity of the sea coast is often found to answer well for the inland part of the country. But, as a general rule, the seed should be brought from a later situation, and a less fertile soil, than that in which it is to be sown.

Wheat intended for seed should be as pure a sample as possible of the kind; but, in consequence of the inattention of the generality of farmers to the preservation of the different varieties, it is difficult to find any that is not more or less mixed. It is hardly necessary to remark that the ears from mixed seed cannot attain maturity simultaneously: some being sooner ready for the sickle than others. And it is impossible to avoid cutting down the crop in an unequal state of ripeness; the consequence of which is, that the sample will be uneven, and the grain of inferior quality, especially for seed. It is still a subject of controversy whether light shrivelled seed, or such as is plump and full of flour, ought to be preferred. Some intelligent farmers consider that the former yields the largest produce, while being comparatively cheap; others, however, are of a contrary opinion, among whom may be mentioned Colonel le Couteur, who, in re-

ference to this point, observes in his work "On the Varieties, Properties, and Classification of Wheat," "It must be obvious that lean and shrivelled wheat is not so likely to nourish the young plant just starting from its embryo state into life, with a mere miserable skin of a parent to live upon, as the fine rich nutriment to be met with in a plump, round farinaceous grain, full of meal. As well might a farmer expect to have a fine, fat, skipping calf from a poor lean cow, fed, or rather starved, on Dartmoor Heath." Though fully convinced that, in general, the farmer will find it his interest to sow plump, good-looking seed, I am aware that in not a few instances grain partly shrivelled and of inferior quality has produced good crops. It must be remembered, however, that like often produces like in the vegetable as well as in the animal kingdom.

The following directions for judging of the quality of seed wheat, by the author of the "Book of the Farm," are well worthy of attention. "The dimpled end of the grain should be distinctly marked, and the site from which the rootlets issue should be rather prominent, and the end from which the blade springs should be covered with a slight degree of wooliness or hairiness. The protuberances of the rootlets and wooly ends should not have been rubbed off by any process, such as shelling, as the grain is thereby rendered unfit for seed, by being deprived of its vitality. Nor should the grain have been kiln-dried, because that process may also deprive it of vitality, and its effects may partly be detected in the undue hardness of the grain, and partly also from the smoky flavour which the grain has acquired. But hardness alone is not a sufficient criterion, as some wheats become much harder in ordinary drying than others; and in some parts of the continent, such as on the shores of the Mediterranean, some wheats are naturally so hard as to induce that in the ordinary state to be called soft. If no smokiness can be detected in the flavour, the surest test of existing vitality, when time is allowed to apply it, is to germinate the wheat near the fire in a glass, amongst as much water as will swell the grains. In its best condition, all wheat, whether red or white, small or large, long or round, should appear plump within its skin, not in the least shrivelled or shrunk; the skin should be fine and smooth, not in the least scaly or uneven in surface. The colour should be bright, lively, and uniform. The grain should be all of the same size and form, not short and long, round and long, small and large. The grains should be quite perfect: there should be no bruises or holes, or dried rootlets hanging from the dimpled end, or wooly appendages from the other end. If perfect in all these respects, wheat is fitted for any purpose."

No subject, perhaps, has created more controversy among both practical and speculative agriculturists during the last few years than the quantity of seed which should be sown per acre. This is obviously a most important question, and one which ought to receive the best attention of every farmer in the kingdom. There cannot, I think, be the smallest doubt but that a serious error is committed by sowing a much larger quantity of seed than is really necessary; and unquestionably this has been the universal practice until very recently, and continues to be so still in most parts of the country. But while the generality of farmers would do well to diminish the quantity of seed usually employed by them, some caution is requisite to avoid the opposite extreme. Mr. Hewitt Davis and other advocates of thin sowing have adduced some striking results of experiments, made with a view to ascertain the *minimum* quantity of seed per acre; from which it would appear that the proportion of grain actually required to produce splendid crops is extremely small in comparison with the quantity usually allowed. But it also appears that the most, if not all, such satisfactory experiments have been conducted on land in the highest state of fertility; and I need hardly remind the practical reader that in the case of poor, cold soils it would be extremely hazardous to depend on the same quantity of seed which on dry rich lands would suffice to produce the heaviest crops. Still, when we consider the enormous number of seeds generally sown per acre, the impossibility of their all finding room to grow or produce healthy stalks, and the extraordinary number of ears which, under favourable circumstances, will spring from a single grain, we cannot fail to be convinced that the ordinary quantity of seed is unnecessary and injuriously large, even after making every allowance for all the casualties and destructive or prejudicial influences to which the grain before sprouting, and the plants during their growth, are exposed. Probably the most proper proportion of seed for land of average quality is between the quantity usually employed, and that recommended by Mr. Davis.

The advantage of sowing thinner than has hitherto been the general practice does not consist merely in the saving of grain thereby effected (though, when it is remembered that at least one-tenth of the whole wheat grown in the country is again returned to the earth in seed, it will, I think, be admitted that this is of itself a most important consideration), as the plants are afforded the benefit of ample space, and an adequate supply of light and air; all of which are essential to their complete development, and the proper maturation of the grain. When the plants are too thick and crowded, the ears must necessarily be of unequal size, and

the grain unequally ripened. But the quantity of seed actually required per acre cannot accurately be stated without reference to given circumstances, as this must, in a great degree, be regulated by the nature and condition of the soil, the period of sowing, and the particular method of sowing. In poor undrained soils not a few of the seeds may be expected to perish in the ground; and those that do braird produce comparatively few off-shoots; consequently, a larger allowance of seed is requisite than in the case of drier and more fertile land. Again, land sown in autumn, or in the early part of winter, does not require so much seed as if the sowing were deferred till the months of February and March, owing to the plants tillering much better in the former than in the latter case. Thus the multiplying capabilities of the plants are dependant, in a great degree, on the quality of the soil and the period of sowing. Some extraordinary instances of the extent to which plants are increased, under favourable circumstances, by the process of tillering, are recorded by agricultural writers. A correspondent of Mr. I. J. Mechi, the spirited improver of Tiptree Hall Farm, mentions having seen in the month of July one hundred-and-fourteen ears from a single plant sown in the preceding August; and Colonel le Couteur states that one plant from a single grain of a downy variety, in 1833, threw out thirty-two tillers; all produced ears, with an average of fifty grains to each, or 1,600 grains from one. Both of these are doubtless extreme cases; but, nevertheless, such extraordinary instances show how much more productive the wheat crops of the United Kingdom may be rendered by bestowing greater attention to the proper tillage of the soil, and allowing sufficient room for the tillering and complete development of the plants. In Scotland, where the broadcast mode of sowing is almost exclusively adopted, from two to three bushels of seed, according to the condition of the soil and the period of the year, are usually allowed per imperial acre. Many farmers are now of opinion that two-and-a-half bushels are amply sufficient. When the seed is drilled in in rows seven or eight inches apart, one bushel will probably be quite sufficient; indeed, according to a statement of Mr. H. Davis, even three pecks are enough for one acre, drilled in the ordinary manner. Where the practice of dibbling single grains in rows is adopted, a very small quantity of seed is capable of sowing an acre of land, and the saving thereby effected is very considerable.

The precise quantity of seed which it is most advisable to sow is a question that should be determined by every farmer for himself; and this he can do by a few carefully-conducted experiments. They should at first be made on a small scale. The results, whether favourable or unfavourable to thin-

sowing, will be more satisfactory and convincing than those obtained by another.

Wheat is subject to various diseases, such as smut, rust, mildew, blight, &c. The most common of these is *smut*, to which my remarks on this part of our subject shall be confined. The nature and cause of this disease long remained enveloped in obscurity, and was the subject of vague conjecture; but it is now believed to be occasioned by a parasitical fungus, whose germs or sporules are supposed to be resident in the seed, or on its surface; these *spori* are inconceivably minute, so minute and impalpable indeed that it requires an indefinite number of them to cover a square inch: they are taken up, and conveyed to the ear, by the ascending sap. Long before farmers were made acquainted with the real cause of smut, it was generally known that washing or pickling the seed in certain liquids preparatory to sowing constituted the only means of preventing or palliating its injurious effects. It is now, however, understood that the efficacy of this process is owing to its destroying the vegetative properties of the exceeding small germs of the fungus, or removing them from the surface of the grains.

There are several methods of pickling or steeping wheat, and various substances are employed for the purpose. By repeatedly washing the seed in pure water much of the infection is removed off the surface of the grains; but this alone is insufficient, and rarely depended on, to effect a cure. Urine has long been employed for the purpose by the Scottish farmers, in preference to all other substances; and in general it has proved successful as a preventive. Its utility as a steep does not consist merely in preventing, or at least mitigating the effects of smut (though this, of course, is the primary object), as it is to be expected that the growth of plants whose seeds have been steeped in urine, one of the best of liquid manures, should be thereby considerably promoted and invigorated. This substance, in a proper stage of fermentation, seems to unite both advantages in a greater degree than any other of the steeps commonly resorted to for pickling seed wheat. It should be used neither very stale nor yet quite fresh: sometimes it is necessary to dilute it with water.

The following method of pickling wheat with stale urine is recommended for efficacy and despatch:—Two tubs, one of which may be larger than the other, are to be provided; and the barn floor, cartshed, or other suitable place, being properly cleaned, the larger vessel, in which the seed is to be steeped, is placed on a stand or tressel of a convenient height, and the other, containing the urine, laid contiguous on the floor. The former is now nearly filled with the grain, and a sufficiency of the

liquid is, at the same time, poured in with a stable pail. The wheat is then well-stirred with a wooden shovel, and after being thoroughly and equally moistened with the liquid, and allowed to remain in it from six to ten minutes, according to the strength of the urine, the latter is withdrawn through an orifice into the empty vessel. Any light seeds and all impurities that float on the top after stirring the grain in the steep are of course to be removed. The wheat thus pickled is immediately placed on the floor, previously well cleaned for the purpose; and a quantity of newly-slaked lime, sufficient to absorb the moisture, is sifted over every shovelful. A fresh portion of wheat is next put into the pickling-tub, and treated in a similar manner; and in this way the entire quantity then intended to be sown is steeped. The grain to which the lime has been added is next carefully turned and intermixed, in order that the whole may be equally limed. No more seed should be pickled with urine at one time than is intended to be sown on that or the following day. When it is necessary to discontinue the sowing from any cause, the pickled grain should on no account be suffered to remain in sacks, but is to be at once spread thinly on a dry floor, and frequently turned, to prevent fermentation, which would destroy the vitality of the seed.

When seed wheat is suspected to be much infected with smut, it is recommended to wash it thoroughly in water, in order to remove as much as possible of the sporules of the fungus from the seeds, previous to subjecting them to the influence of the steep. In this case the following method of preparing the wheat has been adopted with success in the southern Scotch counties:—Take four vessels, two of them smaller than the other two; the former with wire bottoms, and of sufficient size to contain about a bushel of wheat; the latter large enough to hold the smaller within them. Fill one of the larger tubs with water, and putting the wheat in the smaller one, immerse it in the water, and stir and skim off the light grains which float on the top, and renew the water as often as is necessary, until it comes off almost quite clear; then raise the smaller vessel, in which the wheat is contained, and repeat the process with it in the second larger tub, which is filled with stale urine; and, in the mean time, wash more wheat in the water tub. When thoroughly washed and steeped, the wheat is allowed to drain for a short time, and then placed on a clean floor, and intimately incorporated with newly-slaked lime, till rendered sufficiently dry for sowing. Another effective and simple method of steeping seed wheat, which is also frequently adopted in the south of Scotland, is conducted in the following manner:—Let a large tub and two baskets be provided; the former for holding the

urine or other liquid, the latter capable of containing each about half a bushel of wheat, and having handles projecting upright from the rims. Put the wheat into the baskets, and dip each basketful of seed into the tub of urine, so as completely to cover the grain. After remaining in the urine for three or four seconds, lift the basket up, in order to allow the surplus liquid to drain again into the tub; and then place it on two sticks over an empty vessel, to drain yet more, till another basketful has been immersed in the urine, and again withdrawn. Then empty the drained basket of its contents on the floor; and, as every basketful is being emptied, let a little newly slaked lime be sifted over the wheat. In this manner each successive basketful of seed is treated till the whole has been steeped, when the heap is repeatedly turned, in order that the lime may be thoroughly mixed with the wheat.\*

Several other substances besides stale urine are occasionally resorted to for the purpose of pickling seed-wheat. A pretty strong solution of chloride of lime has, in some instances proved to be one of the best materials for preventing smut. A weak solution of blue vitriol, or sulphate of copper, has also proved effective in most cases, and is strongly recommended. The mode of using it is as follows:—Five pounds of blue vitriol are dissolved in as many quarts of boiling water; and the solution, along with about thirty gallons of cold, soft water, is placed in a sufficiently capacious tub; the seed is then put into a basket, and immersed for one or two minutes in the liquid; and after being drawn up and allowed to drain, it is spread thinly on the floor to dry. It is proper to mention that quick-lime should not be added to wheat after being steeped in this solution, as it would have the effect of neutralizing the influence of the sulphate. The grain, however, requires but a short time to become sufficiently dry for sowing with the hand. Salt brine, made so strong as to float an egg, is very frequently employed with the best effects in steeping wheat. The immediate object of pickling being to get the grain thoroughly moistened with the liquid employed, and to free it from all impurities, it is obvious that the process may be conducted in any way which circumstances render most convenient; care being always taken to guard against the vegetative powers of the seed being in any degree injured, which will be avoided by attending to the precautions above adverted to, and not steeping too much at one time.

The comparative advantages of the different methods of sowing, viz., broadcast, drilling, ribbing, and dibbling, the proper depth of covering for the seed, the best substances to apply as top-dressing,

\* See "Quarterly Journal of Agriculture."

and the most proper stage of ripeness for harvesting, are subjects on which much diversity of opinion prevails among farmers. To these, and a few other particulars connected with the culture of the wheat crop, I purposed briefly to advert in this article; but my observations having already extended to greater length than was intended, their consideration

must be deferred till another opportunity. I may just remark, however, that in general it is an objectionable practice to apply manure directly to grain crops; under a proper system of husbandry they may safely be made to depend on the manure and good cultivation bestowed on the preceding green or fallow crops.

### TENANT RIGHT—SPARKENHOE FARMERS' CLUB.

COPY OF RESOLUTIONS PASSED AT A MEETING OF THE MEMBERS OF THE SPARKENHOE HUNDRED FARMERS' CLUB, HELD AT THE WENTWORTH ARMS INN, IN KIRKBY MALLORY, THE 3RD OF DECEMBER, 1846. SUBJECT FOR DISCUSSION—TENANT RIGHT.

First, That the members of this club believe the questions involved in the consideration of tenant right to be of great importance to the renting occupiers of land. They believe that some well defined and legislative measure is necessary to secure to the tenant an equitable interest in his outlay upon buildings, permanent improvements, manures, and management of his farm. And they conceive such legislative measure is daily becoming more essential to the interest of tenants, from the still increasing amount of capital employed in the cultivation of the soil.

Secondly, That the members of this club are fully aware that many difficulties present themselves, on the consideration of this important subject, in the equitable adjustment of the landlord's and tenant's interest; but when it is remembered how intimately these interests are blended together, and that the improvement of the land, and thence the advantage of the owner, is implied in the security sought for by the occupier, they cannot believe these difficulties to be wholly insurmountable. The members of this club conceive that the discussion of this subject by local clubs and meetings, and the recording of opinions there expressed, combined with a central comparison of such records, would greatly facilitate the removal of the difficulties which at present hamper this question, by giving a more comprehensive view of its merits, and by making its justice and importance to be more clearly understood.

Thirdly, That, in accordance with the preceding resolution, this club does now record the opinion of its members upon what they conceive ought to rest the just claims of the tenant; and also upon the adjustment of interest between owners and occupiers of land, as involved in the proposed question of tenant right, as follows:—

Whereas, a long period of time may elapse before capital invested in agricultural improvements can be repaid, it is equitable that a tenant should have

secured to himself or his family an interest and advantage in his outlay upon such improvements to the full extent of such period of time. And, if his occupancy should terminate before the expiration of that term, it is only justice that he or his representatives should receive a compensation equivalent to that portion of his capital which is left for the enjoyment and advantage of another.

That in all outlay in labour, materials, and haulage, upon good and substantial buildings, erected after the prevailing fashion of the country, for the use of the farm and the permanent advantage of the occupation, and solely at the expense of the tenant, he (the tenant) should be deemed to possess a twenty years' interest from the time of their erection and fitness for use. And in case his occupancy should cease before the end of that term, he ought to be entitled to claim one-twentieth part of their original cost for every year of that term yet unexpired, or be at full liberty to take down the materials, and carry away the same. But it should be imperative upon the tenant to deliver to the landlord or his accredited agent an account of the labour, material, and haulage of buildings erected by him, within three months of their completion and use, under the penalty of forfeiting all right or interest therein. Furthermore, should the landlord consider the erection of such buildings to be unnecessary to the wants and requirements of the farm, or the outlay to be exorbitant or injudiciously made, he should have power to decline taking the tenant's interest in the buildings for the unexpired term, leaving the latter at liberty to take down the materials and carry them away.

That the tenant should be deemed to possess a twenty years' interest in the labour, materials, and haulage of all drains of six feet deep and upwards, which shall be laid with pipes, tiles, or other enduring materials, solely at his expense; and in all material, labour, and haulage expended in the erection of brick or stone bridges for occupation roads;



and also in flood gates, culvers, and drains of enduring material for the purposes of irrigation; and also in all wells sunk, pits and dams made; and pumps or pipes put or laid down for supplying the house-premises or lands with water; and his claim should be admitted to receive one-twentieth of the original outlay, for every year of the said twenty years' term which may be unexpired at the end of his occupancy. But it should be imperative upon the tenant to deliver a full account of all outlay to the landlord or his agent, within three months of the completion of the work, with proper vouchers, under penalty of losing all interest therein. Furthermore, the landlord should be relieved from taking to any such portion of the tenant's interest in the outlay upon material, labour, or haulage, as shall be deemed by a jury to have been injudiciously or uselessly made.

That the tenant should be deemed to possess a ten years' interest in all draining of less depth than six feet, executed with tiles or other unperishable material solely at his expense; and also in the expenditure of labour, material, and haulage upon new occupation roads; and also in the outlay upon labour, material, and haulage in constructing water-courses and levelling land for the purposes of irrigation; and also in cutting new and filling up old brooks; and also in reclaiming bogs and waste land; and also in building fence-walls, with planting new hedges, with oaken or iron gates, and posts therein; and also in planting orchards or fruit trees, or shrubberies for ornament or shelter; and he the tenant ought to be allowed one-tenth part of the outlay so made, for every year of the term of ten years yet unexpired at the termination of his occupancy. But he should be required to produce bills and vouchers as before specified. And the landlord ought to have the before-mentioned redress from overcharge and useless or injudicious expenditure.

That in all labour and haulage of draining not exceeding three feet in depth, and where the landlord may have found the materials, and also in the cost of labour, material, and haulage of claying or chalking land, and also in the labour of cutting up ant banks in old pastures, the tenant should be deemed to possess a five years' interest, and ought to be allowed one-fifth part of the original cost for every year of that period unexpired at the end of his tenancy. But the landlord's security against imposition and improvident outlay should be provided for in the production of bills and vouchers as aforesaid; and the power of obtaining redress by appealing to the verdict of a jury.

This club leave untouched the existing claim of the outgoing tenant in acts of husbandry, fixtures, &c., as irrelevant to the present question; but

should a general measure be adopted legalizing a tenant right, they believe these claims might be simplified, and general rules laid down with advantage to all employed in agricultural pursuits.

For instance, this club are of opinion that in all manures and fertilizers of the soil purchased and laid upon the land at the cost of the tenant, he (the outgoing tenant) should be deemed to possess a three years' interest, and ought to be allowed one-third part of the original cost and haulage for every year of such term of three years as shall be unexpired at the end of his tenancy. And the commencement of such term should be deemed to take place from the time of its application to the land; but all years of fallow for turnips, or in which vetches, rye (as a green crop), cabbages, carrots, mangel wurzel, or other such crops shall be grown, (as the only crop for the year), and shall be wholly consumed upon the farm, ought to be omitted in the calculation of the period of three years. But the outgoing tenant should be required to produce bills and vouchers for the same, or forfeit his right or interest therein.

Also, the outgoing tenant ought to be deemed to possess an interest in oil cake and other fattening substances purchased by him and consumed upon the farm by the feeding of cattle, equivalent to one-fourth part of the original cost; and this interest ought to go back three years from the termination of the occupancy, decreasing after the rate of one-third part of such interest for every year he may or might have received advantage therefrom; but bills and vouchers should be produced by the tenant, or his claim should be disallowed.

The members of this club conceive that in equity the outgoing tenant should possess a claim in the corn consumed upon the farm by the feeding of cattle, though grown by himself, equally with oil-cake purchased; but this item, with some others, are unnoticed by this club from the want of some adequate means of protection to the landlord, or incoming tenant's interests. But the members of this club concur in the opinion that the foregoing clauses, extended in their general bearings and modified in their adaptations to the requirements of different localities, would greatly promote the advantage of tenants, and would by no means act prejudicially to the interests of the owners of land.

Fourthly, That the members of the Sparkenhoe Hundred Farmers' Club express their decided belief, that the general adoption and legislative enactment of a tenant-right would be the means of securing to the tenant an equitable interest in his outlay upon improvements, and thereby causing an additional expenditure upon the land, would be a benefit to the nation at large. And furthermore,

when they look upon the field of agricultural advancement, within a few years so greatly enlarged by scientific researches, and when they look also upon the rapid increase of the population and the necessity of extending the sources for supplying this increasing population with food, they (the members

of this club) can no longer regard this subject solely as a question of interest between landlord and tenant, but (as a means of increasing the amount of agricultural produce) they must look upon it as a measure of national importance, and interesting alike to every member of society.

### NORTON FARMERS' CLUB.

The monthly meeting of members was held on Monday evening, December 7, 1846, in their room, at the Bagshawe Arms; J. Lee, Esq., of Dalton Parva, in the chair. Mr. Samuel Linley, of Millhouses, and Mr. John Bradbury, of Unston, were elected members. After a number of new publications and works had been ordered to be added to the library, the secretary read a letter which had been sent by W. Shaw, Esq., the editor of the "Farmer's Magazine," the object of which was to induce the members of this club to co-operate with the London Farmers' Club in an endeavour to place leases and "tenant-right" on a better foundation.

The SECRETARY reminded the club that the subject had been several times discussed and alluded to at their meetings, but that no specific or tangible result had followed, neither had any resolution been founded thereon. The question was one that required calm and attentive consideration, and he submitted that before one of such great importance was again entertained, the members at large ought to be apprized of the time when it would be again brought forward. The question of "tenant-right" had been very ably handled by Mr. Shaw, of the Strand, London, and Mr. Bennett, an extensive farmer, at a meeting of the London Farmers' Club, a report of which appeared in the "Farmer's Magazine," published in January last. Those who had not already read the report, had better do so, and then they would perhaps be better able to offer an opinion on the matter at some future time.

The CHAIRMAN understood that the conditions on which farms were let in this district were so widely different, it would be an utter impossibility to make a general rule for the guidance of all parties in the taking and holding of farms. For instance, conditions suitable for this neighbourhood would be found impracticable in another, and hence the difficulty of establishing a uniform system of tenant-right. He (the Chairman) suggested that every tenant should make his own agreement with his landlord, who, he thought, if an honourable man, would never seek to drive a hard bargain with an eligible tenant. The question, however, as stated by their secretary, was one of such great

moment that he would advise a postponement of its discussion till a future meeting.

After a few other remarks, by Mr. T. Bishop and the Secretary, amongst which it was stated that Mr. Lister, of Greenhill, would read a paper on the malt-tax at the next meeting in January, it was arranged that a discussion on the former subject should also be taken at the same time.

A discussion then arose on the propriety of petitioning the legislature to remit the duty on game certificates; but no resolution having been come to on it, the meeting adjourned.

**TENANT-RIGHT. — PETERBOROUGH FARMERS' CLUB.**—At a special meeting of the Peterborough Farmers' Club, held on Saturday, the committee appointed to consider the claims of tenants, on the subject of "tenant-right," introduced the following resolution, which was unanimously adopted:—"That the committee have agreed that, in order to insure the country the greatest produce from the soil, a law is absolutely necessary to secure the landlord against the dilapidation of his property, and indemnify the tenant for the capital and skill expended in improvements which remain unexhausted at the expiration of his tenure. The committee are of opinion that the claims of the tenant for improvements (whether he is a tenant at will, under a lease, or otherwise) should be settled by arbitration; one arbiter to be appointed by the landlord, one by the tenant, and a referee to be called in by them, whose decision shall be final, in substantiating the tenant's claims, which local circumstances alone can regulate, for improvements made upon the farm in the shape of convenient buildings, roads, bridges, draining, quicksetting, the consumption of corn, cake, linseed, and the use of all artificial manures, &c., according to their acknowledged durability. The committee are of opinion that the tenant, in erecting buildings which the landlord has refused to erect, should be allowed only for those buildings that can be proved necessary for the occupation, but that the tenant ought to be permitted to remove those that may be deemed superfluous and unnecessary. The committee are of opinion that the inventory of unexhausted improvements should be charged to the landlord, upon a tenant quitting a farm; and that, whenever the landlord requires it, the tenant should produce the accounts of the several improvements he has made."

## ON THE FARMING OF CAMBRIDGESHIRE.

BY SAMUEL JONAS.

*(Concluded.)*

## THE THIRD DISTRICT

Consists of the parishes lying on the western side of the county, abutting on Bedfordshire, Hertfordshire, and Huntingdonshire, commencing at Guilden Morden, and running in a northward direction by Whaddon, Barrington, Harlton, Barton, Granchester, and crossing the turnpike-road leading from Cambridge to Huntingdon, and proceeding in the same direction until it joins the fen district, gradually becoming better and stronger land as it nears the fen. Those parishes abutting upon the first or light land district are also good useful land; so also is that portion adjoining Hertfordshire—the Abingtons, Wendy, and Shingay, and the flat or lower portion of the parish of Tadlow, and a portion of Wimpole and Orwell.

The land is of a good deep staple from these villages to the western side of the county: as you ascend the range of hills you find the soil of a thin staple and very poor, resting upon a tough, retentive, tenacious, clayey subsoil of little value, and which has not as yet been well farmed. You here perceive the plan our forefathers adopted to get rid of the water; for, instead of taking the water from the land, they endeavoured to take the land from the water. And this they endeavoured to do by ploughing the land on what is now called high backs. The plan adopted was to begin to plough by commencing in the middle of the land, or gathering; and they have thus for centuries continued to gather up the land. They gather up twice and split once. These lands, formerly lying in the common-field state, are ploughed of all sizes, and running in every direction, none scarcely being found that are straight; and since the enclosures of the various parishes they have been continued in the same form and shape. The plan is to hollow-drain up the furrows of each land. In fact, they cannot drain in any other direction, in consequence of the high elevation of the ridge of each land.

I am well aware it may justly be said none are so well acquainted with the best system of farming land of any description in any locality as those who have been situated on the spot all their lives. Yet allow me to draw attention to the vast improvements that have taken place in nearly every district and description of soil within the last half-century. Look what claying and draining have done for the fens; it has so consolidated and condensed the

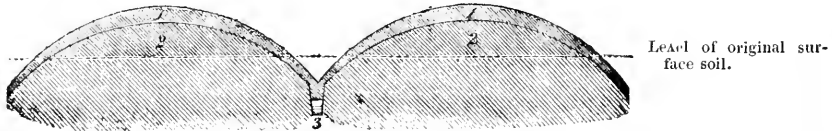
lands, as to render that which was formerly of little worth now the most productive and valuable soil of any in the kingdom.

See what bones and guano, &c., have done for the thin-skinned, poor, light, hungry lands. Observe the neatness of the heavy land district on the eastern side of the county, every field being ploughed straight on the three or six feet lands, no horses being allowed to walk on the land, all going in the furrows. But it is not so in this western district: here both horses and carts must tread and poach on the land. I am well aware that it is contended you would ruin the land by ploughing it down and getting it flat, so as to be able to plough on any sized lands we pleased, or drain it in any direction. I know that it is stated by practical men of the district that we should get the furrows too strong, while the middle or heading of the stetch would grow little or nothing. Supposing their observations to be correct, it most fully proves to me the advantages of deep ploughing on these heavy lands, for the present soil of the furrows consists entirely of the original subsoil; yet, by constantly ploughing deeper, the action of the sun, air, and frost have made it, in appearance and texture, like that of the surface soil. Yet, if we split these lands down so as to get them level, we are told the present furrows would become too strong: this could only be done by the staple or surface soil being made so much deeper by the plough. What can more clearly or convincingly convey to any reflecting mind the great advantages of deep ploughing on heavy land than this very fact—for I admit such would be the result—that it *would* be stronger in the old furrows? But I would soon endeavour to make the present heading or gathering as good by deep ploughing and the application of manure. I am confident the advantages of ploughing deep on this description of soil are incalculable; it deepens the staple, it more readily drains the soil, and affords better nourishment for plants. I well recollect, in my early days, that the green sides of a heavy clay lane, abutting upon my father's property in Suffolk, were dug off at three different periods, until at last nothing was left but the tough tenacious clay subsoil. A few years afterwards, several of his labourers living in his cottages near the spot, asked his consent, and obtained permission, to enclose this land for gardens. A quick was planted, the land divided into allot-

ments, and although (poor fellows!) they had nothing but solid clay to commence operations on, by thorough-draining it and deep digging (for then they double-dug, or trenched it), with the application of manure, and good and deep culture, these allotments are now as fine gardens as I wish to see, producing everything very early in the season, and full also of thrifty and growing fruit-trees.

On these high-back lands, I contend that the gathering up, or centre of each land, by not having been exposed to the action of sun or air for centuries, has become dead, inert clay; yes, even that portion which was the original surface soil: and I prove it thus—by digging across lands of this description, I have always found the soil lying in the following manner:—

*Section of Ends of Lands lying on high Backs.*

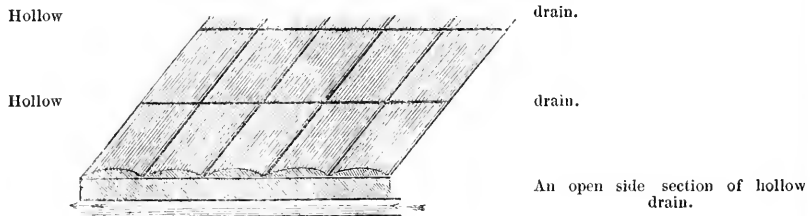


1. Present surface soil.
2. Land gathered up above original level of surface soil, now become, to a certain extent, dead, inert clay.
3. Hollow drain up the middle of old furrows.

The middle portion of the land now gathered up above the original level of surface soil is now found, a certain portion of the centre, to have become dead inert clay, from having lain for centuries deprived of the action of the air and sun; and the furrows, and sides of furrows, much below the original bottom of surface soil, are now become,

by being moved by the plough, and by the action of the frost and summer's sun, fair surface soil.

If these lands were ploughed down and got level, as they would have been in the eastern district, they would lie in the following manner; and the following sketch will at once clearly show the advantage of the latter system:—



These lands are two yards wide, and made to fit the drill.

In riding over several thousand acres in the month of December, I found only three men hollow-draining; two were on the estate of Lord Hardwicke, at Wimpole, putting in drain-tiles on very flat land, 7 yards apart and only 21 inches deep; the other was on the hill near Hatley—he was at work upon one of the old furrows of a high-backed field, with lands two rods wide, and putting the drains in only 14 inches deep, filling up with haulm and bushes cut from the hedge-row border. This surely could not be looked upon as a very expensive improvement; yet it is wonderful what great improvement is effected even by this imperfect and partial attempt at draining. In the flats of the parish of Tadlow, &c., I found draining going on in every direction, and the land appeared to be well farmed. A large portion of this district belongs to Downing College, and I think they

would much benefit their tenants, without injuring the estate, were they to remove all the hedge-row timber, and allow the width of the hedge rows to be lessened, as the injury sustained from hedge-row timber is incalculable. From Wimpole to Hatley I found a large tract of land very badly cultivated, not only covered with thistles, conchgrass, &c., but sadly in want of that first and great improvement on heavy clays, viz., thorough draining. It certainly was a description of land that would repay the least for outlay of capital; but so long as such lands are kept in cultivation, it is only by the judicious application of capital and good farming that any return for the capital employed can be made; and unless such soils are well thorough-drained, well-ploughed, and kept clean, their occupiers cannot, I am confident, realize a profit. It was a bad sort to have in hand, and appeared to me to require a considerable outlay of capital to get it in good order. On the estate at

Childerly, belonging to Colonel Calvert (which is an entire parish, containing 1,050 acres of land; has no church, nor any poor, as the population does not amount to more than 50), I found considerable improvements going on, under the able superintendence of his intelligent bailiff, Mr. Franks. Some well arranged and well constructed sheds for fattening beasts had just been erected, and about 100 beasts eating oil-cake, &c. Mr. Franks grows about 20 to 30 acres of turnips or mangold wurzel every year; this he does on the newest or strongest land. With these, and the hay grown on the farm, with the addition of about 200 tons of cake consumed by beasts and sheep, he is improving this estate. He does not attempt to winter sheep on this cold clay soil; but in the spring and summer months stocks heavily with sheep, fed with cake; and in the two years it has been under his management he has laid down 260,000 drain-tiles, and intends putting down half that number this year. He is also gradually ploughing the lands down off the high backs, and shaping them into lands more convenient for the drill. I saw some of his wheat on land lying as tight and as level as on the best cultivated heavy clay districts of Suffolk. He farms this on the four-course system, and it is the course of cropping generally pursued in the whole district.

I consider that on the poorest portion of it, if instead of growing beans they grew tares, and fed them off on the land with sheep, eating corn or cake, it would much improve the land; and, in my opinion, by so doing for a term of years, the land would not only be improved, but the total proceeds would be increased. But the first great improvement to be adopted in this district is thorough draining; and surely the expense can be no excuse for not effectually doing it; this district lying nearly all on the high backs, which are lands varying from 7 to 15 yards wide, and the hollow drain being made up the furrows only, there cannot be more than from 4 to 6 score rods of draining per acre to pay for: the bushes they fill up with are cut from the hedges; the haulm or stubble to cover up with, left in the field; so that the expense of doing this work cannot be very heavy.

I believe I am justified in claiming for this county the honour of being the first county in England into which irrigation was introduced; the history of it is remarkable. Pa'lavicino, who was collector of Peter's pence in England at the death of Queen Mary, having £30,000 or £40,000 in his hands, turned Protestant on the accession of Queen Elizabeth, and appropriated the money to his own use, buying with it the estate at Babraham, near Bournbridge; and procuring a grant from the crown of the river which passes through them, he was

enabled to build a sluice across it, and use the waters for the purpose of irrigation. The quantity of land thus watered is about 300 acres; and although an interval of 287 years has elapsed since this introduction of irrigation, I think I am correct in stating that this example has not been followed in any instance in the neighbourhood, except on the banks of the Cam, on the borders of the county at Littlebury, in Essex, on the well managed estate of Lord Braybrooke: in this instance the waters of the Cam are used, as well as a small tributary stream running from Saffron-Walden, the water of which is considerably improved by the drainage from the sewers of the town. The quantity of grass produced by this system, and in this case, is extraordinary. These works are well executed, and do great credit to the noble proprietor.\*

The estate at Babraham is now in possession of Mr. Adeane; and I would point out this village as worthy a visit from any of my brother farmers, as one in which they would find lands of little or no natural fertility rendered productive by the judicious application of capital, employed in carrying out the most improved systems of cultivation; and I will pledge my word to them that they will be well repaid for a day's journey. The time of our landed proprietors would not be wasted in also paying this village a visit; they would find all the cottages clean and neatly built, and would have strong evidence of a degree of comfort and cleanliness not to be excelled, if equalled, throughout the kingdom. Celebrated as Babraham no doubt was in the time of Queen Elizabeth, in consequence of the first introduction of irrigation, it has now, in the time of Queen Victoria, become of much greater note by being the parish in which a tenant of Mr. Adeane's has reared and produced some of the best blood of Southdown sheep, from which the celebrated Babraham flock takes its name. Mr. Jonas Webb commenced his annual business of letting tups in the year 1823; and most people are aware with what success his efforts to improve the breed have been crowned. He lets nearly 200 rams annually, and has been one of the most successful breeders of Southdown sheep. May he long be spared to his family and country, to carry on the improvement in the breed of these useful animals!

The breed of Southdown sheep has much increased in this county of late years; several still prefer the white-faced Leicester or Lincoln. I

\* On my return from our Meeting at Derby, I availed myself of the opportunity to go over the watered meadows of Clipston Park, belonging to the Duke of Portland, and I there saw really barren waste land made most valuable by irrigation; there, indeed, were seen the art, science, and ingenuity of man crowned with triumphant success.

neither like to see them on my land nor on my table.

On the chalky soils of this county large breadths of sainfoin are grown, and a most valuable article it is; it will yield a good crop of hay for wintering horses, and for cutting into chaff for sheep; and the rowen is most valuable for lambs. It is a general rule not to feed it down too close with sheep, as it injures the next year's crop. It is sown with the barley in the spring, drilled in with 4 bushels of seed per acre. Many farmers lay down the poorest portion of the farm with this useful plant; but I consider nothing would pay better than getting such land into good order and good heart, before laying down with sainfoin: nor can such land be got too clean, as it is apt to get covered with florin-grass after lying a few years. It will not stand more than nine years; and a practice is now much gaining ground of feeding and folding it close the last year with sheep, and ploughing it up and sowing it with wheat. This plan has been very successful.

A new variety of sainfoin has lately been introduced in some parts of this county, and has been exceedingly well spoken of; it is called the gigantic sainfoin. The seed has been selling as high as four guineas per bushel; it grows with a broader leaf, is much earlier, and cuts a heavy crop.

A plan has of late been most highly commended by all who have tried it, and the practice has also much extended. They sow sainfoin in the regular course of the four-course system, instead of seeds, for one year's layer only, to be mown for hay and fed close with sheep, then ploughed up for wheat the next year, with the rest of the regular seed-shift. This plan was first introduced into this county in the neighbourhood of Mildenhall. The difficulty of getting a plant of seeds, from the land becoming clover-sick, led to an experiment of this kind with sainfoin, and its having been attended with great success has led many others to follow the plan. It is stated, by those who have tried it, that they not only get a fair crop of hay, and good after-feed for sheep, but that wheat is sure to succeed well after it, of which I have no doubt. But I cannot say I feel much inclined to adopt the system; I endeavour to prevent my lands from becoming clover-sick, by not sowing mixed seeds, having one portion red clover, another white clover, another trefoil, and the remainder peas or tares mown for hay, fed off or seeded; and after the peas and tares, take oats instead of wheat. It appears to me, that after getting a good plant of sainfoin, to plough it up the first year must be attended with a loss; for after having been at the expense to seed your land, we know that the second, third, fourth, and fifth years will each nearly, if not quite, double the quan-

tity of hay that was produced the first year, and this without any further expense except rent, tithe, and rates, and the cost of moving, making, and carrying. I would, therefore, much prefer letting it remain one whole rotation, if not more, and plough up the layer for wheat after the first year of the succeeding course. This would bring it into the regular four-course shift or course again after four years.

#### THE ISLE OF ELY, OR FEN DISTRICT.

The difficulty I feel in writing on the farming of this county is considerably increased in consequence of a large portion of it consisting of fen-land, being so different in every respect from any other part of the county. But I have, by a careful view of this district at various times, and by communications with some of its most spirited cultivators, endeavoured to obtain, and I trust have obtained, sufficient information on the subject. Yet I feel that none but those brought up, living in, and cultivating this district, can fairly and fully do justice to it. It is a wonderfully fine district, and one in which more improvement has taken place within a few years than in any other. I think a district so important deserves and is entitled to a separate Report.

I will endeavour to give a full account of its original state, as described by various writers, and of its state at the present moment. Mr. Atkins (a Commissioner of Sewers in the reign of James I, 1604) states, that in his opinion the fens were once of the nature of land meadows, fruitful, healthful, and very gainful to the inhabitants, and yielded much relief to the high-land countries in the time of great drought.

Sir W. Dugdale, about 1644, says, "that great numbers of timber-trees grew there, as was plain from many found in digging canals and drains, some of them severed from their roots, the roots standing as they grew, in firm earth below the moor; fir-trees at the depth of four and five feet, but the oaks at three; they were found lying in a north-west direction, not cut down, but burnt near the ground, as the ends of them being coaled manifested. The oaks in multitudes of an enormous size, being five yards in compass and sixteen long, and some smaller, of a great length, with a quantity of acorns near them. About a mile westward of Magdalen Bridge, in setting down a sluice at seventeen feet deep, several furzes, and nut-trees, pressed flat down, with nuts firm and sound lying by them, the bushes and trees standing in the solid earth below the silt." Dugdale also mentions a gravel causeway three feet deep, supposed to have been made by the Emperor Severus, who was born 146, and died 211, from Denver in Norfolk to

Peterborough in Northamptonshire, twenty-four miles in length, which is now covered with moor five feet in thickness. In deepening the channel of Wisbeach river, 1635, the workmen, at eight feet below the then bed of the river, discovered a second bottom, which was stony, with seven boats lying in it covered with silt. And at Whittelsea, in digging through the moor at eight feet deep, a perfect soil was found, with swarths of grass lying on it as they were first mown.

Henry of Huntingdon, in the reign of Stephen, 1135, described this fen country as pleasant and agreeable to the eye, and watered by many rivers which ran through it, diversified by many large and small lakes, and adorned by many woods and islands. And William of Malmesbury, in the time of Henry II, 1154, in writing of the lands round Thorney, says, "It is a very paradise in pleasure and delight; it resembles heaven itself, the very marshes abounding in trees, whose height without knots do emulate the stars. The plain there is as level as the sea, which with the flourishing of the grass, allureth the eye."

It appears that all sorts of trees are found buried in the uplands, but mostly oaks; in the lower fenlands they are all firs. The horns of red-deer, acorns, and nuts are found in various parts of the fen.

The inundation of the fens or level district arises from various causes. First, the waters flowing from the uplands through the various rivers, which, from the want of being properly scoured out, were constantly overflowing their banks; and in addition, the rain poured its waters upon the smooth and porous portion. This, in addition to the already overburthened accumulations from the uplands, laid this district under water; which, however, would not happen unless in winter, or at least, seldom in summer. But the greatest addition was the daily flux of the tides driving from the German Ocean through the harbours of Lynn, Wisbeach, and Boston, into the defenceless and over-burthened level. These waters would naturally overflow to a considerable distance the surface of flat country; and we may also suppose an accumulation of sand and silt at the mouths of the rivers, the constant recurrence of the tides preventing the regular discharge of the floods collected from the upland and downfal waters. Thus the waters of the ocean, mingled with those of the heavens and the springs of the earth, passed over the whole of what was then, in its most extended sense, the great level of the fens, consisting of about 300,000 acres.

Soon the attention of the enterprising was drawn to this immense tract of rich land; but to undertake to drain such a vast extent of country must at

these early periods have been a work of formidable magnitude. Yet even then public-spirited and enterprising men were found, with genius to plan and perseverance to carry into effect works so extensive, being indeed no less than cutting one entire new river, in the first instance, 25 miles long and 100 feet wide.

In 1605 a bill was introduced into the House of Commons for draining certain fens and low grounds within the Isle of Ely and country adjoining, being 300,000 acres, but was rejected on the third reading.

In the year 1607 the "Little Bill" for 6000 acres of fen land, called Waldersea Country, was passed. This was the first District Act for draining the fens. There, as in the fens generally, after many years windmills were erected for pumping the waters up to the level of the river from the lowlands below: this was only done imperfectly. In going over this district in 1846, I was informed that previous to the erection of the powerful steam-engine which drains it by throwing the waters into the river Nene, at certain periods of the year boats went over the land, which was the habitation of large quantities of wildfowl. But immediately after the erection of this engine the lands were laid dry, and splendid crops of corn grown the first year. I was over this land just in a flood, and the lands were as dry as any in the upland part of the country; I might say drier, for I found the plough going in most parts of the fen, although the rain had fallen in such quantities that we were not moving a plough on our dry chalk and gravelly soils. I looked upon this as strong evidence of their effectual system of draining. This steam-engine was erected in 1832; it is of sixty-horse power. The waters are raised by a pump six feet in diameter, and it lifts 46 barrels of water each stroke, and can take from six to ten strokes per minute, according to the height of tide in the river. It had that morning been raising the water 20 feet, so that at the time of high flood the water in the river Nene stood 20 feet above the level of the water in the drains in the level fen below. This engine, with buildings, cost about £3000; the coal to work it costs about £150 per annum. It drains 6,500 acres of as fine land as I ever saw, the drainage-tax on which is 4s. 6d. per acre. When the mortgage-debt is discharged, a portion of which is done annually, the tax can be reduced to 1s. 6d. per acre.

In 1630 a contract was entered into with the Earl of Bedford, called the Lynn Law, sanctioned by the Commissioners of Sewers, and enrolled in the Court of Chancery. The Earl was to have 95,000 acres of the drained lands for his satisfaction, on account of the expenses and hazard consequent on such a work. In this he was joined by

thirteen gentlemen adventurers. In order to carry off the superfluous waters wherewith the level was so much annoyed, from causes previously stated, the Earl and his associates caused numerous channels or drains to be made.

1. Bedford River (now called the Old Bedford River), extending from Earith to Salter's Well, 70 feet wide and 21 miles in length.

2. Sam's Cut, from Feltwell in Norfolk, to the River Ouse.

3. A cut near Ely, now called Sandy or Sandall's cut, two miles long and forty feet wide.

4. Bevill's lean, being a cut from Whittlesey Meer to Guyhirn, about ten miles in length and forty feet in breadth.

5. Morton's Lean was connected with these works, but this cut had been made as early as 1478, by Morton, Bishop of Ely. It was forty feet wide and four in depth, and extended from Peterborough to Guyhirn, a distance of about twelve miles.

6. Penkirk drain, ten miles in length and seventeen feet in breadth.

7. New South Eau, from Crowland to Clow's Cross.

8. Hill's cut, near Peterborough, about two miles in length and fifty feet in breadth.

9. Shire drain, from Clow's Cross to Tyd, and so on to the sea.

Besides these cuts and drains, they caused two sluices to be made at Tyd, upon Shire-drain, to keep out the tides; and also a clow at Clow's-cross, for the fresh water; and likewise a great sasse at the end of Well-creek, where it empties itself into the river Ouse at a place called Salter's-lode, to keep out the tides; and another sluice at Earith, to keep out the floods; but above all (says Dugdale) that great stone sluice below Wisbeach, at the Horseshoe, which cost about £8,000, to hold the tides out of Morton's-team.

In 1649 the act for draining the great level of the fens was passed. This vast tract of fen country extended itself into the counties of Northampton, Norfolk, Suffolk, Lincoln, Cambridge, Huntingdon, and the Isle of Ely, and consisted, as before stated, of 300,000 acres.

In 1650 Sir Cornelius Vermuyden, a Zealander, was appointed director of the great works of draining the fens. He commenced operations by dividing the level into three parts, the North, the Middle, and the South, by which names they are distinguished and known at the present day. Each of these levels has its particular rivers, banks, works of drainage, and outfalls to the sea.

These immense works were not carried on without considerable interruptions and temporary delays, occasioned by failure of pecuniary resources and

the requisite number of labourers; and to surmount the latter difficulty, in 1650 arrangements were made by which a large number of the Scotch prisoners taken at the battle of Dunbar were employed in completing these stupendous works. In 1652, of the Dutch prisoners taken by Admiral Blake, 500 were also employed. And thus the result of war was made to contribute to the redeeming of a vast extent of new territory, which we now see affording employment for thousands in the peaceful occupations of rural life, thus rendering that which was formerly valueless now the most valuable and productive land in the United Kingdom. And to prove of how little value it was at this period, we find that in 1651 the Earl of Arundel sold his lands in the fens, consisting of 5,900 acres, to William Stephens, Esq., of the Middle Temple, for the sum of 3s. 9d. per acre, the total purchase being for £1,032 16s. This was no bad investment, for the land now lets, I suppose, at about £7,000 per annum. On the 25th of March, 1653, the adjudication of lands to the adventurers took place, on which occasion a general thanksgiving was offered in the Cathedral Church at Ely, in humble gratitude to heaven for the completion of these works.

Soon after the year 1726 a plan of private drainage by legislative enactment was commenced, and an act passed "for the effectual draining and preserving of Haddenham-level, in the Isle of Ely." From this period may be dated the plan of drainage by mills. The windmills, however, erected in this district have been pulled down, and a powerful steam-engine erected, which most effectually drains the fine fen lands of that parish.

After the general erection of windmills, the plan soon adopted was what is called double lifts—that is, first one large mill is erected near the main river, and then a smaller one at some distance behind: the one mill, by first raising the water from the mill-drain a certain height and in certain quantities, lessens what is called the head of water to be thrown by the first mill, and greatly facilitates its operation.

The artificial system of drainage, under the authority of local district acts, by the means of water-engines, may be thus explained:—Certain proprietors of any given quantity of land agree to apply to Parliament for a local act. The boundary is set forth, and sub-division dikes are made for draining the estate of each owner. These division-ditches empty themselves into a main drain, cut at the general expense of the owners (commonly called the mill-drain), and run through the whole district, which is embanked all around by a mound of earth, raised to a height proportioned to the quantity required to be excluded. The mill-drain terminates



at one end, near a river, upon the banks of which the water-mill is erected; and thus by means of a circular wheel the water which has found its way into the mill-drain is thrown from thence into the river, from whence it passes to the outfall, and onwards to the sea. The number of mills in each district depends upon the extent, and the head or quantity of water required to be discharged.

The steam-engines now erected in the fen district of this county are ten in number; besides some private ones.

1. In the district of Littleport and Downham we have two very powerful steam-engines, one standing on the banks of the New Bedford river, which is an 80-horse power engine, which raises by a water-wheel about 40,000 gallons of water per minute, lifting it about twelve feet high.

2. The other engine stands on the banks of the ten miles river, and is of similar power. These two engines drain most effectually about 23,000 acres of fine fen land. One old man about sixty informed me that he perfectly recollects, before these engines were erected, that he had known this district flooded three times to the depth of from six to seven feet.

3. The steam-engine at Walderssea-fen, before fully described.

4. One at Bene, or Bageney-fen.

5. Another at West-fen.

6. Mepal engine, 80-horse power pump-engine, drains about 13,000 acres, the tax for which is 3s. 6d. per acre.

7. Over steam-engine, 12-horse power.

8. Haddenham }  
9. Cottenham } on the banks of the Ouse.

10. Swaffham, on the banks of the Cam.

It did appear to me surprising that in this age of improvement 5,000 acres of fine land should still be left liable to be covered with water in any flood—I mean the reservoir or space between the banks of the two great rivers, or artificial drains, called the Old and New Bedford river. Of course as an upland farmer I am entirely unacquainted with the management of fen land, and totally ignorant of the difficulties that prevent the accomplishment of so desirable an object: but great difficulties I presume there must be; or with the proof before their eyes of the advantages of arable crops over the coarse, sour grass now grown on this land, the proprietors would long ere now have called science to their aid, and by her assistance rendered this a corn-producing district. But I have no doubt we shall, ere many years roll over our heads, see this made as dry and secure from floods as any of the surrounding lands—that is, if in future the prices for grain produce should be sufficiently high to stimulate them to do so. I am justified in the above

observations by the opinion expressed by the intelligent registrar of the fen district, Mr. Wells, whose urbanity and kindness in freely giving the information I sought on the subject of the drainage of the fens, I beg gratefully to acknowledge.

I rode through the whole of this district in January, with a friend. We had a flooded time, and my own farm, as I have mentioned, was so wet at the time that I did not move a plough for days; yet I found this fen district so perfectly drained that they were ploughing and carting on the land, and claying the soil. I saw men at work in holes seven to eight feet deep, and only requiring the use of a small scoop to throw the water out of the holes occasionally. In nearly the whole of the low, flat portion of the level of the fens the soil consists of a deep deposit of vegetable matter, or bears' muck, as it is called in the district. This turf consists of the congeries of the roots and fibres of a great number of different species of plants. It is found varying in depths from two to seven or ten feet; it rests upon the Oxford or fen clay, which is almost without a stone in it, and is of a very soft nature, cutting out like butter by the men employed in claying. All the high lands of this district consist of diluvial deposits of sand, gravel, and clay, either separate or mixed. At Haddenham and Waterbeach the lower green sand crops out. A portion of the fen district, abutting on the dry sandy soils of Norfolk and Suffolk, consists of a light, sandy, porous fen mould; and is, in my opinion, of less value than any other portion of the fen. I felt a great pride and satisfaction, in riding over this district, to see what the persevering spirit of British enterprise will undertake and successfully carry into execution; to know that two hundred years ago this large tract of rich country was deluged with water and valueless to the country, but now, by the judicious application of skill and capital, is rendered the most productive and most valuable land in this county. Grain crops succeed each other in succession for years, if kept clean, and this at comparatively little expense. The high lands surrounding this district, where the diluvial deposit is of clay, are well hollow-drained, which many years ago was done with turf; but they are now executing their hollow draining in a more effectual manner by the use of drain-tiles. Between Ely and Littleport is a fine tract of high land belonging to Mr. Layton, and in his own occupation, which is well farmed: he has a portion of fen land belonging to this estate, on which he has lately erected a steam-engine at his own expense, which completely drains his fen land. At the foot of this skirt or high land is a large drain called the Catchwater-drain, which conducts the waters running off his high land into the river, so as to pre-

vent its running off his high land in time of floods into the fen land below. This considerably facilitates the operations of the steam-engine, as it greatly lessens the quantity of water for it to throw. He has a very fine brick and tile kiln on his estate, adjoining the turnpike-road from Ely to Wisbeach, close to which passes a navigable canal. He has made some most excellent drain-tiles with soles, and some pipes with a foot or flat bottom attached, to act as a sole for them to rest on. Mr. Layton uses these tiles for draining his heavy clays on his high lands.

Near Ely is Grunty-fen, consisting of 1,280 acres lying in the seven parishes of Ely, Witchford, Wentworth, Haddenham, Wilburton, Streatham, and Thetford, into which fen the several inhabitants of each village turn cattle or sheep, without any restriction or limit as to numbers. This fen would make most excellent arable land; but the difficulty appears to me insurmountable as to enclosing it, and I fear it is doomed to remain as a lasting monument or evidence to show of what little value the surrounding lands would have been if left in the same state.

From Ely, through Littleport, to the banks of the Bedford River, is a fine tract of well-cultivated land; around Littleport village high land of good quality and a tract of fen land running down the river or 100-feet cut. At Welney we passed over a beautiful suspension bridge, erected at the sole charge of the Rev. William Gale Townley, the rector of Upwell. This structure does great credit to the taste of the projector. The road or causeway from this bridge to the one over the old Bedford river is three-quarters of a mile in length, and stood about 2 to 3 feet under water. This was a portion of the Washes before described. At Welney we found a continuation of the fine fen soil, but it did not appear to be so well drained as at Littleport. Between Welney and Upwell we crossed the new cutting for the Middle Level Drainage, which commences at St. German's Bridge, running to the sixty-foot drain; they are cutting it 60 feet wide, and about 15 deep; it will be 11 miles long to the sixty-foot river, which will be deepened; and this is intended also to lay dry the great meer at Whittlesea, which contains about 1000 acres. From Wisbeach to March, we passed through a district of splendid fen land, a portion of which is still drained by windmills. From March, Wimblington, and Doddington to Chatteris, the road passes on the ridge of diluvial deposits of gravel and clay. A portion of this district is also still left to the uncertain power of wind for its drainage. I must express my great surprise that land of so much value should be left to the uncertainty of this power. I feel no doubt but that in a few

years we shall see nothing but steam-engines used for that purpose.

At Willingham we observed a large tract of land partially inundated, from the want of a mill to throw off the water; the old windmill was in a dilapidated state and useless. The enclosure of this parish was going on, and it is intended to erect a steam-engine to drain the fen land of this parish. Ramp-ton parish is newly inclosed, some part of the land is a wet clay, and requires hollow draining: that which was done appeared badly executed; it wanted, I considered, a few main drains, or deep ditches, to carry off the water.

The improvement that has taken place within the last few years in this district of the fen, by a system of drainage and claying the lands, is truly wonderful. Draining condenses the land, and claying consolidates it.

In all the farm-yards you find large quantities of cattle; and the plan adopted is to give them straw in the yards, and from 2 to 3 lbs. of linseed cake per day: these are therefore only kept in good store order all winter, and sold in the spring. Those who have any high land, with good grazing ground on it, fatten them in the summer; but the greater portion of them are sold and sent into the fine grazing counties of Leicester and Northampton. The fen land does not answer well for grass, consequently but little grass land is found in the district, only on the uplands, and here we have some very fine grazing land. In the whole of this fen district the surface soil consists of a light, porous, vegetable matter, through which the water most easily percolates, until it reaches the clay; and so freely does it do so that in digging the holes for claying, the water appears to keep trickling from the pipes or hollow tubes of the undecomposed vegetable matter; as soon as you get into the clay no water oozes out, it is as if it were impervious to wet, but the water lies as in a sponge in the vegetable mould above.

The great difficulty in describing the system of cropping pursued in this district is that no regular or uniform system is adopted. They have so much natural or virgin strength, that with some farmers it appears their whole study is how to tame it down; and this they endeavour by making wheat succeed wheat, then oats, again wheat (with some), wheat again, then oats, then wheat, then seeds, then wheat, then oats, then wheat; and by this time they may have got it so full of couch or twitch grass as to be induced to give it a rest, by following the old plan; which used to be—after cropping some years, to lay it down with clover and grass seeds for three or four years; then to pare and burn, to take a crop of rape; then pursue another course or round of cropping. But this plan is fast

giving way to the practice of letting them lie only one year in layer, which is mown for hay, and the aftermath fed with sheep. The plan pursued by the best farmers of this district is to fallow with rape or turnips, to which a dressing of bones is applied; and this is quite a new feature in fen-farming, but it is found that bones answer exceedingly well for rape or turnips on this soil. The rape is fed off with sheep, and this is done without hurdles. The rape is so strong and luxuriant, and stands so high, that the sheep eat as it were their way in, the outer boundary of the rape acting as a wall or fence against them. A portion of the turnips are drawn off for beasts in the yards. Sometimes wheat is sown after rape, but generally oats, as they are fearful it should be too strong for wheat; therefore we may say—2nd crop oats, 3rd wheat, 4th oats, 5th wheat, 6th oats, 7th wheat, 8th seeds one year, 9th wheat, 10th oats or fallow.

But the period in which it comes fallow depends much upon the clean state of the land, for it is rarely that it requires rest from exhaustion. It is extraordinary how well wheat succeeds after oats; and by the system of claying, the land is so consolidated that not only very large crops of wheat are grown, but of good quality also. The great difficulty they have to contend with is in getting rid of the oats that shell out on the land at harvest time; these they endeavour to make vegetate by harrowing and dressing the land. One plan by which they might easily get rid of them is one they dare not adopt—that is, by skeleton-ploughing or by the Kentish plan of broad sharing, which would too much loosen the soil, and their great aim and object are to keep the land as whole and close as possible. Great numbers of the Irish, after having assisted in reaping the early wheats in our warmer and earlier part of the county, flock into the fens to assist them in their harvest operations: and a new-reclaimed territory like this is not yet sufficiently peopled for all the work required at the busiest periods of the year. On the uplands or skirt land they pursue nearly a similar course of cropping, but not so exhausting, as they are enabled to grow large crops of beans, of which great breadths are annually grown. Oats succeed the fallow, then wheat, then beans, wheat, oats, seeds, wheat, oats, fallow, or fallow after wheat; but they vary so much, according to the strength and cleanliness of the land, that it is impossible to describe a plan or course that is generally adopted.

*Claying.*—This is done by opening furrows in the field intended to be clayed, about fourteen yards apart, parallel to each other. The workman commences at one end by sinking a hole about five feet long, and about four feet wide: this hole is sunk perpendicularly; and when he arrives at the clay, which

varies in depth from the surface from two to seven or ten feet, he throws out about three spit, which is about three feet deep, of this clay on each side of the hole, half the clay on one side and half on the other. The vegetable matter that is dug out of the first hole is spread on the surface of the land; he then proceeds to sink holes or pits all up the furrows, about one foot from each other, so that this space thus left acts as a wedge to prevent the sides of the drain from slipping in. In digging the second hole, the peat earth is thrown into the first hole, and thus the moor or *bear's-muck* dug out of each hole is made to fill up the preceding one. The tools used for this work are—a small light shovel or spoon, with very thin sharp cutting edges, and about twelve to fourteen inches deep—a light wooden shovel, made as a scoop, for throwing out the water as it runs into the hole from the sides of the vegetable matter—and a bill or axe. And each man has on a large pair of fen-boots, which are made water-tight. Before the workman commences operations, he drives a strong stake deep into the end of the drain, on to which a strong rope is fastened, with a noose tied full of knots; this hangs down the hole and by it. When he has finished by throwing out the quantity of clay required, he pulls himself up out of the pit. But sometimes the men are compelled to do so before the work is finished, in consequence of the drains slipping in upon them. The bill is in constant requisition to cut and clear out the stumps and roots of trees, which are found just upon the fen clay; thus evidently proving that this clay was the original surface of the soil, and that the vegetable matter had grown up and risen above them. But by the perfect system of drainage now adopted, the loose fen has been so much condensed that many of the old fennemen say the clay has risen, as it is much nearer the surface now than years ago, forgetting, as they do, that it is the condensation of this loose spongy soil which has brought the surface nearer the clay.

The lands are ploughed with a very light wooden plough, with a wide breast and a very wide share, about twelve inches wide, and it is but little labour for the horses. At the head of the plough is a foot rut, made of wood, and a wide piece of wood on the end, to prevent the plough going deep; if the foot was not wide, it would cut into the soil. The coulter is a circular piece of iron plate, sharp at the edges, which revolves and cuts through the vegetable mould. The corn is generally drilled in a workmanlike manner, and I never saw wheats looking better than they did in January. Few sheep are kept in this fen country. The portion of land in clover and rye grass is mown for hay, and the aftermath fed with sheep.—Journal of the Royal Agricultural Society.—Ickleton, Feb. 22, 1846.

## THE LONDON FARMERS' CLUB.—MONTHLY DISCUSSION.

## AGRICULTURAL STATISTICS.

The usual monthly discussion of the London Farmers' Club took place on Monday, Dec. 7, in their rooms, at the York Hotel, Bridge-street, Blackfriars. Mr. Baker, of Writtle, Essex, in the chair.

The subject of discussion on the occasion was, "The necessity of an accurate system of Agricultural Statistics."

The CHAIRMAN opened the business of the evening by stating the question which stood upon the card for discussion, and informed the meeting that it would be opened with a lecture by Mr. Shaw, of the Strand, who had so often favoured them on similar occasions.

Mr. SHAW said the subject to which he proposed to call the attention of the club this evening was one of very great interest and importance to British farmers, and, in fact, to the public at large. The subject might be considered in three points of view. First, as a single return, embracing the whole surface of the country, showing the number of acres of meadow, pasture, arable, woodland, waste, and water—the quantity of crops of every description, with the number of cattle of all descriptions, made once, and not repeated for a period of years. Secondly, as an annual return for the purpose of showing the yearly produce of the land as a means by which to judge how far the supply of food grown at home may be sufficient to meet the increasing wants of the people. Thirdly, as the annual return may be used to advance the practice of agriculture by the details of the results, obtained under similar and varied circumstances. Now, of these three branches or divisions of the question, gentlemen, the only one to which I shall this evening direct your attention is the second, relating to an annual return for the purpose of showing the yearly produce of the land (hear). I feel satisfied that in addressing this club I am appealing to men whose minds are disabused of the vulgar prejudice that they can benefit by the ignorance of others in respect to the peculiar condition or circumstances attendant on their occupations or calling (hear, hear). Time was when the giving publicity to the amount of produce raised upon his farm would have been regarded by the farmer as most imprudent, being calculated to induce an advance of his rent, should it reach the ears of his landlord that he was improving his annual acreable increase—a prejudice which reared a most efficient barrier against all improvement. Intelligence has, however, I trust, dispelled this prejudice (hear). Man is described as "an animal endowed with reason;" and those who will not attend to the voice of reason will be found the exceptions to the general rule, and comparatively few in number. Ignorance is the great cause which induces a deaf ear to reason, and hence to dispel ignorance is to increase the influence of reason, and proportionably insure the obtaining of justice (hear, hear). The landlord

who is a reasonable man requires only to be made acquainted with the real value of his estate to enable him to fix that rent for its use which a tenant can afford to give. The tenant who is a reasonable man is willing to give that fair rent which is the landlord's due, and which can only be fair when allowing him, under all the circumstances, a fair return for his capital, his skill, and his industry (hear, hear). The producers of food, as a body, do not seek to obtain a higher price for their produce than the amount of expense in raising, taking into consideration the vicissitudes occasioned by seasons, blights, and the depredations of innumerable predatory insects, entitle them to; and the public, as a body, do not desire to obtain the fruits of the farmers' labour at a price below that at which it can be rendered. Want of that knowledge which affords a reasonable approximation to the quantity of agricultural produce forthcoming in any season is prejudicial to the producer; it frequently makes him a speculator without information to guide him, and which can only be regarded as a system of gambling in the dark (hear); it prevents his best and immediate customer, the capitalist, the miller, and the corn dealer, from investing his capital, or at least only to an extent to meet immediate demands. The want of this knowledge, which an accurate system of agricultural statistics would afford, gives a vast and preponderating advantage to the few over the many; it is as the advantage of communicating by the electric telegraph, compared with the now common mode of travelling by railway. The few adopt means of obtaining information not available to the many, and hence obtain advantage over them. How frequently has it happened that the farmer, believing the crop of corn of the year was short, has held his produce, and eventually sold at a reduced price, consequent upon the crop being larger than was anticipated; and again, smarting under the recollection of this, has on another occasion pursued an opposite course, but with results equally disappointing (hear, hear)! We believe that at the present moment individuals very capable of judging are of opinion that the stock of corn on hand in this country is much larger than is generally believed. Whether it be so or not is mere matter of opinion, which can be brought to no test. Had a system of agricultural statistics with annual returns been established for the last twenty years, we should have been enabled to determine with a sufficient degree of accuracy what the stock in the country actually is and know the extent of the deficiency to be provided for. (hear). Demand and supply are the great regulators of price; but whilst the effect of demand should not be underrated, the effect of supply *cannot!* (hear). The increase of demand is scarcely ever, if ever, so general as the decrease of supply, more especially as regards corn and other produce of the soil, in the raising of

which man is but an assistant to nature, the success of his exertions being dependent on influences over which he has not the slightest possible control (Hear). Commercial men are sensibly alive to the importance of statistical information, and hence we find the utmost anxiety evinced to learn the extent as well as the probable produce of the crops of cotton, sugar, coffee, indigo, &c. The probable cut of wool in Germany and Australia, and the amount of produce of tallow in Russia, are matters of great interest to persons engaged in those trades. Now, is it to be supposed that the cut of wool in England, or the quantity of tallow to be produced, to which the amount of those articles respectively imported are but trifling, can be matter of less importance to the British farmer? And here I wish especially to combat the notion, if such do exist, that information of this description may be of use to the commercial man, but of little or no benefit to the farmer (cheers). Why is it that the individual who is engaged in the several branches of trade alluded to is desirous of knowing the quantities forthcoming, but to enable him to regulate the price he may give for the respective articles? Now it must be manifest that if the question of price is of importance to the first purchaser from the grower, it must be equally so to the grower himself. It is remarkable that almost every subject connected with the existence and condition of mankind has been deemed worthy of being made the subject of statistical inquiry, except that which is the foundation, the main-spring of all—agriculture, upon which the very means of supporting life depend. Population, vital statistics with a view to the duration of life, education, the condition of the working classes, postage, railway travelling, railway accidents, criminal statistics, drunkenness, lunacy—in fact, every possible subject except the food of the people—has engaged the attention of the statist. This is inexplicable when we reflect that the exertions of the greater part of the population in this, as well as other countries, are entirely directed to the obtaining food for themselves and their families. If money value, if the amount of capital employed in any branch of trade, commerce, or manufacture, be any criterion of its importance, then must agriculture stand first and above all (hear, hear). In the year 1836 Mr. Potter Macqueen, in his book, entitled “General Statistics of the British Empire,” estimated the capital of the farmers of the United Kingdom, invested in stock and the cultivation of the soil, at 650,000,000*l.*; the increase in which in the last ten years I should be disposed to set at not less than 15 per cent., which would add nearly one hundred millions to this sum. Surely a knowledge of the annual amount of produce raised by the employment of such an immense amount of capital must be of importance to those to whom that capital belongs, as unquestionably it is to those who depend upon the successful results of the application of their capital to supplying them with food (hear)—the great body of the people (hear, hear). It may be that the absence of any severe suffering from the failure of the crops for a long period has lulled both the government and the people into security, and thus

they have not been sufficiently impressed with the importance of knowing the extent of the resources of the British Islands to supply food for the population. No arguments can be advanced to prove so clearly the necessity of a system of agricultural statistics as the debates in Parliament in the session of 1842, and that just past, when Parliament was called upon to legislate on a question, to decide upon the real merits of which that information which they could not obtain seemed indispensable. If such really be the cause of the neglect of this, I may say, vital question, the Government has, in the last two seasons, had an admonition through the destruction of the potato crop at home, and of the grain crops abroad, which they should not fail to regard, and which should determine them to take the necessary steps for obtaining that information which will enable and induce the producers of food to apply the means of increased production in other crops commensurate with the loss which we are likely to sustain, from the want of one important source of support for man, directly as an esculent, and indirectly as food for animals in producing meat. How invaluable would the information have been, had it been known in the year 1845 what number of acres of potatoes were grown in the United Kingdom, with a view of ascertaining the amount of food of other kinds which would be necessary to supply the place of that which had been rendered unfit for use! The same remark will apply to our situation this year, with the additional force that, independent of the loss by disease, a decreased quantity will have been planted, through fear of failure, and which will necessarily cause an increased drain upon other sources of food. Nor will the evil rest here, inasmuch as the supply of bacon and pork, the gross amount of which produced throughout the country by the use of the potato we have no means of estimating, must unavoidably be decreased to an extent which it is impossible to calculate upon (hear), and which must be supplied by some other article. The subject of agricultural statistics is one of the importance of which has attracted the attention of foreign governments. In Holland and Belgium, I believe, annual returns are made of the extent of the land under crops specifying the different kinds, and their probable produce. I have not been able to obtain information as to the nature of the machinery used; but persons in the various offices under the control of those governments, in every department, even down to the rural police, are so numerous as to render the obtaining returns for such a purpose comparatively easy. In France a somewhat similar system is adopted, but I have been informed that it is not to be depended upon. Of this, however, I am not certain. I find in a French paper, the *Echo Agricole*, published twice a-week, which I have taken for some years, that a return has just been made from one department, and which is stated in such terms as to induce the belief that it is an authentic document, and would lead to the inference that their system is good. In the United States of America a decennial return is made at the same time that the census is taken, and is, I understand, as accurate as the vast extent of that

nation (a very large portion being uncultivated and wild) can be. The returns in the United States are thus described in a letter which I have received from a gentleman whose position and connection with the agriculture of that country renders him a good authority. It is to the following effect:—"Dear sir,—I have your favour of this morning. You were right in your conjecture that the note which you say you addressed to me never reached me. Provision is made by the constitution of the United States for taking a census of the population once in ten years. The United States are divided into several districts, each embracing a whole State if large, or several States if small. Each district has a marshal, or sub-sheriff. The Secretary of State directs him to appoint agents and sub-agents, who visit every town, parish, and family, and make personal inquiry as to certain particulars. Blanks are furnished by the Government, ruled in lines and columns, and with printed heads indicating the topics upon which inquiry is to be made. Such, for example, as the number of persons male and female, colour and condition, whether slave or free, profession or occupation, age, or between what periods; and for one or two of the last takings of the census other topics of inquiry have been added, such as, what products are grown, or what manufactures are carried on, or what species of commerce, if maritime, the people are engaged in; and if farmers, what is the amount of agricultural products; and if manufacturing, what is the amount of each branch of manufacture. These returns are all, in due season, sent to the marshal's office, and thence to the State Department, where they are examined, arranged, summed up, and reported, and then printed by order of Congress. This is an approach to an accuracy of return; but great errors often occur. The Commissioner of the Patent-office has undertaken for a few years past to give an annual report of the condition and products of agriculture. In the year of the census you perceive what materials he has upon which to found his returns. In the intermediate years his returns are conjectural or probable, and collected only from various correspondents which he has in different parts of the country, and oftentimes mere general calculations, founded upon what has been ascertained in former years to be the general state of increase or decline, if there has been any decline. They are, of course, of very uncertain authority; but they are worth something. The pretence, however, of extreme accuracy, by giving, as is sometimes done, unit numbers or fractions, is absurd, and perhaps only tends to deceive. In the State of Massachusetts statistical returns are taken once in ten years. I do not know that this is done in any other state. The State levies a tax for the support of the government, the pay of the governor, the wages of the legislators, the support of the judiciary, and various other objects. The State is divided into towns or townships, and the tax is divided, to be levied among the towns in proportion to their property. To ascertain this, and also for the purpose of levying taxes for town expenses, such as schools and roads, and the support of the poor, assessors are appointed in each town, who go to every family to

ascertain their number and age, to every farm to ascertain their annual product, its kind and quality, and all the live stock kept upon it; and these returns are made upon blank sheets, under different heads, and returned to the secretary of state's office, where they are examined and arranged. Thus, in this State it is fully ascertained the whole number of acres, how many waste, cultivated, in wood, in pasture, in orchards, in grain, and what kind of grain, in hay, in grass for hay, in potatoes, &c., &c.; and there are obtained also from each individual farmer, as near as possible, his number of sheep, horses, cattle, swine; the number of bushels of grain, wheat, maize, rye, barley, potatoes, &c., and the number of tons of hay which he grows, with very tolerable accuracy, all of which are returned as stated to the office of the secretary of state, to be laid before a convention of persons chosen for that object, by whom, and according to which schedule, the taxes of the state are to be apportioned, and the sum to be raised by each town determined. In some cases, too, particular inquiries are ordered by the state legislature, as, for example, into the state of manufactures, when the product of each town in any particular branch of industry is ascertained very much in the same way. In one case, where a bounty was given by the state upon wheat grown, whenever the quantity exceeded a certain number of bushels, each competitor for the bounty was obliged to return in blank a return of the number of acres cultivated, the number of bushels grown, the amount of seed sown, the kind of manure used, the effects of lime and ashes, and a variety of particulars, which gave me when State Commissioner of Agriculture the duty of examining and analyzing on all these subjects no less than 3,700 returns in one year. I hope I have rendered myself intelligible. Our Government is an *imperium in imperio*; and though it may appear complex, yet when it is understood it will be seen to be simple" (hear).

In England general statistics are attracting much attention, and enough has already been done to prove their value. The establishment of a general system of registration of births, deaths, and marriages, is clearly beginning to furnish most valuable information on vital statistics. The proceedings of the Statistical Society, established in 1834, are of great value, not only by directing attention to the importance of the subject, but also through the valuable information it has already been the means of accumulating. The establishment of a statistical department of the Board of Trade is the quarter by means of which information upon all the leading subjects of import to the country at large ought to be procured. It may not be known to all present that an attempt was made in the year 1836, I believe at the suggestion, or, at all events, under the direction, of that indefatigable labourer in the field of statistics—G. R. Porter, Esq., of the Board of Trade, to try the experiment how far returns of the land under cultivation, and of the different kinds of agricultural produce raised, with a view to form the basis of a system of agricultural statistics, could be obtained. A series of questions were framed and issued from the statistical department of the

Board of Trade, addressed to the resident clergymen of the county of Bedford, 126 in number, requesting their answers thereto; the result of the inquiry was, out of the 126 addressed only 27 replied. The character of the returns made, however, prove unquestionably that there would be no difficulty in making them, but that to obtain them a compulsory power would be necessary. Several excellent papers have appeared in the *Gardener's Chronicle* on this subject, in one of which it is suggested that the Farmers' Clubs throughout the country should be incorporated for the purpose of creating them authorized bodies to make official statistical returns. I cannot, however, concur in this view, as I believe such a system would not work. So far as regards the obtaining statistical information, with the especial view to improvement in practical agriculture, I believe these institutions to be invaluable, and I think, if used for that especial purpose, they would fully work out the advantages set forth thus clearly and forcibly in the *Gardener's Chronicle*:—

“And we must not forget that the information thus collected from the results of experience over large districts is not liable to those incidental influences which may disturb the results of single and isolated experiments. A statement of the experience of twenty persons in twenty parishes is as valuable and trustworthy as that of the experience of one person twenty times repeated; on which account the suggestions of science, based on the experience of a district, will be safer and more useful than if they were founded on individual experiment or individual opinion only. A great saving of time in the diffusion of truth, which is of the highest importance, would thus be accomplished. An authentic statistic record of our agriculture would afford to men of science a source from which they would extract truths that no one could refuse to acknowledge. We should, in fact, by such means, supply them with a well of information, whose waters none would hesitate to drink. The same means which would enable science to improve agriculture, would also confer a similar ability on the *practical farmer*. They would point out to the cultivator the full extent of the riches which the soil can be made to yield, and the nature of the means which have been, and are, employed to develop the resources of particular districts. They would show him what nature can do when her energies are directed by capital and skill, agents which have in so many cases converted the morass into meadow land, the heath into harvest-fields, and the fever-breeding fens into first-rate feeding pastures. They would show him, by the evidence of facts, how an improved rotation, a fresh sort of crop, a fresh mode of managing an old one, the adoption of a new power, or the use of a new implement, has increased the produce or reduced the expenses of cultivation. They would point out what energy has accomplished; how it has enabled us to overcome natural difficulties; to remove the superfluous water from the hill and the hollow; to remedy physical imperfections of surface soils by the addition of materials which are hid beneath them; and to create fertility by the use of manures gathered from the caves of India, the battle-fields of Europe, the deserts of Africa, and the distant islands of the Pacific. They would also show him the vast unexhausted resources which the cultivator has yet to avail himself of. A volume of agricultural statistics worthy of the country must, in this manner, be of use to all classes who are connected with the cultivation of land. Containing a concentration of our knowledge and experience, it would alike instruct by its details and stimulate by its re-

sults the capitalist, the landowner, and the tenant. If the tenant should be encouraged to imitate others in improvements which he was previously ignorant of, and to make such further improvements as his own peculiar circumstances might call for, the capitalist would be taught that there is ample scope and verge enough for investment in the improvement of the uncultivated and half-cultivated acres of this country; while for speculation he would be informed that the earth-bank is of all ‘banks’ the safest—the ploughshare is of all ‘shares’ the most pleasant to hold—the manure deposit of all ‘deposits’ is the most certain to afford a ‘return;’ for interest upon each of these is secured by the strongest of all ‘bonds’—the bond of gratitude, which binds mother earth to return to her children full recompense for the exertions used in her service. The landowner would learn an equally valuable lesson—that his estates are valuable to him in proportion as skill and capital are employed in their cultivation; and that, therefore, in giving his tenant equitable terms and liberal tenure, he is giving him the power to improve.”

In order, however, to establish an accurate system, so that the return may be relied upon as correct, I feel persuaded that it must be a government measure, and compulsory upon the parties as the population returns are (hear, hear). However gentlemen, as I said at the commencement of my observations this evening, my object is merely to throw out a few ideas upon this subject, with the view of eliciting a discussion, by practical men like yourselves, upon a question which I hold to be of the highest interest and importance (cheers). I have here a number of the *Statistical Journal*, which contains the questions which were sent out by the Board of Trade into the county of Bedford, which might form the basis of what we want, although I incline to the opinion that they go too much into detail. If you go too much into detail you incur a vast expense and complicate the returns (hear). The simpler the plan, the better to commence with; and advances can be made in the increase of details as you find your system of operations becoming better understood. (hear). With a view to place the subject in something like a practical shape before you, I shall propose a resolution to the effect—

“That, in the opinion of this meeting, an accurate system of agricultural statistics would be highly beneficial:—

“First, because it would show how far the British soil was capable of producing a sufficient supply of food to meet the demands of the population.

“Secondly, that it would show the annual increase in the amount of agricultural produce.

“Thirdly, that in seasons of deficient harvests it would indicate the probable amount of deficiency, and thus prevent undue speculation in foreign grain, to the injury as well of the farmer as of the importer.

“Fourthly, that it would enable both the landlord and tenant to form an opinion whether there was a growing demand, and thereby determine to make an outlay in improvements to meet it; and.

“Fifthly, that in the case of failure of crops, as of the potato crop in the last two years, the deficiency might be readily ascertained, and consequently the amount of food required to replace the deficiency more easily and promptly provided” (loud cheers).

Mr. SMITH (of Rutlandshire).—In France, I believe, they have a system of agricultural statistics which answers very well.

Mr. SHAW (of the Strand).—No: they are like



some of the American returns, rather speculative than accurate statistical returns, and cannot be relied on (Hear). I have in my hand a French paper which I received only last Friday, and which contains a return put in a very official form, for the department of the Eure-et-Loire. It assumes that the produce of that department for the year 1846 is ascertained, and it is presented in a shape and form which show that some sort of machinery must exist; but a gentleman, who has been a good deal in France, and has seen the way in which these returns are made, tells me that it is quite impossible that you can place any dependence upon them. This arises not from any impracticability in the matter, but merely because the French people do not give that attention to details and figures which is necessary for the purposes of statistical accuracy (Hear, hear).

The CHAIRMAN.—Gentlemen, you will excuse my rising so soon, but I wish to make a few observations upon this important subject (Hear). I feel we are very much indebted to Mr. Shaw for having on various occasions directed our attention to such matters, and I am quite sure that, considering the position in which the agriculture of England is at present placed, there never was a better opportunity upon which to fix for the purpose of carrying out a system of statistical details than now (Hear). We are all aware that, in connection with the recent introduction of the new tithe laws, nearly the whole of England has been accurately surveyed, and therefore I think we might obtain, in the different Poor law unions, the information we require. I look to the unions as the best sources from which to obtain this information, and I think from them it would be easy to obtain a return of the number of acres of land in a state of cultivation in England and Wales. The first thing we should look to is that which is most essential and important, namely, to ascertain the cultivable acreage of land in England—the number of acres of grass land, and the number of acres of waste land in England at the present time (Hear, hear). We should then issue a circular, and appoint a day for making these returns towards the end of July or the beginning of August. The inhabitants of each parish might be called together, and there make the return required of the number of acres of grain then growing, and the number of acres of land then brought into cultivation. This might be handed over to the board of guardians, and by the guardians forwarded to the government. By adopting this plan, I think an accurate statement might be obtained (Hear). The reason why I think this mode is perhaps the best, is that farmers are always rather jealous with regard to the question as to how many quarters they grow to the acre. However they may boast over their glass as to the number of quarters of corn per acre which they may have grown under particular circumstances, farmers have a natural antipathy to making their affairs known (Hear, and a laugh); and therefore I think that if we could obtain the number of acres under cultivation in each parish, I presume we should ascertain, through the

board of guardians, the number of quarters produced, better than by an individual return from each parish. This is a mode which I have thought of as most likely to succeed; and with so simple a machinery I think there is no doubt it would. We should have nothing to do but to fix a particular time for its being done. One or two days, I presume, would be quite enough for this purpose; and if we had the number of cultivable acres, I think we should not be far off the number of quarters of corn grown (Hear, hear). Mr. Shaw has certainly given this subject a great deal of attention, which I have not until to-night; for as Mr. Shaw had to bring it forward, I did not think this necessary. But although I have not done this, it has, to some extent, occupied my attention, inasmuch as I have been in communication with a gentleman who has been employed in the government, for the purpose of advising with the leading men of the day upon this subject, and the suggestions which I have thrown out are, in point of fact, his. He is at present drawing out some papers which are to be submitted to competent persons, for the purpose of being put into operation to effect the object which we are now seeking (Hear, hear). I shall not offer any further observations, gentlemen; for all we have to look to is the machinery necessary to accomplish our object. With regard to the necessity of the information there is no doubt (Hear). We are told that we have a largely increasing population, and that unless we have increased means of growth, that population cannot be fed upon the production of our own soil. In answer to this, the farmers reply they are in a position to show that they can grow food enough for the increasing population if they have that encouragement which they ought to have (Hear, hear). It is asserted by some that this cannot be done. Now, if you do nothing else by means of this statistical information, you will at least settle the question upon this disputed point, namely, whether or not the quantity of corn grown in this country goes on increasing in the same ratio as the population does. This is a point of the utmost importance, and I can only say that I hope there may be gentlemen present who have turned their minds to the subject, and may be ready to give us their views upon so important a matter (Hear, hear).

Mr. BEADELL.—I do not think, gentlemen, that there can be the slightest difference of opinion upon the importance of this subject, and therefore that part of the question is at once disposed of (cheers). But the other part of the question, namely, how it can at once be brought practically into operation, is another consideration (Hear, hear). Mr. Shaw has suggested that the only means of accomplishing this is to make it compulsory—and that there is, in fact, no other way out of the difficulty, and in this I entirely concur. With regard to our worthy Chairman's proposition that it should be done by the Board of Guardians, the only difficulty on that point is, that you would get a return made by the farmers themselves, a return upon which you could not depend. We shall never get the thing properly done until the Government sees the import-



ance of the matter sufficient to induce them to appoint proper persons to collect this statistical information, perfectly independent of the persons interested in making them (Hear, hear). If you go into the country, you will find the farmer will not tell you how many acres he grows, or how many quarters per acre; and therefore to make your return of any value, it must be obtained by parties who are perfectly distinct and perfectly independent of those who are the producers of the corn (hear). If you get inaccurate returns, you will not derive half the advantage which you would from correct statistical details; in fact, unless they are correct, such returns are worse than useless (Hear, hear). With regard to calling upon the guardians to perform this duty, we know they are not very liberally rewarded for what they do already, and I think they would soon begin to fancy that they were not particularly called upon to do this new duty; and if you made it obligatory upon them, they would take the shortest cut to obtain the information, taking it from the first who might choose to bring it. The system could not be properly carried out except by persons who were responsible for the performance of such duties, and they must be paid for it (hear). As Mr. Shaw stated, out of the 126 persons to whom the notice had been sent in Bedfordshire, only 27 made a return to it.

The CHAIRMAN.—But in that case the making of a return was not compulsory (hear).

Mr. BEADELL.—No; but how can you make it compulsory unless you have responsible officers?

The CHAIRMAN.—You have the number of acres ascertained already, and the division whether arable land, grass land, or wood land; and therefore you have only now to ascertain with regard to the number of acres of arable land whether they are sowed with wheat, barley, oats, or other grain. In order to insure a correct return, you might impose a penalty on persons making a false return, as is the case in many other matters, and then the parties whose duty it was would take care to be tolerably accurate. If the Board of Guardians or Churchwardens could not be depended on, why some other officer might be called in, or some person might be appointed upon whom the task should be fixed, to state the number of acres of corn which the parish grew.

Mr. BEADELL.—The great difference between you and me, Mr. Chairman, is this, that you would leave the matter to the Board of Guardians; and I would appoint three, five, six, or seven statistical collectors for each county, as might be found necessary (hear). I quite agree in the propriety of making use of the Board of Guardians as far as available; but what I wish is that the return should be the return of the officers appointed, and not the return of the Board of Guardians (Hear, hear).

Mr. JAMES WOOD, of Sussex.—For my part, Mr. Chairman, I have a very great objection to having a number of collectors riding over the country as proposed by Mr. Beadell; I regard them as peculiarly vexatious, and think we have quite a sufficient number

of such overlookers already without adding to their number (hear, and a laugh). I want nothing of the kind. I for one, gentlemen, am not very fond of paid commissioners (Hear, hear). With regard to the number of acres of land cultivated in each parish, and how those acres were cultivated, I do not see that the Board of Guardians or Churchwardens could take any unfair advantage in making a return; for a farmer having made his return to them, if there were anything suspicious in it, his neighbours would inquire into the matter: they would say, "Why so and so sows so many acres of this, and so many acres of that," and look into the thing; but if paid officers were going over the farms, why they would not think it worth their while to say whether the return were right or wrong (Hear, hear, and a laugh). For my own part, I think it much better that people should make a voluntary return, with regard to their own land, than that there should be a compulsory return to Government-agents. We know that many farmers do not keep very accurate accounts of what they grow, and therefore, having to make a return for statistical purposes, would be an advantage to them. Generally speaking, those who know what the land is, and what it will produce, could settle the matter much better than persons coming from a distance; and I do not see that they have much motive for withholding the truth (hear). I think that by the means I am contemplating you would in a short time get as accurate a return as by any other, and avoid the adoption of that obnoxious mode of sending round persons in the inquisitive manner which has been proposed—as the phrase is, it would "go down better" than the other way (Hear, hear). I therefore think that the proposition of our excellent Chairman very much to the point (hear). I feel very much the value of Mr. Shaw's speech on this point, and I perfectly concur with him in thinking that it is absolutely necessary that we should show by statistical statement (for that is the only proof) that this country is quite able to maintain the increasing population—any increase of population—of this country (Hear). I am an advocate for increase of population ("Hear," laughter, and cheers). I know perfectly well that there are not sufficient agricultural labourers in my district, and it is very desirable that their numbers should be increased (Hear). It is also very desirable that the agricultural labourers should be greater consumers of manufactures than they are at present—(Hear)—and until there is an increase of population among them, that will not be the case (Hear, hear). I am for making matters more even by making the agricultural classes greater consumers. We are quite capable of increasing the production of this country to the extent of maintaining double the population which now exists (cheers). As far as I am a judge of these matters, I should say that the soil of this country is capable of maintaining a population of sixty millions instead of thirty millions (Hear).

Mr. TURNER (Devonshire): I have not, Mr. Chairman and gentlemen, much studied this question; but

I quite agree in the proposition that nothing but compulsory means will effect the object which we have in view (Hear). I think that this is quite clear; that for the thing to be done properly and satisfactorily, it must be done by the Government of the country (Hear). If the Government can get statistical statements upon other subjects, why not upon these? If the churchwardens and overseers were compelled upon oath to state the number of acres of wheat, peas, beans, &c., grown in their parishes; surely they might, and would, as well do this as make a return upon any other subject. If this plan were adopted, I think it would be found to answer; but with regard to half-a-dozen men going over the country, I am disposed to think, with Mr. Wood, that that would not do; and as to voluntary returns, I do not think you could depend upon them (Hear, hear).

The CHAIRMAN: Mr Wood quite coincides with my views, I think.

Mr. BEADELL: The only objection to the plan, I think, is, that you entail the duties upon persons who are perfectly inefficient. If you take the churchwardens, you will frequently find that they are the tradesmen of the town: now, what do they know of farming? ("Hear," and a laugh). You are, moreover, entailing upon them an additional duty, for which you ought to pay them. If you wish to have the duty performed by them, do so; but pay them for it (Hear). For depend upon it, that if you have your information for nothing, it will be worth just what you give for it, and no more ("Hear," and laughter). In most parishes you will find the overseers perfectly incompetent to the task. You will find that the overseers are ironmongers, tailors, or shoemakers: now what is the use of sending them? Why, you will just get what you don't want; namely, the farmer's own return (Hear).

The CHAIRMAN: When I mentioned the guardians or overseers of the poor, I meant the persons in the parish most competent to the performance of the duty. All I say is, let the persons most competent be appointed to the duty (Hear). If for these returns the Government were to furnish printed forms, and certain persons were compelled to attend and fill them up, there would be no difficulty about the matter. The system would very soon come to act as perfectly as machinery; and like multiplying wheels, would begin with the units, advancing to the tens, and so forth, until the required returns were furnished (Hear, hear). Let two fit persons be appointed to each parish, and it surely would be very easy in agricultural parishes to find persons competent to such duties (Hear). There never was, perhaps, an occasion on which the necessity of agricultural statistics had been so clearly demonstrated as during the period of the past harvest; all the computations had been wrong; the most competent judges had, in fact, overrated the wheat crop this year (Hear, hear).

Mr. BEADELL: Your system would get the information from interested parties; that is my objection to it. The farmers would say, "We must not return

this too high, or we shall have to pay the jail-rate upon it" (Hear). Oh, I have heard this said on more trifling occasions.

Mr. FISHER HOBBS: Mr. Chairman and gentlemen, I cannot allow this discussion to pass without putting in my *veto* against the assertion of Mr. Beadell, that the farmers would not make correct returns (Hear, hear). For my own part, I am in the habit of mixing very much among farmers; and I think they would make much more correct returns than paid officers. I see no difficulty at all in getting from the board of guardians an accurate return of the acreage: if they were once appointed to the duty, the responsibility of making a correct return would rest with them (Hear). My plan would be to instruct the parish officers to send round circulars to every occupier of land; similar, in fact, to the mode adopted now in the election of guardians. My own opinion is, that parties would make a very impartial return of the quantity of grain grown. Many members of the board of guardians being in the habit of travelling about from one market to another, would be able to make a return as to ten or twenty parishes out of a union, and few unions consist of less than thirty parishes. Persons thus in the habit of going over their unions would, in my opinion, be more capable of making such a return than any other class of individuals; and although this might entail expense and some little responsibility, yet, when it would be for the public good and beneficial to the industrious classes throughout the country, I feel persuaded they would take it upon them (Hear, hear). I do think this would be the simplest and best mode of carrying out our plan, and one which might be fairly recommended. I think at the same time, gentlemen, that we ought not to rest here, but that we ought to ascertain the feelings of our representatives upon the point, and endeavour to get the subject taken up in the House of Commons (Hear).

Mr. BEADELL.—It is all very well for Mr. Hobbs to *veto* my observations: it is perfectly correct that he should do so if he thinks proper, but I beg to say that he has represented what I did not say—or at least did not mean. I did not intend to suggest or propose that you should take persons out of Bedfordshire, for instance, to collect agricultural statistics in Essex (Hear, hear). What I mean to say is this, that you will not get statistical returns for nothing, or that if you do, they will be worth just what you give for them (Hear, and a laugh).

The CHAIRMAN.—There are various returns of land tax, property tax, and with regard to the highways; and are we to infer, because those returns are not paid for, that they are not correct? (Hear, hear).

Mr. BEADELL.—If you use the board of guardians, their labours should be concentrated; but I am still of opinion that returns, to be depended on, must be made by individuals appointed for the purpose.

The CHAIRMAN.—I have no objection to the returns being made by a regular board, but I only suggest that the board of guardians should be the channel through which they were made.

Mr. BEADELL.—If you mean to have a regular board which you pay for the collection of these statistics, why that is all I am contending for. We are all agreed upon the point that great benefits would arise from having an accurate system of agricultural statistics, if it can be carried out; but I don't think that it is any part of the object of the present discussion to show the way in which that can be done.

Mr. SMITH (of Rutlandshire).—This is the first occasion upon which my attention has been immediately addressed to this subject, therefore I have not had much time to consider it; but in my mind it is a very important subject; for when we look to the manufacturing and agricultural improvement of this country, we must perceive that the farmer, the merchant, and the consumer, equally require to be in possession of statistical information (Hear, hear). The first and most necessary thing for them to know is the produce of the soil. We read in various works the number of acres of land in wood, in waste, and in grass, but I am not aware that there is any work in existence which gives us the number of acres in cultivation (Hear, hear). I can inform you, gentlemen, that this subject has been mooted in Rutlandshire by Mr. Stafford O'Brien, M.P.—who is, as you know, a firm and staunch friend to the farmer (cheers)—and he is ready to go forward with the subject in Parliament. We are, therefore, in safe hands, as far as the House of Commons is concerned (Hear, hear, and cheers). As to the working out of the subject, it has certainly struck me that the plan must be compulsory, and with the Government (Hear, hear). As to managing the matter through the churchwardens or boards of guardians, or even a board of paid commissioners, I do not think that would answer. I should wish that a board be established for each county, and that one person or more be appointed in every parish or village, whose duty it should be to collect the information, and return it to the central board of the county (cheers). There is another point of importance in this question, and that is the period which you select for going round and making the survey or report: the result would depend entirely upon the time at which you set about it (Hear). For instance, as has been remarked, the wheat crop was this year altogether over-estimated (Hear, hear). You will see therefore, gentlemen, that it is of great importance as to the time at which the statistics go round (Hear, hear). I fully agree with Mr. Shaw in the expression of the opinion, that this is a subject which ought to be grappled with at once (Hear). We are sometimes told out of this room that we are next to drones, that we have not stepped forth in defence of our own rights and interests (Hear). But I tell those accusers that we have come forth, and that we will assume the tone and character of “a class,” and get from under the bushel (cheers). Our policy at the same time will be to go step by step in our forward course, and endeavour to see that we place the matter in hands stronger than our own (renewed cheers). Let us no longer be accused by the manufacturers of having no returns (Hear, hear). If we look back for

a period of fifty years we shall find the population of this country very considerably smaller than it is at present. The people are, nevertheless, better fed and more cheaply; we have, therefore, beyond a doubt made great national strides in agriculture, but there is yet much necessity for improvement (Hear, hear). The Royal Agricultural Society, the Smithfield Cattle Club, and the railways have brought about improvements which will, in the end, prove great blessings (Hear). I think, however, as this subject has been taken up by Mr. Shaw, who is always first and foremost in advocating the cause which he deems for the good of his fellow-man, that a board might be formed which would become a positive national good (Hear, hear, and cheers).

Mr. SHAW (of the Strand).—I stated at the first, that my object in bringing this question forward was merely to direct your attention to its importance (Hear, hear). It appears to me that of the number present in this room almost all have had their attention, more or less, directed to it and their minds working upon it; but all will agree that however much individual minds may have been at work, the subject is not yet fairly brought before the public (Hear, hear). Now you will recollect that this time last year there was another subject which I brought before this club, namely “tenant right,” which attracted a great deal of attention, and has been discussed at many local clubs, and which is making great way as regards principle; in fact, there is scarcely a local club in England which will not in the course of the next year have discussed it (Hear, hear). I merely mention this to show that the same results may arise from the opening out this question, and that my object is to get it before the country, not merely individual minds but the public mind. What I want is to get men to co-operate; in short, to make it a public question (Hear, hear). I scrupulously and purposely avoided saying anything of the mode or machinery by which this object was to be carried out. For I did not think, and do not think that the public mind is ripe for the machinery, unless indeed the government sees its way. All, therefore, that I wanted to do was, to direct the discussion into such a channel as should lead to a full and fair consideration of the subject itself, rather than to the mode of carrying it into operation (Hear, hear). I have had some communication with persons whose attention has been given to this question; and I know that for several years past various modes by which it might best be carried out have been under the consideration of gentlemen connected with Her Majesty's Government (Hear). I know that the mode mentioned by our excellent chairman has again and again been considered by these individuals, and that they have not yet been able to come to the conclusion that any machinery at present in existence will accomplish the object; but that machinery must be purposely constructed for it, although it may be costly (Hear). The conviction that agricultural statistics must be put upon a sound basis has come home strongly to the minds of many persons of late (Hear, hear). I believe

a very large and influential body of the members of the House of Commons who were at one time opposed to a system which would show the actual amount of native agricultural produce, are now prepared to take the lead in carrying it out (cheers); and that those individuals who once were prejudiced against such returns are now prepared to co-operate with the advocates of a system of agricultural statistics, who have hitherto laboured under considerable difficulties from the peculiar views which their opponents took of their objects, regarding them as mere visionary, political economists (Hear, hear). They have now, however, come over to our ranks, and are ready to help us in providing the machinery necessary to obtain that information which is so highly important in reference to the producing food for the population of this country (Hear, hear). I believe we have only to agitate the question to obtain what we desire; and very little agitation will be necessary if the body of large and intelligent farmers such as I see here to-night will take up the subject, and show that they are really desirous of getting a proper system of agricultural statistics (Hear). There are persons who would be glad to have your support in accomplishing this important object (Hear, hear). I feel that I need scarcely say anything more than to repeat that I scrupulously avoided referring to the description of machinery which should be adopted, because, on a question upon which there are so many different views, a discussion upon that part of the subject would be endless (Hear); and when we are arrived at that point that all we want is the machinery to enable us to accomplish what we have in view, our object will be accomplished. I hope that at all your different local clubs and societies you will broach the question whenever you have an opportunity, in order to ascertain the feeling upon the subject. If the practical farmers of England (for they are the persons who will be most listened to) will take up the question, their doing so will be the most ready step towards its attainment. I do not know that anything could so opportunely have shown the necessity of such a system than the prejudice and ignorance which existed during the last year upon the subject of the actual state of the crops, and which have been the cause of inducing the speculators to ransack all parts of the world for corn which may or may not be wanted—a species of ignorance which I regard as a national disgrace. Now this would not have been the case if there had been any means of ascertaining what the real acreable produce, and the precise state of the harvest were, for we have already a tolerable knowledge of what the consumption is (Hear, hear). With these observations, gentlemen, I shall conclude, and once more read the reasons which I have already adduced in favour of a system of agricultural statistics (Hear).

The resolution, with the reasons for the adoption of an accurate system of agricultural statistics, as given above, having been proposed and seconded by Mr. TURNER and Mr. HOBBS,

The CHAIRMAN put the question, which was carried unanimously.

Mr. TURNER moved a vote of thanks to Mr. Shaw

for the able manner in which he had brought the subject before them (cheers), and said that that gentleman had always taken the lead in everything that could be useful to the agricultural body in this country (Hear, hear).

Mr. BROWNE seconded the motion, and said, from what he had heard to-night, he was more than ever convinced of the necessity of a system of agricultural statistics (Hear). He had for many years tried to ascertain what quantity of corn could be produced, in order to enable him to answer the assertion, "You cannot grow corn enough in this country to support the people" (Hear). It was certainly most desirable that they should know in what position they stood with regard to the question of being able to feed the people of this country. (Hear). It was most important that all the land which it was possible to be brought into cultivation should be cultivated, first for the purpose of supplying food for the people, and secondly for the purpose of affording employment to the labourer (Hear, hear).

Mr. SHAW returned thanks for the honour done him, and said that in his exertions on behalf of agriculture he did no more than his disposition inclined him to do, and he should be at all times ready to do whatever might be in his power for the cause (Loud cheers).

The meeting then separated.

It will be seen by the report of the proceedings at the dinner of the Smithfield Club, that two elegant silver wine-coolers were presented by his Grace the Duke of Richmond, the President of the Club, to Mr. Brandreth, as a slight testimonial for his services as Honorary Secretary of the Club for the space of seven years, and also as Director of the Country Shows of the Royal Agricultural Society. Mr. Brandreth's address to the meeting was received with those hearty and universal marks of approbation which, whilst they are creditable to the Club, could not fail to be gratifying to him. His brother, Mr. B. T. B. Gibbs, the present Secretary, follows in his brother's footsteps, and will, we doubt not, earn the well-merited approval of the Club.

It will be seen that his Grace the Duke of Richmond, in reply to a deputation which waited upon him in reference to a testimonial proposed to be presented to him, stated that he wished "that any fund to be raised as a testimonial to himself should be used as the foundation-stone of an institution for the relief of farmers reduced by adverse circumstances." When the subject was first mooted, we suggested that the local Agricultural Protection Societies had it in their power to carry out the proposition in a manner which would be creditable to themselves and worthy of his Grace. We hope the hint will not be lost sight of by them.—Mark Lane Express.

The silver medal presented to the largest purchaser of stock from the Smithfield Cattle Show of the past year has been awarded by the committee to Mr. Banister, of Threadneedle-street, purveyor to Her Majesty.

## THE FARMERS' CLUB.--ANNIVERSARY DINNER.

The anniversary dinner of the Farmers' Club took place on Thursday, Dec. 10, at Radley's Hotel, Bridge-street, Blackfriars, and proved in every respect a bumper. The chair was filled by Mr. George Turner (a celebrated and well known breeder of Devonshire stock), and was supported by the following gentlemen: Mr. R. Smith, Burley; Mr. H. Overman, Weasenham; Mr. W. F. Hobbs, Mark's Hall; Mr. G. Emery, Banwell; Mr. R. Baker, Writtle; Mr. J. C. Nesbit, Kennington; Mr. G. P. Tuxford, London; Mr. S. Boydell, London; Mr. J. Blackstone, Harrow; Mr. J. A. Ransome, Ipswich; Mr. J. Meehi, Tiptree Hall; Mr. W. Hutley, Powers Hall; Mr. W. Bennett, Lewsey; Mr. J. Lattimore, Hertford; Mr. John Gedney, of Redenhall; Mr. J. Oakley, Darland; Mr. C. W. Johnson, London; Mr. Henry Trethewey, Bedfordshire; Mr. R. B. Harvey, Harleston; Honourable Mr. Wilson, Alexton Hall; Mr. E. Ball, Burwell; Mr. J. W. Jones, Chastleton; Mr. Tyler, Layton; Mr. R. B. Smith, Huxley Farm; Mr. W. Shaw, jun., Northampton; Mr. J. Wood, Cuckfield; Mr. W. Shaw, Strand; Mr. Lewis, Hertingfordbury; Mr. W. Bell, Bucklesbury; Mr. W. R. Browne, Chisleton; Mr. W. Cheffins, London; Mr. J. Hare, Nelson Square; Mr. E. Lawford, Leighton Buzzard; Mr. T. Mount, Saltwood; Mr. H. Muggidge, St. Andrew's Hill; Mr. E. Lovegrove, London; Mr. G. Bell, jun., Watford; Mr. E. Purcer, Bridge Street; Mr. G. Parsons, Lambrook; Mr. T. Umbers, Wappenbury; Mr. T. Wakely, Raynham; Mr. T. Grainger, Cheetham Grange, &c., &c.

Honour having been paid with every demonstration of loyalty to their majesties the Queen and the Queen Dowager,

The CHAIRMAN said that in proposing "The health of Prince Albert, the Prince of Wales, and the rest of the Royal Family," he could not refrain from observing that they were particularly called on at the present time to do full justice to the toast, not only because His Royal Highness the Prince Consort had done everything in his power since his arrival in this country to endear himself to the subjects of the crown, but from the fact of his having become a prize farmer (cheers). He (Mr. Turner) hoped that before long His Royal Highness would become a pattern farmer (hear, hear).

The toast was drunk with enthusiasm, and followed by that of the "Army and Navy," after which

The CHAIRMAN rose to propose the toast of the evening, "Success to the Farmers' Club" (cheers), and in doing so begged to call attention to the nature of such institutions. If he had considered agricultural societies of importance twenty years ago, and if at that period he had lent his humble aid to promote them, how much more strongly convinced must he now feel that he was then right in his opinion when he found that from them—from, he might

say, the Smithfield Club, had sprung the Royal Agricultural Society of England, together with those local clubs, all of which, taken conjointly, had rendered more essential services to the country than a whole race of politicians (cheers). And why did he consider them of such essential service? Because he had observed that greater improvements had taken place in agriculture since their formation, or, at least, within the last ten years, than within double that number of years previous to their being established. Another most gratifying result springing from those societies was that noblemen and gentlemen of the first rank had come forward at public meetings, and declared that the relations between landlord and tenant required to be improved, and that from such improvement the greatest benefits might be expected to flow to society in general. Who, ten years ago, ever heard of such men announcing to their tenantry that the time had arrived when timber should be cut down, better farm buildings erected, and a more enlightened system of cultivation adopted? It would be idle for him to occupy their time by further pointing out the advantages which those institutions had conferred upon agriculture, and consequently upon the community at large. He would therefore only request of them individually and collectively to use their best exertions to uphold and promote them, and above all, to be careful, as the Farmers' Club was regarded as the beacon whereby other clubs might be warned and safely guided, not to allow anything to go forth from it that was not in strict conformity with science united with practice (hear, hear). He begged most heartily to drink "Prosperity to the Club."

The example of the Chair having been readily and warmly adopted by the whole company,

Mr. SHAW (of the Strand), on being called upon to respond to the toast rose to do so amidst loud cheers. He was exceedingly happy, he said, to hear those cheers, as well as to observe, on the present festive occasion, so full a table, and so many cheerful faces around it, because he could not otherwise than regard such demonstrations as directly indicative of the utility of the Club. He was sure they all appreciated the character of their Chairman (Hear, hear), and that they would follow the admonition he had given them to do all in their power to support and advance the institution. It was not the parent of all the clubs in the country, but he hoped to see the time when it would be the point of concentration for all, and when it would give to the entire machinery a unity of purpose capable of producing results such as might be looked for in this enlightened age from the farmers as well as from other classes of the community (Hear, hear). The Chairman, who in a few words said a great deal, had touched upon a subject which was just now attracting the public attention—a subject which he (Mr. Shaw)

had very much at heart, which had been considered and discussed by that Club, and by many of the 170 local clubs throughout the country—which he believed to be making as much progress as any subject of interest to the farmers could, but respecting which he feared there existed in the mind of one important class some serious misapprehensions—that subject was “tenant-right” (cheers). At the first dinner of the Club after its formation, they were honoured with the presence of a landed proprietor; but as on that occasion he (Mr. Shaw) as Chairman had some difficulty in repressing an ebullition of feeling not quite in accordance with their rules, he feared that something had then occurred to prevent the gentleman to whom he alluded from again conferring upon them a like honour. He had not attended any of their dinners since, but he was amongst them now (cheers), and he was sure they would hail his presence with gratification, as a proof that after a temporary absence he could still meet and agree with them (cheers). It was quite impossible to suppose that the question of tenant-right and the opinion entertained upon it by the Club could have escaped his notice, and he therefore regarded his attendance amongst them that day as a sufficient proof that he was a convert to the question; that was to say, to a settlement of the question upon a sound, fair, and proper principle (Hear, hear). It had come to his (Mr. Shaw's) ears that there was something in the title “tenant right” which was not liked, but that in point of fact the principle was not objected to. Now, he cared not a fig what it was called: he asked for the principle (Hear, hear). What he meant by “tenant-right” was, compensation to the tenant for improvements; that if he had no security of tenure, and lost his occupation, he should be remunerated for his unexhausted improvements. He only asked for fair terms with the landlord. He knew that there existed an apprehension that the tenants wanted to set up a right by which they might extort something from the landlords (cries of No, no). They repudiated the charge, as would every tenant in the kingdom, because they sought only for that security for the capital they embarked in the cultivation of the soil, which the landlord enjoyed from the soil itself, and to which they were just as much entitled (hear, hear). They were all aware of the large sum which was vested in land in this country; but he would beg to remind the owners of that land that there was a sum approaching to 800,000,000*l.* belonging to the tenantry of the country, invested in its cultivation. Was it not just as fair that that capital should be protected as the capital that was vested in mills, in factories, in mines, &c.? And if so, how could it be expected that the tenant-farmer would rest contented to have his capital placed at the will or the beck of any man, however good that man might be (hear, hear)? They were blessed with many landlords under whom they might be proud to hold land upon a yearly tenancy; but who could give security for the life of those men? or who could promise that their successors would tread in their footsteps? He repeated,

then, that the tenant should not be placed in the position or even in the danger, however remote, of being bereft at a moment's notice of all he possessed. He was extremely happy to observe that amongst the highest in the land there were now to be found men of that opinion. Lord Talbot had declared that a person who would take a farm without a lease must be out of his mind. The Duke of Rutland observed lately at an agricultural meeting that, owing to the nature of the tenure—namely, life estate—the landlords of France complained that they could not improve their property. How, then, he would ask in the name of the tenantry of England, could they improve on a tenure for *one year*? He (Mr. Shaw), having been instrumental in bringing this subject into public notice, must say that his creed upon it was this—that “tenant-right” could only be carried out properly and fairly when it involved mutuality of contract, equally binding and equally profitable on both sides (hear, hear). He felt perfectly confident that all that was necessary to obtain “tenant-right,” was to make the landlords perfectly acquainted with its meaning and intention. If they could once make it intelligible to them he was convinced that they would not only admit its justice, but candidly acknowledge that it would benefit themselves. As there was nothing like exemplifying theory by practice, so did he always point to the county of Lincoln when he spoke upon the subject of “tenant-right,” and in particular to the estates of Lord Yarborough, the tenants under whom cultivated their land just as well and with as much confidence as if they had a twenty-one years' lease, because they knew that they would be repaid the value of all their unexhausted improvements, in the event of their being displaced; and if the same security existed all over the country, by means of “tenant-right,” there was no reason for doubting that the same results would follow, and that all England would be as highly cultivated as Lincolnshire, pronounced by Mr. Pusey to be the best cultivated county in Great Britain. He was thus explicit on the subject because the gentleman to whom he had just now alluded as a landed proprietor was amongst them, and he was anxious to set himself and the club right before him, and to let him know that they had not met there that evening for the purpose of benefiting themselves at the expense of any other class (hear, hear). He was also desirous of informing those not in the habit of attending the Club, that the question would shortly be discussed in another point of view, viz., as to how far “tenant-right” would act beneficially to the interest of the landlord. They had already dealt with one side of the question, and now they intended taking up the other side, at the discussion of which he hoped they would be favoured with the presence of those landlords who should hear of it, and also with the presence of the hon. gentleman beside him (the Hon. Mr. Wilson). He was satisfied that the more that hon. gentleman heard, the more he would be convinced that they had no desire to diminish or impair the property of any landlord, and sought only that degree of security which would suffice to protect their own (Hear, hear). While

he (Mr. Shaw) rejoiced that the Club was not retrograding, he must at the same time admit that between the periods of their annual meeting in that room they did not make that rapid progress which they ought, and which the opportunities afforded by their meetings, to gentlemen in the country, of intercommunicating with each other and discussing questions of mutual interest, might attain. The chairman had asked them to do their best to support this Club. He (Mr. Shaw) would exhort them to do so by using every effort to stimulate the local clubs of their respective neighbourhoods, and induce them by discussions on questions involving the practice of agriculture, or on such a question as "tenant-right," to carry out the principle upon which they were established. Let this be done, and he was sure that no long time would elapse before the improved condition of agriculture, keeping pace with the intelligence of the age, would place the farmers of the United Kingdom high above those of any of the nations of the earth. They might meet with untoward circumstances, they might have difficulties to encounter, they might have enemies to overcome; but he relied upon that elasticity of character which appertains to Englishmen and to that indomitable spirit which increases as the necessity for it becomes greater, to enable them to overcome all obstacles, and finally attain that proud position (cheers). He thanked them for their patient hearing; rejoiced to see the club so well supported, and hoped to meet them all again on that day twelvemonths (cheers).

Mr. BAKER (of Writtle) rose to propose a toast, and having expressed his gratification at meeting so large and respectable a body of agriculturists, proceeded to show how such societies had advanced according as their usefulness and efficiency had become more and more apparent. While others were forming themselves into clubs for their own interest, the great body of the agriculturists were without a single point of union. They had, if he might so express himself, no staff to lean upon, and it was to supply this want that the Farmers' Club had been instituted. With a wider range had been established the Royal Agricultural Society, giving rise to the offering of prizes by men of the highest talent and station in the kingdom, and thus creating a competition of the value of which they were made acquainted through the Society's publications. But that was not its only good; it had most convincingly shown the advantages to be derived from uniting science with practice. Practice had, no doubt, done much for agriculture, and was of great value, but practice with science was mighty; and for that reason the general advancement of the science of good farming was never so apparent as under the auspices of the Royal Agricultural Society. Practice was a combination of facts—facts which were adduced by one generation and handed down to another, like learning communicated without the use of letters; and which it was, therefore, difficult to analyze without the aid of science. Science, on the other hand, stood in need of facts to prove its laws; and to think of becoming a good farmer by the study of chemistry, geology, or any other science, without the aid of practice,

would be like teaching a boy the art of navigation without sending him to sea. Science without practice, therefore, could do no good; they must be united. The value of unity, then, had been fully proved by the Royal Agricultural Society; and he was sure he required no stronger justification for proposing on the present occasion, "Success to that society" (cheers). He also felt satisfied that they would permit him to associate with the toast the health of one of those gentlemen who had been most instrumental in founding it—to the advancement of the agricultural classes and the glory of England—he meant Mr. Hobbs (Hear).

The toast having been drunk,

Mr. HOBBS took occasion to express his thanks, not only for the present compliment, but for the honour which had been conferred upon him in electing him chairman of their club for the ensuing year. He was no longer a tenant-farmer, but that would not make him a less unflinching advocate of the agricultural interest, or a less warm supporter of the tenant-right (Hear, hear).

Mr. OVERMAN proposed, after a few appropriate remarks, "Success to the Smithfield Club." There never was a time when the existence of a club calculated to encourage a good breed of animals was more necessary than the present, when the market was thrown open to foreign competition. He had no fears for the result; believing, as he did, that the perseverance and undaunted courage of the gentry of England were as little likely to be overcome on the banks of the Thames as upon those of the Sutlej.

Mr. SMITH responded to the toast, as steward and representative of the Smithfield Club. He assured the meeting he was fully alive to the importance of the question which had been so forcibly introduced to their notice by Mr. Shaw, and which he believed to be uppermost in the minds and hearts of the tenantry of England. He had also to observe with pleasure, that he found amongst landlords a growing disposition to pay attention to the subject; and he was on that account the more gratified to learn that in future discussions upon it the rights of landlords as well as of tenants would be considered. The subject of draining was likewise one of great importance, and he hoped it would not be overlooked.

The Hon. Mr. WILSON, who was very warmly received, rose to propose a toast, which, as they were well aware, could not emanate from the chair. It had fallen to his lot, and he discharged the duty with the greatest possible pleasure. He was not personally acquainted with the gentleman whose name he was about to introduce to their notice, but had long known him, from his attendance at the meetings of the Royal Agricultural Society, as a zealous supporter of agricultural interests, and a successful breeder. If he needed anything further to recommend him to their notice, it would be the able and affable manner in which he had presided over them that evening (cheers). It might be asked why, as a farmer's club, he was present on this occasion. His answer was, that he had been in the habit of associating with farmers from his earliest



childhood (hear, hear), and that he had ever seen the disadvantages that arose from landlords not being intimately acquainted with the details of practical farming, and the wants of practical farmers, and from not being able of themselves, without the intervention of their agents, to give encouragement to do that which was right, or to recommend a contrary course when that which was about to be done was wrong (hear, hear). He had attended meetings of the farmers with the greatest pleasure, and had ever been treated at them with the greatest respect. In pursuing that course, he at least trusted that he was one amongst his fellow-landlords, who were desirous of carrying out the principle of "Live and let live" (cheers), as the principle most conducive to the interests of landlord as well as tenant. Indeed, he had ever maintained, through evil report and through good report, that their interests were identical (cheers). It was said that there was no pleasure without an alloy, and on the present occasion the saying was manifested in his person, inasmuch as he had deeply to regret the observations which had been made by the gentleman on his left (Mr. Shaw), in reference to his taking offence at something that was said at their first dinner, absenting himself from their subsequent meetings, and attending the present as a landlord who had been converted to the principle of a tenant-right. He was sure those observations must have originated in a mistake, because he was one of those who were the first to join a farmers' club as a means of concentrating the general opinions of the farmers of the kingdom, and of uniting into one strong bond of union the identical interests of farmers, tenants, and landlords (hear, hear). That mistake was probably owing to a remark he had made to Mr. Shaw, half-an-hour ago, namely, that he objected to the term "tenant-right," although he agreed in the principle. For very many years he had had the management of considerable property in three counties; and during the entire period, embracing nearly half a century, he had never given an agreement or alteration of an agreement without placing at the bottom of it that the tenant should be allowed for all his unexhausted improvements (cheers). He felt that a meeting of comparative strangers was not the place for introducing the details of personal management in such concerns; but, having been so directly alluded to in connection with the question of "tenant-right," he was sure he would be excused for having done so (Hear, hear). He felt also that he was somewhat justified in mentioning that, when his friend Mr. Bennett, at the end of the table, informed him, yesterday, at the Smithfield Club, that the question of tenant-right would, he had reason to believe, be fully discussed at their afternoon meeting at three o'clock, he declined to attend, lest a landlord's presence might not be acceptable. Mr. Bennett observed that they would be much obliged by having his views upon the subject, and he therefore put off every other engagement in order to be present, prepared as he was to defend the principle of "tenant-right" upon the high ground of the responsibility which attached to the great landowners of the kingdom for the manner in which they conducted the

management of their estates; because, as they were all well aware, one of the greatest blessings in this great kingdom was a resident gentry, who, acting as magistrates, controlling what was wrong and encouraging what was right, must have a great national effect upon the moral and physical condition of their poorer neighbours (cheers). He was ready to enter into the question upon these high grounds; upon the lower grounds of self-interest to both the parties concerned, and also upon the ground of the pleasure and the satisfaction which a landlord must feel, placed in his high position, from seeing around him an assembly like the present, ready to state their views, and openly and fairly to consult for their mutual interest. What was the object of their meeting? Why, to produce the greatest possible quantity of food for the use of the nation, at the least possible expense compatible with a full and fair remuneration to the occupier for his time, talent, and capital, and without deteriorating the property of the landlord; that he might leave to his successors a happy and a prosperous tenantry, and that he might rejoice, as many of them could, that the families of his tenants had been longer in occupation than his own (cheers). Upon that point he would say no more. He rejoiced at seeing so large an assembly on the present occasion, because they could meet there without the fear of any disagreement upon party or political subjects (Hear, hear); and because he had found, from the experience of the past, that when there was a want of union amongst the farmers, the interests of the tenantry of the country, no matter what the Government, were never sufficiently attended to. Such, he well remembered, was the case during the discussion upon the malt-tax; because they had then no rallying point, or society, to go to, and could not, spread over the country as they were, bring their sentiments into one focus, and press them upon the minister, whoever he might be. Different counties made different demands; there was no union amongst them, and they therefore failed. On the other hand, the towns were united—the towns clamoured—the towns were heard—the repeal of the beer-tax obtained, and the farmers thrown to the wind. This was why he had supported, and ever would support, meetings of this kind. But there were other points which were neither of a party or political character, and would have to come under their consideration, such as the county-rates and the poor-rates (Hear, hear). He had, upon several occasions, felt it his duty to lay before members of both Houses of Parliament various calculations and statements showing that those burdens fell upon the farmers in the most unjust and oppressive manner (Hear, hear). He thanked them for their patient hearing, and could assure them it would be one of his proudest feelings if he could think that by his attendance at the Farmers' Club he had contributed in the slightest degree to the welfare of the tenantry of England.

The toast having been drunk in a bumper, and with three times three, and the Chairman having returned his grateful thanks for the compliment, with the assurance that they could not have a chairman more sincerely devoted to their cause,

Mr. SHAW asked permission to give an explanation



of what had fallen from him, and what he feared had been misunderstood by the Hon. Mr. Wilson. What he intended to say was this, that Mr. Wilson having honoured them with his attendance at their first Dinner, and not subsequently, he was afraid that the *brusquerie* which occurred upon that occasion had, as it was perhaps calculated to do, given some little offence, or caused some degree of displeasure to that hon. gentleman; and that, whether such was the fact or not, he was much gratified now to see him amongst them. He meant the remark to be entirely complimentary; and he thought the Meeting had reason to thank him for it, since it gave rise to so valuable an address as they had just heard, and above all to the declaration that he was the advocate of "tenant-right," that he thought the owners of the soil responsible for the management of their property, and that landlord as well as tenant ought to be actuated by the principle of "Live, and let live." It was certainly worth a great mistake to hear such sentiments enunciated by that hon. gentleman (cheers).

The CHAIRMAN called upon Mr. Lattimore to propose the next toast.

MR. LATTIMORE said that he had great pleasure in submitting to the meeting the toast entrusted to him, which was, "Prosperity to the Local Farmers' Clubs in the Kingdom." (Cheers.) Previous to this evening, when many practical and really valuable remarks had been made, he was disposed to think that that society, which had been termed the "parent society," had much to learn from some of the local clubs, in the mode of discussing topics vitally important to the tenant-farmers in the kingdom. (Hear.) He would allude especially to the Harleston Club, in Norfolk, where he had met with such demonstrable proofs of the utility of these organizations as to raise his conviction of their value. (Cheers.) He was happy to see the chairman and secretary of that club now present. (Cheers.) There appeared to exist some doubt as to the topics which should be discussed at these meetings; but, for himself, he believed that a *bona fide* farmers' club ought to have no fears in discussing any subject vitally important to their interests and welfare. (Cheers.) He rejoiced that the subject of "tenant-right" had been broached that evening by Mr. Shaw, and he was also glad to hear Mr. Wilson connect the word *responsibility* with landlord duties. (Cheers.) That great philanthropist, Mr. Wilberforce, said "that God had never made man who was not fit for freedom." Now, he asked, Were the tenant farmers of England to be the only exceptions to the rule? (Loud cheers.) Human nature was similarly constructed all over the world. The physician ceased to subscribe, the lawyer to advise, and the soldier to fight, when all hope of payment ceased. (Hear, hear.) Could it then be expected that the tenant-farmers alone would put forth their energies, and exercise their skill and capital without a prospect of reaping the fruits produced thereby? (Hear.) They well knew that they did not at present possess such security, and that a hair-suspended sword hung over their heads, ready to fall upon them either by caprice, accident, or the various vicissitudes to which human life is subject (hear). For himself, he never wished to place any man, or body of men, in a position savouring of injustice or unbecoming their position as *free* men (cheers). But what he demanded on behalf of the floating capital employed in the cultivation of the soil of this country was a "legal recognition," and security equal to that now enjoyed by the landowners (cheers). He felt confident that public good would accrue from the State throwing its man-

tle of security over that large, and now unrecognised, amount of capital, and to none more than to the landowners themselves (cheers). Uncertainty was the bane of good cultivation, and this was exemplified in Turkey, Persia, and all over the world (hear). In Turkey, the Koran forbids taxation; but arbitrary contributions are levied at the caprice of the governors of provinces, and no man is certain but that his property may be seized without notice. What is the result? Why, the lands contiguous to Constantinople, the capital of the kingdom, although naturally fertile, are left in a barren state (hear). And we must not forget that *two-thirds* of the arable land in the United Kingdom are in a very partial state of cultivation, owing to the want of security to the cultivators (cheers). Responsibility rested upon them as standing between the landlords and the labourers (hear); also between them and the public in the supply of food; and it was their duty to make known their requirements in order faithfully to fulfil their duties to all classes of the people (cheers). If they should hesitate to discuss such important subjects, it appeared that another Society (consisting of stewards, land-agents, and land-valuers) did not shrink from doing so, having observed a string of subjects for discussion at their meeting at the Old Bell, Holborn, on Monday, Dec. 14. With their permission he would read the list to them. Mr. Lattimore then read a copy of the resolutions reported in the *Mark Lane Express*, Dec. 7. In the 4th resolution, he thought great ingenuity would doubtless be exhibited by the members of that society; but if the farmers possessed legal security for their property, as he had before stated, these gentlemen would be spared their labours upon that point. He alluded particularly to the 6th article, and appealed to the meeting, amidst considerable applause, as to whether they were willing to resign all discussion upon these important subjects to a body of land agents, possessing such tender sympathies for the *rights of the soil*? (No, no! and loud cheers). For his own part, he thought he had never met with more cool assurance or confident assumption than was displayed in that document (loud cheers). And he would state that if the tenant farmers of England were disposed to submit their interests to the arbitrary disposal of that "Junta" (which he could not believe), then they would deserve their fate, and would sink in the estimation of the community (cheers). They had tried all remedies but legal recognition without effect, and what was the result? The papers were daily teeming with cases of injustice and oppression (such as that of Mr. John Bankin, of Uppminster, Essex, detailed in the *Daily News* of Saturday last); and others were so familiar to them that they ceased to create surprise (Hear). Let them learn from the example set them by this society, and discuss all subjects relative to their interests, and unite with determination to seek redress for their grievances, to which they were justly entitled (Hear, hear). He, Mr. Lattimore, would frankly confess that he had been jealous for the honour and true interests of the tenant farmers of the kingdom, and anxious to see them occupy their natural and legitimate position, and exercise their political independence (cheers). And if he knew himself aright, all his actions had aimed to promote that great object (cheers). He called upon them to prove worthy of the times in which they lived, and the important position they now occupied (Hear). He fondly hoped that the historian in relating the important events of the 19th century, the progress of civilization, the mighty triumphs of steam, railroads, and manufactures, may also be able to insert upon the page of history, that the agriculturists of the country, moving with the age, came forth, and demanded that security for their property and occupation, which destroyed the landmarks of ancient feudalism, and established an enlightened system of agriculture, which might

well become a model to the world (loud cheers). Thus they would be enabled to contribute to the advancement of the physical, social, and moral welfare of the community, and add to the lasting glory and happiness of their country (enthusiastic cheering). It was with these feelings that he now submitted to them the toast, "Prosperity to the Local Farmers' Clubs throughout the kingdom" (great applause).

The toast having been drunk with marked enthusiasm. Mr. TRETHERY briefly responded.

Mr. BALL (who was called upon by the Chairman) said, that more than eighteen years ago he had united with the Hon. Mr. Wilson and other gentlemen to accomplish those objects for which the Farmers' Club had been established, and which he sincerely hoped to see it realize. He was, therefore, in a position to speak of that hon. gentleman's merits, and could honestly declare that to no individual were the farmers or the country more indebted; for as long as he had known him he had used the most constant and unceasing efforts to maintain unity between landlord and tenant. Mr. Ball then proceeded to notice the meeting which had taken place at Norwich, and which, he observed, Mr. Cobden had been engaged to influence, by attempting to prove that advantages would flow from depriving them of their protection, and from putting landlord and tenant at variance with each other; but on being reminded that that was a subject which savoured too strongly of politics (there being a general cry of "No politics" throughout the room), explained by stating that he was merely desirous of pointing out how injurious it would be to them to suffer a feeling of distrust to be generated or disunion to be created between landlord and tenant, thereby weakening their power for good, and separating them from the interests of the land. However, he could pursue the subject no further than by declaring his belief and conviction that the interests of the owner and the occupier of the soil were identical, and that it was only by keeping them so they could hope to obtain the objects for which they were associating. He had now to recommend to their notice, and as worthy of an expression of gratitude for their services, those gentlemen who constituted the Committee of the Farmers' Club.

Mr. EMERY, in returning thanks (after the toast had been duly honoured), said that nothing more strongly convinced him of the benefit of such societies than the observations that had fallen from the Hon. Mr. Wilson. He quite agreed with him, that without them nothing, with them everything, could be obtained: that what this wanted, and what that society had been endeavouring to bring about since its foundation, was a unity of feeling between landlord and tenant; because it was evident that no legislative enactment could ever effect that which was only to be accomplished by personal intercourse between the two classes (hear, hear).

Mr. BENNETT, in proposing "Success to Agriculture, Manufactures, and Commerce," said that the farmers had but one wish upon the subject, and that was to go side by side with all the varied interests in the country (hear, hear). They did not want nor desire to get into the boat and upset others; but they felt they should be wrong if they did not feel that they were as deserving of riding safely to shore as the rest (hear, hear). They

only wanted to be safely piloted over the ocean of life on fair open and honest terms (hear, hear). They had been told by Mr. Lattimore that one of the subjects to be discussed by the Society of Land-Agents, &c., was "Is the failure of the potato crop a partial good or a positive evil?" He would unhesitatingly say that it was a great good (a laugh), because it had produced something like a right feeling in the community, as regarded the importance of the agriculture of this country (cheers). The doctrine had been promulgated not long since, that this country must be equally independent and great if there was not a sheaf of wheat grown on the land. He would not stop to argue that question at so late an hour of the evening, but he must say that he really knew not whether he should most condemn its gross extravagance, its wanton absurdity, or its foolish wickedness; such a declaration in the sight of Heaven as that, a country which did not care to possess the necessaries of life within it, might be just as prosperous as if it did (Hear, hear). When such absurdities as that were attempted to be palmed upon the people, he could not but rejoice that a slight failure in the potato crop had given rise to a much sounder feeling respecting the agriculture of the country. Even those very men who had been guilty of them were turning round to the farmers, and saying, "There is going to be a scarcity of food; for God's sake cultivate—cultivate—cultivate!" (cheers, and laughter). If that was the result, if a right impulse had in consequence been given to the public mind, he hesitated not to say that the potato failure was a great blessing to the country (cheers). To the sentiments uttered by Mr. Shaw, Mr. Lattimore, and the Hon. W. Wilson on the subject of tenant-right, he subscribed most heartily. It was quite a mistaken notion to suppose that the farmers contemplated taking away anything from the landlords which they were not entitled to possess (Hear, hear). He had been long in the habit of closely observing the landlords of England, and he could aver (there were, no doubt), as in all general cases, exceptions) that they were not more dignified in rank than they were in demeanour, and in all the social qualities of life. But it did not at all meet the case, that even such men should say that the tenant-at-will who invested his capital in the soil was entitled to just remuneration; because the uncertainty of human life, or the chance of the property passing into other hands, might render such a promise wholly nugatory, the tenant being all the while in the agony of doubt. Time did not permit, or he should be happy to enter into the question much more largely. But it certainly was a most mistaken notion on the part of the landlords that could induce them to take fright at the term of "tenant-right." Now, a peer of Parliament said to a friend of his, "We see that the tenant does not possess a sufficient security for his capital; and if your clubs will associate together, and frame some proper provisions for a bill, which all can consider fair and just as between landlord and tenant, I will do my utmost to carry it through the upper House" (cheers). He believed the opposition of the landlords was a mere mis-

take, arising out of the fact that they really did not know what the tenant-farmers of the country proposed. He wished the landlords to know that the tenant-farmers did not propose to take from the landlords a single shilling (hear, hear). They did not even go the length of saying that the landlord was bound to grant leases. He might let his land from year to year if he liked that better. They did not attempt to say that a man shall not do what he likes with his own; they merely went upon the principle that he shall not do what he likes with the property of another (hear, hear). There were doubtless many men in the country who would scorn to take advantage of the tenant's improvements, and it was his good fortune to live under such a landlord. But, as he had already observed, that did not meet the case. The late Duke of Bedford had declared in 1830 that the tenant property of the country was not sufficiently protected to warrant the cultivation of the land to its full extent; and he hoped that the Government would soon see the propriety of taking up this important question. In advocating a "tenant-right," he therefore wished it to be understood that he cast no reflection whatever on the landlords of the country. With regard to manufactures and commerce, he had only to say that he hoped they would derive all the benefit which had been anticipated from the new circumstances in which they were placed, and in which it was determined that they should be placed. He would also hope, and venture to predict, that the day would never arrive when the agriculturists of the country would seek any advantage which they had no right to seek, or which they could only obtain at the expense of mercantile men, and the commerce of the kingdom (hear, hear).

The toast having been readily received and honoured by the company,

Mr. MECHE was called upon to respond to it. He said, that connected as he was with the manufactures and commerce of the country, he was fully convinced that they were inseparably connected with agriculture, and that you could scarcely do an injury to the one that would not be felt by the other. His only surprise was that a contrary notion could have ever existed. The more food they were blessed with by Providence the more universal was prosperity in the country. The manufacturers were good customers to the farmers, and the farmers to the manufacturers; but each were liable to be influenced by any marked change in the condition of the other—making it obvious that their interests were not, as they were often said to be, separate and distinct. But manufacturers had got the start of agriculture in bringing to its aid the use of science. By the application of steam-power, the manufacturer could now do at an expense of 4d. or 5d. what with horse-power used to cost between 2s. and 2s. 6d. Now, although our mode of agriculture had been much improved, it was still in a very unsatisfactory state. One fact alone would show it. The farmers of England were with one hand paying about £1,500,000 for the refuse of birds, and with the other throwing away by wholesale another species of manure which was far more valuable and more

easily had, and for preserving which in the metropolis he was glad to perceive a sewage manure company had been incorporated. As one of the council of the Royal Agricultural College, he was happy to bear his fullest testimony to the advantages which agriculture was likely to reap from the mode in which the students were there instructed. Much had been said about the necessity of practice; but if they could only get science to take practice by the hand, there was not much danger of either losing their way (Hear, hear). He was convinced that much remained to be done in the science of agriculture, and that the higher they farmed, having regard to a sovereign returning twenty-one shillings, the better it would be for the labourers, the farmers, and the country at large.

Mr. NESBITT proposed "The Visitors," and expressed his concurrence in the views of Mr. Mechi, believing, after having been some time engaged in the instruction of youth, that agriculture would never fare as manufactures had done, until tested by the full approbation of science (Hear).

Mr. HARVEY (of Harleston) responded to the toast. He gave it as his opinion that, although he by no means underrated the results which agriculture might derive from science, more speedy results would be obtained from urging indifferent farmers to adopt the best known systems of cultivation, than by pressing science on the best cultivators.

"The health of the Vice-President," was the next toast proposed; and Mr. Hutley, having expressed his acknowledgments for the compliment, the company (at half-past eleven o'clock) retired, well satisfied with the evening's proceedings.

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### TENANT-RIGHT.

At a meeting of the Holm Cultram and District Farmer's Club, held Wednesday, December 2, after an adjourned discussion on "tenant-right," it was unanimously resolved:—

1st. That it is the opinion of this club that it would be advantageous to both landlord and tenant, as well as the community at large, that the tenant farmer, in the absence of a special agreement to the contrary, should have a legal claim to compensation for improvements on his farm made by him during his tenancy, for the outlay of which he has not been reimbursed at the time of quitting.

2nd. That it is desirable that arbitrators chosen by the parties should have authority to determine the sum to be paid by the landlord for improvements, or received by him for dilapidations; and that, for that purpose, the farm of an incoming tenant should be viewed by competent persons at the time of his entering.

3rd. That the tenant ought not to be entitled to remuneration for new buildings or fences, if made without the consent of the landlord.

## ANNUAL DINNER OF THE SMITHFIELD CLUB.

The anniversary dinner of the Smithfield Club took place on Friday, Dec. 11, in the great ball at the Freemasons' Tavern. At half-past four, the Duke of Richmond, president of the club, took the chair, and about 250 members sat down to a substantial repast, which appeared to give general satisfaction. A military band attended in the gallery, and played several popular airs during the dinner, and in the intervals between the speeches.

It will be perceived that the ordinary proceedings of the club on these occasions was somewhat diversified by the presentation of a testimonial to Mr. Brandreth, who has recently resigned the office of honorary secretary.

The dinner was attended by many of our leading agriculturists, amongst whom, in addition to the noble chairman, we noticed the Earl of Warwick; General Wemyss; P. Pusey, Esq., M.P.; Colonel Sibthorpe, M.P.; C. Hillyard, Esq.; Hon. H. W. Wilson; J. Wood, Esq.; Mr. Frewin, M.P.; Mr. Elman; Mr. Jonas Webb; Mr. Samuel Webb; Mr. Bennett; Mr. Trinder; Mr. J. Stephens; Mr. Hall; Mr. J. Boothe; Mr. T. Twitchell; Mr. F. Hobbs; Mr. Painter; Mr. Sandy, &c.

The cloth having been removed, the healths of the Queen, the Queen Dowager, Prince Albert, the Prince of Wales, and the remainder of the Royal Family, were drunk with great enthusiasm.

The CHAIRMAN then proposed "The Vice-Presidents of the Smithfield Cattle Club," and coupled the toast with the name of Mr. P. Pusey.

MR. PUSEY, M.P., in returning thanks, said he could only be entitled to the honour as a constant attendant at their dinner. As an active member of the club, or a contributor to their shows, he felt that he had no claim to their notice. He belonged to a class which he feared was not very popular amongst farmers—the class of book-farmers. He was, however, glad to find great improvement amongst book-farmers. Their object now in attending meetings of agricultural societies was not to teach farmers, but to induce farmers to teach them. They had endeavoured to raise up a school of practical writers; and if there was anything in their proceedings he looked at with satisfaction, it was that they had succeeded in doing so (Hear, hear). He would only give them one instance. They would recollect that a prize was offered by the Royal Agricultural Society for the best account of the farming of Cambridge. That prize was won by one well known to most of them, Mr. Jonas, of Ickleton, near Saffron Walden (cheers). His paper on the subject was one of the best they had had in their journal; and he thought that any statements on the subject must receive great additional weight, when it was known that the writer kept an arable farm of 1,600 acres in a ring fence (Hear, hear). When such a man told them what they ought to do with their turnips, it was something very different than if coming from a person who only farmed in his garret-window (Hear, hear).

He wished to turn for a moment to a subject on which he addressed them last year, and which continued to increase in importance and in the attention paid to it—he meant that of "tenant-right." He told them then that he was drawing up some agreement on the subject which he could send to his tenants. Since that time he had done so, assisted by Mr. Almack; and he was glad to say that the result exceeded his anticipations.\* Indeed, one of his tenants was so anxious to commence building, that having himself a salutary dread of bricks and mortar, and indeed all expense above ground, though he thought they could not spend too much on draining, he was obliged to prevent his doing so. He was convinced the subject of the "tenant-right" was the life or death of practical agriculture (cheers). He could not then enter more upon the question; all he could say was, that he trusted before the club met again, it would make some decided practical progress (Hear, hear). In responding to the toast, he could speak of the club with impartiality, for he had never entered into competition, but as Englishmen were wont to do, he looked at its practical results. The club had been established forty years; and when they were assailed as they had been, he would ask, Had they, or had they not, during that time, improved the breeds of animals in this country? (cheers). They had three breeds of cattle—the short-horns, the Herefords, and the Devons; and he did not believe that any breed in any part of the world could compete with either of them. The same might be said of their sheep and pigs. If, then, they had thus succeeded, was it not a pretty good argument that they had set the right way about it? (Hear, hear). He would only add, that to obtain a higher state of perfection, it would not do for the club to relapse; for if they should withdraw encouragement from the breeder, his efforts would relapse, and the breed would be sure to fall away. The honourable gentleman sat down amidst much cheering.

The award of prizes was then read by the chairman, and the prizes distributed.

The CHAIRMAN then proposed, "The Successful Competitors in Cattle," and called upon the Earl of Warwick.

The Earl of WARWICK briefly returned thanks, and said he thought it had been truly stated that the breeder of stock was entitled to the first award. Having accidentally gained a prize at a local society, he had since always sent to their exhibition any thing he might find in his stock worth sending, and, whether successful or not, he should continue to do so. His own feeling with respect to stock was, that quality should be their first object. They should remember that in a few days all London would be partaking of

\* The agreement referred to will be found in the number of the *Farmer's Magazine* published on the 1st of November last.

it; and if the Londoners did not find its quality good, depend upon it they would care very little for its symmetry (Hear, and laughter).

The CHAIRMAN next proposed "The Successful Competitors in Long Woolled Sheep," and "The Health of Mr. Painter," observing that the animals that gentleman exhibited were well worthy the character he bore of an honest English yeoman.

Mr. PAINTER, in returning thanks, said he had attended these meetings many years, and had received about fourteen medals. He hoped to live to come again; but he would say no more, for he could feed sheep better than make speeches (cheers and laughter).

The CHAIRMAN next proposed "The Successful Candidates in Short Woolled Sheep, and Mr. S. Webb, of Babraham." They had heard something of "tenant-right," but he would tell his friend, Mr. Webb, he hoped his tenure of this prize would not be a lasting one, but that he should beat him before long (Hear, hear).

Mr. S. WEBB briefly acknowledged the compliment.

The CHAIRMAN next proposed, "The Successful Competitors in Pigs," with "The Health of the Earl of Radnor."

Mr. MOORE, his lordship's agent, returned thanks.

The CHAIRMAN then proposed "The Health of the Unsuccessful Competitors." He would tell them, for their encouragement, that several years passed before he could get the slightest commendation from the club; and he remembered the late Earl Spencer telling him that he had seen his flock when visiting him, but had not thought them so bad till he saw them in the show-yard of the Smithfield Club. He hoped they would follow his example, for instead of going home and abusing the judges, he went home determined to make his stock worthy of their prizes (Hear, hear). He gave the unsuccessful candidates present great credit for their courage in coming to witness the triumph of their competitors. There might have been some excuse for their staying away, but there was none at all for the others. He knew there was much difficulty in getting any one to respond to the toast, but he hoped some of them would have English blood enough to do it; and if he might presume to make a speech for them, he would suggest to them to say, "We are obliged to you for drinking our healths. We will try to do better, and if you don't mind we will beat the best of you" (cheers).

No one rising to respond to the toast, the Chairman called upon Mr. Hillyard, who he said was not indeed an unsuccessful competitor, but something a great deal worse, since he had not shown this year at all. All he could, therefore, ask of him was, that he would express the feelings he would have had, if he had been an unsuccessful candidate (laughter).

Mr. HILLYARD said he had been in the habit of returning thanks both as a successful and an unsuccessful candidate, but as an old man he wanted some better stimulus than the wine (port) he had before him. Had it been champagne he might have been able to talk to them, for that set up an old man like him better than anything in the world. But, however, he

needed not champagne to enable him to assure them that he would do everything in his power for the club. They knew that he had devoted much attention to crossing the breeds of animals. His friends said he would never get on with it, but when he was sure of that he would give it up. He thought, however, that if he could produce sheep worth as much in Smithfield as any other, always excepting the Southdowns, it was worth trying for, and that he should be doing a benefit to the country. He believed he should show them the best cross produced in this country—a cross by a short-horn cow out of a Scotch bull (roars of laughter). At any rate, they would admit that was a *bull* of his own making (renewed laughter).

The CHAIRMAN said he now rose as President, and by desire of the members of the Smithfield Cattle Club, to present a testimonial of their respect to Mr. Brandreth, whom they had long known as their hon. secretary (cheers). He must say he felt gratified in being asked by the committee who got up this testimonial to be the medium of communication between them, because he had long had the advantage of personal acquaintance, and he believed he might say of friendship, with that gentleman. He had seen his great exertions in their cause, and he thought that it would be the greatest gratification in his life when he received the acknowledgment of them which the members of the Smithfield Club and of the Royal Agricultural Society of England, not as societies, but as individuals and practical farmers, now felt it right to present to him. They must be aware that the duties of secretary to a club such as that he was now addressing, must be very arduous. They must be aware of the number of applications made to him, and how necessary it was that such a situation should be filled by a man of honourable, honest, and upright principles. This testimonial would prove to him how highly they appreciated his services, and he believed also that in resigning his offices and retiring to reside in the country, Mr. Brandreth would only be the more convinced by it that acts of favour or kindness to the farmers of England would never be forgotten by them (Hear, hear). He believed they were grateful to the heart for the services Mr. Brandreth had performed, and in their name he would wish him all health and happiness, with the fervent hope that, in retiring from London and commencing a rural life, he might long enjoy the sun rising, the sun shining, and the setting sun (loud cheers). His grace then presented Mr. Brandreth with the testimonial, which consisted of a pair of splendid silver wine-coolers, with the inscription:—

"Presented by the members of the Smithfield Club and of the Royal Agricultural Society of England, to Humphrey Brandreth, Esq., as a mark of their respect for him, as well as their appreciation of his unwearied and valued honorary services rendered for many years to these institutions."

The toast having been drunk upstanding, with three times three,

Mr. H. BRANDRETH, in returning thanks, said he was aware they paid him this compliment for the humble services he had rendered them in former years as secre-

tary of this club, and as director of the Royal Agricultural Society of England. He had tendered those services because the objects the societies had in view were in accordance with his own inclination; but, nevertheless, they had a right to demand that, in conferring those offices upon him, he should exert himself every way in his power for the advantage of the institutions. When he accepted office as secretary of that club, he admitted that he thought the business of it had not been conducted as efficiently as he could wish, and particularly as regarded their exhibitions. He had, therefore, several conferences with their noble president on the subject, who, though at first he doubted the propriety of removing from the neighbourhood of Smithfield, was still convinced that the time had come when a change ought to be made. Accordingly a sub-committee was appointed, which succeeded in obtaining the desirable premises where for the last seven years they had held their show. Having obtained this important point, he had the opportunity of carrying out his own notions of the business of the club—with what success their kindness that evening had convinced him. If, however, he had failed, he could truly say it would not have been for want of good-will. He could also conscientiously assure them that during the whole time he held office he had endeavoured to do justice to every exhibitor (cheers). He took the liberty on the present occasion of laying stress upon this point. It had been said by some that he had strained the bow too tight in his adherence to the rules, instead of accommodating individuals. He admitted that he had endeavoured to adhere strictly to the rules, and he did so from a conviction that it was useless to have rules unless they abided by them (Hear, hear). He felt that he should not have been fit to hold the responsible office they had placed him in if he had allowed any feelings of private friendship or inclination to turn him in favour of any particular individual. Those who took an active part in the proceedings of the club, and were aware of the jealousies amongst many exhibitors, would agree that their secretary, as the Duke of Richmond had stated, ought not only to be an honourable man, but that in his conduct he ought to be above suspicion (hear, hear). With regard to the Royal Agricultural Society of England, he would not detain them. He had done by that society, as by this club, his best; but he could not help on this occasion expressing his satisfaction, when looking at the advantages derived from that institution, to think that it had originated in the parlour of that club. There were only three persons present; he was one, the late Earl Spencer was another, and the third was Mr. Shaw, of the *Farmer's Magazine* (hear, hear). When he took office, he neither expected nor desired any other testimonial than their kind will and good wishes, with consideration for the imperfect manner in which alone he could perform his duties; but as they were pleased to desire that he would accept a more tangible demonstration of their kindness, he felt he should not be treating their liberality with the respect it deserved if he did not accept it, and with thanks. He accepted their kind present with the feeling, indeed, that it was

not deserved, and the knowledge that it was given for what he had endeavoured to do, and not what he had done. He would place it with his family plate as a memento to those who might follow him that one who had gone before them had earned the esteem and friendship of the agriculturists of England by endeavouring to do his best in their service (hear, hear). Mr. Brandreth concluded, amidst much applause, by proposing "The Health of the Chairman, the Duke of Richmond."

The toast having been drunk with enthusiastic cheers,

The Duke of RICHMOND said he could not plead that he was unused to receive marks of their approbation, because from the time he left the army to the present day, he had felt that to support the agricultural interest was supporting the best interests of this great country. He had not words to express the feeling of gratitude which he entertained towards the great body of the tenantry of the empire. His services on their behalf had not been successful, and he felt that they were inefficient; but they were kind enough to take the good will for the deed, and he would venture to say that no man could ever point to any period of his life when he had attempted to oppress any individual in the country, or had been backward in endeavouring to ameliorate their condition, were they commercial, manufacturing, or belonging to the landed interest of the country (cheers). He objected to those who, in the present day, attempted to divide them into sections. He believed the interests of England—and he would stand up for them to the last moment—could only be properly served when all classes in the country were united in one bond of union. He belonged to the agricultural part of that body, but he was willing to do his best, inefficient as he might be, to promote the welfare of all classes of her Majesty's subjects (cheers). They were fellow-subjects and fellow-men (hear, hear). He would not speak of politics, which were there rightly and properly excluded, but he would say this, that the only way to legislate was to legislate for the nation at large. He owned he thought the agricultural interest was of the greatest importance to all. He believed no class could be prosperous unless agriculture was flourishing, and he thought that great improvement might yet take place in agriculture. He was delighted that so much improvement had already taken place. They were told that the Smithfield Club produced beasts not fit for the use of man—that in doing so they lost a great deal that would be useful, and that they ought to dissolve, as they rendered no assistance to the country. He objected not to these attacks; he rather rejoiced at them. They brought the question before the public, and to the judgment of the public he was content to appeal. He was not one of those who object to the expression of honest opinions: far from it; he courted inquiry, and he wished those men who said they had done no service to visit the great markets of the country, and see whether the stock had not much improved since the establishment of that club (cheers). What the club wanted to do was to show to

the farmers of England the animal that had the greatest kind of aptitude to fatten. They cared not whether it was a certain weight or no; the aptitude to fatten was the quality which, as well as they could, was sought after by the judges. He remembered Earl Spencer saying they could not fatten one of the cross-bred animals in five years; whereas, by getting a beast of breed and symmetry, they might fatten it at a much earlier period. He felt that the Smithfield Cattle Club had done great service to the country. True, as Mr. Brandreth had said, it was the foundation of the Royal Agricultural Society of England, which he believed had been of essential advantage to the country; but he thought it had done more—it had formed those associations of farmers in various parts of the country which had given a stimulus to individuals residing in those districts, and induced them to produce a much better breed of cattle than they ever had before (Hear, hear). Before he sat down he must make one observation respecting what Mr. Pusey had said about “tenant-right.” He must be permitted to say that he thought the phrase “tenant-right” was an unfortunate phrase, inasmuch as it conveyed, not to his mind, but to that of the landlords of the country, an idea which it was not meant that it should convey. What he meant by “tenant-right”—and he hoped that in advocating it he should never be found backward—was justice to the tenantry of the country (loud cheers). No man would go further than the individual addressing them in doing justice to the tenantry of the country, but in this free country they must permit him to say that the choice of expression was a matter of great importance indeed. He believed that if some years ago, when the question was first brought forward, instead of the phrase “tenant-right,” they had adopted the phrase “justice to the tenant,” at the present moment that justice would have been done to them which he believed was not done in many parts of this country (Hear, hear). Many of them must be aware, coming as they did from various districts, that there were in this country considerable differences in what was called the custom of the country. Now he wished, if it were practicable, to see one general custom established by law for all; or, if it were incorrect there to refer to law, he wished to see one universal feeling among the landowners and occupiers of the country as to the system on which a tenant should leave his farm. If a tenant laid out a large sum of money in the improvement of the soil, he thought that if he were removed he ought to receive the value of the unexhausted improvements (Hear, hear). He felt that it was of great importance this question should be settled. He did not doubt that it could soon be carried out; and he could assure them that, as president of that club, or an individual landowner, they should not find him backward in attempting it (cheers). The noble duke, in conclusion, urged the expediency of union between owners, occupiers, and labourers, as essential to the interests of the nation, and resumed his seat amid protracted acclamations.

Mr. PUSEY, M.P., explained that he fully agreed with the chairman that “tenant-right” was an unfortunate phrase, but he had merely used it as one in common use,

and generally understood. He thought the phrase unfortunate, because it appeared as if the interest of the tenant was adverse to that of the landlord; but he was convinced that nothing could be more favourable to the interests of the landlords than that their tenants should have this right, because they would be induced to lay out money as soon as they had this security for doing so. All the landlord was required to say, and it was no great boon, was, that the outgoing tenant should receive this again from the incoming tenant. To a certain extent, it was a charge upon property; but the landlords understood this subject better than they did, though he agreed with the chairman that the sooner they found a better phrase to express it the better (hear, hear).

The CHAIRMAN then severally proposed the healths of the judges of the stock and the stewards of the dinner, for which Mr. Smith and Mr. Druce returned thanks.

The CHAIRMAN next proposed “The Health of Mr. B. T. B. Gibbs, their secretary, in whom they found a man of honour, efficiency, and impartiality; with thanks to him for his honorary services” (cheers).

Mr. B. T. B. GIBBS briefly returned thanks, he congratulated them upon the prosperous state of the Club, and assured them that so long as they should entrust him with their affairs it should be his best endeavour always to promote the interests and further the welfare of the Smithfield Club (cheers).

The company then drank the healths of “Mr. Gibbs, the father of the Club;” “Prosperity to the Royal Agricultural Society of England, the Royal Highland Society of Scotland, and the Royal Agricultural Society of Ireland;” and “Agriculture, Manufactures, and Commerce.”

The CHAIRMAN then proposed “The Labouring Classes of England;” and said, in doing so he must remind them that he did not limit the toast to the labourers in agriculture (Hear, hear). He wished to extend it in the greatest possible manner, and that they should pay a compliment to all who earned their bread by the sweat of their brow. As farmers, they knew the great importance of having men who served them not so much for the wages they gave them as the desire to do their duty by their employers. He believed and hoped that such was the case. He was in the habit of associating much with the labouring classes, and he knew that many of them, in the situation in which Providence had placed them, were subjected to great privations; but he knew also that their employers had the means, by showing kindness to them and their families, to elicit the best feelings of gratitude and affection. It had been said that the agricultural labourer was not attached to his employer. Those who said so would say anything. He did not believe it. He was intimately acquainted with the labourers of the country, and he told them that should any attempt be made to do anything against the laws of the country, he, as Lord-Lieutenant of the county of Sussex, should call out the tenantry and labourers; and he believed the labourers would respond to that call in a manner that would very much surprise those who wished to overthrow our laws or constitution

(cheers). He hoped and trusted there were few farmers in the country who were not aware of the value of the labouring classes, and did not do justice to them; and he was quite sure that none of them would argue against the principle that the labourer was worthy of his hire (cheers).

The toast was drunk upstanding, and with great applause.

The CHAIRMAN next proposed "The Butchers who had purchased their stock," "Live and let live;" after which some new members were admitted, and his grace having briefly returned thanks for his re-election as president of the club, left the chair, and the company separated.

## AWARD OF PRIZES.

### OXEN or STEERS.

CLASS I.—Oxen or Steers, of any breed, under 5 years old, without restrictions as to feeding.

Mr. W. Trinder, of Wantage, Berks, first prize, £20, and silver medal to Mr. Roberts, who bred the animal.

The Most Hon. the Marquess of Exeter, second prize, £15  
Mr. John Stevens, of 19, Holywell-street, Oxford, third prize, £10.

CLASS II.—Oxen or Steers, of any breed, under 6 years old, weight 90 stone and upwards.

The Right Hon. the Earl of Warwick, of Warwick Castle, Warwick, first prize, £30; silver medal to Mr. Thomas, who bred the animal, and gold medal to Lord Warwick.

His Royal Highness Prince Albert, second prize, £20.

Mr. James S. Bult, of Dodhill-house, Kingston, near Taunton, Somerset, third prize, £10.

CLASS III.—Oxen or Steers, of any breed, under 5 years old, under 100 stone, and above 70 stone weight.

His Royal Highness Prince Albert, first prize, £15, and silver medal to Mr. Roberts, who bred the animal.

Sir Charles Wake, Bart., of Courteen Hall, Northampton, second prize, £10.

CLASS IV.—Oxen or Steers, of any breed, not exceeding 4 years and 3 months old, under 85 stone weight.

The Right Hon. Lord Southampton, of Whittlebury, near Towcester, Northampton, first prize, £10, and silver medal to Mr. Child, who bred the animal.

Mr. Wallett Goodale, of Boroughbury-house, near Peterborough, Northampton, second prize, £5.

CLASS V.—Oxen or Steers, of any breed, and four years and six months old, and under 80 stone weight, without restrictions as to feeding.

The Right Hon. the Earl of Leicester, of Holkham, near Wells, Norfolk, prize of £10, and silver medal to Lord Leicester.

CLASS VI.—Oxen or Steers of the Scotch, Welsh, or Irish (Kerry) breed, of any age, without restrictions as to feeding, yet the kind or kinds of food must be certified.

Mr. John Rob, of Thorpe Field, near Thirsk, Yorkshire, prize, £10.

### COWS AND HEIFERS.

CLASS VII.—Fattened Cows or Heifers, under five years old.  
Mr. W. Trinder, of Wantage, Berks.—First prize, £20; a silver medal to Mr. Hewer, who bred the animal.

Mr. Capel Hanbury Leigh, of Ponty Pool Park, near Ponty Pool, Monmouth, second prize, £10.

Mr. J. L. Hassall, of Packington, near Ashby-de-la-Zouch, Leicestershire, third prize, £5.

CLASS VIII.—Fattened Cows, of 5 years old and upwards.

Mr. D. Bennett, of Farringdon, Berks, first prize, £20; a silver medal to Sir J. A. Cathcart, Bart., who bred the animal.

Sir George Philips, Bart., of Weston House, near Shipston-on-Stour, Warwickshire, second prize, £10.

CLASS IX.—Fattened Cows, of five years old and upwards.

Mr. John Booth, of Killeby, near Catterick, Yorkshire, first prize, £15, and gold medal and silver medal.

Mr. John Hall, of Wiseton, near Bawtry, Nottinghamshire, second prize, £5.

### EXTRA STOCK.—CATTLE.

His Royal Highness Prince Albert, a 2 years and 11 months Highland Scot and Durham Heifer, silver medal.

### SHEEP.

CLASS X.—Long-wooled Fat Wether Sheep, 1 year old.

Mr. J. S. Burgess, of Holme Pierrepont, near Nottingham, first prize, £20, and silver medal.

Mr. Thomas Twitcheil, of Willington, near St. Neot's, second prize, £10.

CLASS XI.—Long-wooled Wether Sheep, 1 year old, each sheep not to exceed 180 lbs. live weight.

Mr. Thomas Twitcheil of Willington, near St. Neot's, Bedfordshire, prize, £10 and silver medal.

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

Mr. John Painter, of Burley, near Oakham, Rutland, first prize, £20, and silver medal and gold medal.

Mr. William Sanday, of Holme Pierrepont, near Nottingham, second prize, £10.

CLASS XIII.—Long and short-wooled cross-bred fat Wether Sheep, 1 year old, without restrictions as to feeding.

Mr. John Hitchman, of Little Milton, near Wheatley, Oxon, first prize, £10, and a silver medal.

The Right Hon. the Earl of Leicester, of Holkham, near Wells, Norfolk, second prize.

### EXTRA STOCK.—LONG-WOOLED SHEEP.

Mr. Christopher Faulkner Allen Faulkner, of Bury Barnes, near Busford, Oxford, silver medal.

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

Mr. Samuel Webb, of Babraham, near Cambridge, first prize, £20, silver medal and gold medal.

His Grace the Duke of Richmond, of Goodwood, near Chichester, Sussex, second prize, £10.

CLASS XV.—Short-wooled fat Wether Sheep, 1 year old, without restrictions as to feeding. Each Sheep not to exceed 180lbs. live weight.

Mr. Thos. M. Goodlake, of Wadley House, near Fardon, Berkshire, the prize, £10, and silver medal.

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

Mr. Samuel Webb, of Babraham, Cambridgeshire, first prize, £20, and silver medal.

His Grace the Duke of Richmond, of Goodwood, near Chichester, Sussex, second prize, £10.

### EXTRA STOCK.—SHORT-WOOLED SHEEP.

Mr. Samuel Webb, of Babraham, near Cambridge, silver medal.

CLASS XVII.—Pigs, of any breed, above 13 and not exceeding 26 weeks old.

Mr. Charles Eley, jun., of Heathfield Farm, near Hounslow, Middlesex, first prize, £10, and silver medal.



The Right Hon. the Earl of Radnor, of Coleshill, near Faringdon, Berks, second prize, £5.

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

The Right Hon. the Earl of Radnor, of Coleshill, near Faringdon, Berks, first prize, £10, gold medal and silver medal.  
His Royal Highness Prince Albert, second prize, £5.

EXTRA STOCK.—PIGS.

The Right Hon. the Earl of Radnor, of Coleshill, near Faringdon, Berks, silver medal.

B. T. BRANRETH GIBBS, Hon. Sec.

Half Moon-street, Dec. 8.

## EXHIBITION OF IMPLEMENTS.

As usual, the pipe and tile machines attracted great attention, and the exhibitors having them constantly at work kept crowds around the various stands where they were in operation. Garrett and Sons' hand pipe and tile machine, which took the first prize at the East Norfolk Agricultural Society last year, was especially noticed, it being the first tile machine in view on entering the gallery. It is a beautifully simple contrivance, and can be worked by a man and two boys with a lever purchase. Messrs. Garrett's stand was peculiarly attractive, from the great number of useful agricultural implements and machines which were exhibited. His seed drilling machines, particularly those for general purposes, attracted much attention. His patent horse-hoe, which took prizes for four years from the Royal Agricultural Society of England, was also much looked at. Space prevents our going into more minute details of this stand. The stand of Mrs. Mary Wedlake, of Hornchurch, and 118, Fenchurch-street, London, contained a very great variety of ploughs, scarifiers, cutting machines, furze-bruising machines, &c. We noticed an ingenious turnip cutter for bullocks and sheep; a new invention, worked with much facility, cutting for sheep, and by revolving the action of the wheel cutting for bullocks. Few implements have attracted so much attention as a very simple and inexpensive implement—a gorse or furze crushing machine—made by the widow of the old exhibitor, Mary Wedlake, whose late husband was the first implement exhibitor at the commencement of this excellent institution. The implement, now brought to perfection, will be found to answer the purpose for which it is intended: it is worked by two men. Horse or water power may be tacked to it. The gorse comes out as green as young grass, and as moist as green-food. The smell of the gorse, thus bruised, is very sweet. In parts where this plant is plentiful, it may be turned to an enormous advantage in feeding cows, whose milk it will make worth some 30 per cent. more than if fed on any other food, and for horses, whose coats it improves wonderfully. Several of the specimens exhibited obtained medals of the Royal Agricultural Society; and the number of the agriculturists which were around this stand evidenced the interest taken in the articles exhibited. Beart's patent machine for making tiles, pipes, &c., was deservedly admired, as was also Clayton's, of London, who has adapted his machine so that it

can be worked either upon the vertical or horizontal plan, which we consider a great advantage. Smart's improved cattle-weighing machines, as also his drill, revolving harrow, and other instruments, attracted much attention. The weighing machines were especially attractive. Stratton, of Bristol, exhibited his Norwegian harrow and scarifier, and took a fair share of public attention. Read, of Regent Circus, exhibited his agricultural fire-engine, as also his pulverizer, which obtained the prize in the years 1844, 1845, and 1846, from the Royal Agricultural Society. Smith and Co., of Stamford, manufacturers and brass-founders, had some good specimens in their line of agricultural implements; as had also Howard, of Bedford. His patent iron plough, marked J. A., attracted great attention. It has obtained several premiums from the Royal Agricultural Society. Coleman's patent expanding lever harrow was the source of much attraction: for a description of this really useful invention we refer our readers to the "Farmer's Magazine" for February, 1846, which will be found instructive to the farmer. William Cambridge's (Market Lavington) press wheel roller was much approved of, as was Cottam and Hallen's serrated chain harrow, which obtained the prize at the Derby Meeting; indeed, their stand attracted great attention. W. Crosskill had different specimens of his implements; his clod crusher is so well known, that we need not particularize it. Bewley, of Chelmsford, exhibited various winnowing, crushing, chaff, and other machines: his earthing plough is an ingenious contrivance. Barrett, Exall, and Andrews, of Reading, Berks, had at their stall a numerous and much admired collection of ploughs of various kinds, subsoil and otherwise; but their hand thrashing machine, which is on the same principle as their horse machine, was much looked at. They had also numerous other machines and liquid manure carts on show. Mr. J. Comins's (of Southmolton) turnwrest plough was considered a great improvement in ploughing hilly land; and the testimonials to that effect from eminent agriculturists prove its utility. Hornsby, of Grantham, Lincolnshire, attracted the usual notice with his drill machines for ridges and flat ground, and also his drill for general purposes. His chaff-cutting machines seemed easy to work, and effective. Indeed the quantity of chaff cutters exhibited were more than an average of what usually are to be seen. Ryland and Dean, of Birmingham, had an extensive stand; but it would be impossible to notice them all. Their hand and other flour-dressing machines are such as from their simplicity we think ought to have obtained a good sale this year in Ireland, as such machines were much sought after in the sister kingdom. Their improved portable steam engine which took the prize at Shrewsbury, was much admired. Wedlake and Thompson had also an excellent collection of machines and other implements, which were manufactured in a style that reflected great credit on the manufacturers, and was highly commended by all that had previously used them.

Johnson's metallic churn is a simple, useful article. The turnip-cutting machines of Gard-

ner, of Banbury; Joyner, of Romford; Burchfield and Son, of Smithfield, London, were distinguished amongst the multitude for their perfection and the ease with which they worked.

Vingoe's (Penzance) patent seed-planting and manure machine.—The ease with which the entire apparatus can be raised out of the ground is an improvement in this machine: it took the prize at the Slarwsbury meeting.

#### SEEDS, ROOTS, &c.

T. Gibbs and Co., of Half-moon-street, Seedsmen to the Royal Agricultural Society of England, and for some years Seedsmen to the Honourable Board of Agriculture of Sweden. The varieties of mangel-wurtzel exhibited by those eminent seedsmen, and the extraordinary size of the specimens, drew crowds round their stand from the time the doors were opened until night. Amongst the turnips, those called "Gibbs's purple-topped yellow Swede," and "Gibbs's green-topped yellow globe hybrid," appear from fineness of stock and lightness of offal to be invaluable to the farmer. The large green-top white Belgium carrot, introduced by themselves into this country, and of which description the Duke of Bedford obtained last year a crop of forty-one tons six hundred-weight per acre, of the seed purchased of them, was also much admired. They had sundry descriptions of grasses, corn, &c. Their stand attracted great attention. Robert Matson had some splendid specimens of turnips.

The exhibition of Messrs. George Gibbs and Co., of 26, Down-street, Piccadilly, the seedsmen to the Royal Agricultural Department of Belgium, and of Zealand, in the Netherlands, presented some very beautiful specimens of roots sent to them by various customers, the produce of seeds furnished by them. We particularly noticed those grown on the royal farms at Windsor and Bagshot. They were perfect specimens of mangel-wurtzel, carrots, and turnips. Some wonderful roots of mangel-wurtzel were grown by the Rev. Jas. Linton, of Hemingford: one root weighed 40lbs. Those grown by Mr. R. Foord, of Borden, Kent, were greatly admired; and so were the carrots grown by H. Cheffins, Esq., on the estate of Viscount Maynard. Some mangel-wurtzel sent by Mr. Best, of Reading, were very handsome. The roots of Swedish tur-

nip sent by Mr. Ashcroft were very fine; as were also some handsome roots of Kohl Rabi, white globe mangel-wurtzel, several varieties of Swedish turnips, cattle-cabbages, &c., grown by himself at Barham-wood, Elstree.

M'Neill and Co., of Bunhill-row, London, had specimens of asphalt for roofing, which being impervious to heat or cold, must be invaluable for temporary erections of covering for cattle-sheds for the farmer. We were much interested in witnessing the several models, showing the various uses of this important and economical roofing. Some were for the purpose of affording portable shelter to sheep, whilst feeding in the turnip field; others were for permanent hay and corn stack covers. There were also models for the economical framing of timber in the construction of roofs for farm buildings in general, for which the lightness of the material affords ample scope. We obtained from them a pamphlet, with numerous engravings, illustrating the cheap constructing of roofs. No agriculturist should be without this little work, which can be had gratis by application. But among the prominent attractions was "stand 42," where was exhibited a roof covered with "patent asphalt felt," manufactured by Mr. T. J. Croggon, 8, Laurence-Pountney-hill, London, effectually showing the economy in the use of timber for farm-buildings, and the efficacy of the "material." Davis, of West Smithfield, Orchard and Co., of same place, L. Staff, of the Dover-road, and W. Pigott, of Fore-street, severally exhibited their specimens for marquees, rick and hay-cloth, waggon-covers, &c., &c.; but to whom the palm is due for the best invention, we will not take upon us to decide. Messrs. Edgington's (of Southwark) exhibited, with their usual rick and sack cloth for tents, &c., netting for sheepfolds, by which there is a considerable saving of labour; also, it is cheaper than hurdles. They had specimens of the patent chemical wheel-grease, one third of the quantity of which, when compared with that generally used, is sufficient for the same length of time for waggon or car wheels, mills, or railway carriages. Mr. Thomas Bigg, whose sheep-dipping composition is so universally known and approved of, exhibited his apparatus. The testimonials produced by Mr. Bigg prove beyond question the essential service of his composition in effectually removing tick, scab, and lice, and preventing the fly.

### SMITHFIELD CHRISTMAS CATTLE SHOW.

MONDAY, Dec. 14.

The holding of the great Christmas cattle market has been invariably regarded with more than usual interest, not only by the agricultural body, but the community at large. This being the day appointed for that purpose (which, according to the arrangements for several years, almost immediately follows the close of the proceedings in the show-yard at the Bazaar, thus giving the owners of the stock there exhibited, and not disposed of, an

opportunity of bringing their beasts and sheep hither for sale), a very large number of buyers and sellers, as well as visitors from most parts of the United Kingdom, assembled at a very early hour; and not a little anxiety was manifested by them to ascertain the numbers and quality of the stock brought together. As this could be best ascertained by a comparison with former shows, we shall here make a few observations to elucidate this

important matter. On looking through the supply of beasts, we were forcibly struck with the numerical strength of the pure Devons; not a few of which were of a first-class character, both in symmetry, weight, and fatness. The various points of the breed in question reflected the highest credit upon the breeders whose exertions, during the present year, to improve that excellent breed of beasts are beyond all praise. That a difference of opinion has existed as to the comparative merits of the Devons and Herefords, we are prepared to admit. They have long had a severe, though by no means profitless, contest for priority of excellence; yet it behoves us to state, on the present occasion, that the latter breed—although the actual number brought forward was not quite so large as that shown at the corresponding periods in 1844 and 1845—excelled the Devons in general quality, and, in some instances, in symmetry. The next breed to which we shall now direct attention are the short-horns, the supply of which, as might be expected, considering that this market derives the principal portion of its bullock supplies from Lincolnshire, Leicestershire, Northamptonshire, and our other northern districts, during the present month, and in which the short-horns are principally bred, greatly exceeded that of any other. In this particular portion of the show a most wonderful improvement was apparent; indeed, we may venture to observe that a finer collection of shorthorns was never witnessed in this or any other market in the kingdom. This is a fact highly creditable to the northern graziers. Our readers can, no doubt, recollect that years since this description of stock was not unfrequently shown in a very “staggy” condition; in other words, there was a great deficiency in their fore-quarters as to symmetry; but to-day the shorthorns were much improved in this respect; in fact, we may state that in some instances they were nearly equal in quality and general condition to many of the Herefords and Devons. Considering, therefore, the importance of those great counties whence the shorthorns are principally derived, the immense numbers annually sent to this market, and, moreover, the absolute necessity of keeping pace with our increasing wants, we conceive those who graze in the north have made very rapid strides towards perfection in their stock. We have now treated of what we conceive to be the three greatest breeds in this country shown here at this season; but there are others deserving of more than a passing commentary from us, though, from the present time being that during which the arrivals from the eastern districts are always small compared with the summer months, we are not in a position to generalize our remarks upon the Scots and homebreds grazed in Norfolk and Suffolk. Still, however, those brought forward this morning were of a character which confirms us in the opinion that they have lost none of their well known excellence; on the contrary, the show in this respect was unusually good, and, as such, well merited the marked encomiums of all present. As to the animals received from Scotland—the number of which somewhat exceeded that of last year—we may ob-

serve they were in first-rate condition, consequently commanded our extreme prices. But we must not forget to notice another important breed, we mean the Welsh runts. These were in strong force, and of quality seldom or never equalled. Again, there were some exceedingly good old Sussex Beasts exhibited, and our only regret was that their number was not equal to their importance as a class. From the midland counties large droves of Beasts, originally imported from Ireland in a lean state, were on offer in good condition; but their weight of meat was in no way adequate to their size. With North Devons and other kinds, as well as with fattened cows, the market was well supplied.

Having now detailed the quality and condition of the various breeds of beasts, we may state generally that the show of beasts to-day, taken as a whole, has been seldom equalled; yet, at the same time, we may observe there was a falling off in the number of the prize animals brought forward. As illustrative of the foregoing observations as to supply and value, we here give the following statement of the numbers exhibited on the “great day” during the last seven years, and the quotations at which they were disposed of:—

Years.	Beasts shown.	Prices.			
		s.	d.	s.	d.
1839	.... 5,074	.... 3	4	to	5 0
1840	.... 3,528	.... 4	4	..	5 8
1841	.... 4,500	.... 3	8	..	5 0
1842	.... 4,541	.... 3	4	..	4 8
1843	.... 4,510	.... 3	0	..	4 6
1844	.... 5,713	.... 3	6	..	4 8
1845	.... 5,326	....			

It would appear invidious on our parts to offer any commentary upon the stock offered by the various salesmen, from the fact that nearly the whole of them had beasts on show of a most superior character. We regret, however, to state that Sir Charles Knightley was not an exhibitor on this occasion, he having disposed of his beasts at Fawsley in the preceding week.

Another most interesting portion of the show was the exhibition of Sheep. At the corresponding period in 1845 the supply, in this particular, was remarkably good; but that of to-day was unprecedentedly prime as to quality, the weight exceeding anything we ever before witnessed.

We have now to consider the all-important question of trade. Owing to the prevailing fine and seasonable weather, and the large attendance of both town and country buyers, the demand for all breeds of Beasts was steady, though we cannot call it very active, and the primest Devons, Herefords, and Scots were mostly disposed of, at prices varying from 4s. 2d. to 4s. 6d. per 8lbs., at which, considering the immense number brought forward, a fair clearance was effected. As there were very few inferior Beasts in the market, we have considerably enhanced our lowest figures.

The droves from the northern districts comprised about 2,500 shorthorns; while, from the western and midland counties, 2,000 Herefords, runts, Devons, &c., came to hand, and from other parts of England 500 of various breeds were received—the remainder of the supply being chiefly composed of Scots from Scotland and the Beasts derived from abroad.

## ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A Monthly Council was held at the Society's House, Hanover-square, on Wednesday, the 2nd of December, present—The Earl of Egmont, President, in the chair, Lord Portman, David Barclay, Esq., M.P., Thomas Raymond Barker, Esq., Samuel Bennett, Esq., William Blount, Esq., Humphrey Brandreth, Esq., W. R. Browne, Esq., F. C. Cherry, Esq., John Bell Crompton, Esq., Samuel Druce, Esq., Richard Garratt, Esq., Brandreth Gibbs, Esq., W. G. Hayter, Esq., M.P., C. Hillyard, Esq., W. Fisher Hobbs, Esq., John Kinder, Esq., Francis Pym, Esq., Professor Sewell, William Shaw, Esq., John Villiers Shelley, Esq., and Charles Stokes, Esq.

*Finances.*—Mr. Raymond Barker presented to the Council the Report of the Finance Committee for the month just ended; from which it appeared that on the 30th of November the invested capital of the Society stood at 7,000*l.* stock, with a current cash balance of 1,395*l.* in the hands of the Bankers. This Report, and the various recommendations it contained, were unanimously adopted and confirmed.

Mr. Pym, Chairman of the Collection of Subscriptions Committee, presented the report of that committee, which was also unanimously adopted and confirmed.

*Prize Essay.*—Mr. Pusey, M.P., Chairman of the Journal Committee, reported the adjudication of the Society's Prize of 10*l.*, for the best Essay on the St. John's Day Rye, to Mr. W. P. Taunton, of Ashley, near Stockbridge, Hampshire.

*Country Meetings.*—Mr. Pym presented, on the part of Mr. Druce, Mr. Kinder, and himself, as Stewards of the Cattle Yard, at Newcastle, a Report on the various documents referred to them by the Council. This Report was unanimously adopted and confirmed.

Lord Portman then brought forward the three motions of which he had given notice at Newcastle, on the undue fattening of animals intended for exhibition at the Society's Country Meetings; on the penalties to be inflicted on parties who failed to send stock and implements entered for exhibition; and on the means to be taken to prevent fictitious biddings of the sales by auction; when an interesting discussion ensued, and the two latter topics, along with Sir Matthew Ridley's and Mr. Hillyard's suggestions in reference respectively to the removal of animals from their place in the show-yard, and the conditions of prizes to be offered at Northampton, were, on Lord Portman's motion, unanimously referred for further consideration and discussion to the General Northampton Committee, which his lordship, as its chairman, had directed to be summoned on the Wednesday in the following week.

On the motion of Mr. Shaw, seconded by Mr. Brandreth, the following Committee was appointed to report on the practicability of appropriating, after the year 1847, a portion of the fund subscribed towards the expenses of

any country meeting, to the purpose of Local Prizes to be competed for by such parties only as are resident within the particular district, viz.: The Duke of Richmond, Lord Portman, Mr. Fisher Hobbs, Mr. Brandreth, Mr. S. Bennett, Mr. Pym, and Mr. Shaw.

The Council then proceeded, agreeably with the Bye-Laws, to appoint the Standing Committees for the ensuing year.

*Cattle Diseases.*—Mr. Fisher Hobbs gave notice, that at the next monthly Council he should move the following Resolutions, viz.:—

1. That the grant of £200 given by the Society annually to the Royal Veterinary College, be reduced to £100 per annum.
2. That a Prize of £50 be offered by the Society for the best Essay on Pleuro-Pneumonia.
3. That a Prize of £50 be offered by the Society for the best Essay on the general Diseases of Cattle, Sheep, and Pigs.

Communications were received from the Leominster Agricultural Association, and Mr. Edward Angell, of Kensington.

The Council then adjourned to their weekly meeting on the 9th inst.

A Weekly Council was held at the Society's House, in Hanover-square, on Wednesday, the 9th of December; present, the Earl of Egmont, president, in the chair, Duke of Richmond, Lord Portman, Lord Southampton, Hon. H. W. Wilson, Sir Matthew White Ridley, Bart., David Barclay, Esq., M.P., Thomas Raymond Barker, Esq., Samuel Bennett, Esq., Humphrey Brandreth, Esq., W. R. Browne, Esq., Colonel Chaloner, John Bell Crompton, Esq., Richard Garrett, Esq., Brandreth Gibbs, Esq., W. G. Hayter, Esq., M.P., C. Hillyard, Esq., W. Fisher Hobbs, Esq., John Hudson, Esq., Samuel Jonas, Esq., John Kinder, Esq., Philip Pusey, Esq., M.P., Professor Sewell, William Shaw, Esq., William Shaw, jun., Esq., H. S. Thompson, Esq., George Turner, Esq., Thomas Umbers, Esq., W. B. Wingate, Esq., B. Almack, Esq., J. B. Browne, Esq., Rev. Daniel Gwilt, Rev. James Linton, Samuel Solly, Esq., Thos. Tweed, Esq., and F. E. Williams, Esq.

*Prize Essays.*—Mr. Pusey, M.P., Chairman of the Journal Committee, reported the adjudication of prizes for Essays.

## MISCELLANEOUS COMMUNICATIONS.

1. Communications from Viscount Palmerston, H. M. Principal Secretary of State for the Foreign Department, having reference to Reports on the Potato Disease in Poland and the United America.
2. Communications on the Potato Disease, from Mr. Drury, Dr. Reidy, Mr. Whytell, Mr. Rogers, Mr. Tilleard Ward, and Mr. C. Williams.

3. A Paper on Mineral Poisons used as Therapeutic Agents by the Agriculturist, from Mr. Read, of Crediton.
4. Specimens of Soil from a field in Jamaica, on the property of Mr. Beckford, known as the "Lightning Field," on account of its peculiar liability to injury during thunder-storms.
5. A communication from Dr. Spurgin, of Guildford-street, explaining the construction and advantages of a portable contrivance for supplying given quantities of liquid manure to the roots of plants.
6. Communications from Mr. Dean and Mr. Charnock on Draining Tiles.
7. A copy of Mr. Raynbird's new Work on Grasses, illustrated by natural specimens dried for the purpose, and guarded in the alternate leaves of the work on pages opposite to the letter-press.
8. Papers from Mr. Coxworthy, requesting the appointment of a Committee for the consideration of his suggestions.
9. Letter from Mr. Dickson in reference to his work on Flax.
10. Paper from Dr. Murray on Hydrophobia.
11. Report from Mr. Dean on the progress made in carrying into effect the provisions of the Contagious and Epidemic Diseases Prevention Act in the Parish of Tottenham.
12. Specimen of Asphaltine, for economical roofing, from Mr. Davies, of Droitwich.
13. Letters from Mr. Mumford, Mr. Piper, Mr. Fairbank, and Mr. Martin, on Wheat.
14. Letter from Mr. Salmon, of Bristol, on Guano.
15. Letter from Mr. Broadhead, of Stainsby Mill, on the preservation of Hay and Corn.
16. A communication from Mr. Osborn, on the application of steam-power to the cultivation of land.
17. A present from Mr. Shaw, of Cotton End, near Northampton, of a Hay and Corn Rick Borer, made by Samuel Ashley, of Northampton; capable of boring horizontally as well as perpendicularly, and thus forming apertures in different directions into the stack, by means of which a more complete circulation of air is effected.
18. A present from Mr. Casella, of Hatton Garden, of a Self-registering Thermometer.
19. A present from Mr. Henry Strafford, of Moreton Villas, Camden Town, of the 6th Volume (in continuation by him) of Coates's Herd Book of Short-horned Cattle.
20. A present from Mr. T. C. Eyton, of Donnerville, Wellington, Salop, of the 1st Volume of the Herd Book of Hereford Cattle.
21. A present from Mr. Glover, Secretary to the Newcastle Farmers' Club, of a copy of his Paper on the cultivation of Flax, and the fattening of Cattle by Box-feeding.
22. A present from the Royal Society of Agriculture at Lyons, of the current volume of their Transactions.
23. A plan for an agricultural Repository from Mr. A. F. Campbell.

The Council, having ordered thanks to be returned for

the favour of these communications, adjourned, on the motion of Mr. Raymond Barker, over the usual Christmas recess, to the first Wednesday in February.

A SPECIAL COUNCIL, by order of the President, was then held, at which Lord Portman, as Chairman of the General Northampton Committee, reported to the Council the recommendations of that Committee, which were unanimously adopted; and the Report of the Council to the General Meeting on the ensuing Saturday, was unanimously agreed to.

A SPECIAL COUNCIL, under the Bye Laws of the Society, was held on Thursday, the 10th of December: present, the Earl of Egmont, president, in the chair, Duke of Richmond, Sir Matthew White Ridley, Bart., Thomas Raymond Barker, Esq., S. Bennett, Esq., H. Brandreth, Esq., Colonel Challoner, F. C. Cherry, Esq., John Bell Crompton, Esq., S. Druce, Esq., John Ellman, Esq., R. Garrett, Esq., B. Gibbs, Esq., C. Hilliard, Esq., W. Fisher Hobbs, Esq., S. Jonas, Esq., John Kinder, Esq., Philip Pusey, Esq., M.P., Professor Sewell, William Shaw, Esq., William Shaw, jun., Esq., John Villiers Shelley, Esq., Robert Smith, Esq., W. R. C. Stansfield, Esq., M.P., Charles Stokes, Esq., H. S. Thompson, Esq., George Turner, Esq., and Thomas Umbers, Esq.

Sir Matthew Ridley having laid before the Council a communication from Mr. Robertson, of Lees, near Coldstream, in reference to the condition applied to the Society's Prize at Newcastle for thorough-bred Stallions, and Mr. Shelley a letter from Mr. Parkes, the Consulting-engineer to the Society, on the subject of the Prizes for Implements, the Council proceeded to the consideration and discussion of the several Prizes for the Northampton Meeting in 1847; and having arranged the prize sheet for that occasion, in which a sum of £1,500 is appropriated to the Prizes of next year (independently of the sum of £350 previously voted for Essays and Reports) the Council declared the prizes to be finally determined, and ordered printed copies of the new prize sheet to be immediately prepared for the purpose of being laid on the table at the ensuing General Meeting for the information of the members. The President notified his intention to direct a special Council to be summoned in February next, for the purpose of apportioning the sum voted for Implements into distinct prizes for competition.

Mr. Raymond Barker gave notice that at the Monthly Council in February he should move the "re-consideration of the Report from the Collection of Subscriptions Committee, with a view to limit its operations within the originally prescribed Counties, and eventually to bring its labours to a close."

The Duke of Richmond presented to the Society, from Gordon Castle, a compact fibrous mass obtained from a drain which it had entirely choked up to the extent of from 4 to 5 feet. The fibres had proceeded from the roots of an ash tree growing at a distance of 15 feet from the drains, which were 2½ feet deep, and had been in operation for 18 months.

THE ANNUAL GENERAL MEETING of this Society was held at 11 o'clock on Saturday, Dec. 12, at the Society's house, Hanover-square; the Earl of EGDMONT, President of the Society, in the Chair. Among those present we observed Mr. Pusey, M.P.; Mr. Barker; the Rev. Mr. James; Sir R. Jodrell; Col. Challoner; Sir R. Price; Mr. Shaw; Col. Austen; Mr. Fisher Hobbs, &c., &c.

The noble Chairman called on the Secretary to read the report of the Council.

Mr. HUDSON, the Secretary, then read the following REPORT.

In commencing this report, the Council have no hesitation in stating that not only have facts of important practical bearing been obtained through the agency of the Society, from the varied localities of the kingdom, and again made known through the pages of the *Journal* to its members residing in every district throughout the country, but a spirit of inquiry on the best means of effecting agricultural improvements has been excited, both in individuals who have extensive opportunities of carrying out their views, and in local associations already established for agricultural objects, through which the amount of experience has been increased, and a firmer foundation laid for more secure advancement. Experiment has been actively at work, both in testing the accuracy of reported facts, and ascertaining for further application the conditions under which they have occurred, as well as in furnishing suggestions for new modes of practice, to be again submitted to the same strict practical investigation of condition and occurrence.

For the purpose of obtaining new and important facts, the Council, in addition to the prizes of the Society for Reports and Essays on various subjects, have been enabled, through the liberality of the Duke of Northumberland, the Marquis of Downshire, and Major Curteis, M.P., to enlarge the offer of its premiums. For the attainment of the same end by distinct research, they have concluded a satisfactory arrangement for an experimental investigation into the relation existing between the composition of the ashes of a plant and the fixed elements essentially required to be present in the manure or soil in which it is grown; and the first report by Professors Way and Ogston, of the Royal Agricultural College of Cirencester, will appear in the forthcoming part of the *Journal*. In the communication of information, the Council have not only made every increased exertion, at no inconsiderable expense, to facilitate the transmission of the *Journal* to the various members of the Society, but have enlarged the opportunities afforded by lectures and discussions for the elucidation or illustration of subjects of a practical and scientific character. The lectures of Professor Johnston and Mr. Parkes, at Newcastle, and the discussions to which they gave rise, formed a new and most successful feature in the Annual Country Meeting of the present year, held at that place.

The Council were so well satisfied with the result of the first trial of a discussion on the questions of practical interest and personal experience connected with agriculture at Newcastle, that they have resolved to make arrangements for a similar opportunity for the interchange of opinion on such topics, under similar regulations.

The Society has this year, in the course of its prescribed circuit, held its Country Meeting in the district comprised of the northern counties of England, and remote from the localities of former years; but they have the satisfaction of recording, that in every point of view the Newcastle Meeting has been a most successful one, not only in the fine exhibition of stock, and the trial of implements, but in the opportunity which it has afforded the Members of the Society of experiencing the hearty welcome, and the lively participation of the farmers of that district in the common object of their mutual interest. To Dr. Headlam, the Mayor, and the members of the corporation; to Sir Matthew Ridley, the Chairman, and the Members of the Local Committee; and to all the other individuals and public bodies in Newcastle and its neighbourhood, who had laid the Society under deep obligation by their zealous and efficient co-operation, the Council have had the grateful task of returning their unqualified thanks.

In consequence of parties having in many instances made entries for the Society's Shows and subsequently failed to send their stock or implements so entered, the Council have found it requisite to agree to the following rule, for the purpose of prevention:—

“That for the purpose of checking the entry of cattle and implements, which are not intended to be exhibited, a fine of 10s. per head for beasts and horses, and 10s. per pen for sheep or pigs, and 5s. for implements under, or 10s. for those of the price of £10 or upwards, be charged on every animal or pen of animals, or implement entered and not exhibited, unless a certificate shall be sent to the Secretary on or before the day of exhibition, that the non-exhibition is caused by unavoidable accident. And that the Director and Stewards of the Yard be requested to report the names of the parties who have not exhibited as entered at the show, or neglected to pay the fines.”

The Council have also resolved to discontinue the Sale by Auction in the Show-yard at the Country Meetings of the Society.

The Journal Committee have reported during the past half-year, the following adjudication of Prizes for Essays, namely—

To George Phillips, analytical Chemist to the Excise, the prize of fifty sovs., on the Duke of Northumberland's foundation, for the best Essay on the Remedy for the Potato Disease, and on its treatment in the various stages of planting, growth, and preservation.

To Henry Cox, of Longford's House, Minchinhampton, the prize of twenty sovs., on the Duke of Northumberland's foundation, for the second best Essay on the same subject.

To F. J. Graham, of Cranford, near Hounslow, the prize of thirty sovs., on the Duke of Northumberland's foundation, for the best History of the Disease at the present time affecting the Potato, involving a condensed detail of facts developed by experiments.

To Hugh Raynbird, of Bury St. Edmund's, the prize of twenty sovs. for the best Essay on Peat Charcoal, as a manure for turnips and other crops.

To Wm. Pyle Tautton, of Ashley, near Stockbridge,

Hants, the prize of ten sovs. for the best account of the St. John's Day Rye.

The Council have accepted the liberal offer of the Marquis of Downshire to add £30 to the sum of £20 already voted by the Society for the best Essay on the Cultivation and Management of Flax, to be sent to the Secretary on or before the 1st of March, 1847.

The Finance Committee have reported that during the past half year 302 new members have been elected, 56 have died, and 789 have been struck off the list by order of the Council; and the Society now consists of—

Life Governors.....	89
Annual Governors.....	201
Life Members.....	587
Annual Members.....	5532
Honorary Members.....	20
	<hr/>
	6429

Of the above 789 members whose names have been expunged, 519 are those of Members whose subscriptions for the years 1841 and 1842 have remained unpaid on the Books of the Society for the last four years, and are still undischarged. Their names have been struck off the list of the Society by order of the Council, on the special recommendation of the Finance Committee.

The Committee have also presented the following statement of the arrears of subscription, made up to the first day of the present month.

Amount of arrears due for—

1843 ....	£456
1844 ....	911
1845 ....	1520
1846 ....	2488
	<hr/>
	£5375

Of the amount of the arrears for 1846, nearly one-half has been discharged during the last ten days.

They have also reported that the capital of the Society invested in the public Funds stands at £7,000 Stock, and that the current cash balance in the hands of the Society's bankers on the 1st inst. was £1,395.

The auditors will lay before the Members the Half-yearly Balance-sheet of Accounts as audited by them on the part of the Society.

In filling up the vacancy in the list of Trustees, occurring through the lamented decease of Mr. Handley, by the unanimous election of Lord Portman to that office, the Council have recorded on their minutes an expression of their deep sense of the severe loss the Society has sustained in the removal from its Councils, of one so intimately connected with its existence and establishment as one of its founders.

In conclusion, the Council beg to congratulate the Members on the increasing usefulness of the Society, and on its steady progress in the prosecution of those national objects for which it was founded. They feel, however, that it is only by the individual interest and co-operation of its numerous Members, each within their local sphere, in carrying out its practical views, that its vigour and vitality can be efficiently maintained. And they repeat the invitation to the Members at large, to favour the Council not only with their attendance at the Weekly Meetings in London, and at the Meetings in the Country, but

also from time to time with such practical suggestions and communications of interesting facts connected with the various topics of agricultural improvement as may promote both the objects of the Society and the public good.

By order of the Council.

JAMES HUDSON, Secretary.

London, Dec. 9, 1846.

The report was received with cheers.

Mr. SMITH: I beg leave to propose that the report which has just been read be received and approved of.

The motion having been seconded, was put to the meeting, and agreed to unanimously.

Mr. BARKER: The next business we have to do is to have the balance-sheet of the Finance-committee read.

Colonel AUSTEN: My Lord, I shall now read the balance-sheet of the Finance Committee; but I wish to premise that it must be borne in mind that the accounts are made out for the half year only; that is the half year ending on the 30th of June, and that this is the reason why sums since received on account of arrears are not credited. The letters which have this year been addressed to the members in arrear, calling for payment of their subscriptions, have been answered in an unusually quick and rapid manner; a fact which must be gratifying to the meeting. Col. Austen then read the balance-sheet, from which it appeared that—

HALF-YEARLY ACCOUNT, ENDING 30TH JUNE, 1846.

	RECEIPTS.	£	s.	d.
Balance in the hands of the bankers, 1st of January, 1846.....		760	2	5
Balance in the hands of the secretary, 1st January, 1846.....		14	12	9
Dividends on stock.....		110	8	8
Sale of stock.....		1174	10	0
Life-compositions of members.....		372	0	0
Annual subscriptions of governors.....		747	10	0
Annual subscriptions of members.....		2666	12	10
Sale of Journal.....		139	10	2
Sale of Cottage Tracts.....		3	3	1
Receipts during the half-year, on account of the Country Meetings.....		4	5	9
Payment made in error by Messrs. Child and Co. to Messrs. Drummond.....		45	0	0
		<hr/>		
		£6046	15	8

PAYMENTS.

Permanent charges.....	£270	12	6	
Taxes and rates.....	21	8	2	
Establishment charges.....	935	12	10	
Postage and carriage.....	27	5	6	
Advertisements.....	13	5	0	
Expenses of Journal.....	1568	7	10	
Prizes.....	260	0	0	
Payments during the half-year, on account of the Country Meetings.....	296	1	7	
Subscriptions repaid.....	11	6	0	
Miscellaneous payments.....	6	19	3	
Repayment to Messrs. Child of sum paid in error.....	45	0	0	
Balance in the hands of the bankers 30th June, 1846.....	2564	17	10	
Balance in the hands of the secretary 30th June, 1846.....	25	19	2	
		<hr/>		
		£6046	15	8

These, my Lords, are the accounts in the abstract only, but all the details of the accounts are on the table, and were submitted to the auditors, and their accuracy does not rest on the examination and opinions of the Finance Committee, but they have been most carefully and scrupulously examined by the auditors, with the most minute exactness, and then certified as correct by Mr. Turner, Mr. Tawney, and Mr. Knight.

The Committee have also to report that, although there are some small bills connected with the Newcastle Meeting which have not yet been settled, they are in a position to assure the meeting that the charge on the funds of the Society in connection with that meeting is at present only 721*l.*, and will not exceed 800*l.* I have no farther observations to make, but simply to express my satisfaction at the state of our affairs.

The balance sheet having been received and adopted,

Sir RICH. JODDRELL said: I beg leave to propose the thanks of the Society to the auditors, Messrs. Turner, Tawney, and Knight, who have so ably and beneficially discharged their duty to the Society.

The Rev. C. T. JAMES: I have very great satisfaction in seconding the motion, and I most heartily thank the auditors; for that is the least we can offer to those who give their time and attention to the accounts of the Society, and who are therefore deserving of our cordial thanks. When I entered this room, it was my intention to speak to the meeting of the claims which the deserving and industrious labourer has upon our attention; I will, however, confine what I have to say to a word or two. There is no subject connected with the business of agriculture, or the objects which the Society has in view, which should command more attention than the interests of the agricultural labourer, and the adoption of measures to improve his condition. A committee has already been appointed by the Society in reference to this important matter, and much valuable information has already been obtained on the subject throughout the country. I would, however, suggest whether more could not be done, and whether this Society could not do much in drawing attention to the matter, and in obtaining statistical information on the subject, with a view to the adoption of some measures of amelioration. With these remarks, I have much pleasure in seconding the motion which is before the meeting, and I will conclude by an expression, in which you will all I am sure join—Prosperity to the honest and industrious labourer, and may his heart never know distress.

The motion was then put, and carried *nem. con.*

The CHAIRMAN said: Since the last report of the Council has been made, a Special Meeting of that body has been held, with respect to the prizes which are to be given at our next Country Meeting; and I have to inform you that full and detailed lists of them are now on the table for your use. You will perceive that some of the premiums have been increased; but, upon the whole, the total sum has not been altered.

Col. AUSTEN: Yes, a little, but not materially.

Col. CHALLONER: Mr. Hudson, an enquiry has

been made near me whether this list has been laid upon the table with the view that, if any gentleman may be disposed to propose any alteration, he will be permitted to do so. Is that the case?

Mr. HUDSON: Oh no: the prize-list as now made out, is settled and final.

Mr. BARKER: It is now unalterable.

The CHAIRMAN: The sums to be given for implements will be particularly announced at the Meeting in February.

Mr. HUDSON: Yes, my Lord. I have stated so in the printed list.

Mr. PUSEY, M.P.: As the business of the day is now completed, I rise for the purpose of proposing a vote of thanks to our noble Chairman. I must congratulate the meeting on the prosperity of the Society, and the pleasing facts disclosed in the reports which have just been read. We must not form our opinion of the prosperity of the Society from the number of members present, because we do not expect, and never have a great number present at our London meetings; but our friends are numerous in the country, and the report shows that the number is increasing. With respect to what fell from the Rev. Gentleman near me with reference to the agricultural labourers, I beg to observe that this Society has already produced much benefit to the labourers; and great improvement in their cottages and cottage gardening has resulted from the encouragement which the society has held out to them. With respect to the wages of agricultural labourers, it is difficult to interfere with it; but I am certain that the society has done a great deal of good for the labourers by the stimulus which it has given to the improvement of the soil—that is, the improvements which are now in operation on the soil on which hundreds and thousands of men are at work at this season of the year, when they used to be principally idle (Hear, hear, and cheers). There are many thousands at work now in draining and other operations on land which have been encouraged and promoted by the society. I can only again congratulate you on the success and prosperity of the society, and the effects which it has produced in every part of England, and I hope that it will continue in its prosperous career, and produce still greater effects in after years. I beg leave to propose the thanks of the meeting to our noble president, for his valuable services on this and on other occasions (cheers).

Sir R. PRICE: I beg leave to second the motion. We are much indebted to Lord Egmont for the great pains he has bestowed on the interests of the society; and we all hope the next country meeting will be fully as successful as the last, and that the prosperity of the society, which has done great good in all parts of the country, will go on increasing. The motion was then put by Mr. Pusey, and carried amidst cheers.

The CHAIRMAN: Gentlemen, I beg leave to thank you for the compliment you have paid me. You may always depend upon my doing everything in my power to promote the prosperity of the society, which has effected so much good; and I hope that the Northamp-



ton meeting next year will be as successful as that held at Newcastle this year. You shall always have my best support in promoting the objects of the society, and I hope that it will go on in increasing usefulness. Gentlemen, I have again to thank you (cheers).

The meeting then separated.

#### N E W M E M B E R S.

Benjamin Bond Cabbell, Esq., M.P., of Portland-place, London, and Edward Wood, Esq., of Stout Hall, Swansea, were elected Governors, and the following gentlemen Members of the Society :—

Barlow, Rev. Peter, Cockfield Rectory, Staindrop, Durham  
 Bragg, William, Cockermonth, Cumberland  
 Bravender, John, Cirencester, Gloucestershire  
 Bullock, Henry, Marden-Ash, Ongar, Essex  
 Dawes, Edwin Nathaniel, Rye, Sussex  
 Cater, Lieutenant-Colonel (R.H.A.), Beckenham, Kent  
 Cornes, John, Barbridge, Nantwich, Cheshire  
 Douglas, Rev. H. D. Cockburn, Weaverthorpe, Sledmere, Yorks.  
 Fowler, Richard, jun., Gravelly Hill House, Birmingham  
 Freeman, John Gardner, Rockfield, Hereford  
 Garnett, Robert, Wyreside, Lancaster  
 Greg, Thomas, Ballymenock, Belfast  
 Green, Daniel, Fingrinhoe, Colchester, Essex  
 Gundry, Joseph, Bridport, Dorsetshire  
 Hardy, James, Jaques Hall, Manningtree, Essex  
 Harrison, Rev. Robert John, Caerhowel, Welshpool  
 Harrison, Rev. T. H., Bugbrooke Rectory, Weedon  
 Hewlett, Thomas, Northampton  
 Higgins, William, Northampton  
 Jason, Charles Roger, Barton, Preston, Lancashire  
 Jennings, Richard, Wargrove Hill, Henly-on-Thames.  
 Jones, Joseph, Welshpool, Montgomeryshire  
 Leche, John, Hurlstone, Carden Park, Chester  
 Longmore, George, Orleton Court Farm, Ludlow, Salop  
 Male, Harry, East Chimnock, Yeovil, Somerset  
 Matheson, John, The Lewes Island, N.B.  
 Nash, Thomas T., Great Chesterford, Saffron Walden, Essex  
 Newmarch, George, The Woodwards, Cricklade, Wilts  
 Norris, William, Wood-Norton, Fakenham, Norfolk  
 Oswald, Thomas, Old Palace, Croydon, Surrey  
 Palmer, Edward, 8, Lower Thames-street, London  
 Rammell, Thomas, Sturry Road, Canterbury  
 Ramsden, Henry, Ledstone, Pontefract, Yorkshire  
 Richmond, George, Heighington, Darlington, Durham  
 Sampson, Samuel, Gloucester Road, Regent's Park, London  
 Sancton, Philip, The Ley, Ley Lane, St. Alban's, Herts  
 Simcoe, Rev. H. A., Penheale, Launceston, Cornwall  
 Smith, James, Icklesham, Rye, Sussex  
 Smiggs, William, Preston-Condover, Alresford, Hants  
 Stanton, Robert, jun., Swaffham, Norfolk  
 Stephens, Henry Lewis, Tregenna Castle, Hayle, Cornwall  
 Stowell, William Stow, Faverdale House, Darlington  
 Thompson, William, Bishop-Auekland, Durham  
 Walker, Capt. Robertson, Kilgarren, Whitehaven, Cumberland  
 Wilkinson, Hooper John, Walsham-le-Willows, Ixworth, Suff.

#### TESTIMONIAL TO THE DUKE OF RICHMOND.

A meeting, convened by circular, was held at the Freemasons' Tavern, on Tuesday, Dec. 8, in reference to the Richmond Testimonial. Amongst those present were:—Messrs. Holden, of Alton, Hants; George Brown, Avebury, Wilts; Meir, Uckington, Shropshire; Hildish, Triplock Hall, Shropshire; S. Cheetham, Oakham, Rutland; J. Weston, Brixworth, Northampton; J. Ellman, Landport, Sussex; G. Oliver, Kingston, Sussex; Edward Wyatt, Chidham, Sussex; P. O. Onsiow, Alpeck, Worcester; Thomas Earle, Icher Stoke, Hants; William Layton, Woodhouse, Isle of Ely; Hartshorne, Silkmore House, Stafford; Benjamin Hall, Buxted Lodge, Sussex; J. Paine, Felmersham, Bedfordshire.

Mr. John Ellman was called to the chair, and the following resolution was carried:—That a deputation be appointed to wait on his Grace the Duke of Richmond, to ascertain his wishes as to the most acceptable mode in which a testimonial could be presented to his grace; and that Messrs. Ellman, Hilditch, Hartshorne, Onslow, Brown, Paine, and Cheetham be appointed the deputation for that purpose."

The meeting then adjourned to three o'clock, and at that hour they again assembled, when the deputation reported that they had waited on the Duke of Richmond, and that his grace had expressed his grateful thanks for the very handsome manner in which they had been pleased to express their approbation of his exertions, and stated his wish that any fund to be raised as a testimonial to himself should be used as the foundation-stone of an institution for the relief of farmers reduced by adverse circumstances.

On which the meeting resolved—"That a subscription be raised for carrying into effect the noble objects proposed by his Grace the Duke of Richmond; and that the minutes of the meeting be printed, and a copy sent to each protection society in England, requesting them to take immediate measures for forwarding the above object."

It was also moved, seconded, and unanimously agreed to, "That the meeting be adjourned to Tuesday, Jan. 12, 1847, then to be held at the Freemasons' Tavern, London, at 11 o'clock precisely, to receive an account of subscriptions, and to appoint a committee for carrying the above resolutions out in the most general and efficient manner; and that Mr. W. W. Burrell be requested to act as hon. secretary till the 12th of January next."

The thanks of the meeting were then voted to Mr. Ellman for his able conduct in the chair, and the meeting separated.

## SOCIETY FOR THE PROTECTION OF AGRICULTURE AND BRITISH INDUSTRY.

The annual general meeting of the committee and members of this society took place on Thursday, Dec. 10, at the rooms of the society, 17, Old Bond-street. In consequence of the arrangement come to at the meeting of the committee on the previous Tuesday, when the question of the repeal of the malt tax was fixed for discussion on the 12th of January, the proceedings attracted little interest; the business transacted was merely of a formal nature, and there were only a small number of members present.

His Grace the Duke of Richmond having taken the chair, said they were all probably aware that the present was merely a formal meeting, for the election of officers and a committee for the ensuing year. The reason why the council had not made any report was, that application had been made to the society at the meeting on Tuesday last, to take into consideration the propriety of applying to parliament for a repeal of the malt tax. That appeared a proper question for the society to decide; but it did not appear to them to be a proper question to decide without due notice to the members. The consequence was, that a special meeting had been called for the 12th of January next, when that subject would be discussed. They had, therefore, really nothing to do that day but to fill up the vacancies and re-elect the officers of the society. There were, he believed, a great many members of the society at present in London. He had himself seen twenty or thirty of them at the Royal Agricultural Society, where business was at that moment transacting, and as they were aware that the present was merely a formal meeting, they did not think it necessary to come. It was of great importance that it should go forth that the farmers should attend their local protection societies between that time and the 12th of January, because it was of the greatest importance that the society should know what was the opinion of the great body of the tenantry with respect to the malt tax. His (the Duke of Richmond's) opinion on the subject was well known—he had always thought it a most odious tax, and that it interfered very much with the manufacture of malt. It was a great inconvenience to farmers to have an excise officer about their premises, and prevented their using malt to feed their cattle, which, notwithstanding all that had been said by a learned professor, he thought of very great value and importance; and what was more important than all was, that their labourers would be able to have a cheap and wholesome beverage. At the same time the question was, not what were his opinions, or those of any other individual, but what was the general opinion of the farmers upon the subject? (hear.) He hoped that on the meeting of the 12th of January they should be favoured with the opinions of all the protection societies in England, and no doubt the question would then be

fairly discussed. He thought customs duties far better than excise duties, because, if they removed the customs duties, part of the relief went into the pockets of the foreigners, whereas, if they removed excise duties, the whole gain was to the inhabitants of their own country. It was quite out of the question to suppose that the malt duty, which amounted to upwards of five millions sterling, could be repealed without some substitute being found. He should be one of the last to put in jeopardy the public credit of the country, but he hoped they would have an opportunity of fairly discussing the question, and taking measures, if the opinion of the agricultural body should be in favour of it, for carrying a repeal of the malt tax, or else of removing those local burdens which, after the report of the committee of the House of Lords, he could not think would long be permitted to remain as a burden on the landed interest of the country. That at least he thought they ought to accomplish. He had now only to submit to them the names of the committee, and some gentleman present would perhaps move their re-appointment.

Mr. Peter MATHEWS, of Coomb End, Cirencester, moved the re-appointment of the committee.

The motion was seconded by the Rev. D. GWILT, and carried unanimously, and the meeting then separated.

The following is a list of the officers and committee—

PRESIDENT.—The Duke of Richmond, K.G.

VICE-PRESIDENT.—The Duke of Buckingham and Chandos, K.G.

TRUSTEES.—The Duke of Rutland, K.G.; Lord G. Bentinck, M.P.; the Duke of Cleveland, K.G.

GENERAL COMMITTEE.—Mr. Allix, M.P., Cambridge-shire; Mr. Bramston, M.P., Essex; Lord Beaumont; Mr. M. Bell, M.P., Northumberland; Mr. Buck, M.P., Devon-shire; Sir C. M. Burrell, Bart., M.P.; Mr. Cayley, M.P.; Mr. Christopher, M.P.; Mr. Colville, M.P., Derbyshire; Rev. John Cox, Essex; Mr. E. Beckett Denison, M.P., Yorkshire; Mr. R. Gordon, Gloucestershire; the Marquis of Granby, M.P.; the Earl of Harewood; Sir T. B. Hepburn, Bart., M.P., Haddingtonshire; Viscount Ingestre, M.P., Staffordshire; the Earl of Malmesbury; Mr. W. Miles, M.P., Somersetshire; Mr. Newdegate, M.P., Warwickshire; Mr. Charles Newman, of Hayes, Middlesex; Mr. Stafford O'Brien, M.P., Northamptonshire; Mr. Plumpton, M.P., Kent; Mr. Pusey, M.P., Berkshire; Mr. G. Silvertop, Northumberland; Mr. R. Smith, of Burley, Oakham; Earl Somers; Sir J. Trollope, Bart., M.P., Lincolnshire; the Earl of Tyreconnell; Hon. J. Vesey, M.P., Queen's County; Mr. Waddington, M.P., Suffolk; Hon. H. W. Wilson; Mr. Wodehouse, M.P., Norfolk; Marquis of Worcester, M.P.; Mr. R. Baker, Writtle, Chelmsford; Mr. W. Bennett, Lewsey Farm, Dunstable; Mr. H. Bethell, Enford, Pewsey; Mr. E. Bowley, Siddington, Cirencester; Mr. W. R. Browne, 2, Devonport-street, Hyde Park; Mr. T. Ellman, Woodhatch, Reigate; Mr. T. Greehan, Stainfield Hall, Wragby; Mr. R. Healy, Laughton,

Folkingham; Mr. Fisher Hobbs, Mark's Hall, Kelvedon; Mr. S. Jonas, Ickleton, Saffron Walden; Mr. P. Mathews, Coomb End, Cirencester; Mr. D. Maydwell, Highlands Farm, Leatherhead; Mr. S. Mills, Elston House, Devizes; Mr. G. Passingham, Lilley, Luton; Mr. J. Pope, Symondsburry, Dorchester; Mr. G. Shackel, Mapledurham, Reading; Mr. H. Trower, Castle Thorpe, Stoney Stratford; Mr. R. Trumper,

Wyke, Hounslow; Mr. T. Umbers, Wappenbury, Leamington Spa; Mr. J. Warsop, Alconbury, Huntingdon; Mr. T. Weall, Woodcote Lodge, Carshalton; Mr. F. Woodward, Little Comberton, Pershore; Mr. E. Wyatt, Chidham, Epsworth; Mr. K. Viall, Stoke, Halstead; Mr. A. Winkworth, Sattenham, Godalming.

SECRETARY.—Mr. Henry Byron.

## ON THE BREEDING, REARING, AND FEEDING OF CATTLE.

WITH A VIEW TO EARLY MATURITY, AS PRACTISED BY THE WRITER FOR UPWARDS OF TWENTY YEARS.

By George Lowes Ridley, Esq., Banks Hall, near Barnsley.

If experience in any particular branch of business is to be gained from a length of servitude, I may fairly be allowed to claim to myself that privilege; and it is for the benefit of the younger branches of my brother farmers, that I attempt to make known to them my system of rearing and feeding my own stock, not with any view of showing up my management as superior to that of many other breeders more fortunate than myself.

Firstly, I must strongly impress on all farmers whose farms are adapted to the rearing of stock, that their first great object should be to possess themselves of a good and useful lot of cows—good well-formed short-horns (not too high bred), with plenty of substance, good sound constitution, plenty of soft hair, and of good quality; above all good milkers, as the number of calves reared will depend much upon the quantity of milk produced. The next most important object is a first-rate bull, whose substance, constitution, and quality must, if possible, excel that of your cows; for it is now an admitted and well authenticated fact that the sire has more to do with the progeny than the dam, and that as 'like begets like,' so you ought to be the more careful in selecting a good sire, with a good frame and great inclination to fatten. And I would strongly urge upon the breeder whose yearly cast of stock is an object to him, never to use a bull from his own herd, but, if possible, to procure a yearling from some well-known stock when need requires.

Secondly, I should recommend, where a herd of from eight to twelve cows are kept, that not less than three or four should drop their calves in the latter part of November or beginning of December. Calves are with proper care easily brought through the winter and with less milk, it being supposed that you have by you a supply of hay, cakes, and turnips; the latter of which they are soon taught to eat, if cut into small slices, and put into their mouths to suck, two or three days running, by their attendant; this, with the addition of one or two pounds

of cake per day, and plenty of good seed hay, will quickly bring them forward to do without milk. And here I will take the liberty of impressing upon the breeders of stock the absolute necessity of proper ventilation and cleanliness in their calf pens, which ought all to be boarded with slabs, and raised about ten or twelve inches from the ground, either leaving a space of an inch and a-half between each slab, or perforating the slabs with a number of holes to allow their water to pass off into a gutter or drain, which will not only keep the pens dry, but prevent all unpleasant smells. Each pen should be large enough to contain two milk calves, with a larger one to remove them to as they get older and are taken off milk; each pen should be furnished with a small rack and trough, and a place to fix in either a piece of chalk or rock salt for the calves to lick, which will add very materially to their general health. With three or four cows you will easily rear six or eight calves through the winter, which you would be able to put to grass nearly as good as yearlings; and as you can quit your fat stock in the spring or first cast, you will be able to remove the oldest calves into the feeding sheds, where they will have more room, and be better prepared for turning into pasture at the proper time. As it will be necessary to purchase calves to make up your cast of stock, I have generally made a bargain with some of my neighbours or cottagers, who dispose of their calves, to send cows that I approve of to my bull, and taking the calf, if I like it, at a fixed price, two days after it is dropped, which I have found a ready way of making up my number of calves. I should strongly recommend to all breeders not to attempt to rear more calves than is required for a regular yearly cast of stock; it is more profitable to do a given number well, than a great number badly, to say nothing of the great liability to disease of the poor half starved animal.

Thirdly, Your next lot of cows should begin to drop their calves about the end of February, none later than May-day (and those last always your first

calf heifers). Calves dropped about this time require more milk and more attention to get them through winter than the older calves, and are much more subject to local complaints; as also from their size they spoil the uniformity of your cast of stock. Your summer calves should have new milk at least four weeks, if not six; and the milk should be given three times in the day, as it is better and more natural to give six quarts at three times than twice; the calves thrive better and keep their forms better, and are not so liable to get what is termed "pot-bellied." When it is not convenient to have milk from the cows in the middle of the day, I should recommend the morning's milk to be given with a little warm water added, to give it the proper heat, for the calves under six weeks old; the older ones will do with a little old milk at mid-day. The writer has found it a very good plan, when milk was scarce, to boil the older calves linseed, and give this in their new milk when it is found necessary to increase their quantity; by this plan you have a greater quantity of new milk at your disposal for the younger calves. After my calves get past their sixth week, their new milk is gradually decreased, and the quantity made up of old milk, until the new is taken off them entirely, and their food is then linseed and old milk till they are twelve weeks old; they are then gradually weaned with a drink of milk and water, and a pound of cake allowed twice a day (if thought necessary), with a good, well-sheltered pasture and a plentiful supply of water, and, if possible, a shed to retire into at pleasure, which will protect them from both sun and rain. The linseed is best prepared by steeping in cold water from morning to night and from night to morning, and when put upon the fire not to boil more than twenty minutes, thereby retaining more of the essential oil, a great part of which is too frequently evaporated in steam by an excess of boiling, thereby rendering the food less nutritious.

When your cows are put to grass in the spring they will improve in their milk, so as to enable you to allow your last dropped calves a plentiful supply of milk thrice in the day, by which means you must try to get them up to the older calves both in size and condition (and this may be done by continuing their new milk two or three weeks longer, or, if butter is an object, by giving, after they are six weeks old, half new milk for a few weeks), for nothing adds so much to the beauty of a young stock as to have them well matched both in size and condition.

After your calves are weaned, they must be forced forward with the best keep you can afford them,

such as clover fog, old land fog, or young seeds; but care should be taken that they never go upon clovers after rain, or when there is dew upon them, for at such times they are liable to get hoven, or, if not, the effect of too much damp luxuriant food taken upon the stomach is more than likely to produce other complaints, and none sooner than that fatal one known as black quarter.

About the middle or end of October, they should be brought into a shed at nights, or if the weather be cold, taken in for winter; they should then be supplied regularly with good seed, hay, and Swede turnips, cut, with one or two pounds of cake each per day, and a plentiful supply of litter, never forgetting that cleanliness is half meat. Choose the warmest and best sheltered sheds for your young stock, as they are most liable to take cold; in the following spring they will go out fresh to a good pasture, and if fortunate will come up in October good rough beef, and then be put on full turnips with oat straw and a few pounds of cake per day; about the following March or April your first lot of winter calves will be fit for the butcher, being then two years and four or five months old. Your next lot of spring calves must then be pushed forward, and by the end of May will also be fit for the butcher (they being about two years and four months old), and may either be sold or put to grass a few weeks, as deemed advisable, according to the then state of the markets.

In conclusion, the writer begs to state that under this system of management he has sold his cast-off stock for from 16*l.* to 21*l.*, their price being partly regulated by a greater or less number of steers, as well as the price of beef at the time of the selling of the stock.

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**TENANT-RIGHT.**—The following resolution has been passed by the Peterborough Farmers' Club, after a full discussion on the question of tenant right:— "That under the law that now exists between landlord and tenant, the country is restricted in the resources derivable from the soil; the labourer and the artizan but inefficiently employed; and the tenant through the insecurity that exists for the investment of his capital, is impeded in the prosecution of those improvements which would be advantageous to the landlord, himself, and the country.

"That a revision of the present law between landlord and tenant is imperative, inasmuch as the establishment of a just and equitable tenant-right will alone enable the farmer to meet foreign competition, and supply at a low price the increasing population with food."

## GUILDFORD FARMERS' CLUB.

A meeting of the Guildford Farmers' Club was held on Tuesday, December 1. In the absence of the President (H. Drummond, Esq.), Mr. Turvill, the Vice-President, took the chair. The subject, which was introduced by Mr. John Ellis, jun., of Arlington, was "On the Physiology of Fattening."

Mr. ELLIS said—You must be aware, gentlemen, that to give a lucid and distinct view of the principles of animal and vegetable life requires that I should have had great and practical experience, and further, that I should possess a scientific knowledge, to which I make but the slightest pretension; but should I succeed in eliciting the opinions of the several gentlemen I see around me, whose scientific knowledge and experience are much greater than my own, and thus lead others to examine and investigate those laws upon which I believe so much depends the success or non-success of their daily practice, my object in introducing it will have been realized. I shall begin with the assertion, which all who have paid the slightest attention to the constitution of animals will readily admit to be correct, that the fat state is neither the natural nor the healthy state of the animal; for example, the lean and spare sheep, feeding and subsisting on the scanty pasture of the South or West Downs of England, consuming a comparatively small amount of food, and that obtained by dint of great physical exertion, is, I contend, in a more natural, and consequently more healthy, state than the enormous and pampered prize sheep, sheltered from the weather, without any means afforded it of taking exercise, and whose food is made to consist of every variety of the most nutritious ingredients which human ingenuity can devise or procure. It has been ascertained by scientific men—Liebig for instance—that the principal agents in producing the fat and desired state of the animal are *heat* and *quietude*, and that the average temperature of animal bodies is about 100 degrees Fahrenheit, or about 40 degrees above the average temperature of our climate. From this circumstance it will be clear that by every respiration of air the animal loses a degree of heat, and would most assuredly soon cease to exist were it not for the counteracting heat supplied to it by the elements of food. The animal heat produced by the supply of food is generated by the combustion caused by the union of the external air, or oxygen, with the carbon and hydrogen and other elements of food. If you talk to the most illiterate and unedu-

ated farmer that can now be met with, he is probably acquainted with the fact that sheep require a much greater quantity of food to satisfy them on a cold dry day in December or March than on a damp and warmer day in August or September; but in the majority of cases his knowledge extends no further than the fact. I know there are those who will argue that the bare knowledge of the fact is sufficient for all practical purposes; but with such I beg most respectfully to differ, for I believe that unless there is a knowledge of the principles indelibly impressed upon the mind, the chances are that the facts resulting from it will be too often lost sight of, and thus will arise unintentional and serious neglect. Now, to conclude these few remarks, I shall proceed to notice some of the facts which have been brought before us in the discussions of the two preceding meetings, together with some other views generally admitted to be correct relative to other animals. The advantages of *stalling* beasts intended to fatten during the winter months have been ably pointed out by Mr. Drewitt. These advantages are easily accounted for. From the confinement the animal is subject to, the number of its respirations is much diminished; a smaller amount of oxygen is inhaled than where exercise is permitted, and consequently a much smaller quantity of food (or fuel, as it may be regarded) suffices for the maintenance of the natural temperature of its body, allowing the redundancy supplied by the stimulating nature of the food to be converted into *fat* and *muscle*. Again, the increased shelter and unnatural warmth rendered to the animal by the *stall* is, upon the same principle, an equivalent for a certain amount of food. All who have been in the habit of tying up beasts to fatten have doubtless occasionally had, perhaps, *one* in a stall, which had hitherto been an extraordinary good feeder and evinced a kindly disposition, suddenly fail to eat, and show symptoms of uneasiness, without any apparent disease, except perhaps a dulness and *vis inertie* of the whole system. In such a case it is an excellent practice to turn the animal fasting into the yard, which generally has the desired effect. To explain this: the animal having taken too much food for the amount of oxygen inhaled, the system becomes clogged, and the digestive apparatus ceases to perform its functions; the increased supply of oxygen received from a sudden exposure to the air, combined with the exercise and increased velocity of its respirations, are

the means by which the animal is restored to its wonted vigour and appetite. From this we may understand the advantage of the practice adopted by Mr. Drewitt, of allowing stalled beasts their liberty for a short time every day. I shall now say a few words relative to the results of certain experiments on farm-feeding of sheep as extracted from the "Agricultural Journal," and given us by Mr. Messinger at our last meeting, in connection with his remarks on "The management and fattening of Sheep." You will recollect that the results of those experiments as detailed were opposed to yard-feeding, and in favour of the open field, so far as regards the increase in weight of the sheep; but even in this case the difference was very trifling (I think only about 1lb. of mutton per sheep more gained in the nine weeks), and I cannot but think there must have been something favourable to the open-fed sheep, which was not recognised by the party to whom we are indebted for the result, as, if the principle we are considering is sound and correct in the *one case*, it must be so *universally*. I will now read an extract, also from the "Agricultural Journal," giving the result of an experiment made by the late Earl Ducie, at Whitfield-farm, where 100 sheep were folded by tens, in pens, each of which was 22 feet in length, by 10 feet in breadth, and a covered shed attached of 12 feet by 10 feet. They were kept in these from the 10th October to the 10th March—each sheep consumed on an average 20lbs. of Swedes daily. Another hundred were folded in pens of a similar size, but *without* sheds attached. They were kept during the same time, and their daily consumption of Swedes amounted to 25lbs. each. Here the circumstances were precisely the same with respect to exercise, the only difference being that the first had sheds into which they might retire, and thus be partially protected from the cold. It is further observed that the partial protection was equivalent to a certain amount of food; and we consequently find the sheep enjoying this protection consumed *one-fifth* less food than those sheep which were left entirely exposed to the cold. In the last case the consumption of the additional food arose wholly from the necessity of adding more fuel (or food) to the furnace of the body in order to keep up its nominal temperature. This was proved from the circumstance that those sheep which enjoyed the protection had increased 3lbs. *each* more than those left unprotected, although the latter had consumed *one-fifth more food*. This result you will perceive differs entirely from the other to which I have alluded, and I have extracted it, not because I have any evidence of its being more accurately described, but for the purpose of illustration. In this latter case I should

say the important difference in the amount of food consumed must have arisen entirely from the shelter afforded to the animal by the sheds, as the food and attention are represented as being perfectly the same, and from the yards being of the same size, and containing the same number of sheep, there could not possibly have been the slightest difference in the exercise and consequent respiration. I would not be understood to recommend the adoption of yard feeding for sheep, as there are many disadvantages attending it; as, for instance, the labour and expense in carting off the root crops, and the recarting the manure back to the field, together with the almost impossibility of distributing it as is done by the animal itself, and the want of suitable yards and farm-buildings. These and other considerations must for a long time render the experiment too expensive to be extensively adopted. The advantages of the modern system of cutting turnips for sheep, and feeding them in troughs, were considered at our last meeting. These advantages are manifest to the scientific man at first sight, from the comparatively small amount of physical exertion required of the animal in order to fill itself, and consequently the greater quietude and smaller absorption of oxygen in proportion to the food consumed; but it remains for the practical and experienced man to decide whether the advantage to the animal is profitable, and adequate compensation for the extra labour required. This can only be done by experiments accurately tried, or by that other infallible test, long-continued and close observation. It is well known (although the extent is difficult to be ascertained by the practical man) that the nutritive value of vegetables and root crops differs very much, and in fact varies with the season of the year. From this arises the necessity of some degree of knowledge of the chemical properties and physiology of plants, and other organic substances used in the fattening of animals; but this most important division of my subject I must leave to be dilated on by those more competent to do it justice. Mr. Ellis concluded his very interesting speech by trusting that gentlemen of more practical experience than himself would finish what he had, however imperfectly, begun. (Much applause).

Mr. CURRIE said, that being in the habit of fattening many beasts, he should like to hear what the advantage of tying them up could be over leaving them loose in their stalls. He tried his both ways, and thought they thrived as well one way as the other.

Mr. ELLIS thought the advantage was in the much shorter time in which they fattened.

Mr. CURRIE said, those in the yard made the best manure.

Mr. MESSINGER said, they might make more

manure, but he thought it could not be so good.

The CHAIRMAN said, the amount of manure must depend entirely upon the amount of food consumed by the animal. He thought there could be no difference in point of fact whether they were tied up or kept loose in the yard.

Mr. MESSINGER, in saying that the manure from the beasts tied up was better, meant that it should be put in heaps, not spread about the yard.

Mr. EVERSLED agreed with Mr. Messinger, that the manure, if put in heaps, would be of a superior quality from the beasts tied up.

Mr. TURVILL said, that Liebig told them that the straw, if burnt upon the land, would do as much good as if laid upon the land to rot; and that the time would come when they would burn all their straw upon the land, but he did not think he should live to see it.

Mr. COUSMAKER approved of the system of tying up calves in close pens. He had tried the plan with much success. His method was to tie up the calf and milk the cow, giving the calf the milk to drink; in this way he had fattened calves in eight weeks. They had at that age weighed 16 or 17 stone, while other calves that had sucked were very lean at that weight. They could get 4d. per stone more for a fat calf of 16 or 17 stone, than for a lean calf of the same weight; independently of which, he thought the cow liked it better, as they were not butted about by the calves.

Mr. ELLIS thought that calves in a forced fat state were unhealthy; animals kept for stock required a different system to be pursued with them. He once had a calf that was in the habit of drinking about one gallon and a half of milk from a pail, independently of what it sucked; it was allowed to do so, and thrived astonishingly.

Mr. CURRIE, in answer to a question from Mr. Ellis, said that his beasts were kept in sheds, but

not tied up while feeding. He thought mangel wurzel or potatoes preferable to white turnips or Swedes. They had also this advantage—they came up earlier.

Mr. TURVILL felt certain that common potatoes were better than Swedes, as they contained very much more starch. It was a well known fact that old and young animals required different food.

Mr. COUSMAKER said there were many different opinions respecting the necessity of artificial heat while fattening animals. He knew Mr. Drewitt did not consider it necessary, and that he even clipped some part of the animal, to prevent it being over heated. When their horses were too fat they sweated them down, whereby they lost their fatness, and he thought this might be the case with other animals. He had seen beasts groomed and curry-combed, and he thought it a good plan, but of course an expensive and troublesome one.

Mr. ELLIS thought it was pretty well agreed that warmth and quietness were necessary; some animals evinced a much more quiet disposition than others. Mr. Drewitt had a flock of lambs remarkably tame and quiet, and they thrived astonishingly.

Mr. MESSINGER thought the shepherd had a great deal to do with that. He had no dog, and the sheep were not worried. All sheep that came under the care of Mr. Drewitt's shepherd were kept quiet and tame.

Mr. ELLIS was of opinion that the natural disposition of the sheep had still more to do with it.

After some desultory conversation, the CHAIRMAN announced that the next meeting would be held on the 27th of December, when R. A. C. Austen, Esq., would give, as a subject, "The Physiology of Plants."

Messrs. Nicholls and Hooker were unanimously elected members of the club, and the meeting adjourned.

#### DARLINGTON FARMERS' CLUB.

The December monthly meeting of this club was held on Monday, December 7, at the offices of Mr. Thomas Dixon, agricultural engineer, their honorary secretary; John Walton, Esq., in the chair, who, in opening the meeting, said that as Mr. Dixon had proposed the subject which they were then met to discuss, he would probably favour the meeting with his views thereon.

Mr. THOMAS DIXON then said—The subject on hand is "The quantity and kind of stock that can be kept upon a clay soil farm, half arable and half grass, compared with when it is nearly all arable." And in order to arrive at anything like

satisfactory results in discussing this question, a good deal of calculations and comparisons will be requisite; for we shall find that in consequence of the subject branching off in a variety of ways, it will require a good deal of consideration before we can make ourselves conversant with all its details. But, gentlemen, do not let us despair at this, do not let us look at the thing otherwise than as a matter of business in which, to some extent, at least, we are every one of us concerned; and let us at the same time bear in mind, that the greater the number of cattle we can feed and keep upon a farm, the more profit the farm is likely to yield; and of

course the more cattle that are kept, the greater the quantity of manure will there be produced, and more particularly if such cattle are chiefly stall fed. I ought, however, here to remark generally, that in order that a farmer may do justice to himself on a clay land farm, should it be cold or wet, he must have a part of the tillage land properly drained, for he cannot expect to succeed in times like the present unless his land be efficiently cultivated; the fact is, he ought and must grow some turnips, or he otherwise must sustain a serious loss for the want of them, not only for his cattle, but for his manure heap. You will, I believe some of you, recollect that at a former discussion of this club, a resolution was come to, that it was more economical to keep all heavy cattle in the house upon green cut food during summer, than to turn them out upon the pastures, and that, by doing so, a greater number of cattle could be kept with advantage; and I am still fully convinced that stall feeding during the summer is more profitable to the farmer than turning the cattle loose upon the pastures. Now, gentlemen, if we admit this to be the case, I think it appears also quite evident that a farm nearly all in tillage will carry a much greater number of cattle to advantage than what a farm half arable and half grass would do. On a farm nearly all arable, if a suitable course of cropping be adopted, I have no doubt but that every requisite kind of food may be produced, to keep more than one-third additional cattle, particularly fattening cattle, over what could be kept if the same farm were half arable and half grass. Old prejudices are fast wearing away, and therefore you will not be surprised when I tell you that if I live a few years longer, I expect to see linseed used as a general ingredient for feeding cattle on almost every farm; and not only this, but I also expect to see every farmer grow his own linseed for that purpose. It is true that flax has from time immemorial been condemned as a scourging and injurious crop to produce on a farm, and therefore it has been in many farm leases and agreements prohibited from being grown; but for all this, I very much doubt if it is a more exhausting crop than several others that are grown: and the principal reason of its being thought a scourging crop has, I believe, arose from an improper course of cropping having been pursued, and thereby the fertility of the land in some cases injured; whereas, the great art in following out a proper course or rotation of cropping, is to adopt such a scheme, that no particular crop may follow another which has already extracted from the soil a great portion of the principal ingredients required for the succeeding crop, without first adding to that land such a description of manure as will remedy the

defect. I may here also be allowed to name that at another of our past discussions I was deputed to introduce the subject, which was "The comparative advantages and profitable cultivation of old grass land as compared with arable land of similar quality." I then showed that it required, at the very least, two acres of good grass land to keep a fattening beast for a year; and I now wish to show as clearly as I am convinced myself, that less than an acre and a half of medium tillage land, by adopting a proper system, will do the same thing, and also will feed the cattle much faster than the old method. There are already some gentlemen, not far distant from our immediate locality, who are using considerable quantities of linseed, as steamed food, along with meal, cut straw, and turnips, for winter feeding, and I believe also with very good effect; and I think the probability is that, to some extent at least, it will be also applied by the same parties to summer feeding, along with green cut food. There is one gentleman in particular that I may name, John Hutton, Esq., of Sowber Hill, who has adopted this system, and who very kindly invited our chairman, along with Mr. Johnson and myself, to go to his place, and see the whole process of preparing the food, and the way in which the stock seemed to thrive upon it; we availed ourselves of his kindness, and by that means obtained a treat of no common order, when he gave us in detail all the different items of expense that he was at in the preparation of the food; and during the few hours that we spent at Sowber Hill, we were three different times amongst the cattle, and each time found them laying down resting; in fact, their quiet appearance and healthy thriving condition were such, that we felt perfectly satisfied that they were feeding in a very superior manner; whilst Mr. Hutton quite convinced us that by using the steamed food along with turnips, he could feed at least twice the number of beasts with the same quantity of turnips that he formerly did, and that in a much less time than what was required when the steamed food was not used along with the turnips. He was also convinced that it was with equal, if not greater profit to himself. Now, in order to give you a clear view of my own ideas on this matter, it will be requisite to go a little into detail, to shew what may be done by growing such produce upon a farm as is requisite for cattle feeding, viz., corn, linseed, and turnips, also rape, tares, clover, and rye-grass. Now an acre and a quarter of land will grow 208 stones of corn; another acre and a quarter will produce 90 stones of linseed; and upon three quarters of an acre you may grow 14 tons of turnips. Now these quantities, the corn being ground into meal, the linseed steamed, and both mixed as



required with a sufficient quantity of cut straw, will, with the addition of the 14 tons of turnips, be ample for feeding four beasts during the whole of the 26 weeks of the winter half year. This would be at the rate of two feeds of the compound, and two feeds of turnips, in each day. Then for the summer half year, I am pretty certain that it would be a considerable advantage to give one feed of compound per day along with mown clover, tares, or rape, and by this means five-eighths of an acre of corn, five-eighths of an acre of linseed, with one and a half acres of rape, tares, and clover, would be sufficient to feed four beasts through the twenty-six weeks of the summer half year: thus the quantity of land required to feed four full grown beasts for a year, is six acres. But I must now tell you, that the whole of the produce of the six acres would not be required; for you will recollect that in this calculation I named above an acre and three quarters of linseed. Now if the fibre on this acre and three quarters and twenty perches of flax be rough dressed for the market, it will yield a profit of about £12 10s., independent of the linseed used for the cattle feeding; and therefore, this being the case, if we reckon five acres we shall be much nearer the truth. Now, gentlemen, if it be found by experience, that flax is a more remunerative and profitable crop than most others, I don't see why it should not be grown under proper management, when it is also seen that the seed is so valuable in the feeding of cattle; besides which, it is now well known that the manure produced by linseed feeding is much more valuable than that produced by ordinary stall feed; but the most profitable part of the crop is the fibre of the flax. I have taken some pains in endeavouring to ascertain the expenses of rearing and preparing a crop of flax; and I find that the profits thereon are generally much greater than upon ordinary crops of corn; and from the information I have got, I am led to believe that forty stones per acre is certainly not above an average, crop but which, without reckoning anything for the seed produced, would yield a profit of about £7 per acre. The expenses of cultivating an acre of flax, and preparing it for sale, will be about as follows:—

	£	s.	d.
To rent of one acre of land . . . . .	1	10	0
To rates and taxes . . . . .	0	10	0
To ploughing, harrowing, &c. . . . .	1	5	0
To seed 2½ bushels . . . . .	1	10	0
To weeding . . . . .	0	12	0
To pulling . . . . .	0	12	0
To saving and dressing seed . . . . .	0	10	0
To watering and grassing . . . . .	1	5	0
To carting home . . . . .	0	10	0
To stutching 40 stones . . . . .	2	0	0
<b>Total expenses per acre . . . . .</b>	<b>£10</b>	<b>4</b>	<b>0</b>

By 40 stones of flax at 7s. . . . .	£14	0	0
By 18 bushels of seed at 7s. . . . .	6	6	0
<b>Total produce per acre . . . . .</b>	<b>20</b>	<b>6</b>	<b>0</b>
<b>Deduct expenses, as above . . . . .</b>	<b>10</b>	<b>4</b>	<b>0</b>
<b>Profit per acre . . . . .</b>	<b>£10</b>	<b>2</b>	<b>0</b>

I must beg of you, gentlemen, to pardon me for thus digressing from the question at issue; but I have done so to show that it is desirable that each farm should produce its own linseed for feeding, and that it is profitable to do so; and also to show that it would not be fair to take the whole six acres, which I have before named, into account for the feeding of four beasts for twelve months, but that five acres are sufficient, as follows:—

	A.	R.	P.
First for the summer 26 weeks,			
Land to grow corn for meal . . . . .	0	2	20
„ Linseed for steaming . . . . .	0	2	20
„ Clover, tares, and rape . . . . .	1	2	0
<b>Total quantity for summer . . . . .</b>	<b>2</b>	<b>3</b>	<b>0</b>

Then for the winter 26 weeks,			
Land to grow corn for meal . . . . .	1	1	0
„ Linseed for steaming . . . . .	1	1	0
„ Turnips . . . . .	0	3	0
<b>Total for winter . . . . .</b>	<b>3</b>	<b>1</b>	<b>0</b>
<b>Total for summer . . . . .</b>	<b>2</b>	<b>3</b>	<b>0</b>
<b>Total for the year . . . . .</b>	<b>6</b>	<b>0</b>	<b>0</b>
<b>Deduct for the flax . . . . .</b>	<b>1</b>	<b>0</b>	<b>0</b>

Quantity of land required . . . . . 5 0 0

Therefore, gentlemen, this shows that five acres of arable land, of medium quality, under proper cultivation, are sufficient to feed four full sized beasts for twelve months; whereas, on a farm half arable and half grass, eight acres at least would be required to do this; therefore, this, I think, shows pretty clearly that a considerable quantity more stock may be kept on a farm in which the land is chiefly under the plough. Now, I would not have you to understand that I would confine the system to feeding beasts only, certainly not; for if it answer well for fat stock, I don't see why it should not answer well for milk cows and other heavy cattle. A farmer's milk cow, upon ordinary land, generally consumes from an acre and a half to two acres for her summer's keep, and about as much more for winter; but I have no doubt, if the same cow were fed in the house upon cut-food with a feed per day of the compound, that one-half the quantity of land would be ample for the same purpose. Then if this be so, there can be no doubt but similar results would accrue in all cases of heavy stock being fed in the stall instead of in the pasture. From inquiries which I have made, I find

that in winter, feeding with the steam compound, the following quantity is sufficient for a grown beast per day:—

Linseed . . . . .	2lbs.
Ground corn . . . . .	5lbs.
Cut straw . . . . .	10lbs.
Turnips . . . . .	30lbs.

This quantity is given in two feeds of the compound, and two feeds of turnips; and a little straw is also given at night. Milk cows and other cattle might have one feed per day of this compound, along with their ordinary food. The great advantage derived from the use of the compound which I have now partially described, seems to arise in different ways. 1st.—From the food being cut, ground, and given in a warm state, both mastication and digestion is considerably assisted, and thereby the animals obtain more rest, and consequently fatten in less time. 2nd.—By using the compound a greater number of cattle can be fed, which is a very important matter, more particularly where turnips are not plentiful. 3rd.—The manure produced by this method of feeding is found to be more valuable than by turnip feeding only.

HENRY CHAYTOR, Esq., of Clerveaux Castle, said that if the system of stall or box feeding cattle were carried out to a greater extent than at present, he had no doubt but that it would be beneficial, more particularly if the linseed required for the purpose was cultivated and grown upon the farm where it was consumed; and he had very little doubt but that the system partially detailed by Mr. Dixon, the secretary, might be carried out successfully, as well as beneficially; and if the fibre of the flax could be profitably saved and prepared for the manufacturer, which he did not see any reason to doubt, he thought it would be the means of producing a good deal of labour in vacant seasons for the wives and families of the labouring man, which he considered would be a very good thing. Now a good deal had been said with regard to flax being an exhausting crop, and no doubt it might be so; yet he had reason to believe that wheat and some other crops were also exhausters of

the land—perhaps as much as flax; therefore, in that respect, he fancied there were no difficulties but what could be removed by judicious cultivation and a proper course of cropping. But in discussing this subject there were so many things which ought to be taken into account, that it was, he thought, utterly impossible for the present meeting to come to any correct conclusion; for although Mr. Dixon had entered pretty largely on the subject, yet there were many points which bore upon the subject that would require explanation, as for instance, he had not shown how it would answer to stall feed in summer with grass cut from old sward, in comparison with tares, clover, or rape. He also thought that Mr. Dixon's estimate of the expenses of cultivating an acre of land, and winning the flax, was too high, as was also the value that he put upon ordinary land; yet there was no doubt but the profit would be equal, if not superior to the profits upon ordinary crops of corn, if at all judiciously managed.

MR. WALTON said, that bringing about a system of house-feeding cattle, as described by Mr. Dixon, would impose a considerable increase of labour; and labour in his neighbourhood was scarce; and he was afraid that it would be had to carry out to advantage, except in large establishments, where men could be specially employed to attend to the preparation of the food and feeding of the cattle only.

MR. CHAYTOR — Undoubtedly there must be some difficulty in the first instance for want of a proper system, but by a little contrivance he thought this might be overcome: it certainly would not answer to break in upon the time of the ploughmen, or those going with the draughts, to attend to the cattle; but he thought in ordinary establishments a method might be adopted that might work advantageously; although the whole of the time of the parties attending the cattle should not be taken up with it.

Other members gave their opinion, and the discussion was continued until five o'clock, the time for closing the meeting, but no resolution was come to on the subject.

The subject fixed for the January meeting is "Draining."

#### INTERESTING AGRICULTURAL EXPERIMENT.

On the 12th of September, we stated that an experiment had been made upon a farm in South Lancashire, in the growing of roots, that might, if successful, serve to counteract the injurious effects of the failure of the potato crop, both as regards the farmers and the public. We have now the pleasure to state the result of this experiment, which has answered,

and even exceeded, the expectation we then formed of its success.

The land occupied by this experiment, we found, on correct measurement, to have been three acres one rood and eighty-three yards. The land was sown in alternate drills at a distance of 30 inches between each, first a drill of potatoes (cups, as they are called),

and then a drill of Swedish turnips; so that the potato tops in one drill did not come in contact with those of the next drill of the same root. The potatoes and the turnips thus grew together till about the middle of last month (October), when the potatoes, which had been partially attacked by the prevailing disease, were dug up and sent to the Manchester market, where they were sold at 12s. per load of 3 bushels; but the turnips remain in the ground, and are growing vigorously, each drill having now twice the accustomed room for nourishment and growth.

The quantity of potatoes produced proved to be 68½ loads of large, 10 loads of small, and 5 loads of decayed potatoes, which sold as follows:—  
 68½ loads at 12s. . . . . £41 2 0  
 10 loads of small at 6s. . . . . 3 2 0  
 5 loads bad, unproductive. . . . .

£44 4 0

The turnips, as we have stated, are still in the ground, but from their appearance the crop may be asfly estimated at 20 tons—value, 27s. per ton . . . . .

27 0 0  
 £71 4 0

The yield of cup potatoes, on an average of years, is 60 loads per acre, and the average price in the Manchester mar-

ket, 5s. per load; so that if the whole field had been set with potatoes before, the quantity produced would have been 200 loads, at 5s. . . . . 50 0 0

Excess of produce in money this year over an average of years . . . . . £21 4 0

Independent of this gain in money, we have here a practical security against the future failure of the potato crop, or of having that failure made up by the two crops united. It may be proper to add that the manure used in the cultivation of this field was six cwt. of guano per acre, sown in drill, of the value of 6s. per cwt., and that the soil is reclaimed peat earth, which abounds to so great an extent in Lancashire and in most of the Irish provinces. As this favourable result is, we believe, principally attributable to the separation of the potato drills from each other, we see no reason to doubt but that under this system of husbandry the results would be equally favourable on any land suitable for the growth of these valuable roots. The risk of an experiment is very inconsiderable; and we recommend its adoption, to a certain extent at least, so long as the country shall suffer under the visitation of the loss of one of the most important articles of food for the people.—Leeds Mercury.

TENANT RIGHT.

SIR,—Your journal having for some time past contained many useful and appropriate letters on the question of tenant-right, with your permission I will offer a few observations on that important subject; and as it is now entertained, not only as a leading question in various Farmers' Clubs, but also by the Members of both Houses of Parliament; and as the subject has been taken up by those who have already taken such an interest for the advancement of agriculture, I have every reason to hope that great benefit will result from their united and praiseworthy exertions.

I consider that the question of tenant-right involves that of the landlord, the labourer, and the public, and as the tenant must be considered the principal to carry out all improvements in the cultivation of our soil, it is highly requisite that he should have security for his investment by an improved tenure, and no longer be subject to that baneful practice, which is too often witnessed, by mercenary landlords and unjust stewards, in taking advantage of the improved condition of the land, merely giving the tenant six months' notice, depriving him and his family of a home, and selling his property invested in the soil to another in the shape of increased rent. Surely this is a proof that such base practices in this enlightened age should be no longer tolerated, and that the tenantry should be protected by some legislative enactment, the necessity of which W. S. Crawford, Esq., M. P., has clearly shown by his excellent letters in your paper

to the tenantry of Ulster, which is applicable to the tenantry of England. He shows that the property invested in the soil is the tenant's, and which all honest landlords will readily admit is the tenant's right. He also states that the tenant is often grievously wronged, and to prevent a continuance of such dishonest practices, he is desirous to see him protected by the laws of his country; and further states, that if the landlord will not allow him to sell his property invested in the land, that the landlord should pay for it himself.

Such a provision would protect the industrious farmer from that unjust system of turning tenants out at six months' notice, and letting the land by tender—a sort of dark auction; filching from the tenant the property which rightly belongs to him, and selling it to another in the shape of increased rent.

A case of this description occurred about three years since in the county of Kent, and that by a noble earl who gave his numerous tenants six months' notice to quit, and let his farms by tender; some of the tenants were of long standing, and had been cultivating their land in a first-rate style, unfortunately for them, under a false security. This is not a solitary case, but it is satisfactory to know they are not numerous; also that there are few noble lords that would act in the same manner.

It is such cases of injustice that induce all thinking men to advocate a better tenure. Indeed, I consider that the landlords' and tenants' interest are inseparable,

as they both are dependent on the produce of the soil, the one owning the land, and the other finding skill and capital for its cultivation. And as the owners of the soil have not the means to cultivate it properly, it should be no longer a question with them as to an improved tenure embodying both their rights.

Under such impressions I therefore offer my opinion. I consider, in the first place, that the proprietor of the land is a responsible agent, and that it is a duty incumbent on him to select such tenants who will cultivate his land properly, giving them every encouragement by assisting or bearing the principal outlay for all permanent improvements, in order to increase the productive powers of the soil to its greatest extent to supply the demands of an increasing population. Looking at his situation in society as the owner of the soil, the country demands it at his hand; at the same time it must be admitted that he is entitled to a fair rent for his land, and if he should improve such land after letting it by an effectual drainage, by cutting down useless timber, grubbing hedges, to enlarge the fields, chalking, &c., &c., he is fairly entitled to receive a reasonable interest for such outlay from the tenant.

As the landlord should be held responsible for the proper cultivation of the land, if at any time he was able to prove that his estate was injured by neglect or improper management, a provision should be enacted that he should have the full power to re-enter and take possession of the growing crops and stock, repaying himself for such injury to the estate, and returning the tenant the surplus—such should be considered a landlord's right. Respecting tenant-right I am of opinion that it would be far better, with a view of encouraging a better system of cultivation, that all yearly holdings should cease—that land should be held, if not under lease, subject to two years' notice, at the option of either landlord or tenant; if on giving up such land it could be proved that it was in any way deteriorated, the tenant should be compelled to pay for it; but if, on the other hand, it could be proved that the land was improved, the tenant would have a claim on his landlord; such a system would hold out encouragement for good farming, and inflict a penalty for neglect.

This may be considered by many rather severe, but on due consideration the principle is just; as I have before observed, that the owners of the soil are responsible agents, there must of necessity be a law to protect their estates from injury.

The tenant's rights, on giving up possession, may be important; he may have undertaken the drainage, erected buildings with various improvements; he may have taken possession of the land in a foul state, overrun with couch and weeds, which is attended with considerable expense to eradicate, leaving the land greatly impoverished; one coat of manure would not be sufficient to restore its fertility; to use a simile, it would be like a hungry man after one meal, he would soon require another; land so neglected would soon cost an outlay of 10*l.* per acre, increasing the value of the land in the same proportion, consequently the tenant would be entitled to a fair compensation for such outlay.

It might be said that there would be great difficulty in ascertaining the improvement after a holding of several years; this may be obviated by a survey by competent persons, reporting on the state of the cultivation on taking possession; a similar system might be adopted on the purchase of manure, when it is put on the land, to call in a responsible person and obtain his certificate as to the quantity; this course would only be necessary two years previous to giving up the possession; the same would apply to chalk and all artificial dressings. Holding at two years certain would be almost equal to a lease, and paying for all improvements; indeed, I am of opinion that even under a lease every improvement should be paid by the landlord; it would insure almost invariably that the land should be kept in a proper state of cultivation, it would annihilate that baneful system practised two or three years previous to the expiration of a lease, what is termed running the land out, by which practice it will take the next tenant five years to restore it, consequently the productive powers of the land are lost, not only to the great injury of the estate, reducing its value, but also to the labourer and the community at large.

The subject of leases has long been a question before the public, who have advocated the principle as an act of justice to the tenant farmer. I consider that there are few persons (even those of the old school) who will not readily acknowledge the justness of the principle. And although there are many very excellent landlords who let their lands on fair terms by the year, following the steps of their forefathers on the principle of live and let live, who would be reluctant to remove an old tenant or his family; but, alas! like others, they depart, and are no more seen, another fills their place either by right of inheritance or purchase, who may not respect the old tenants who have been many years toiling on the estate, but some like the noble earl in Kent, desirous to increase his rent-roll, embraces the earliest opportunity, and by only a six months' notice deprive an industrious tenant of a home, and not only a considerable portion of his property invested in the land under the security of his late benevolent landlord, but he is compelled to make a further sacrifice of his stock by public auction.

Under all the disadvantages resulting from such an uncertain tenure, viewing the whole subject collectively, it must be acknowledged that the tenant's-right, embodying that of the landlord's, is a public question, the public having a just claim upon the owners and cultivators of the soil, that the land shall be made to produce an increase to its fullest extent.

To me it is evident that the landlords and tenants are placed in that position from a late decision of the legislature that they have no alternative but that of increasing the produce of the land in every possible way, in order that they may not be out-rivalled by a foreign competition.

The trial, no doubt, to combat with all the world, will be an important one, but the landlord and tenant must unite and assist each other, or I fear their fate will be sealed.

In the first place they should establish an improved

tenure, including both their interests; an extensive improvement in the cultivation of our united soils would consequently be the result, and the benefits arising from an increase of produce would be almost incalculable; and as labour increases wealth not only to the rich but the poor also, giving them a ready market for their labour, which is the only property they possess; thus would it be the means of rendering them contented and happy.

By an increase of produce the farmer would be in a far better situation to bear up against low prices, and by the same rule, having his land in a high state of cultivation, he will receive the benefit of rising markets.

And I must repeat again my opinion that every encouragement should be held out for good cultivation, and that a penalty should be inflicted for neglect. The latter would make farmers more cautious, in order to avoid that practice, too often pursued, of holding a greater quantity of land than they have capital to manage properly, alike injurious to themselves and the public. In making these remarks, I wish it to be distinctly understood that I do not allude to those who

have large holdings, if they have capital combined with skill and industry. I consider that it would be an act of the greatest injustice in a free country, if, because a man was doomed to be a tiller of the soil, he should be restricted to acres, and not allowed the same privilege as the manufacturer and tradesman in employing that property with which Providence has entrusted him to the best advantage. And if by superior cultivation he made the land to produce three ears of corn where only two grew before, it would be of little consequence how large a quantity of land he occupied—the public would be indebted to him for such increase.

In conclusion, I must again repeat that it is my firm belief that by the landlord and tenant uniting to establish an improved tenure, the benefit resulting would be very extensive by rendering our fields more fertile, and our labourers better provided with food and clothing.

I am, sir, yours most respectfully,

CHAS. NEWMAN.

*Court Farm, Hayes, Dec. 15.*

—Mark Lane Express.

## ON TENANT-RIGHT.

SIR,—As one of those who, for years, have regretted that all improvements made by the tenant-farmer must, of necessity, be effected by sufferance; and as one who feels deeply the disadvantage of the present law with reference to tenant-right, failing, as it frequently does, the endeavours of our most enterprising cultivators; allow me to express my unqualified thanks to the Hon. W. H. Wilson, Mr. Shaw, and Mr. Lattimore, for the noble manner in which they came forward in defence of the rights of the tenant-farmer, at the Farmer's Club, on Thursday last. The talents of these gentlemen I believe to be unquestionable, and the speech of Mr. Lattimore superlatively manly and admirable. It must be admitted that land-agents, stewards, and land-valuers have as good a right to discuss the question at issue as the farmers themselves; but it by no means follows, that the more important body should be influenced, in the remotest degree, by the opinions of the former: and where a desire to mystify, or get rid of the question by means of a side-wind, is manifested, they would be most unwise to do so. No: brother Farmers! thank Heaven, there are those among us who possess tolerably clear heads, with cultivated minds, and who are, consequently, unlikely to be caught by chaff.

“Legal recognition,” as Mr. Lattimore terms it, “can alone be useful to the country. Overtures from land-agents, unattended by legal enactment, would speedily prove to be merely visionary; and *might* would again soon trample upon *right*.”

Uncompromising as are my opinions on this point, I am proud to acknowledge that England abounds with many noble-minded landlords; men who would rather lose a right hand or a right eye than be guilty of an unjust, or ungentlemanly action. To the honour of an

East Kent M.P. I will relate the following fact: A tenant of his, who had farmed under his late father, had determined on quitting his occupation. On ascertaining that the outgoing tenant alluded to bought all his hay, straw, &c., at a sale price on entering, the *Honourable* gentleman voluntarily agreed to take them on the same terms. The amount of this sale, although no more than just, was considerably more than our good old English laws secure to the tenant-at-will; those laws allowing him the *feeding price only*, where a special agreement to the contrary has not been executed.

Allow me to submit that steps should be taken to ascertain the feeling of every member of the Lower House of Parliament on the momentous question of tenant-right; and is it not time we began to inquire whether the “Brave peers of England, the pillars of the state” (whose ancestors wrung their rights from King John), will, in the 19th century, after having assisted in depriving the British farmer of protection, deny him simple justice, and his dependents that increased employment which wholesome legislation on this subject must, of necessity, secure to them. I cannot believe that the aristocracy of England (the most enlightened, the most dignified, and the most honourable portion of our community) will allow the *mere semblance* of self-interest to deter them from doing common justice to the country at large.

Trusting, Mr. Editor, you will continue to sound the importance of this movement through the length and breadth of the land,

I remain,

Your very obedient servant,

EDWARD CARTER HUGHES.

*Belle Vue, Dec. 17th, 1846.*

—Mark Lane Express.

## ANNUAL REPORT OF THE HALESWORTH FARMERS' CLUB.

NOVEMBER, 1846.

According to past usage, the committee of the Halesworth Farmers' Club have reviewed the minutes of proceedings at the various monthly meetings held during the past year, and now beg to submit them, in a condensed form, for the consideration and approval of the members. In adopting the course referred to, your committee have to acknowledge that much of the useful information elicited during the lengthened discussion of some of the subjects has been unavoidably suppressed. The committee especially refer to the questions of the corn laws and the game laws, and the omission of a paper of great merit, by a zealous and intelligent member of the club, on the subject of feeding cattle with malt. Regretting that the various opinions entertained upon the different topics brought forward cannot be particularized in a general report, your committee hope to be pardoned if they venture to impress upon each member the necessity of his punctual attendance at the monthly meetings, as it is only by pursuing such a course that the full objects of the society can be possibly attained.

The first subject for discussion at the monthly meeting held on the 12th of December, was, "The best method of managing stock during the winter season, upon occupations not suited to turnips."

The terms of this question being of a general character, had a tendency to detract from its ordinary interest; the members present not being prepared with that accurate information with regard to the results of the different systems each had pursued, which can only be arrived at by correctly ascertaining the relative properties and value of the various descriptions of food at the time when the same are employed.

The introducer stated, that in consequence of the great expense necessary to be incurred in the purchase of *artificial* food for fattening beasts on such occupations, it was, in his opinion, to the interest of farmers to keep a comparatively large quantity of store stock, and to have recourse to the more provident means of feeding principally with the produce of the farm.

With regard to keeping sheep, it was mentioned, that although such stock are decidedly an acquisition to the culture of heavy land, yet that folding them upon such lands during the winter was so precarious, that a limited number should only then be kept, and the quantity increased during the

summer months when tares for folding could be advantageously grown. As to the proportion of root necessary to be cultivated, the prevailing opinion was, that it should be to the extent of one-half the course; and beet was recommended above all other roots, as less exhausting to the land, and affording the best and most suitable description of food for the spring.

After discussing the respective values of oil-cake, linseed, and the various compounds, the use of *boiled barley* mixed with cut chaff, in addition to a few turnips, for feeding store stock, was stated to have been attended with the most satisfactory results, and was consequently deserving careful consideration. After some desultory remarks, the following resolution was moved and adopted:

RESOLUTION.—"The best method of managing stock upon occupations not suited to turnips having engaged the attention of the members present, it is resolved, that owing to the considerable outlay in artificial food, incident to the carrying out an enlarged system of grazing upon such farms, the rearing an average quantity of store stock is to be preferred. Amongst the various auxiliaries to be used for either purpose, a proportion of corn, oil-cake, linseed-meal or compound, and also boiled barley, at the rate of from half to three-quarters of a peck per day, pollard, &c., are severally recommended; regard being had to the quality and description of the animal, and the marketable value of each kind of food at the time when the same is employed."

Owing to an important public agricultural meeting on the 16th of January, which many of the members of the club attended, the subject for consideration, namely, "The best system of draining, and the most proper time to perform that operation as regards particular crops," was introduced at so late an hour, that in consequence of the circumstances before alluded to, and the unavoidable absence of the secretary, the minutes of the meeting were not recorded.

"The probable effect of the repeal of the corn laws on the agriculturists of this county," formed the subject of enquiry at the monthly meeting held on the 13th of February.

Sir Robert Peel's proposed alteration with regard to the duties on corn, being at this period under the consideration of the government, an unusual degree of interest (as manifested by the large

attendance of members) was attached to the discussion of this question.

After a few preliminary remarks, the introducer quoted various paragraphs from a well written article in the *Illustrated London News*, of 10th Jan., 1846, intitled "A Descriptive History of the Corn Laws,"—commencing in the reign of Edward the Fourth, A. D. 1436, and relating the various fluctuations which they had undergone from that time down to the present period.

The prices of wheat and other agricultural produce coincident with these changes, and the results accruing therefrom to the producer, the merchant, and the consumer, were severally enlarged upon, and many powerful arguments advanced to shew that whilst great disadvantages had at various times been experienced by almost all classes of the community, from the operation of the corn laws, they had in every instance failed to accomplish the professedly great object for which they were imposed, namely, to secure a steady and remunerating price.

With reference to the proposed alteration of the corn laws, as tending to their entire abolition, it was remarked with great candour by the introducer that although favourable to free trade principles abstractedly, he was not without some doubt that the contemplated "transition" measure of her Majesty's ministers might be attended with serious consequences, not only to the landowner by obliging him to submit to a great reduction of rent, but to the farmer and labourer, by the probable loss of a field for the capital of the former, and by diminishing the employment of the latter.

Having disposed of many of the leading objections to the proposed low scale of duties, some circumstances considered to operate as a balance in favour of such reductions were then mentioned, amongst which the local and internal disadvantages connected with many of the corn-exporting countries lying to the south of Russia were prominently noticed: amongst these disadvantages, the imperfect knowledge of agricultural science, the inadequate supply of the essentials for cultivation, the defective state of the inland conveyance, the great distance at which many districts are placed from a virtual port, the freight and charges incident to the transmission of the produce, and last, though not least, the want of capital in the chief corn-producing countries, were respectively enumerated. Reference was also made to the Canadas, and other corn-growing states in America; and a considerable difference in favour of the quality of the British wheat over that of almost all other countries, was said to exist.

The immense increase of our population; the rapid improvements in our commerce and manu-

factures; the great national undertakings now in progress, in the shape of railways, &c.; and other concurrent circumstances, were also cited as powerful elements of protection—tending necessarily to increase the demand for, and enhance the value of, the staple commodities of the home producer.

After alluding, at great length, to the benefits derived by the community from the relaxation of the tariff in 1842, the speaker, with a view to exhibit the noble race which this country had run in the progress of improvement, entered into a statistical account of our imports and exports at various periods, and concluded his address by expressing a hope, that, with the balances to which he had alluded, combined with a desire on behalf of landlords to meet their tenants upon liberal principles, and a corresponding disposition on the part of the latter to endeavour to increase the fertility of the soil by the due employment of their skill and capital, the agricultural prosperity of this country would, under the blessing of Providence, remain undiminished.

The gentleman who followed entertained opinions essentially different from the introducer, and remarked that although, in his opinion, farmers were not justified in seeking an undue amount of protection, yet, looking at the burdens to which land was subject, and the agreements which had been entered into upon the good faith that the corn bill of 1842 would be maintained inviolate, they would be treated with great injustice by the provisions of the proposed sliding scale, accompanied, as it was, by no corresponding equivalent in the shape of compensation. The speaker regarded with some suspicion the item of expenditure for the freight of foreign corn, and attached great importance to the fact, that the foreigner could, and had during the last year, undersold us in our own market, and paid a duty of fourteen shillings per quarter. A series of arguments were then adduced to prove that a certain amount of protection was indispensable to the British farmer, to ensure the due cultivation of the soil; and reference was also made to the low prices of continental produce, to shew that, in many instances, great poverty and distress co-existed therewith.

A well-informed member of the club stated, that from his personal knowledge both of the Canadas and the United States, a considerable boon would be conceded to those countries, in addition to the privileges they now enjoy: and affirmed, that from the natural resources of the soil, the favourableness of the climate, and the comparatively small expense incurred in the production of corn, in connexion with the intelligent and industrious habits of those who cultivated the land, a rivalry of a most formidable character to the British farmer might be expected from that quarter.

A large proportion of the members present participated in the views of the two last speakers, whilst others advocated with equal energy the principles of free trade, mainly upon the grounds that, whilst under a system of protective duties, rents had considerably increased, they had failed in the great objects to which the gentleman who introduced the subject had so justly alluded—viz., to secure a steady and remunerating price.

After a lengthened and animated discussion, the following resolution was submitted by one of the members:—

**RESOLUTION:** “That, in the opinion of this meeting, the existing laws prohibiting the importation of foreign corn duty free into this country, whilst they bring upon British agriculturists all the odium of being a favoured class, are, instead of a protection to the great body of farmers and labourers, a serious injury, and that we shall therefore welcome the day of their entire abolition.”

The following amendment was subsequently put, and carried by a large majority:—“That the members present are of opinion that the repeal of the Corn Laws, or any alteration in the existing scale of duties would be highly prejudicial to the interest of the tenant farmers of this country.”

The subject which occupied the attention of the members at the monthly meeting held on the 13th of March was—“Hints on migration and emigration, with an inquiry as to the most legitimate means of obtaining resources for the latter purpose.”

In looking at the general bearings of this question, it was submitted that they had a more direct tendency upon the interest of the landowner than that of the farmer, inasmuch as the benefits (if any) accruing from either system were permanent to the former, and in most cases only temporary to the latter. The question, however, gave rise to many useful and interesting remarks, and the views of the members may be ascertained from the following resolution:—

**RESOLUTION:** “That under our existing poor laws, the system of migration, as regards this locality, is open to very grave objections; experience having proved that many individuals who have hitherto sought employment in the manufacturing districts in seasons of prosperity have returned under adverse circumstances entirely disqualified for agricultural labour, and have in consequence become a dead weight in the parish to which they belong; but if in certain situations, owing to a redundancy of population or other conspiring causes, it should be desirable to promote the practice of emigration to our distant colonies, the same should be under the care and control of the legislature; and in reference to the expenses of removal, they should, in the opinion of this meeting (independ-

ently of government advances), be borne proportionably by owners and rate-payers.”

At the monthly meeting held on the 17th of April, “The best system to be pursued in breaking up old pastures, and also the most desirable way of laying down ploughed land for permanent pasture,” was introduced for discussion. In reference to the former operation, or breaking up old pastures, it was considered that the cheapest and most effective method was—first, to pare and burn the sward arising therefrom on small heaps, as early as the season would permit (by which system wireworms and other destructive insects would be considerably reduced); after which, two ploughings, with such scarifyings and other dressings as are necessary, should be given at proper intervals in preparation for a root-crop. As a general rule, about one-third of the burnt ashes might be beneficially removed to improve the poorer surfaces on the farm, and the residue spread upon the land where burnt, great care being used to clear the bottoms of the heaps. One member, who stated that the practice almost invariably pursued in Scotland was to break up pasture lands with a plough, and then sow the same with oats, and who reasonably argued that a portion of the soil must be necessarily consumed from the process of burning, inquired as to the chemical effect of that operation; to which it was replied that by burning, organic matter only is expelled, and inorganic matter or ash is left, and the soil in consequence remains unimpaired.

A long discussion followed as to the best method of cropping to be pursued upon newly-broken lands, but on this branch of the question no defined rule could be laid down by the members.

With reference to the second part of the subject, or laying down ploughed land for permanent pasture, but little difference of opinion prevailed, and the views of the meeting may be derived from the clauses embodied in the following resolution:—

**RESOLUTION:** “That it is the unanimous opinion of the members present that the best system to be adopted in breaking up old pastures is—first, to pare and burn the sward arising therefrom as early as the season and other circumstances permit, and subsequently prepare the same for a root-crop, by giving such ploughings and other dressings as may be deemed necessary; and that with regard to laying down arable lands for permanent pasture, great care should be exercised to make a clean fallow, and (if requisite) to drain the same preparatory to sowing the artificial grass seeds, which should be judiciously selected, according to the nature and properties of the soil; and it is further recommended, not to feed such new leys with heavy stock for the first two years, but to allow the grasses to shed their seeds as much as possible (renewing such de-



scriptions in the mean time as may appear in deficient quantities), after which, a covering of manure, at the rate of from ten to fifteen loads per acre, would prove highly beneficial."

The secretary having intimated at a preceding meeting, that he had received a report to her Majesty's government from the Commissioners of Excise, in respect to feeding cattle with malt, it was determined that this important document should be submitted to a member of the club, with a view to bring the subject under consideration at the meeting held May 15th, which accordingly took precedence of the intended question for discussion.

The member who kindly consented to undertake this analysis, having noticed at considerable length the object of the report, and the nature of the experiments, with a description of the animals and the amount of their products, proceeded with great clearness to explain the various chemical properties contained in each quality of grain; giving his opinion in favour of barley over that of malt for the purpose of feeding cattle, thereby corroborating the government report.

Having passed a high encomium upon the minute accuracy displayed in conducting the various experiments, some disadvantages connected with the trials in question were then cited; and in reference to the last experiment, the object of which was to ascertain the relative value of barley and malt when employed to fatten two bullocks, the following observations were made:—"This trial is, in my opinion, by no means satisfactory; after the first fortnight the bullocks were attacked with the foot epidemic; and although the experiment was continued nearly four months, it appears that either from the effects of the disease, the large quantity of grain given, or the bad state of the turnips, the functions of the digestive organs of the bullock fed on barley became deranged and his health much impaired."

After considerable discussion, the following resolution was unanimously agreed to:—

**RESOLUTION:** "This meeting having taken into consideration the reports furnished to her Majesty's government in respect to feeding cattle with malt, resolved, that although they (the members) are duly sensible of the scientific manner in which the investigations therein recorded have been conducted, nevertheless, owing to the limited scale of the experiments, especially with regard to the feeding bullocks, and the adverse circumstances connected therewith, they do not regard such experiments as satisfactory or conclusive, but confidently hope that fresh trials on a more enlarged scale will be instituted under the guidance of practical farmers, and the results thereof reported to the club at some future period."

At the meeting held on the 12th of June, "The various systems of putting in turnips, with their results," were discussed.

The member who brought the question forward spoke highly of the advantages of early ploughing, and advised the use of artificial manure for roots, at least to a limited extent, on all occupations. This gentleman has tried 10 cwt. of carbon and 7 cwt. of rape-cake per acre, each with great success, but thinks a compound of both might be even more advantageously substituted, the properties contained in the former having a decided tendency to promote the growth of turnip plants when young, whilst great additional vigour is imparted by the latter when in their more advanced state.

One member gave his experience in favour of guano over that of any other artificial manure, whilst others advocated the use of farm-yard manure, bone dust, malt combs, &c., each of which had been attended with varied success. With regard to the time of sowing or drilling, it was thought advisable not to perform such operations too early, on account of the increased liability to the ravages of the fly, on the one hand, and the probable deterioration of the crop by mildew, on the other.

The following valuable remarks connected with this subject were handed to the secretary by a member of the club, which your committee feel it their duty to embody in the report:

"By the aid of chemical analysis we are enabled to determine the nature and proportions of the different inorganic constituents of which turnips and other plants are composed; we can calculate with accuracy, not only the particular ingredients removed from the soil, but also the degree in which it becomes exhausted of such ingredients by the various species of plants. Now, as the inorganic matters of plants are abstracted both from the soil and manure, it is obvious that each in conjunction with the other must contain a due supply of those particular ingredients which are essential for their perfect development. The average weight of an acre of Swedish turnips is, of bulbs 12 tons, tops 4 tons; and as one ton of bulbs yields 17lb., and one ton of tops 33lb. of ashes, they consequently contain 336lb. of ashes, or inorganic salts; 100lb. of which consist of potash and soda 81½lb., and phosphate of lime 18½lb.: hence, from each acre this crop removes 274lb. of the former, and 62lb. of the latter salts. One of the most important mineral ingredients for this crop is *phosphoric acid* (contained in all bones), of which acid much of our arable land is very deficient. Potash is also required in large quantities by the turnip plant; for if the soil be deficient in alkaline salts, even should all other substances be present in abundance, the plant cannot attain maturity, because it is the pre-

sence of these salts in the leaves which enables them to take their food from the atmosphere. By recent analysis, it has been shown that farm-yard manure yields by incineration about ten per cent. of ashes, and 100lb. of these ashes contain from 6lb. to 8lb. of potash and soda, and from 5lb. to 6lb. of phosphate of lime. Linseed or rape-cake leaves seven per cent. ash; and 100lb. of this ash yield from 31lb. to 38lb. of alkaline salts, and from 47lb. to 56lb. of phosphate of lime. Peruvian guano contains twenty-five per cent. phosphate of lime; and bones, *fifty* per cent. of the earthy phosphate.

"If, therefore, we calculate from these data, we find that, in order to supply the soil with the whole of the mineral substances contained in sixteen tons of Swedes, it would require respectively of farm-yard manure fifteen to twenty tons, linseed or rape-cake one ton, guano  $2\frac{1}{2}$  cwt., nitrate of potash  $3\frac{1}{2}$  cwt., soda  $2\frac{1}{2}$  cwt., and bone dust 125lb. per acre.

"The ammoniacal salts in guano act very powerfully in rendering the phosphates in the soil *soluble*; but guano when used *alone* must fail, if the soil be deficient in potash or soda, as it contains only from two to four per cent. of these salts. If the soil need only the *earthy phosphates*, they are contained in 125lb. of bone dust, which should always be dissolved in either sulphuric or muriatic acid before being applied to the land. Many of our best loam and clay soils contain an almost inexhaustible supply of potash and soda; hence, in using these salts, great caution should be observed. This also furnishes us with the solution to the query—'Why their use is not always attended with the same results.'"

After a lengthened debate, in which many practical facts were elicited, it was moved, that in consequence of the adverse opinions entertained by the members, no resolution can be satisfactorily adopted.

At the monthly meeting held on the 11th of September, the question of "The Game Laws" was entertained by the members.

The gentleman who introduced this subject entered largely upon the oppressive and injurious tendency of game-preserving:—first, upon the tenantry, who not unfrequently sustain serious injury from such a practice, without receiving adequate compensation for the same; secondly, upon the rate-payers generally, who are subject to manifold aggravated expenses, in consequence of the convictions which occur under the game laws; and lastly, the unhappily demoralizing influence of the entire system upon the labouring population.

Having alluded to the great temptations to which poachers are often liable, by reason of the discre-

ditable practice of encouraging a traffic in game, and numerous *minor* details, the late resolutions of the Lords' committee were presented to the meeting, in consecutive order, and were unanimously pronounced to be both vague and unsatisfactory. Extracts, having reference to the assessment of game, and the baneful effects of strictly preserving, were quoted from the Earl of Euston's liberal pamphlet addressed, about two years since, to the magistracy of the western division of the county, and gave rise to many interesting observations. A statistical account of the annual number of convictions which had occurred under the game laws, for a term of five years, was also read.

The majority of those present concurred in denouncing more fully the undue preservation of *hares and rabbits*, than that of any other species of game: whilst others affirmed, that the right in game being only qualified, nothing short of a total and immediate abolition of the laws relating to such a description of property ought to be tolerated.

In confirmation of this view of the question, a series of resolutions, passed at a county meeting by the farmers of Haddingtonshire, in Scotland, condemnatory of the entire system of game laws, were submitted, and the prominently independent course pursued by that body was ably supported.

Considerable discussion ensued; and whilst all present acknowledged the evils of the existing laws, and expressed a strong desire for their amelioration, yet no specific remedy was proposed which seemed to the majority of the members to be practicable.

The following resolution (accompanied with a recommendation that the subject should be again introduced at a future period) was then moved and adopted.

RESOLUTION.—"That the present game laws (especially those which relate to the preservation of hares and rabbits) are highly prejudicial, not only to the occupiers of the soil, but to rate-payers in general—involving, as they do, considerable and undue expenses in regard to the convictions which occur under such laws—and are equally objectionable, in consequence of their injurious operation on the morals of the labouring classes."

"The principles of breeding animals, adapted respectively for the dairy and grazing purposes," formed the last subject for discussion at the meeting, held on the 9th of October.

The introducer, after some preliminary remarks, observed that the animals which produced the largest proportion of fat and muscle, with the smallest consumption of food, are the Herefords and shorthorns; the former of which will fatten at the age of two years to sixty stones, whilst the

Scot or home-bred would require four years to attain an equal weight.

This fact was deemed to be of the highest importance, inasmuch as the value of a breed of cattle ought not to be determined by the profit which is yielded between buying and selling, but rather that which is produced to the breeder and grazier conjointly, from their birth to maturity. The successful experiments of Messrs. Bakewell and Charles and Robert Colling were then alluded to, and the various systems which each had pursued, in order to develop the highest degree of perfection in their respective breeds of cattle, were explained.

The following table exhibits the distinguishing characters of animals possessing the properties of fattening or grazing, as compared with those which indicate the faculty of yielding milk, viz. :—

#### FOR GRAZING.

**HEAD**—small; muzzle fine; ears large, a little erect, and transparent.

**NECK**—short, light, and nearly straight; small from the back of the head to the middle; dewlap large and deep.

**CHEST**—broad and round; ribs deep and barrel-shaped; with a hump behind the elbow.

**BACK**—straight from the shoulder to the tail, and well filled up with muscle; hips wide.

**BELLY**—nearly straight.

**QUARTERS**—full, long, and large; the muscles reaching close down to the joints; legs short; bones small and flat.

**TAIL**—falls perpendicular from the line of the back.

**UDDER**—firm and fleshy, and the milk vein small.

#### FOR THE DAIRY.

**HEAD**—large; muzzle coarse; ears rather pendent, and tinged yellow inside.

**NECK**—long, slender, and tapering towards the head; with but little loose skin below.

**CHEST**—deep, but narrow, and strikingly deficient in the substance of girth; ribs flat and wide apart.

**BACK**—narrow; joints wide and loose; bones prominent; hips narrow.

**BELLY**—large and drooping.

**QUARTERS**—muscles thin, but very firm.

**LEGS**—long, coarse, and inclined to be sickle-hammed.

**TAIL**—set on low; haunch drooping to the rump.

**UDDER**—large, thin, and loose, and the milk vein very prominent.

The disappointments of breeders, it was affirmed, are mainly attributable to the exercise of an improper judgment in the selection of their stock, a

very prevailing error being, that of crossing between a male and female of opposite descriptions and characteristics, without regard to the kind of animal sought to be produced.

The opinions of Mr. Ellman and other eminent men, were cited in corroboration of this fact, and various quotations were adduced, to shew the fallacies which had been practised in endeavouring to improve the various breeds of cattle in this and other countries. It was well observed, that it is difficult to combine the qualifications of an extreme aptitude to fatten with the properties of producing milk to any degree of profusion, inasmuch as the perfect development of form necessary to ensure the one, is invariably accompanied with a corresponding failure as regards the other.

Supporting these views, the speaker alluded to the mischief which, in his opinion, had been produced by the unwise practice of attending too exclusively to the attainment of a propensity to fatten, as applicable to our native breed—the old Suffolk cow—which, he contended, should be estimated principally for her rearing and milking qualities. A long series of useful remarks followed, and the meeting separated without coming to a resolution.

With this brief and imperfect detail of the principal features arising from the various subjects which have been discussed, your committee, before closing this report, have pleasure in repeating their thanks for the continued kindness of those friends who have contributed to the cottage allotment prizes, and are happy to state that the interest heretofore manifested in this department of the society remains unabated. The suggestion offered by the judges last year, with regard to a discrimination between the products of light and heavy soils, has been carried into practice and attended with satisfactory results.

Owing to the partial failure of the turnip crop in this neighbourhood, the exhibition of farmers' roots was not so large as could have been anticipated; some fine specimens, however, both in point of size and quality, were displayed; whilst the cottagers' productions, which were more numerous than those of any former year, were of the most commendable character, and became the subject of many approving observations.

The accounts of the treasurer, which have been examined, denote a balance in favour of the club (after payment of the necessary outlay), amounting to £1 2s. 10d.

Forcibly impressed with the idea that many important consequences may result from political changes which have recently taken place (changes which, it will be seen, are at variance with opinions recorded in a preceding part of this report), your committee earnestly hope that the members of the

Halesworth Farmers' Club will promote the welfare of their order, by combining with their practical experience *the resources of science and art*; and whilst your committee would respectfully urge the future consideration of questions associated with general farming pursuits, as best designed to promote the legitimate and primary objects for which the society was constituted, they are bound,

from the impulses of the times, to recommend, in connection therewith, an assiduous and untiring devotion to obtain a sound and equitable system of Tenant Right, and the removal of such particular burdens as impede the progress of agricultural improvement.

On behalf of the Committee,

CHAS. LENNY, Secretary.

### NEWCASTLE FARMERS' CLUB.

On Saturday, the 7th November, 1846, the monthly meeting of the above society was held in the club room, in the building of the Literary and Philosophical Society, Wm. Anderson, Esq., in the chair.

Mr. Glover, the secretary of the society, then read the following papers on the cultivation of flax, and the fattening of cattle by box feeding:—In bringing this subject before you, I do not lay claim to any originality, for I have derived my information chiefly from the diligent perusal of the writings of Mr. Warnes and others, and from seeing the system fully carried out by the gentleman just mentioned, at his farm at Trimmingham. I bring the subject before you with the hope that what I have to state may induce some of you to follow out the system. I am convinced of the feasibility and utility of the plans of Mr. Warnes, if properly carried out. When we consider that, annually, this country expends from five to six millions of money for foreign flax (a sum nearly equal to the poor rates of England), and about three millions for seed and oil-cake, and that if we were to cultivate flax to supply our wants, the number of hands required would be such that a great demand for labour would take place, the subject assumes even a national importance. The cultivation of flax is calculated to give employment to the youngest child capable of occupation, and therefore to young females, for whom the pulling, spreading, drying, scutching, &c., are all suitable operations. At Trimmingham, a heavy poor rate has been replaced by a merely nominal one, owing to the introduction of the flax culture into that parish; two old and infirm persons only being on the poor books. It is astonishing that, with the enterprise, talent, and capital employed by the British farmer, the real properties of flax should have been so long neglected. "We have invariably asserted our conviction," remarks the *Farmers' Journal*, "that the occupied lands of Great Britain and Ireland, if properly treated, are capable of supporting ten times the present number of inhabitants of those islands, and that the wastes may be rendered available to an ex-

tent as yet but little understood." The growth of flax offers the prospect of a more permanent occupation for the poor than any other that has yet been brought forward; for while the crops are highly remunerative to the grower, they give a more varied employment and multiplied occupation than any other produce of the soil. The seed contains, according to the analysis that I shall give, all the vegetable substances necessary to support gramivorous animals. Being a native plant, it is sufficiently hardy to endure the climate of this and more northern countries. It has, indeed, a wild range of climate, being cultivated for the same purpose from Egypt to the Polar regions. In Belgium it is called the "golden crop;" in Ireland it is called the "rent-paying crop." "In Ireland, until recently," Mr. Nichols remarks, in the *Journal of the Royal Agricultural Society of England*, "the cultivation was much neglected, and that raised was of a very inferior quality. This was not so much owing to the inferior nature of the plant as to the mode of managing it after it was drawn; and the society which was established a few years ago in the north of Ireland, for encouraging the growth and improving the preparation of flax, directed its earlier attention to correct this defective management. They brought over skilful cultivators from Belgium, to instruct the people; and afterwards, finding this was not sufficient for the purpose, they selected a number of intelligent young men, and sent them to Belgium, to learn the Flemish mode of cultivation and preparing the flax; and the result has been, that not only has the quantity of flax grown greatly increased since the society commenced its operations, but the quality of the flax has likewise greatly improved; and Ireland may now look forward, at no very distant day, to produce as much as she requires of this great staple of her manufactures." Can we doubt that what has, it may be said within a recent period, been done in Ireland, ought not also to be done in England? The soil and climate are at least as favourable for the growth of flax as they are in either Holland or Belgium. The only difficulty that we have to con-

tend against is our want of knowledge respecting the different preparations that it has to undergo, so as to render it fit for the market. But instructors may readily be had from those countries (that is, Holland, Belgium, and Ireland, and I have reason to suppose from Mr. Warnes's establishment in Norfolk), or persons might be sent from hence to learn the various processes, and, on their return, they might impart instruction to others. The general introduction of flax culture in England would constitute a new and most valuable change in the rotation, and would enable the farmer to vary and extend his successions, which is itself a highly important consideration. It has always been urged against the flax culture that it exhausts the soil; but that is not necessarily the case. If the seed be saved and mixed with vegetable productions for fattening cattle, as recommended by Mr. Warnes, it will make a great return as to manure: the richest being produced from animals fed upon it. As a proof, I have seen a field this year at Mr. Warnes's farm that would average at least 44 bushels of wheat after flax, and on only recond-rate land. I firmly believe that the grower would be amply remunerated by the seed alone, for its worth is incalculable when converted into cattle food, both as respects the return in the shape of meat, and the productiveness of the land on which the manure is spread. If sown with the view of obtaining the greatest quantity of seed, the produce would vary from 24 to 28 or 30 bushels per acre—weight about 4 stones per bushel—which, at 6s. 6d. per bushel, the price at which it is sold at present in this town, would be worth from £5 16s. to £9 15s. per acre. Mr. Warnes states in his book that “two acres of newly-broken up heath land were sown upon the estate of Robert Markham, Esq., of Stratton, and produced about 38 bushels of excellent seed, 75 stones 12lbs. of good flax, 5 lbs. of ordinary, and about 4 stones of tow. The chief part of the seed was given to the cattle, and the remainder was sold at 7s. 6d. per bushel.” Messrs. Marshall, in a letter to Mr. Warnes, say, “The cost of raising and preparing a crop of the fine description of flax for the market is £13 10s. per acre, including £5 for rent, and the average value £28 per acre, leaving a clear profit, independent of the seed, which ought never to be sold, of £9 10s. per acre. Mr. Barrett, of Barney, tenant to Lord Hastings, thrashed out an acre of flax that produced 24 bushels of seed: he sold half of the flax for £11.” In the report on the agriculture of the West Riding of Yorkshire, by R. Brown, published by the Board of Agriculture, 1799, are the following remarks: “From my own experience I am convinced that flax is not an impoverishing crop.” He gives the expense of cultivating an acre at £12 19s., including £5 5s. for rent, and the crop

yielded 50 stones, at 8s. 6d. per stone, leaving a profit of £7 10s. In the report of Argyle, by John Smyth, published by the same board, he gives the expense at £11 per acre, and the value at £19 14s. per acre, so that it leaves a profit of £8 4s. per acre. Mr. Warnes, in a recent letter to the Editor of the *Farmers' Journal*, says, “that a great proportion of my flax produced at the rate of about one ton from three acres of land; or, at £85 per ton, at the rate of about £28 per acre; or, at £53 per ton, £17 10s. per acre—exclusive of the seed, which in some instances amounted to 26 and 28 bushels the acre. But taking 20 as the average, at the present price of English linseed, £7 per acre may be added to the above sums.” With respect to the produce, from twenty to seventy stones have been produced from an acre, but from forty to fifty stones may be considered a medium crop. I think that those facts and statements which I have quoted are sufficient to prove that, if properly managed, the cultivation of flax will amply remunerate the grower. I shall now proceed to describe the plant, the soils best adapted to its growth, and the management of the crop. Flax belongs to the genus *Linum*, of which there are several species; the most important, and the only one that is cultivated, is *Linum usitatissimum*—(common flax). Root annual, fibrous; stalks upright, two or three feet high or more, round, smooth, leafy, branching only at the top; leaves, lanceolate, sessile, at the lower part of the stem growing thickly together, without any order, on the upper part of the stem more distant and alternate; flowers large, of a delicate purplish blue colour; petals fine, wedge shaped, deciduous, streaked with veins of a deeper colour, the tips notched as if eaten by insects, the claws white. According to the analysis of Leo Mayer, the seed contains 11·265 of fixed oil, 0·146 of wax, 2·488 of soft resin, 0·550 of resinous colouring matter, 0·926 of a yellow matter analogous to tannin, 1·48 of amidine, 6·154 of gum, 15·12 of vegetable mucilage, 2·921 of gluten, 2·782 of albumen, 10·884 of sweet extractive, 44·382 of husks containing mucilage. Although the soils best adapted to the growth of flax are deep and friable loams, and such as contain a large proportion of vegetable matter in their compositions, yet it is grown in inferior soils in Belgium and Holland, rendered rich by manure, and upon mere bogs in Ireland. In truth, the plant will flourish upon most soils not absolutely barren. The diseases of flax are few, consisting chiefly of the mildew and the rust. The young plants are sometimes attacked by the fly, but these casualties rarely occur in this country. With respect to the management of flax, I shall be able to state more clearly by taking each part under a separate head.

*Rotation.*—The place for flax in the rotation is

after ley or a corn crop, and as soon as possible after the land has been broken up from grass; it will therefore succeed, with propriety, oats or wheat after ley, and this may be regarded as the proper place for flax in the rotation. It should not by any means come after turnips or potatoes, as the fibre would be invariably coarse and the stalks uneven, from the manure not being properly incorporated with the soil. It must not be cultivated on land which has been recently limed, certainly not sooner than the third or fourth year.

*Preparation.*—In preparing the land for flax, the objects to be attained are the reduction of the soil to a fine tilth, and the thorough eradication of weeds. The preparation of the land for this crop is even of more importance than the quality of the soil itself. The land should receive a deep ploughing in the autumn as soon as the previous crop is removed off the land, as this ploughing facilitates the after pulverization of the soil in the spring. In this state it remains during the winter; and as early in the spring as the state of the soil will admit of the action of the implements of tillage, its further preparation is to be resumed with a good harrowing, to reduce partially the furrow slices which have stood the winter. After this another ploughing is to be given in a direction crossing the preceding one, after which the harrowing is to be repeated, and continued as long as it is found to have a beneficial influence in pulverizing the soil. Such weeds as have been brought to the surface by the action of the harrows are then collected over the surface, and removed from the field, as well as all large stones, which in most soils are also disengaged by the action of the harrows. In favourable cases, and in rich and easily pulverized soils, this preparation may be sufficient; but in most cases another ploughing and harrowing will be requisite. The action of the clod-crusher will be a necessary auxiliary to that of the harrows, especially on adhesive soils, the lumps of which, in dry weather, will resist the action of the harrows alone.

*Sowing.*—The best seed time is during the latter part of March and beginning of April, the precise period being regulated by the weather and consequent state of the land. Flax seed that is proper for sowing should be fresh, smooth, plump, and so heavy as to sink in water; it should taste sweet, and on being broken it should appear of a bright yellowish green colour, and oily. The quantity of seed sown is from six to nine pecks, or three bushels per acre, or even more when particularly fine flax is required. It is better, perhaps, where fibre is the primary object, to sow too thick than too thin; as with thick sowing the stem grows tall and straight, with only one or two seed capsules at the top, and the fibre is found greatly superior in

fineness and length to that produced from thin sown flax, which grows coarse, and branches out, producing much seed, but an inferior quality of flax. After sowing, cover it with a seed harrow, going twice over it, and once across or anglewise. This makes it more equally spread, and prevents the deep creases generally made by the teeth of the harrows.

*Weeding* commences when the weeds can be readily distinguished amongst the plants, or about the third week. In this country it is usually performed in the same manner as the weeding of corn.

*Pulling.*—The best criterion is when about two-thirds of the stalks are observed to turn yellow, and to lose their leaves; and also, when by cutting the seed pod across (horizontally) the seeds have changed from the white milky substance which they first show, to a pale brown colour, and are pretty firm. In pulling, take the plant close below the bolls; this allows the shortest of the plants to escape: with the next handful, the puller draws the short plant, and so keeps the short and long each by itself, to be steeped separately. This should be particularly attended to, as it enhances the value to the spinner, and consequently to the grower, who will be amply repaid for his trouble. As soon as pulled, the flax is stooked without binding. The handfuls are set up, resting against each other, and the top ends joining like the letter A, forming stooks about eight feet long, a strap keeping the ends firm. In this way it will resist wind and rain, and dry quickly. In six or eight days it may be bound into sheaves, with wheat straw bands, and stacked; the seed may be taken off at leisure; the mode of taking the seed is by repeated strokes of a beater, the foot being at the same time kept on the root end of the flax, to prevent it from being turned about, which would impede the after process in its manufacture.

*Steeping.*—It is the practice of some to steep as soon as the flax has been dried in the field. A great disadvantage in treating flax in the autumn is the difficulty in many cases of preserving the seed after rippling. The system now advocated is, that flax should be steeped the following May—a system which possesses the advantage of affording the farmer the best season of the year for steeping and grassing, and a time of comparative leisure, when his attention is not called off the harvesting of other important crops. The object of causing the flax to undergo this process is to facilitate the separation of the fibre from the stem, during which the mucilaginous matters, causing the fibres to adhere to it; partially undergo the putrefactive fermentation. The water for this purpose should be soft, pure from all mineral substances, clean and clear. The sheaves of flax are put into a frame made of common

poles, something like a large earthenware crate, with the root end undermost. The whole is immersed in the water: a covering of straw, to shade off the light, is found to be advantageous. When covered over in this manner, stones are placed upon the frame, till the whole is sunk a little under the surface of the water. The bottom should not touch the ground, so as to allow the water to flow over and under it. A gentle stream should, if possible, always pass over the pond; it carries off impurities, and does not at all impede due fermentation; it is essential to produce flax of a good colour: flood and all impure waters should be carefully kept off. The test for knowing when the flax is sufficiently watered is this:—Try some stalks of an average fineness; break the woody part in two places about three inches apart, at the middle of the length; catch the wood at the lower end, and if it will pull out (downwards) for those three inches freely, without breaking or tearing the fibre, it is ready to take out. This trial should be made every day, after fermentation subsides, for sometimes the change is rapid. It is safer to steep it too short a period, than ever so little too long. In the first case, merely a little more time is required in the future processes; the second, the strength and texture of the fibres may be injured. When the flax is sufficiently watered it is taken out of the pond and placed on the banks to drain for a few hours.

*Spreading.*—Short and close pasture land is the proper place on which to spread the flax, and in this operation it is important to distribute it evenly over the surface, and to make the rows perfectly straight, to prevent confusion in turning. The intention of this process is to wash and bleach the flax by exposure to the sun and rain. After remaining two, three, or four days, according to circumstances, it is turned over by long poles, or wattles, run under the rows, beginning with the first row, and proceeding, so that the second falls upon the ground occupied by the first. The length of time during which flax should remain on the grass is variable, depending on the weather and state of the flax. If possible, it ought not to lie longer than five days.

*Breaking.*—The flax is bruised by an instrument called a break, which consists of two frames fixed together at one end by a hinge, and works the one into the other; or by passing it through a breaking machine, which consists of four pairs of fluted rollers, placed upon a frame of wood. Through the flutes of the rollers, which revolve into each other, the flax is passed in small handfuls. In this manner the flax is bruised, and put into a state to have the ligneous refuse separated from the fibrous part by scutching.

*Scutching.*—This operation may be performed

either by machinery or by manual labour. When performed by manual labour, a handful of the flax is held by one hand in the opening of the scutching board, and beaten by an implement called a swingle, held in the other hand, by the repeated strokes of which the woody particles of the stem are separated from the fibre. Or the operation of scutching may be performed by a machine called a scutching mill. It resembles a small caravan; in the interior are three recesses formed for the men to stand in while at work, and for their protection from the action of the swingles, which being placed in an iron axle, and set in motion, would, if necessary, strike the flax resting on the scutching boards at the rate of about twelve hundred times in a minute. The scutching mill and breaking machine were the invention of Mr. Warnes.

I now come to the second, and perhaps more important, part of my subject, namely, the system of fattening cattle in boxes—a system that is of the utmost importance to the farmer, for it insures a rich supply of manure, and takes very little money from his pocket; the whole of the cattle food being grown upon the farm. There are no bills to pay for oil cake, which is often composed of rubbish, refuse seed, &c., and occasionally may be detected a substance amongst it having the appearance of old tarry rope. But box-feeding is so worked upon and through the farm itself, as to place the superiority of the system over all others beyond a doubt. It is almost impossible for any one who has not seen and paid attention to the subject to form a correct estimate of the advantage of box-feeding cattle. The plan is extremely simple and feasible, which is one of its greatest recommendations. The advantage of feeding cattle in boxes consists in the absence of all waste of food, which in a yard it is impossible to prevent. It affords the opportunity of placing before the animal an equal portion of food, which cannot be the case in a yard where cattle are indiscriminately mixed. It allows each animal to eat at its leisure, ruminate unmolested, and take its rest undisturbed. In yards where there are a number of cattle, the master cattle consume the choicest parts of the food; they drive the weak ones about, and allow them little rest. Hence the great inequality observable in the condition of yard fed cattle, compared to those fed in boxes; and hence the astonishment so often expressed by farmers, that after their fattest cattle have been sent to market, the remainder thrive rapidly. It is then perceived that those cattle which appeared the least prone to fatten would perhaps have been the most forward in condition, had they been separated from others. In fact, the system of feeding cattle in boxes can be regulated to the greatest nicety; while that in the yards must ever

remain slovenly, wasteful, and imperfect. I shall now proceed to give you a description of the boxes, according to the plan of Mr. Warnes. We will suppose that you wish to erect ten boxes, for which you will require a space of ninety feet long and twelve and a half wide; then let a line be drawn from one end to the other, three feet and a half wide, from the side most convenient for the passage. Next, let the mould, to the depth of one foot, be excavated from the other part, and thrown on the side intended for the front, and spread to the thickness of a foot deep. This will give two feet from the bottom of the boxes to the surface. A wall of brick-work four inches wide and two feet high is next to be built round the inside of the part excavated, and intersected at distances of eight feet and a half. At each angle the brick-work should be nine or twelve inches square, which will both support the posts and afford strength and durability. Upon the wall a sill of wood is next to be placed; for which purpose large poles, either square or split, are adopted. The foundation being now complete, posts six feet long, and the necessary sills and ties, may be placed upon it. Across the ties the most ordinary poles may be laid to support a roof composed of the trimmings from hedges and ditches, and completed with a thatch of straw or rushes. Two gates must be added to each box; one of which moves on hinges, and the other to be secured at the top and bottom sills of the building, so as to be taken down at pleasure. Presuming that we have taken advantage of a barn, or other walls or farm premises, the external part is finished: the internal has merely to be parted off with a few poles between each box, and the passage separated by the cribs, which are to move up and down between the interior posts, which are placed upon the angles of each box, and support the roof on the passage side. Such boxes as I have described, where advantage can be taken of an unoccupied wall (which ought to be from six to eight feet in height), may be erected for thirty shillings each. These boxes are  $8\frac{1}{2}$  feet square. From what I have seen I think that they would be too small for our large short-horns; they should be from 9 to 10 feet square. I would not recommend them to be made larger than 10 feet, for if so the manure will not get properly trodden down. Good strong substantial boxes, back wall eight feet high, interior 10 feet square, and with slated roof, can be erected in this neighbourhood for three pounds fifteen shillings. Each box acts as a small tank, the whole of the urine being taken up by the straw, or other absorbents; such as sawdust, dry mould, &c. If cattle are properly littered in this way, the manure will only rise about three inches in a week; it becomes compressed into a hard compact mass,

turning out about 5 or 6 cubic yards of manure, two loads of which being equal to three made any other way by cattle. I shall now proceed to describe the different things that are required for making the "cattle compound." The only apparatus required for carrying out the system is a linseed crusher, an iron cauldron, a hand cup, a stirrer, one or two hogsheads, two or three pails, and a wooden rammer. The probable cost will be about £12. Large cauldrons are found inconvenient for stirring where compounds are made with the meal of peas, beans, &c. The sizes most preferable are those to contain from 30 to 40 gallons. The stirrer is an iron spoon fastened to a shaft of wood four feet long. The rammer is three feet long, about five inches square at the bottom, and two and a half at the top, through which a pin fourteen inches long is passed for the convenience of being raised with both hands. The compounds are made as follows:—Upon every six pails (a pail is supposed to contain six gallons) of boiling water, one of fine crushed linseed is sprinkled by the hand of one person, while another rapidly stirs it round. In five minutes, the mucilage being formed, a half hogshead is placed close to the cauldron, and one bushel of turnips, or tops, and cut straw are put in. Two or three handcupfuls of the mucilage are then poured upon it, and stirred. Another bushel of the cut turnips, chaff, &c., is next added, and two or three cups of the jelly, as before; all of which is expeditiously stirred and worked together with the stirrer and rammer. It is pressed down as firmly as the nature of the mixture will allow with the rammer, which completes the first layer. Another bushel of the cut straw, chaff, &c., is thrown into the tub, the mucilage poured upon it as before, and so on until the cauldron is emptied. The contents of the tub are lastly smoothed over with a trowel, covered down, and in two or three hours the straw, having absorbed the mucilage, will also, with the turnips, have become partially cooked. The compound is then usually given to the cattle, but sometimes allowed to remain till cold. The cattle, however, prefer it warm; but, whether hot or cold, they devour it with avidity. Either potatoes, carrots, turnips, or mangold wurtzel, boiled and incorporated with linseed meal, form a compound upon which cattle fatten with great rapidity. To make it, nothing more is required than to fill the cauldron with washed potatoes, or carrots, &c., sliced. Supposing the cauldron would contain eight or nine pails of water, let only one be added. In a few minutes the water will boil, and the steam will speedily cook the roots; then a convenient portion should be put into the half hogshead, with a little linseed meal, and mashed with the rammer. The remainder



must be prepared in the same way. As the mass increases in the tub, it should be pressed firmly down, in order that it may retain the heat as long as possible. In the spring and summer months, germinated barley may be made into a compound with great advantage, mixed with linseed, cut clover, grass, or lucerne; cattle eat it with great avidity, and thrive fast upon it. The process is simple: Let some barley be steeped about two days, and the water drained off. After the radical or root has grown to nearly a quarter of an inch in length, it must be well bruised by the crushing mill, and as much as possible forced into some boiling mucilage, containing the same quantity of linseed, but a fourth less of water than would have been prepared for dry barley. Care must be taken lest the sprouts are suffered to grow beyond the prescribed length, or the quality will be materially injured; therefore it will be necessary to destroy their growth, by passing the barley through the crushing mill. It may then be used at pleasure. In August, when I was at Trimmingham, Mr. Warnes was using wheat for his compound, as he found it was more profitable to feed his cattle upon it, than to sell it at the price then offered. The wheat was steeped for twenty-four hours, then taken out of the steep, and allowed to sprout, which it did in two or three days; it was then put through the crushing mill. Three pails of wheat were put into the boiling cauldron, containing seven pails of water; it was well stirred, and one pail of crushed linseed was sprinkled into the cauldron; a layer of cut clover, chaff, &c., was put into the half hogshead; two or three of the handcupfuls of the boiling mucilage was then poured upon the cut clover, &c.; it then was well stirred and rammed down, and the same was repeated until the cauldron was emptied. To lay down any general rule for making the compound, would be to destroy one of the great advantages of the system; provide yourselves, from the resources of your farms, with whatever is necessary to form cattle compound. The superiority of the cattle compound to foreign oil cake is explained by the fact that the one, at the best, is merely the refuse of linseed, while the other is made of the seed itself (the real fattening properties of the compound is in the linseed); and that, in order to produce a greater or less effect, it is only necessary to regulate the quantity of that important ingredient. Wheat, oats, barley, straw, or bean stalks, may be used either with or without turnips, according to circumstances; nothing more being required than fibrous matter to act as a vehicle for conveying the linseed to the stomach of the animal, and for re-conveying it to the mouth for rumination. The following compound may be used with great advantage for feeding sheep:—Let a

quantity of linseed be reduced to fine meal, and barley to the thickness of a wafer, by the crushing mill. Put eighteen gallons of water into the cauldron, and as soon as it boils, not before, stir in 21 lbs. of linseed meal; continue to stir it for about five minutes, then let 63 lbs. of crushed barley be sprinkled by the hand of one person upon the boiling mucilage, while another rapidly stirs and crams it in. After the whole has been carefully incorporated, which will not occupy more than five or ten minutes, cover it down, and then throw open the furnace door; should there be much fire, put it out. The mass will continue to simmer, from the heat of the cauldron, till the barley has absorbed the mucilage, when the kernels will have resumed nearly their original shape, and may justly be compared to little oil cakes, which, when cold, will be devoured with great avidity. I have no doubt some of you will be apt to say, "Oh! but there is a great deal of labour attending all this." I will now show you the profit attending the labour. A lot of twelve beasts were equally divided by Mr. Postle, six were fed on oil cake, and six on Mr. Warnes's compound. The account of their food was kept with scrupulous accuracy for nearly six months. The following were the results:—

	£	s.	d.
Expense of oil cake . . . . .	21	14	9
Expense of compound . . . . .	19	6	1½
	<hr/>		
Balance in favour of compound	£2	8	7½

	Dead weight. st. lb.	Loose fat. st. lb.	Hides. st. lb.
Six cattle fed on compound . . . . .	432 7	55 9	39 6
Six do. oil cake . . . . .	387 12	51 7	37 11
	<hr/>		
Difference of weight in favour of compound . . . . .	44 9	4 2	1 9

So that we have in favour of the cattle compound upon the six beasts—	£	s.	d.
44st. 9lb. at 6s. 6d. per stone . . . . .	14	10	2
Difference of expense of compound . . . . .	2	8	7½
	<hr/>		
Total difference in favour of compound	£16	18	9½

By this system of feeding, Mr. Warnes says that he could compete with the foreigner, as he could send cattle to market at 4½d. per lb., and pay himself an ample return. Since he had followed the system of box-feeding, he knows not of a single instance where he has not realized 8*l.* for every head of cattle he kept for six months. At the farm where he now resides he fattened last winter for market the following cattle, after being six months box-feeding:—

	£	s.	d.
Seven Durham steers, cost 8 <i>l.</i> 10 <i>s.</i> each, sold for 19 <i>l.</i> 10 <i>s.</i> each . . . . .	77	0	0
Six Scotch steers, cost 10 <i>l.</i> each, sold for 22 <i>l.</i> 10 <i>s.</i> each . . . . .	75	0	0
One cow, cost 5 <i>l.</i> 5 <i>s.</i> , sold for 15 <i>l.</i> . . . . .	9	15	0
Four Scotch steers, cost 10 <i>l.</i> each, sold for 20 <i>l.</i> each . . . . .	40	0	0
	<hr/>		
	£201	15	0

The above cattle were bought in and disposed of within six months. They consumed, with the following now in herd, 19 acres of turnips, about 14 quarters of linseed, and a few bushels of barley meal, with several acres of pea straw:—

	£	s.	d.
Three Durham heifers, estimated value above the cost price . . . . .	22	10	0
Two Irish steers . . . . .	13	0	0
Five small steers and heifers . . . . .	30	0	0
Three calves, and butter from two cows . . . . .	18	10	0
	<hr/>		
	285	15	0
Deduct, for 14 qrs. of linseed, mostly grown upon the farm, 35 <i>l.</i> ; also for barley, 4 <i>l.</i> . . . . .	39	0	0
	<hr/>		
Leaves a return of . . . . .	£246	15	0

The next item of profit is the manure, to form a just estimate of which is impossible; of course the rent of the land, rates, &c., and expenses for attendance, &c., must be enumerated to show a clear profit; but the utmost allowance that the severest critic could make, would leave a balance unprecedented in favour of box-feeding. In bringing this paper to a conclusion, I cannot do so without strongly urging upon you all to follow the system so successfully and profitably carried out by Mr. Warnes—a system by which you can double the number of cattle usually kept on your farms, you can turn your money over twice in the year instead of once—you can double your profit, increase the quantity of your manure, by which means you increase the fertility of your land—a system, simple in practice, powerful in effect, and applicable to every grade of farmer.

Mr. Glover illustrated his paper with several very ingenious and beautifully finished models of the different machines and hand implements required in the different processes of dressing flax, made by Mr. Dyball, of North Walsham. He also showed plans and models of the cattle boxes.

The CHAIRMAN thought that they ought to be much obliged to Mr. Glover for the mass of facts which had been brought before them in his papers, and regretted there was not time to enter fully into the consideration of them. With respect to the subject on the cultivation of flax, he considered it one of great importance to the country. He knew that some prejudice existed as to its cultivation,

because it was considered the land was not fit for it, and that it exhausted the crops. He, however, was quite convinced that the alluvial lands, such as were found on the banks of the Tyne, were suitable for the culture of flax; there was also a great quantity of land in the north of England, equal to any in Ireland, where he witnessed beautiful crops of flax. The very fact of the nation paying annually five or six millions for flax, showed that the culture of it was worthy their serious attention. In Ireland a society was formed for its cultivation, and it had sent out several young men to Belgium to learn the culture and manufacturing of flax; and the result has been that they have so much improved its growth in Ireland as to reduce the quantity imported to the amount of one and a quarter millions, according to Dr. Kane's late calculations. (Hear, hear). The cultivation of flax was likewise of great advantage in the employment of labourers. It might indeed be considered in that sense expensive; but if so, it was an exceedingly desirable object gained when employment was given to the poor. In going through Belgium lately, he witnessed numbers of people employed among the flax, though only three inches high, and of pea-green colour; and that showed that it was a most important crop raised in that country. Then with regard to the rearing of flax, because it was exhausting: why, it was well known that any crop exhausted the soil; and, therefore, much depended upon the soil selected, and the facilities they had for its due cultivation. He, however, had no doubt that if the subject was thoroughly considered, and the culture of flax pursued upon the principles so ably explained in Mr. Glover's paper, they would secure a handsome profit, besides conferring a great benefit on the country.

Mr. RAMSAY considered that the object of the papers just read was to enable them to fix upon some given principle to act upon. Whether all the details in them were correct or not, still, if attention was directed to the great points involved in the cultivation of flax and the fattening of cattle, some one among them might be induced to give practical effect to them. As to the raising of flax, that was the first question for their consideration; and if that was accomplished, then he had no doubt it would be speedily manufactured by them. Then as to box-feeding being conducive to the fattening of cattle, he thought that was a system similar to what was adopted in Scotland, where the beasts were all tied up by the head. He, however, thought the compound used by Mr. Warnes of Trimmingham would pay any one remarkably well; besides, the profits which he stated he had received on certain animals were such, that any of them would consider half the amount amply sufficient to pay them. Both

the subjects, therefore, which had been brought forward were deserving of their most serious attention; and he strongly urged upon some one the propriety of endeavouring to carry them out. With those remarks, he begged to move a vote of thanks to Mr. Glover for his valuable papers.

JAMES ARCHBOLD, Esq., having seconded the motion, it was put and carried.

The secretary announced the receipt of the following books, which have been presented to the club:—"The Implements of Agriculture," by Mr. Allen Ransome; "The Farmers' Companion," 2 vols., with plates, by Anonymous; "Prize Sheet of the Smithfield Club," by Mr. B. Gibbs; "Report of the Discussion at the London Farmers' Club, on Tenant Right," by Mr. Shaw, London; also, specimens of Egyptian wheat and potatoes by James Archbold, Esq., and mangold wurtzel and white carrots by Mr. Weeks.

## REVIEW.

### BAXTER'S LIBRARY OF PRACTICAL AGRICULTURE.

Baxter and Son, Lewes.

A second edition of this work, already well known to the agricultural world, has just been published. It appeared originally in one volume; but is now extended to two volumes imperial octavo. The first volume is embellished with a well-executed engraving an excellent likeness of His Grace the Duke of Richmond, accompanied by a memoir. In the second volume there is a portrait of the late John Ellman, of whom an accurate and well-written memoir is also given. The title of the work is well chosen, as it is in truth a "library of practical agriculture." It contains nearly one thousand large pages closely printed, upon almost every agricultural subject which can be named. These subjects are arranged alphabetically, and hence easily referred to—a matter of great importance to those who, from not having much time to devote to reading, require a facility of reference. There is, moreover, an excellent and copious index—a most important adjunct to a work of this description. It would be endless to enumerate the varied list of subjects treated in these volumes. The following passages struck us forcibly, bearing upon a question in which deep interest is felt at the present day. The writer of the memoir of the late Mr. Ellman says:—"He deprecated and did all in his power to prevent alehouse tippling; but no one insisted more on the very vital importance of beer to the labourer, and though he ever abjured and abstained from the anger of party politics, no one ever more warmly denounced the malt-tax as cruel and impolitic. Brightly beamed the good old man's eye, as he described to us the labourer of former days coming to his home, where a blazing hearth welcomed his return, and a tidy housewife "plied her every care" for his com-

fort—there was his hot supper and jug of home-brewed beer; and while his heart was lifted up, not with frantic frenzy, but sincere, quiet thankfulness to the Giver of all good, he had no cause to murmur against man." Again, in reference to the condition of the labourer, he says, "As Mr. Ellman's views were benevolent, so were his projects always practical: Keep your young unmarried labourers in your own house; let them feel the comforts of a good home and a plentiful table, and they will be careful of risking them by imprudent marriages. Let your wives and daughters superintend personally the female servants, and they too acquiring a taste for a cleanly and well-furnished establishment, will not tempt the youths to hasty wedlock, nor, indeed, consent to enter into it with a partner without some little money or ability to earn it. When your farming men marry, and settle in a cottage, let them have grass land for a cow and pig, and arable enough to grow potatoes and vegetables for their families, *and above all, pay them according to their skill.* Teach them to respect themselves, and they will respect their employer and protect his property. Give your labourer the means of brewing good beer at home, and most of them will seek no alehouse." How much evil and injustice has been and is done by *not paying the labourer according to his skill!*

Under the title "Agriculture" some very useful suggestions are given on "Hiring a farm," in which "the tenure, both as it regards the duration and covenants of the lease" is mentioned: most important considerations truly. We shall take occasion to again notice this work; but we trust that it will find a place in the library of every farmer who seeks information; and if there be any that do not, we should augur ill of his success in the vast field of competition to which he must inevitably be exposed.

LEOMINSTER.—THE FARMERS' CLUB.—On the 20th ult. a meeting of the members of the above club was held at their room, at the King's Arms Inn, for the purpose of taking into consideration the all-important subject of "tenant right," as well as the great advantages which would accrue to the landlord by his encouragement to the tenant to bring about a superior cultivation of the soil. Upon opening the business of the evening, a letter from the London Farmers' Club, upon the question, was read, when the members, fully agreeing with them upon the magnitude of the subject, passed the following resolutions:—First, "Resolved, that in the opinion of this meeting, the insecurity of tenure and want of proper protection to the tenant for the capital expended 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 that outlay, is the chief obstacle to the welfare of agricultural prosperity in this part of the kingdom."—Secondly, "Resolved, that as the advancement of agriculture is dependent so much upon the outlay of capital in permanent improvements, every inducement should be afforded

to the tenant to make such outlay."—Thirdly, "Resolved, that a proper system of 'tenant right' is one of the greatest moment to both landlord and tenant."—Fourthly, "Resolved, that a meeting for the discussion of the details of the subject shall be called for by advertisement for Friday, the 18th of December, at three o'clock in the afternoon."—Hereford Times.

### IMPROVEMENTS IN WATER-COURSES.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

SIR—Permit me through the medium of your magazine to call the attention of landowners and others interested to the necessity of some legislative enactment, conferring power to deepen, enlarge, or otherwise improve water-courses, or to make new ones for the purpose of drainage, also to remove milldams or other obstructions in flat situations.

As the government has promised to amend the drainage act in the ensuing Session of Parliament, I would suggest the propriety of endeavouring to obtain the introduction of clauses into the amended act, empowering the commissioners to order, on proper application, such alterations and improvements as they shall deem expedient.

A CUMBERLAND FARMER.

Dec. 9, 1846.

### AGRICULTURAL QUERIES.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

Will some of the advocates for compensation, on account of all manner of improvements made by out-going tenants, have the goodness to inform me, through your columns, if they propose or are in the practice of allowing in-coming tenants for existing dilapidations, and for irregular cropping, &c. by which extra management is not unfrequently wholly extracted: these considerations seem to me to form the counterpart of this new era of affairs.

Yours, &c.,

Dec. 2.

A LAND STEWARD.

A Salopian Farmer wishes to learn from one of your valuable correspondents what is the time of year to sow gypsum upon clover leys, and what quantity and how much per acre? If you would allow this to be placed amongst your agricultural queries it would greatly oblige.

Chirbury, Salop. Oct. 29, 1846.

TO THE EDITOR OF THE MARK LANE EXPRESS.

SIR,—I have occasionally used on my farm a description of lime made from what some term the magnesian limestone, which I have found, instead of being beneficial to my land, to have proved detrimental, al-

though the land is of that description which should be benefited by liming. Can any of your readers inform me why it is that lime made from magnesian limestone should have a more caustic effect on the land than other lime has, and also if there are any descriptions of soil that the application of it would prove beneficial to? Your notice of my remarks will oblige, sir,

Nov. 23.

A FARMER NEAR DONCASTER.

### WHEATEN BREAD.

SIR,—Remarks have by some parties frequently been made (most probably for answering some concealed end) that England has occasionally been a wheat exporting country, and on this assertion or fact has been based the idea that if, when the population of the country was less in number than it is now, and that the quantity of acres of arable land under wheat with that smaller population was after a ratio not greater than is the case at the present day, that this country may, by improvements in agriculture, and by a very small increase in the amount of arable land, again become an exporting country of home grown wheats. There appearing something very glaringly incorrect in the advances and deductions of the above line of argument, induces me to ask, through your paper, if any one of your correspondents can give me the information as to what was the description of farinaceous food of the people of this country at different periods of time, and at what time *wheaten* bread became the standard bread of the people. The insertion of my letter in your widely circulated paper will oblige

Your obedient servant,

Thorpe, Dec. 9.

OLD SUBSCRIBER.

SIR,—In your paper on the 9th of November, amongst your notices to correspondents, I find Morton's revolving harrow strongly recommended for cleaning the land of couch. I shall feel much obliged if some of your correspondents, who have tried it, will inform me of whom the implement in question is to be had, and what is its price? Also, please to let me inquire what is the proper time to sow lucerne; how much seed per acre is required, and whether it should be sown amongst corn or singly? A YOUNG FARMER.

A small landowner inquires if the rating of property for the maintenance of the poor be the only legal mode of assessing the amount to which property chargeable with *land-tax* may be liable.

A correspondent inquires whether he has a right to take all the water from E's ditch and conduct it into B's ditch without leave from either party.

### ANSWERS TO AGRICULTURAL QUERIES.

TO THE EDITOR OF THE MARK LANE EXPRESS.

SIR,—“Old Subscriber,” in your paper of Nov. 16, asks for the process of peeling oak-bark in the north of England, and the northern mode of preparing the same. The following description of the method of peeling, and the mode of disposing of the bark, may be taken as very

common in the north. In a general way, large lots of oak-timber are sold standing, the purchaser undertaking to carry it away in a given time; at the proper time a number of good woodmen are employed to fell the timber by cutting the trees with the axe as low as possible, all of them being careful *not* to haggle and hack, as we frequently see done in the southern counties. After the men have felled the trees, a number of boys follow after, who cut off such branches as are worth peeling; the peeling very commonly is performed by women, many of whom are more expert at the work than the men. The drying process is effected by first driving forked stakes into the ground, the forked parts standing upwards and being clear above the ground some foot and a half or two feet; these forks are made the bearers for poles or rails which are laid on them, having a space of about 18 inches between each pair of rails; upon these rails are laid the pieces of bark, which usually become sufficiently dry in two or three weeks for stacking, or for being carted into sheds; if stacked in the open air, and the bark is required to stand long, the stack requires either thatching or covering with a rick cloth.

I am, sir, yours truly,

Nov. 23.

A NORTH COUNTRYMAN.

To the agricultural query in the *Mark-Lane Express*, Nov. 30, col. 2, p. 9, we offer the following answer:—Magnesian limestone is found in Leicestershire, Derbyshire, Notts, Yorkshire, and elsewhere; but these appear to be the central districts. It doubtless differs more or less in the proportion of its components, but the analysis of Mr. Tenant may be taken as an approximate standard. Thus in 100lbs., or parts, we find about—

Of Magnesia . . . .	20 3-tenths	to 22 5-tenths	
Of Lime . . . . .	29 5-tenths	to 31 7-tenths	
Of Carbonic Acid .	47 2-tenths		} to 48
Of Clay and Iron-Oxide . . . . .	8-tenths		
	97 8-tenths	102 2-tenths	

The average of these is 100; and assuming that 30 parts of lime require 2.35 of carbonic acid to convert the lime into chalk (*carbonate of lime*), we have an equal quantity for the 20lbs. of magnesia, which approaches to the equivalent required to produce a bi-carbonate of magnesia, according to Brande's tables. Plants contain, in some cases, an appreciable quantity of magnesia; but the great bulk of it found in the magnesian stone is in vast excess; therefore, when that limestone is, by burning, rendered caustic, the "calcined magnesia" thus produced is inimical to the crops. Davy stated the following facts in one of his lectures to the Board of Agriculture:—"When a magnesian limestone is burnt, the magnesia is deprived of carbonic acid much sooner than the lime; and if there is not much vegetable or animal matter in the soil to supply, by its decomposition, carbonic acid, the magnesia will remain for a long time in a caustic state, and in this state acts as a poison to certain vegetables. Some years ago, sulphate of magnesia was prepared, both in London and Bristol, from magnesian limestone, and in plentiful quantities; this fact proves the large proportion of magnesia which the stone con-

tained; and the injury done to vegetation by the caustic magnesia so super-abundantly supplied to the land may be ascribed, without suspicion of error, to the redundancy of an inorganic element which is not required as food.—J. T.

"An Old Subscriber" may be informed that the great bulk of the people in England began to consume wheat bread about the year 1800, from the increase in wages in towns, arising from the demand for labour consequent on the employment of such an increased number of men for the war of the French revolution; which increased rate of wages has been in great measure continued to artisans, and indeed all labourers, except agricultural and maritime; and the taste for an improved diet once got, it is very difficult going back, if it were in this particular desirable, which I very much doubt. Previously to 1800, oat bread was much used in the north-west of England and in Scotland; with rye chiefly imported from Dantzic, though the use of the latter article was nearly confined to Cumberland and Northumberland, where barley, and peas, and beans, were also much used for bread; further south, rye and wheat mixed, or wheat meal undressed, formed the loaf of many persons, the use of fine flour bread being then, even in the south of England, much confined to towns.

A VERY OLD SUBSCRIBER.

MAGNESIAN LIMESTONE.

SIR,—“A Farmer near Doncaster” asks why lime made from the magnesian limestone should have a more caustic effect on the land than that made from other lime? The wherefore to this why is, that much of the limestone about Doncaster contains from 30 to 40 per cent. of carbonate of magnesia; that pure lime has a greater affinity for carbonic acid than magnesia; therefore so long as any lime remains caustic, the magnesia will remain unacted upon; and when it does begin to be acted upon, the action, when compared with that upon lime, being so much slower, renders the causticity of the magnesia so much more lasting in its effects, that for a considerable period it burns up as it were all growing vegetables with what it comes into contact. To peaty soils (which contain much carbonic acid) lime from the magnesian stone may be effectively applied.—Yours, Mr. Editor,

Dec. 10.

WHY AND WHEREFORE.

HARLESTON FARMER'S CLUB MEETING, 7th Oct., 1846—Subject:—The Law of Settlement. Resolution:—It is the opinion of this club, that the law of settlement, by restricting the field for labour, and by the litigation it encourages, acts very disadvantageously both for the employers and employed; and that any modification of it short of a national settlement, with the poor paid out of a national fund, would be only tampering with the evil. In carrying out this national settlement and payment, it is considered advisable, that all fixed and specified property, whether real or personal, should be assessed to the poor rate.

METEOROLOGICAL DIARY.

BAROMETER.			THERMOMETER.			WIND AND STATE.		ATMOSPHERE.		
Day.	8 a.m.	10 p.m.	Min.	Max.	10 p.m.	Direction.	Force.	8 a. m.	2 p. m.	10 p. m.
	in. cts.	in. cts.								
Nov. 21	29.64	29.54	42	53	46	S. West	variable	fine	sun	cloudy
22	29.45	29.62	41	52	38	S. West	brisk	fine	cloudy	fine
23	29.71	29.69	36	51	50	S. West	brisk	cloudy	cloudy	fine
24	29.61	29.70	49	57	53	S. West	gentle	haze	fine	cloudy
25	29.67	29.30	50	53	47	S. E. West	variable	haze	cloudy	fine
26	29.28	29.26	41	47	37	West	gentle	fine	sun	fine
27	29.29	29.30	31	44	42	N. West	gentle	fine	cloudy	cloudy
28	29.40	29.53	33	45	30	N. West	variable	fine	sun	fine
29	29.70	29.79	30	37	27	N. West	calm	fine	sun	fine
30	29.83	30.00	23	33	29	Northerly	lively	fine	cloudy	fine
Dec. 1	29.90	29.64	27	33	28	Westerly	gentle	haze	haze	haze
2	29.42	29.38	25	35	32	Northerly	gentle	cloudy	sun	cloudy
3	29.55	29.70	31	40	25	N. West	gentle	fine	sun	fine
4	29.79	29.86	24	37	32	N. West	brisk	fine	sun	fine
5	30.00	29.80	29	36	36	W. by South	lively	fine	sun	cloudy
6	29.76	29.80	32	38	34	N. by West	brisk	fine	sun	fine
7	29.90	30.10	32	38	38	N. by West	brisk	fine	cloudy	cloudy
8	30.20	30.20	40	42	41	North	brisk	cloudy	cloudy	cloudy
9	30.18	30.12	39	47	42	N. by East	gentle	cloudy	cloudy	cloudy
10	29.90	29.65	38	45	33	S.W., N.W.	brisk	cloudy	cloudy	fine
11	29.65	29.64	26	30	25	N. West	brisk	cloudy	fine	fine
12	29.63	29.70	24	37	28	N. by East	brisk	cloudy	fine	fine
13	29.70	29.73	24	32	24	N. West	gentle	fine	sun	fine
14	29.62	29.50	21	30	23	W. N. W.	gentle	fine	sun	fine
15	29.45	29.76	19	31	25	Northerly	brisk	fine	cloudy	fine
16	29.67	29.83	24	34	28	N. West	brisk	fine	sun	fine
17	29.68	29.80	26	36	32	N.W., N.E.	variable	fine	sun	fine
18	30.10	30.10	25	30	29	N.W., W. by S.	lively	fine	sun	cloudy
19	29.88	29.88	30	44	42	S.W., W. by N.	gentle	cloudy	cloudy	cloudy
20	29.80	29.67	41	42	41	S. West	lively	cloudy	cloudy	cloudy
21	29.16	29.10	38	47	35	W. by South	variable	cloudy	cloudy	fine

ESTIMATED AVERAGES FOR DECEMBER.

Barometer.		Thermometer.		
High.	Low.	High.	Low.	Mean.
29.120	30.320	55	17	39.8

REAL AVERAGE TEMPERATURE OF THE PERIOD.

Lowest.	Highest.	Mean.
32.0	49.5	36.25

WEATHER AND PHENOMENA.

Nov. 21, fine, then changeable; rain. 22, 23, showers; fine at times. 24, fine after fog, then rain; much rain. 25, haze and rain; clear night. 26, very mild, and quite fine. 27, first frost of the season; roses, dahlias, and other flowers in healthy bloom. 28, lively air in morning, then calm and frosty. 29 and 30, frost increases; sunny.

LUNATIONS.—First quarter, 25th day, 10h. 31m. afternoon.

Dec. 1, haze all day; chilling cold. 2, a slight ground thaw. 3 and 4, fine and seasonable. 5, do.; a hint of rain in the afternoon. 6, barely frosty, wind very keen. 7, becomes mild. 8, 9, 10, some rain; frost gone; the last of these days

gloomy, drizzling rain. 11, brisk frost returned. 12, severe, but very fine. 13, 14, 15, the severest days, and the north-west continues to bring the sharpest frosts of the season; a little snow—more in the west. 16, very fine; a brisk current most of the day. 17, milder; wind fickle. 18, wind goes to south-west just as the moon changed. 19, much rain, and a real thaw. 20, cloudy, and very sombre; warm. 21, clouds, more broken after a rainy morning; cheerful fine evening.

LUNATIONS.—Full moon, 2nd day, 10h. 46m. night. First quarter, 10th day, 9h. 16m. afternoon. New moon, 42 m. after 12 noon.

REMARKS REFERRING TO AGRICULTURE.

The late sowing of wheat, much being unsown in the early part of November, prevented any gay luxuriance, although the weather was so very mild till the 27th. At that date the earliest wheats were looking very healthy and regular; but then frost came on suddenly, and continued with a very short interval till Dec. 18, when it broke up at once. A salutary check has been received, and so far all is well.

Maidenhead Thicket.

J. TOWERS.

## CALENDAR OF HORTICULTURE.—JANUARY.

**RETROSPECT.**—This, under present appearances, will perhaps form a principal feature of our notice. With M. Arago we perfectly agree, that no human being ever did, or ever will, prognosticate, accurately, the weather, from one hour to another; therefore, disclaim every attempt of the kind. Still, there are signs demonstrative of existing phenomena, or to speak more correctly, appearances, which indicate that certain causes are at work which may produce corresponding effects; but as these causes depend upon electro-magnetic agency, their character may and frequently does change, even at the moment when it is observed. With this preliminary remark, we suggest for the reader's recollection the very close resemblance that the present December bears to the same month in the year 1844, when the frost set in about the fourth week of November, and continued, with about three weeks' exception, till the equinox of March, *i. e.*, nearly fifteen weeks.

In the present year, after the cessation of south-west winds and rain, the first indication of frost was given in the night of Nov. 27: it lasted more than a week, the days generally sunny and beautiful, the nights averaging about 6 or 7 degrees of frost. A slight remission took place, with a hint of rain occasionally; but on the 11th of December winter seemed to set in with asperity, the ground became locked, and the nights varied between 19° and 26° of Fahr. Thus December, to beyond its middle, proved as cold as any we have witnessed for many years: and so far there is promise that out-of-door operations must be restricted to those of protection. More must be said of the condition of vegetables before this calendar shall go to press; but we would request the reader to observe in particular the consequence of so early and sudden an attack upon ground-slugs and other vermin, which proved such ruinous pests in the last spring. In general we believe that instinct teaches the moluscous tribes to hide themselves so deep in the earth as to be beyond reach of danger. Shell-snails, it is known, glue themselves into masses, even on the ledges and set-offs of walls, and endure the hardest frosts; but so excessively numerous were the small shellless slugs of 1846, after the most open winter that is within recollection, that it may be hoped a difference in favour of the gardener may be felt in 1847. At all events, since to the very day when frost suddenly set in, the whole of November was consistently warm and temperate, if slugs abound in early spring, the question will be settled, and we

then may rest assured that man must trust to liming, salting, and other artificial appliances, and not to any rigour of the preceding winter.

## OPERATIONS OF PROTECTION.

Cauliflowers, lettuces, salading, radish under frames, ought to have the glasses on, to be closed every sharp night; over which mats are to be thrown, and secured by boards or nailing. Nothing insures protection from cold and high wind so effectually as straw mats, and these are of easy manufacture. Strong lines, the length of two or more lights across, are strained sloping downward, and made firm to the floor of some roomy place—say three or four cords for a two-light frame, and so distant as to correspond with the breadth of the lights: across these, straw bands are laid, and secured by smaller strings, hitched round the band, and each cord, length by length. When neatly done, the mats have the appearance of loose bee-hive work, and will easily roll up. When laid on the glass they are rolled over with great facility, and are then secured by a couple of lines, or heavy boards. The protection thus afforded is very great, and we have seen turf-pits of geraniums effectually secured throughout a winter by such mats alone, laid on skeleton rails, without any glass-work whatsoever.

Open-ground tenderer vegetables are much guarded by fronds of fern laid about the plants, and between the rows: rough sawdust laid in heaps about stems, and over the roots of plants or shrubs, is excellent; and at all times in pit frames or boxes, dry sawdust is an admirable plunging medium.

This sharp weather is admonitory of the great advantage obtained by planting broccoli early in trenches, and of deep ridge covering of autumn-set potatoes. Trenches are easily filled up in the autumn to the entire height of the stems; but the garden where the system is freely adopted ought to be well bottom-drained, otherwise the roots may grow in a swamp. Celery will suffer if the frosty weather continues: we know of no better defence than that of having filled up every space with dry tree-leaves after the last earthing, piling them among the herbage: the same material will protect artichoke plants.

Hotbeds of dung and leaves.—Prepare these in ground surrounded by palings or close hedges: a cold frosty wind checks the fermentation at once. Surely the tank system must prevail in the end! There the work is in-doors, and it goes on: we have

seen cucumbers of fine quality this autumn and winter, growing over tanks in a low span-roof forcing-house, for three months past. No question that the early rhubarbs, and sea-kale in pots, could be excited to per in the mushroom-house, or shed, by aid of a very simple hot-water pipe and tank system.

#### KITCHEN GARDEN.

If open weather, and the state of the land permit, trench and manure for early crops; and sow peas, mazagan and long-pod beans, onions, radish and round spinach; on south borders sow in drills most of the lettuces and small salads.

Cabbage plants.—Remove these from winter nursery beds, to succeed the first crop planted in September and October.

#### FRUIT DEPARTMENT.

Trench and manure ground, preparatory to the introduction of new trees and shrubs; but do not plant till mid-February. Avoid pruning till the buds swell. Give air at every favourable opportunity to strawberry-plants in pots, intended to be early forced.

#### FORCING DEPARTMENT.

The early vinery ought now to be showing its clusters, even in the first week, and therefore 55° at night is not too high a temperature. We dare not yet speak of Palmaise heating; but of hot-water channels, the flue of the furnace being carried also along the whole back wall within, we can speak; the machinery is effective, and vapour is at hand, a moderate portion of which is advantageous.

The consumption of smoke is of great moment in all furnaces with brick flues only; it could be effected by a small jet of steam thrown through the fire and flame; for the watery vapour would thus be decomposed, oxygen and hydrogen liberated, the carbon of the smoke consumed while in the condition of hydro-carbon, and the result carbonic acid and water; the apparatus forms the difficulty, but it will in the long run be made available.

Pine-apple.—We have been interested of late with the several communications made to the *Gardener's Chronicle*, on the cultivation of the pine at Meudon in France, six miles south-east of Paris, by M. Pelvilain. In the paper of Dec. 19, p. 836, there is a plan of the pits for fruiting plants, thus described:—"The pits at Meudon are narrow, and admit only of three rows, of which the wood-cut gives a representation when in fruit."

The merits of the whole plan consist in growing, from first to last, in a most simple soil—a sort of turfy peat—without any of the multiplicity of rotten manure, pigeon's-dung, leaves, bones, &c., with heavy or strong loam as the basis, which have embarrassed and mystified the English grower; aided also by the

atmospheric bottom heat yielded by a dung fermenting bed in a chamber underneath, and by a heat above, raised by a parallel course of two hot-water pipes in front, just below the lower end of the sloping lights. We know that the self-esteem of good growers in Britain will be disposed to contest the pretension of the Meudon practice; and practically, we cannot give individually a strong opinion *pro* or *con*; nevertheless we know that a sucker or a crown will take root more early, and revel in greater luxuriance and verdure, in simple black heath-mould, than in loam of any quality, however aided or enriched. That, therefore, which most effectually promotes the first development of roots, and produces them in the greatest abundance, can scarcely fail to carry forward the plant throughout its course with safety and luxuriance. The weak rooters (such as the black Jamaica) frequently fail and decay under the effect of strong fermenting substances.

While we insist upon the absolute condition of unchecked advance to the period of the fruiting stage, we surely believe, that a pure heath-mould in a bed, as by Hamilton's arrangement, aided, perhaps, by fragments of charcoal, would tend above all things to render all the plants safe from root and heart decay. Nothing more would then be required but a due and steady application of a proper degree of heat. The tank system promises well also.

All the other departments must be simply kept in neat order, till the turn of the year. In the meantime, we announce a total change of the weather on the 19th; and this continues, with wind and rain, to this shortest day, which nature tells us is exactly the middle of winter.

The frosts appear to have produced little or no injury to broccoli, however luxuriant; everything, so far as present appearances promise, is favourable.

December, 21.

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GREAT OAKLEY FARMERS' CLUB.—Subjects for discussion for the ensuing twelve months:—25th of Jan., 1847, On the Selection of Corn and Roots for Seed, and the best mode of Planting Roots; Mr. M. Cooper. 1st March, On the Advantages of Box Feeding for Cattle, as compared with the other mode of Stall Feeding; Mr. W. Thompson. 29th March, On the Management of Manure; Mr. A. Hempson. 26th April, On Tenant Rights; Mr. Stanford. 24th May, On the Advantages of Piece-Work, as compared with other Work; Mr. W. Keer. 25th July, On the Mode of Education best suited for Young Farmers; Mr. Spurling. 20th Sept., On the different varieties of Wheat; Mr. Swinborne. 18th Oct., On the Varieties of Peas, and Mode of Cultivation; Mr. Hardy.



## AGRICULTURAL REPORTS.

## GENERAL AGRICULTURAL REPORT FOR DECEMBER.

The past has proved a month of more than usual importance to the agricultural body in more than one particular, and to which we shall allude, as we proceed to lay before our readers in detail the occurrence of events which in themselves are worthy of the most attentive consideration, not only of the producers, but likewise the consumers. In the first place, we may state that the weather, although it has been much broken, and at times exceedingly cold—colder, indeed, than we have had occasion to notice at any corresponding period during the last three years—has proved very favourable to the young wheats, and of the progress of out-door farm labour no instance of any serious complaints has reached us. On the contrary, our farming correspondents express themselves perfectly satisfied with the position of work in general. That this is a most important feature none can deny; because henceforth we may anticipate the same satisfactory result, in the event of the atmosphere permitting the plough to be taken on the lands at fitting and convenient seasons. In our last report we stated it to be our decided opinion that, in 1847, we should see a much larger breadth of soil under wheat culture than has been the case during the last ten years. To test the truth of that observation, we have caused the most extensive inquiries to be made in the whole of our large grain districts, and we feel ourselves justified in saying that *at least one-third more land has been sown with that description of grain during the last three months*, and that, too, under the most favourable auspices, and in the best possible manner *that has ever been recollected*. This, perhaps—in the absence of clearly collated agricultural statistics, which, by the way, are much needed in a country like this, and which it would be by no means difficult to obtain were efficient and well-devised plans set in motion to obtain them—may be taken as a mere assumption; but passing events prove the assertion to be a “great fact,” and one easy of solution by a few hours’ ride in almost any locality. We are perfectly aware that this statement will be received with more than ordinary pleasure by a certain class of politicians; but even a seeming triumph of particular principles—which, perhaps, we ourselves have felt it our duty to oppose—will not deter us from offering to the notice of the world at large our exact position as a producing nation. Still it behoves us to consider the causes which have led

to this state of things, as well as the effects likely to be produced by even an extended growth of wheat in this country. Unquestionably, the great failure in the potato crop and the falling off in the yield of all spring corn have tended, notwithstanding the large importations of foreign “bread-stuffs,” to enhance the value of wheat to its present standard. By many it has been contended that the deficiency here alluded to has been already made good by the supplies from abroad, and, consequently, that present prices are not safe. In these essential points we beg to differ, for reasons we shall now state. While dwelling upon the actual produce of grain in England—which, as a whole, and taking into consideration the deficiency in the potatoes, is not, in our judgment, so alarmingly small as some parties have stated it to be—there are not a few points omitted by many who have thrown themselves into the arena of argument, and which more than any others are the great regulators of value. These remarks obviously lead us to the consideration of the unparalleled wretchedness and want of the people of Ireland, and the state of the working classes in this country. In the sister isle we perceive destitution and absolute starvation—nearly the whole of the potatoes already gone—a great demand for grain and flour both of home and foreign produce—and a decided falling off in the shipments of grain to our consuming markets. As an illustration of what we have here advanced, we will take the balance of shipments between Liverpool and Ireland during the five months ending on the 30th of November, 1846, compared with that of those at the same time in 1845, and from which we find that, this year, there has been a balance *against* England of 166,554 qrs. of wheat, 3,921 do. of barley, 23,250 do of oats, 53,318 loads of oatmeal, and 122,517 sacks of flour; and all this is exclusive of 100,000 brls. of American flour, 64,000 qrs. of Indian corn, 12,500 brls. and 7,029 sacks of Indian corn meal, which were sent direct to Dublin and the other Irish ports, from New York and New Orleans. In the quarter ending Dec. 27, 1845, the quantity of oats imported from Ireland into London was 221,817 qrs.; in the present year, in the same quarter, the quantity was only 70,000 qrs! Who, under such circumstance, can feel surprised at the present high prices? and who can speak with confidence that we have reached our highest point? It must

be carefully borne in mind that we are now in the midst of winter; that it will be impossible, from the closing of the ports, to obtain any supplies worthy of notice from America or elsewhere until the spring; and, further, that the starving millions in Ireland *must* be fed, and fed, too, principally upon its own supplies, leaving little or nothing for shipment to this country. This falling off in the receipts here, and the almost certainty that the bonded stocks of grain, both in London and Liverpool, will be shortly required to fill up such deficiency, together with the wants created on the continent, arising from short crops, are in themselves strong facts in support of high prices. Although the deliveries of wheat at our principal markets have been good for some time past, it is tolerably certain that the stocks on hand of the present year's growth are about average ones. Upon this point, as well as the large imports of wheat and flour from the United States, much stress has lately been laid, as evidence of no deficiency. But we must beg to remind those who hold opposite opinions to our own, that, with the exception of a very small quantity, the whole of the imports in question have passed into consumption; and further, that even a good crop of wheat can never compensate for such great deficiencies in spring corn as well as in the potatoes as we have experienced in the past season. Take whatever view you may of this great question, the conclusion must be that a great deficiency—taking the wants of Ireland into consideration—still exists, and that there is no prospect of lower prices for a considerable period. Again, a retrospective glance at the comparative activity which has been observed in the manufacturing and other districts during a large portion of the year now just concluding, and the consequent numerous additional hands which have found full employment, any surprise which

may be expressed at the vast consumption of bread in the United Kingdom—we are here showing what has really become of the large surplus growth of America imported since last June—must immediately resolve itself into a simple statement that, even at this moment, we are actually *short* of adequate supplies.

From all parts, our accounts respecting the appearance of the young wheats are very favourable. In some quarters—in the western counties, for instance—they have been exposed to the action of the cold winds; but in the north they have been well covered with snow, which, we need scarcely say, is an important feature at this moment.

We regret to state that the epidemic amongst the cattle is still increasing; as a proof of which we may say that, during a recent tour in the eastern districts, almost every grazier has had beasts suffering from its effects; and, further, that one extensive farmer informed us that, out of 42 oxen he had placed in the stalls for fattening, not less than 22 died of the disease!

Although the quality of the bulbous crops this season has proved by no means good, the actual quality produced has been large. This, together with the plentiful supplies of hay, has caused the store and other animals to fare remarkably well.

The corn markets have been again very active, and a general advance in the quotations of from 2s. to 4s. per qr. has taken place. The great demand for Ireland has, no doubt, tended to increase the value of grain in this country. In cattle an immense business has been doing, and prices have ruled tolerably firm.

From Ireland and Scotland our advices are anything but satisfactory. An increased demand for grain has taken place, at higher rates, with every prospect of further enhanced currencies.

#### REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

The month of December is invariably regarded by all classes of society, but more especially the breeders at large, with more than usual interest, in respect to the supplies, quality, and prices of the various kinds of fat stock offered and disposed of in London, as well as the large provincial markets. We shall, therefore, offer a few observations upon the subject, which, whatever may be urged against it by a portion of the press, possesses features of more than ordinary importance. In the first place, we shall briefly glance at the stock shown in Baker-street, which may be considered the centre of attraction. To speak generally, we have seen the

beasts equalled, but seldom excelled; but the exhibition of sheep and pigs was remarkably fine, though we regret to state that Mr. Fisher Hobbs was not an exhibitor on the occasion, arising from his holding an appointment in the yard. Taking, therefore, the show as a whole, it reflected the highest credit upon the breeders and feeders, and gave us evident proofs that we are not standing still in our efforts to improve the stock of the country. The next point of attraction in the metropolis was the Great Day at Smithfield. The market in question was one of surpassing excellence as to quality, while the number of beasts shown was 5,470,

being the largest, with one exception, during the last ten years. Still, however, the demand, considering the immense weight of meat on offer—the largest, in fact, that we have ever seen—was tolerably steady, and prices were quite as high as could have been reasonably expected. This state of trade and value must, in a great measure, be attributed to the large country demand, for on the day in question at least fifteen hundred head of beasts were disposed of to the provincial butchers, and which were mostly conveyed out of London by the various railways. Hence the actual number turned out unsold was small, and the trade on the following market days, up to the end of the year, was steady, at good prices. We may observe, also, that a large portion of the stock in the yard was taken by the country buyers, one of the Devons the property of Mr. Fouracre having been purchased for the Newcastle shambles.

The following is a statement of the supplies brought forward during the past month:—

	Head.
Beasts.....	19,639
Cows.....	508
Sheep.....	108,410
Calves.....	1,095
Pigs.....	2,150

The above are the largest supplies of cattle sold in Smithfield for a very considerable period, as the annexed comparison will show:—

	Dec., 1843.	Dec., 1844.	Dec., 1845.
	Head.	Head.	Head.
Beasts . . . .	13,290	13,290	17,712
Sheep . . . .	110,362	113,290	98,660
Calves . . . .	980	964	862
Pigs . . . . .	1,260	1,340	2,671

On the whole, the trade since our last has been firm, and good clearances have been effected as follows:—

Per silbs., to sink the offal.

	s. d.	s. d.
Beef . . . . .	from 2 10	to 4 6
Mutton . . . . .	3 8	to 5 2
Veal . . . . .	3 8	to 4 8
Pork . . . . .	3 6	to 4 10

Comparison of Prices.

	Dec., 1843.	Dec., 1844.	Dec., 1845.
	s. d.	s. d.	s. d.
Beef ..	2 6 to 4 6	2 8 to 4 6	2 10 to 4 8
Mutton	2 10 4 8	2 10 4 4	3 4 5 10
Veal ..	3 0 4 8	3 0 4 4	4 0 5 2
Pork ..	2 8 4 4	2 10 4 0	3 6 5 2

The bullock droves in the month just concluded have been derived as under:—

	Head.
Northern districts . . . .	9,200
Eastern ditto . . . . .	400
Western & Midland Counties	4,400
Other parts of England . .	2,700
Scotland . . . . .	400

The remainder of the supplies of beasts have been chiefly derived from abroad and the neighbourhood of the metropolis. Notwithstanding the prevailing cold weather, the imports of foreign stock have been extensive, they having amounted for London and the outports to 1,225 oxen, 1,764 cows, 11,408 sheep, 252 lambs, 90 calves, and 82 heifers.

The trade with slaughtered meat has ruled very steady, and prices have been well supported.

Our letters from most quarters are to the effect that the epidemic is still on the increase.

BERKSHIRE.

Since our last, for November, the weather has undergone a complete change. The rains ceased with the 25th day of that month; the wind became west on the 26th, and north-west on the 27th, when the first frost was seen by the night thermometer. Till that day the tenderest plants of the garden were untouched—dahlias in full bloom, China roses fine as in May—but every night subsequent to the 27th became more and more severe, till, on the 30th, we observed 23° Fahr. (equivalent to 9° of actual frost). Thus, December was ushered in; and it froze by day as well as night till the morning of the 7th. The atmosphere during the eleven days was clear, beautifully sunny, with the exception of a general haze on the first day. The wind had all along been more or less westerly; but on the 8th it inclined more to north-east, the frost went off, and three days of thaw succeeded, with attempts for rain, but without any steady fall. A few flakes of snow fell, the wind went back to north-west, and frost of a more severe character set in again on the 11th. This has continued, with trifling intermissions in the third week, till the present day. With us, no snow equal in appearance to a common hoar-frost, has been observed; the severest night was that between the 14th and 15th, when instruments noted 19° Fahr., but within the distance of four miles, in the valley of the Thames, six degrees lower were observed. Thus thermometric registers are found to be governed by local meteoric agencies. As to the effects of the weather upon crops, we observe that the young wheats, owing to the lateness of the seed season, were never gay; and some breadths sown in November were just emerging from the ground when the first frost set in. There can, then, be no precocious luxuriance; and as the ground was speedily hardened and locked up, it is to be hoped that numbers of the slug tribe may have been destroyed. Time, however, must determine this fact, or its fallacy; but at all events the temperament of the ground must be much mellowed and improved against the operations of early spring. The turnips are looking fairly, and abundance of sheep are feeding on them everywhere. Clover and other artificial grasses appear close upon the ground; and this is all that at present the eye can ascertain. The weather so far meliorated that we observed the plough at work on the 24th, and very nicely did the slices turn off. Thus every thing but the prices (heavy and almost untransportable by the poor labourers at 8s. to 10s. per week) is of fair and healthy promise; but there's the fell evil! A miller told the writer two days since, that he ought that day to have raised his flour (then 9s. 8d. and 10s. 8d. per bushel), but that he knew the wages given would be consumed by that article alone! How different the condition of these *producers* from that of the hardy, well-paid navigators on the rails! Inflictions

have fallen on the crops of some kind, and, while submitting, we may lament; but it is dreadful to look to the results of speculation. As to potatoes, one word more. Beet-root is a better vegetable, and vastly more productive. *The Gardener's Chronicle* assures its readers ("tried") that with beet and flour *fine brown bread* can be made! We trust it may.—Dec. 25.

### SOMERSETSHIRE.

Of the cultivation of the earth this season affords but little remark, further than to the weather as bearing on the crops, the severe frosts putting a stop to the fall sowing of wheat, and the cold to the securing the remainder of swedes and mangel not in. We have had in this county very little snow, and the frost has not continued sufficiently hard throughout the day to carry manure on the fallows, but the length and severity of the frost has been unusual for the season, except the ravages of the slugs, about which we do not at present hear much. The wheat in ground is looking well; very backward generally; our green crops for spring have suffered from the frost, and do not promise so much abundance as before; this applies to the garden vegetables, such as brocoli, which is partially destroyed. We have had a very fine season for feeding off our abundant crop of grass to the best advantage, and to the saving of the hay, and cattle have done well; it would appear that the weather had been more congenial to them than to us, who are more sheltered, as severe colds have been very prevailing, few comparatively having escaped more or less, and many infirm and old persons have been taken off. Our markets and fairs have been largely supplied with fine fat stock, but there has been a fall in the price of 2*l.* to 3*l.* on 20*l.*; this would also apply to the mutton trade. Pigs for bacon and porkers have been very plenty, and have gone as low as 7*s.* 9*d.* to 8*s.* 3*d.*, at which price a great many have been slaughtered, and there are but few coming forward, so that we may anticipate a re-action. It seems that the consumption of bacon by the labourers and other parties has fallen greatly off, reducing the price from 7½*d.* to 5½*d.*, as extremes, but there is now more demand, and prices are rallying. Of fat beef and mutton I am disposed to think there is rather more than a usual stock in the graziers' hands at this season, still I do not look to a serious reduction in prices, which are nothing equal to the price of poor stock and cost of fattening. The future prospects of the grazier are not the best, and it will be some time to an alteration. Our corn markets have been under great excitement. It is very evident that our consumption is much beyond any probable supply, and that before the winter is past, beans, barley, and peas will be yet more resorted to for food. In my last report, I stated my conviction that the increased consumption would compel the millers to be free buyers before our augmented supplies would stand the drain on them: this has been the case, and my anticipations have been fully borne out. I have watched the consumption, and find that through the bakers it is on the increase—that the grist-mills have double work—that the bakers, previous to the rise, were getting fast out of stock; and the millers had very little more stock on hand than enough to supply the sudden demand which sprang up this last week for flour. I believe it has been estimated that we grow in Great Britain about twenty-two millions of quarters of wheat, and on an average import two millions—say an annual consumption of twenty-five millions of quarters of bread stuff; now, if we estimate the increased consumption from midsummer 1846 to 1847, at an increase of two millions, we shall not be beyond the mark; and taking the crop, with the stock of old wheat, at an average, we

shall want an importation of twelve millions in the year, leaving out the wants of Ireland, and her drain from us, instead of the large supplies she used to send us, and against which I would place the spring corn, and for human food this year, in proportion to former ones, and which demand will, I believe, tend to advance their price as the winter advances. I know, already, that parties whose supplies of potatoes have held out to this time, are now without them; and this applies to the farmer as well as labourer. I was told by one, growing two thousand bushels of wheat per annum, that his were all consumed, and they had none for a family of eight grown-up persons; and that he had been among some farmers in another district for a day or two, but no potatoes made their appearance. I can but again record my conviction that we are every one called on to husband as much as possible our resources of food, and in every way practicable add to the supply. We have yet six months before the fruit of another season will begin materially to add to our wants. Our prices for flour since my last have been down as low as 47*s.*; they are now 50*s.* to 52*s.*; wheat, 7*s.* to 7*s.* 9*d.* per 60 lbs., and 7*s.* 9*d.* to 8*s.* 6*d.* per 62 to 64 lbs. best new and old whites: holders are now standing out for 9*s.* best old, and 8*s.* 6*d.* to 8*s.* 9*d.* new. There is still, for this period of the year, a large stock of old wheat, although more than a usual portion has formed for the last month a part of the supplies. There is a complaint of a good deal of tailing coming from the last year's crop, and the weights are 2 lbs. under last year, and 4 lbs. the previous year's growth per bushel, yielding, of course, a much less produce of flour. The price of barley has receded from 5*s.* 6*d.* to 5*s.*, still the supplies are far from large, and there is now a tendency to advance. Although the demand for pigs has greatly fallen off, peas have come more freely from the growers, and might have been purchased at 8*s.* to 9*s.* Beans, new ones, have steadily maintained their price; old ones not so plentiful: the price of the former, 5*s.* to 5*s.* 6*d.*; the latter, 5*s.* 9*d.* to 6*s.* Oats, 24*s.* to 28*s.* per qr.—none but black ones offering, and the new ones are very light. Cows with calves are very high, varying from 12*l.* to 18*l.*; other kinds of poor stock not so much sought after. The high prices of poor sheep have checked the sales recently; but there appears an increasing disposition to breed, and calves are already much in request, and are worth 20*s.* to 30*s.*, and even 2*l.* each for that purpose. Our cheese markets have been but barely supplied, and most sold that has been offered; but at prices about 3*s.* to 4*s.* under previous rates per cwt. Wool remains stationary, with very little doing. There is now every appearance of a settled frost; it has frozen in the shade all day, and the glass, which a few days since was low to an extreme, is rising, and there is every likelihood of a severe frost to-night.—12th month, 25th, 1846. J. C.

### EAST CUMBERLAND.

The end of the year 1846 is fast approaching. The season throughout has been a peculiar and in some respects a remarkable one, and fraught with incidents of great importance, not only to the farmer, but also to the public at large. The summer was preceded by one of the wettest and mildest winters experienced for a great number of years, owing to which out-door farm-work was in an unusually forward state at the commencement of the new year; but the extremely wet weather experienced continuing late on in the spring months, caused the operations of preparing the land and getting in the seed to be much later in being completed than in ordinary seasons. Not only so, but the work was finished under unfavourable circumstances, as the

land could not be properly cleaned or pulverized, owing to its wetness, at the proper time for working it; and the drought setting in suddenly, and with such unprecedented severity, necessarily exercised a baneful influence on a considerable portion of the crops. The hay crop, notwithstanding the drought, was a pretty fair one, there being plenty of moisture in the land at the commencement of the drought, and the heat being so excessive, vegetation sprung rapidly until the drought began to seriously affect the land; but by that time the hay crop was in a forward state, and consequently turned out pretty well. And although the weather broke soon after the beginning of hay harvest, and continued exceedingly wet till the month of August, yet much of the hay was secured in good condition. Notwithstanding the very great quantity of rain that fell during six or seven weeks, there were intervals of a day or two of fine weather, which afforded an opportunity of getting much of it, as said before, in good condition. Spring corn suffered most, as much of it was put into the ground only just before the dry weather set in. Oats were seriously affected, and generally turned off short in bulk, and, owing to the rapidity with which they ripened after the rain came, the sample of grain is very small and light. Barley was similarly affected, being exceedingly short in the straw; and on much of the dry, sandy soil, which is generally considered best adapted for barley, a second crop sprung up from the root of that which was nearly ripe, and was almost as thick as the first one, and was calculated to injure the sample for malting purposes. Wheat, from very obvious causes, suffered least, except spring-sown, which was short in the straw. The sample of wheat exhibited in the market is, upon the whole, a pretty fair one, and much better than last year; and the yield, though in some instances good, will, on the whole, fall short of an average. The early part of the spring, being wet, was necessarily unfavourable for preparing the land for potatoes and turnips; and, where at all dirty, it was with great difficulty that it could be got anything like clean; but there being plenty of moisture, was favourable for the potato plant, and it made rapid progress, and the crop altogether, up till the month of July, never looked more promising, but towards the latter end of the month the plants here and there began to show symptoms of disease, and in the course of the next month it was abundantly evident that the failure would be both general and serious. It was hoped by many that, as the seed was generally selected from the kinds that had suffered comparatively little in the pre-

ceding year, the disease would not affect them in any serious way; but this hope was unfortunately not realized, for, although the seed was thus selected, they were much worse affected by disease than last year, and those who had planted seed from the kinds much diseased last year had scarcely any to take up at the end of the season. The disease made its appearance much earlier than before, and, the summer months being so very wet, the work of destruction was all but complete. On the driest land they were best, there being about one-half free from disease; but, owing to their being attacked in so early a stage of their growth, they were generally very small, many not more than half the usual size; consequently, on the more favourable lands they would not be more than a quarter-crop, and where the subsoil was retentive, although drained, the produce was generally little more than the seed, and in some cases less. Taking the county of Cumberland altogether, there would not be more—probably considerably less—the tenth part of an usual average crop. Turnips that were put in early got to be a pretty good crop; but the great bulk, owing to the weather, was late, and they are small and a deficient crop, though they improved much during the fine weather in September. When they were first stunted with sheep they were selling as high as 6d. a week, about a month ago they might be had for 4½d., but now they are as high as 7d. The late severe frost, which broke up on Friday last, has done them serious injury, and it is much to be feared that very many of the common kinds will be destroyed; indeed, this is evident, and this will be a more serious matter in consequence of the potato failure. The markets for both cattle and sheep have been good and improving till lately; there has been a little check during the last two or three weeks, but the markets for store stock are about closed for the season. Fat, too, has been rather worse lately, and may be expected to be more so should the injury to the turnips be general, as in that case both cattle and sheep would be hurried to the market, which would in consequence be glutted. Pork is selling at from 6s. to 6s. 6d. per stone of 14lb., and many being ill-fed and light, the quantity of bacon will be much short of previous years. Draining is going on with as much activity, and to a full greater extent than hitherto, as many of the tile-yards are already clear, notwithstanding the large quantity made during last summer. Labour has been hitherto plentiful, which is very fortunate, considering the high price of provisions.—Dec. 22.

## REVIEW OF THE CORN TRADE DURING THE MONTH OF DECEMBER.

Since the close of November, when we last addressed our readers, a very great change has taken place in the position of the grain trade. For weeks previous to that period, business had been excessively dull, and prices of wheat in particular had gradually receded some 5s. per qr. from the highest point attained the preceding month. Notwithstanding this reaction, there was a general want of confidence: merchants and millers were unwilling to purchase beyond what was absolutely necessary for their immediate wants; and as for entering into speculative investments, none thought of such a

proceeding. Whilst matters were in this state, the public press put forward predictions daily of a further important fall in the value of agricultural produce, giving as a reason the expected arrivals of corn from abroad. Believing this view of matters to be incorrect, we endeavoured in our last article to point out to our subscribers the fallacious nature of the conclusions; firstly, by drawing attention to the deficiency of the yield of the last harvest (taking all articles together) in Great Britain, and further, to the indifferent produce of many other countries in Europe. The rapid manner in which prices have

since risen affords proof that our opinion was not altogether erroneous.

In considering the probable future range of quotations, the state of Ireland is of the first importance. That the failure of the potato crop was much more extensive there than on this side of the channel can no longer admit of doubt: the misery at present prevailing in that unhappy country, and the manner in which England has been called on to furnish money and food to preserve large numbers from starvation, prove beyond question that the extent of the potato disease, however much it may have been exaggerated here, has not been over-rated in Ireland. The accounts from thence are almost unanimous in asserting that there are scarcely any potatoes left in the island; which may well account for the immense rise which has occurred there in the value of other descriptions of food.

To find a substitute for the loss of an article on which millions of the people wholly subsist cannot be accomplished without raising the value of the commodities employed. Had a surplus of corn been grown in England, or even had Europe produced more than average crops, the difficulty might have been got over without driving prices up very high; but in the actual position of affairs, there can be no question that if the wants of Ireland be really as great as represented, the gap to be filled up will take so much from our own slender resources as to keep food dear in Great Britain up to the time of next harvest.

In entering into a more detailed account of the course of the trade during the month now about to terminate, Ireland and her wants must still form the most prominent object for remark. The difference between receiving supplies from, and having to send supplies to, that country, was felt much sooner at Liverpool and other places on the west coast than in London, and Mark Lane was almost the last place affected thereby. Prices had risen considerably in the provincial markets before any advance occurred in the metropolis; but after the lower descriptions of wheat, Indian corn, &c., had been nearly exhausted at the western ports, attention began to be directed to the London market; and during the last four weeks scarcely a day has passed without large purchases being made here for shipment to Ireland. For this purpose the inferior kinds of foreign—such as Odessa, Danube, and Egyptian—were in the first instance taken; and these sorts have risen more rapidly than the finer varieties. All descriptions have, however, felt the influence; and, to proceed in our usual manner, we shall first notice the fluctuations which prices of English wheat have undergone in the metropolitan market.

In the early part of the month, the arrivals into London from Lincolnshire and other places on the east coast were liberal; and it was not till about the 16th that any actual advance in prices took place. A rise of 1s. to 2s. per qr. was then established, and the upward movement continued until the 18th, when good qualities of wheat were worth 5s. to 6s. per qr. more at Mark Lane than at the close of November. Some portion of this great rise was caused by the severe frost then prevailing, it being naturally concluded that the threatened stoppage of the inland navigation might impede supplies. The disappearance of the ice, which rapidly followed the thaw that set in on the 19th, had consequently the effect of rendering buyers somewhat more cautious; the reaction in prices from the highest point has, however, barely amounted to 1s. to 2s. per qr., and there is a tone of firmness about the trade very unusual at this period of the year, the week immediately preceding and that which follows Christmas being, in ordinary seasons, a time of great depression in the corn trade. Though, as already remarked, the supplies of home-grown wheat have been good, there has been very little accumulation of stocks, the demand for bread having, owing to the extreme dearness, and the very bad quality of the potatoes brought to market, been very extensive. Some quantity of the English wheat has, besides, been taken for shipment to the north; and should there be any falling off in the supplies from the growers, the millers would find it difficult to keep their regular customers supplied.

The rise in the value of foreign wheat has been greater than that established on English. A very extensive demand has been experienced throughout the month for the lower descriptions for shipment to Ireland. The advance on Odessa and similar descriptions, which have been principally taken for the purpose named, cannot be estimated at less than 8s. per qr., and the finer sorts of Baltic wheat have brought prices 5s. to 6s. per qr. above those at which sales were made at the close of November.

There is one circumstance in connection with the Irish demand which is likely to have a material effect on the future range of prices; viz.—that those qualities least suited for the consumption of London, and which might therefore have remained long on hand, have been almost cleared off the market. What now remains on hand consists principally of good, serviceable sorts of red Baltic and Dantzic wheat; and the total stock does not, we should think, much exceed 200,000 to 250,000 qrs. Holders are therefore placed in a very easy position: they have realized the more unsaleable part of their property, and are not likely to press that which remains upon the market. Latterly we have been

visited by purchasers from Liverpool, and a country demand from other quarters may be safely calculated on, London being now nearly the only place at which any quantity of old wheat is to be had. These considerations are certainly against any reaction in prices, particularly as there exists but little prospect of supplies from abroad reaching this country for some months to come.

Bonded wheat has been held relatively higher than free: indeed, the value of the former has approached within 1s. to 2s. per qr. of that of the latter. This has been caused, in the first place, by the trifling nature of the stock under lock in the United Kingdom; and secondly, by the activity of the French demand. At one period there was a temporary falling off in the inquiry from France; but latterly the anxiety of that country to secure supplies has become greater than ever; and from present appearances we should not be surprised if English grown wheat were to be taken when the bonded stocks shall have been exhausted. According to the official report just published, there were only 141,681 qrs. of wheat under lock in the United Kingdom on the 5th Dec., of which 47,003 qrs. were held in the port of London.

The dull aspect of the wheat trade in the beginning of the month induced the millers to lower the top price of town-manufactured flour to 51s. per sack. This, however, proved a short-sighted proceeding; for hardly had it been done when the wheat-market began to rally; and before a week had elapsed, the highest quotation was again raised to 56s. Even this the millers soon found would hardly remunerate them; and on the 18th inst. they agreed to advance flour to 60s. per sack. The article is therefore now as high as it has been at any time since harvest.

The bakers have lately been very anxious buyers, whilst the millers have shown an unusual indifference to entering into forward contracts to deliver the article even at the recently enhanced rates. The fact is, that many of the large London steam-mills have lately employed a considerable portion of their power in grinding meal of the inferior kinds of wheat, to ship to Ireland; and a much less quantity of flour for local use has been made than usual. The arrivals of the article coastwise have meanwhile been only moderate; and as most of the American which has come to hand has been bought up for French account, both sack and barrelled flour has advanced in quite the same proportion as town-made. The quantity in bond on the 5th Dec. in the kingdom was 25,567 cwts.; and in London there were on that day 44,742 cwts.

The arrivals of English barley have been only moderate; but from abroad a fair quantity has been received. The foreign supply has been almost

wholly from the Northern European ports; and as, according to the latest advices from the Baltic, the navigation had closed, no further arrivals can be expected from thence till spring; there is, consequently, a prospect of this grain becoming scarce.

Though the inquiry for malting barley has at no period of the month been particularly brisk, prices have been maintained. At one time a fall of 1s. to 2s. per qr. did take place, but this decline was speedily recovered; and the best qualities are now worth 52s. to 54s. per qr., which is quite as much as they brought at the close of last month. A great proportion of the foreign arrivals has consisted of secondary malting and distilling sorts; but nearly the whole having been imported by the distillers, there has been little or no pressure on the market, and quotations have only fluctuated a couple of shillings per qr., leaving off at the end of Dec. at much the same point they were in the beginning of the month. The increased demand for the coarser descriptions of food for shipment to Ireland has caused some attention to be directed of late to grinding barley, and heavy parcels cannot at present be bought much below 40s. per qr. This appears at first sight a high price; but taking the weight at 50lbs. per bushel, and that of Indian corn at 60lbs., the former is much the cheaper article, as much as 70s. having lately been given for Indian corn. This can only be accounted for by supposing that the latter possesses more nourishing properties, or is in some other way better adapted to the tastes of the Irish people. Though the transactions in malt have not been on a very extensive scale, the value of the finer sorts has gradually crept up, and the top price is at present 78s. to 80s. per qr. That the stocks in the hands of the brewers are very short is certain; and high as prices now are, there is little prospect of any reduction occurring.

The market has throughout the month been very sparingly supplied with oats; indeed, had it not been for the assistance received from abroad, a considerable degree of scarcity must have been felt; and even with the foreign arrivals included the receipts have been materially below the quantity necessary for the consumption of the metropolis. The great falling off has been in the supply from Ireland, only about 25,000 qrs. having come to hand from that country during a space of four weeks; whereas, in ordinary times, nearly that quantity of Irish oats enters the port of London weekly. So long as there was a possibility of obtaining the article from the continent, the decrease in the receipts from the sister isle was not much regarded; but as the northern ports of Europe are now closed by ice, and are likely to remain shut against us till the spring has well advanced, it has become a mat-

ter of serious consideration from whence we are to derive the requisite supply. This difficulty has no doubt been the cause of the recent sudden rise in prices. Until about the middle of the month the trade remained in a comparatively quiet state; lately, however, the dealers have shown a good deal of anxiety to get into stock, which factors have not been slow to observe, and a rise of from 2s. to 3s. per qr. on the rates current at the close of November has been established. Moderately good feed oats have commanded 30s. to 32s., and potato and other heavy qualities have sold at 35s. and upwards. High as these prices are, there is reason to believe that the value of this grain will be still higher unless Ireland is capable of sending us much larger supplies than from the position of that country we have any right to calculate on. It is scarcely to be presumed that whilst the Irish are buying largely in the English markets Indian Corn at 70s. per 480lbs., and wheat meal at 17*l.* per ton, they will forward oats which may be converted into wholesome food for her famished people to this side of the channel. In many parts of Scotland great distress also prevails in consequence of the deficient yield of the potato crop; and so extensive is the demand for oatmeal in that country, that higher prices are obtainable there than in the south; it follows, therefore, that for some months to come, London will have to depend principally on the arrivals from the east coast of England for her supply of oats. Meanwhile the stocks in the hands of our large dealers are unusually short, all parties having for months past acted on the hand to mouth system.

Much less speculation has been carried on in beans this autumn than might from the shortness of the crop have been expected. Throughout November, and during the first half of December, the transactions in this article were on a strictly retail scale, and scarcely any variation occurred in prices. The great rise which has of late occurred in the value of other articles has, however, had the effect of causing attention to be directed to beans. On Monday, the 23rd, several pretty large purchases were made of English, at rates 1s. per qr. above those previously obtainable; and, at the same time, Egyptian, both on the spot and to arrive, rose 2s. per qr. This enhancement has not only been supported, but the tendency has since been decidedly upwards, and from present appearance we are inclined to think that the price of this long-neglected article will ere long attain its relative position as compared with other feeding stuffs.

About the end of last month several large cargoes of white peas were received from abroad, and some further arrivals have since come to hand. These supplies caused sales to be difficult in the

early part of the month, and until quite recently the best English boilers were not worth more than 50s. per qr.; the excessive cold experienced from the 13th to the 19th led to a more extensive consumption, and quotations have since crept up 3s. to 4s. per qr. Other sorts of peas have risen in the same proportion, grey having during the last week or two brought 46s. to 47s., and maples 48s. to 49s. per qr.

In Indian Corn far more business has been done at Liverpool than in London; indeed, we have hardly had any arrivals here, most of the cargoes bought on London account abroad having had a clause in the charter to call either at Falmouth or some other out-port for orders; and Ireland having offered a more advantageous market than England, the captains in charge of the different vessels have been instructed to proceed thither. The transactions have, therefore, been principally in floating cargoes, for which high terms have been realized, say 62s. to 64s. for Galatz, cost and freight, the buyer taking the risk as to the condition the cargo may be delivered in from the ship.

Our notice of the foreign grain markets must necessarily be meagre this month, owing to business having become for a time suspended at many of the northern ports, with the close of the shipping season. The frost set in earlier in the Baltic than with us; and though intervals of comparatively mild weather have been experienced, most of the principal continental rivers have continued so blocked by ice as to render their navigation difficult if not impracticable.

The most recent advices from Danzig state that a large proportion of the wheat expected down the Vistula had, in the first instance, been detained by the shallowness of the water in that river; and afterwards, when this difficulty had been got over, many of the barges had been caught by the frost, from which they were not expected to escape till spring. The receipts from Upper and Lower Poland had consequently fallen short of expectation, which circumstance, coupled with the reports from Great Britain, France, and Belgium, had rendered holders very firm, and high prices had been asked for wheat deliverable in spring. The business actually done does not seem to have been important, and the last quotations were as follows: Prime high-mixed, 57s. to 58s.; high-mixed, fair quality, 53s. to 54s.; good mixed, 51s. to 52s.; good red-mixed, and red, 50s. per quarter. At some of the Lower Baltic ports the supplies from the growers have increased, the frost having rendered the roads sufficiently hard to admit of the transport of goods. From Rostock we learn that the parcels of wheat brought to that market by the farmers had met ready buyers at equal to 52s. to



54s. per qr., whilst merchants had refused to enter into contracts to deliver the best qualities in spring below 54s. per qr. At Stettin the quality of the new wheat does not seem to be nearly equal to that of last year's growth, the weight per bushel being given at 59 to 60 lbs. Notwithstanding which, nearly as high rates are asked there for spring shipment as at Rostock. At Hanburgh the stocks of wheat are very unimportant, indeed hardly sufficient for local wants; and the town bakers have lately been paying there for heavy red wheat what in English money would make the price, free on board, 55s. to 56s. per qr. All over the Netherlands wheat is extremely dear. In the Dutch markets the prices are on about a par with our own: and in Belgium quotations are still higher; indeed, owing to the very bad yield of the rye crop, an importation of bread stuffs from hence was considered a very probable occurrence. In many parts of France provisions of all kinds are so scarce and dear as to have been the cause of serious riots. The government, to encourage importation, has lately made an alteration in the navigation laws. Formerly flour of American manufacture was only allowed to be imported either under the French or American flags; but the pressing wants of the nation have led to the permission of British vessels being employed in the conveyance of flour, not only from the States, but likewise after the flour has been bonded in England. At Marseilles wheat is considerably higher than in London; and the supplies which otherwise might have reached us from the Black Sea and Mediterranean have consequently found their way to that port.

In conclusion, we shall say a few words relative to the probable extent of the arrivals into Great Britain from America. The latest advices from the United States reach to the 9th of December. The weather had then assumed a wintry character, and an early stoppage of the inland navigation was expected. There were, however, large stocks at the principal seaports. At New York the quantity of flour was estimated at 500,000 barrels, though upwards of 100,000 barrels had been despatched from thence in November. The difficulty in procuring ships, and the exorbitant freights demanded (5s. to 6s. per barrel), had greatly interfered with business, and caused prices of flour to recede nearly a dollar per barrel. We still think, as we have thought all along, that the quantity of bread stuffs likely to be received from the other side of the Atlantic will fall short of general expectation; and instead of the millions of barrels of flour talked of, we are disposed to set down the probable receipts at a few hundred thousands.

CURRENCY PER IMPERIAL MEASURE.

DECEMBER 28.

WHEAT, Essex and Kent, new, red	68	73	White	66	69	76
Old, red	65	72	Do	69	73	
RYE, old	36	38	New	40	43	
BARLEY, Grinding 40 45	50	54	Chevalier	54	56	
Irish	—	—	Bere	—	—	
MALT, Suffolk and Norfolk	70	74	Brown	70	—	
Kingston and Ware	70	74	Chevalier	70	74	
OATS, Yorksh. & Lincolnsh., feed	28	33	Potato	36	—	
Yorkhall and Cork, black	25	27	Cork, white	27	32	
Dublin	26	29	Westport	31	—	
Waterford, white	26	29	Black	26	28	
Newry	30	32	Galway	24	27	
S otch, feed	29	33	Potato	32	35	
Clomel	30	32	Lim-rick	32	34	
BEANS, Tick, new	40	44	Sligo	27	28	
Londonderry	28	30	Old, small	43	52	
PEAS, Grey	49	—	Maple	50	51	
White	50	51	Boilers	55	58	
FLOUR, Town-made 56 60	Suffolk	50	per sack of 280 lbs.			
Stockton and Norfolk 44 50	Irish	—				
FOREIGN.						
WHEAT, Dantzic	66	70	Fine	71	75	
Hamburg	60	68	Rostock	66	70	
BARLEY	40	40				
OATS, Brew	32	31	Feed	25	30	
BEANS	42	50	PEAS	50	56	
FLOUR, American, per brl.	36	40	Baltic	—	—	

IMPERIAL AVERAGES.

Week ending	Wheat.	Barley.	Oats.	Rye.	Beans.	Peas.
Nov. 14th	61 5	41 6	26 9	42 4	46 10	50 10
21st	59 8	42 11	25 10	42 7	46 4	49 0
28th	59 0	42 9	25 11	44 2	45 10	47 0
Dec. 5th	59 7	42 11	26 7	42 5	45 4	48 0
12th	60 3	43 1	26 5	42 11	45 0	48 7
19th	59 10	42 11	26 3	43 1	44 8	48 10
Aggregate average of the six weeks which regulates the duty.	59 11	43 2	26 3	42 11	45 8	48 9
<b>Comparative Average.</b>						
Sametime last year	58 6	33 5	24 10	36 1	41 11	44 4
Duties Payable in London till Wednesday next inclusive, and at the Outports till the arrival of the mail of that day from London	4 0	2 0	1 6	2 0	2 0	2 0
Do. on grain from British possessions out of Europe	1 0	1 0	1 0	1 0	1 0	1 0

Account shewing the Quantities of Corn, Pulse, and Flour imported into the United Kingdom, in the month ended the 5th Dec., 1846; the Quantities upon which Duties have been paid for Home Consumption during the same month, and the Quantities remaining in Warehouse at the close thereof.

Species of Grain.	Quantity imported.	Quantity entered for consumption.	Quantity remaining in warehouse.
	qrs. bush.	qrs. bush.	qrs. bush.
Wheat, from British Possessions	9912 4	10998 7	1490 4
Barley, do.	372 0	372 0	—
Oats, do.	357 6	357 6	—
Peas, from do.	6271 4	6508 4	280 3
Wheat, foreign	87455 3	45450 6	14019 4
Barley, do.	75205 3	74871 2	17195 5
Oats, do.	77942 2	76911 2	5186 2
Rye	93 4	81 2	69 2
Peas, do.	52353 4	39958 4	20707 0
Beans, do.	16654 0	27312 1	36558 0
Indian Corn, do.	100610 3	100085 7	3803 1
Buck Wheat, do.	9813 0	9216 3	599 1
	ewts. qrs. lbs.	ewts. qrs. lbs.	ewts. qrs. lbs.
Flour from British Possessions	99862 0 1	88154 2 24	9968 0 5
Flour, foreign	85424 1 26	89122 2 3	245705 0 2

Maize or Indian Corn imported into Ireland on account of Government, 4,021 qrs. 3 bush.

**STOCK OF GRAIN IN BOND IN LONDON  
DECEMBER 5.**

Wheat, qrs.	Barley, qrs.	Oats, qrs.	Beans, qrs.	Peas, qrs.	Maize, qrs.	Flour, cwt.
47,002	2,545	36,572	19,513	11,682	—	44,742

**IN THE KINGDOM.**

Wheat, 141,681	Barley, 17,195	Oats, 51,896	Beans, 36,558	Peas, 20,966	Maize, —	Flour, 255,673
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**PRICES OF SEEDS.**

DECEMBER 28.

Rapeseed, 22/.	25/.	Irish, —/.	—/.
Linseed, Baltic, 44	48	Odessa, 45	48
Mustard, per bush, white	8	10 brown,	9 10
Corraway, 41	43 new, 42	44	Coriander, 10
Hempseed, 35	28 per qr.	Trefoil,	17 19
Canary, 55	58 fine, 60	62	Tares, winter, 6s.
Linseed Cakes, English	13/.	13/.	10s. per 1000
Linseed, English, sowing	50	60	crushing 44
			48 per cwt.

**HOP MARKETS.**

**BOROUGH, MONDAY, Dec. 28.**

The market has been dull, and business at this season is not looked to an extent that will influence the general range of quotations.

**BOROUGH, Dec. 28.**—There has been a fair extent of business done in Hops; there are hardly any bags remaining, and the operations have been almost entirely confined to pockets. Quotations may be regarded as much the same to-day as on this day se'nicht, with rather increased firmness on the part of holders.

**POTATO MARKET.**

**SOUTHWARK WATERSIDE, Dec. 28, 1846.**

The supply to this market during the past week from France was tolerably good, but from all other parts it was very limited. There was an advance in the prices for first-rate samples, but for inferior or secondary samples there was but little improvement.

The following are our present quotations:—

York Regents .....	s.	s.	Kent and Essex Re-	s.	s.
Shaws .....	160	150	gents .....	160	150
Lincolnshire & Cam-			ditto Shaws .....	—	—
bridgsh. Regents .....	130	150	ditto Kidneys .....	140	160
Shaws .....	—	—	French Whites .....	129	140
Kidneys .....	110	120			

**BUTTER, CHEESE, BACON, AND HAMS.**

Dorset Butter, per firkin	54	—	Cheese, per cwt.	—	—
Fresh Butter, 14s. 6d.			Double Gloucester ..	62	64
per doz.			Single do .....	52	62
Irish, do., per cwt.			Cheshire .....	56	84
Carlow, new .....	104	—	Derby .....	58	66
Sligo .....	80	—	American .....	52	54
Cork, 1st .....	98	100	Edam and Gouda ..	46	56
Waterford .....	98	100	Bacon, new .....	64	66
Foreign Butter, per cwt.			Middle .....	—	—
Prime Friesland .....	114	—	Hams, Irish .....	92	—
Do. Kiel .....	102	—	Westmoreland .....	96	—
			York .....	112	—

**WOOL MARKETS.**

**BRITISH.**

**LEEDS, Dec. 24.**—The demand this week has been moderate for the season. Prices are firm, and have an upward tendency.

**WAKEFIELD, Dec. 23.**—There is no variation from our last week's report in either the long or short wool trade. The near approach of Christmas causes transactions to be on a very limited scale.

**LIVERPOOL, DEC. 26.**

**SCOTCH.**—There having been a little speculation in some kinds of foreign, caused a little more inquiry to be made about Scotch. But the accounts from the manufacturing districts continue to be so unsatisfactory, pre-

vents anything like an active demand. The demand for Laid Highland is still limited, with a tendency downwards. White Highland is not inquired for. The low price of Russian fleece Wool keeps this article out of use, except at a reduction on our present rates. In the lower and inferior descriptions of Crossed Cheviot there is comparatively little doing. The better class of each sort is in fair demand by the trade.

Laid Highland Wool, per 24lbs	7	0	to	7	9
White Highland do	10	9	11	6	
Laid Crossed do .. unwashed	9	0	10	3	
Do. do. washed	10	0	11	6	
Do. Cheviot do .. unwashed	9	9	12	0	
Do. do. washed	12	0	15	0	
White do. do	22	0	24	0	

**FOREIGN.**—The speculative feeling that existed last week has somewhat subsided; the dull accounts from the manufacturing districts generally with this season of the year, when people do not wish to increase their liabilities, the business done has been only moderate.

**FOREIGN.**

**LEEDS, Dec. 24.**—There has been less doing in foreign wools during the past week, as is usual at this season of the year, but prices remain very firm.

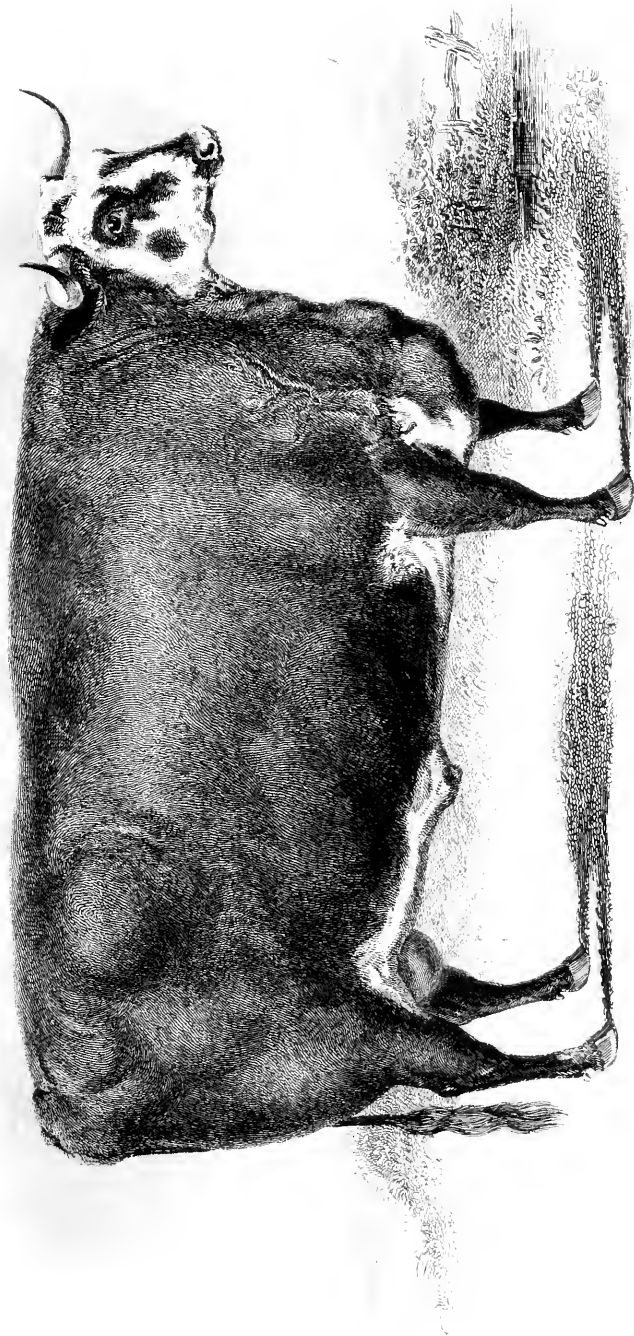
**GERMAN WOOLS.**—A letter from Berlin of Dec. 17 says:—"For several years past the production of wool has become so considerable in Germany, that this country at present finds itself at the head of all those where this branch of trade is carried on. The states of the customs' union possess 21,961,551 sheep, furnishing each year, allowing a minimum of 22lbs. to 10 sheep, 48,500,000lbs. of wool. The Austrian states produce each year 700,000 quintals of wool, two-thirds of which come from Hungary, Transylvania, and the military frontiers; the other third is produced in Moravia, Silesia, Bohemia, and Gallicia. As to the quality, the wools produced in Moravia and Silesia are the best; next come those of Bohemia, Gallicia, Transylvania, and the military frontiers."

**PRICES OF MANURES.**

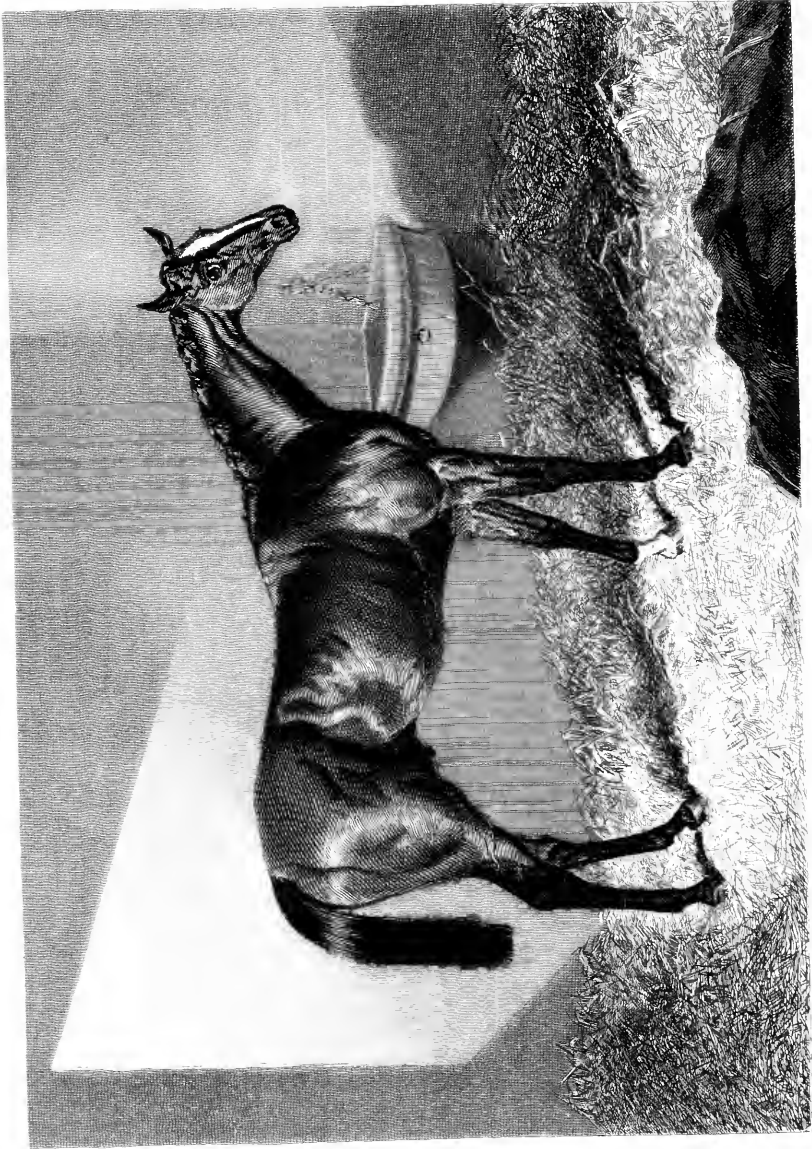
Subjoined are the present prices of several sorts of Manure:—

Agricultural Salt, 32s. per ton	Muriate of Ammonia, 20s. to 24s. per cwt.
Alkalies, 28s. and 42s. per cwt.	Muriate of Lime, 6s. per cwt.
Boast and Co.'s (Bow) Inorganic Manures, from 6s. to 11s. per cwt., according to crop	New Bristol Manure, 8s. per qr
Boast's Guano, 9l. 9s. per ton	Nitrate of Soda, 16s. per cwt.
Carbon, 12s. per qr.	Nitrate Potash (saltpetre), 25s to 26s. per cwt.
Chic fou, 21s. per cwt.	Patent Disinfected Manure 13s. 6d. per qr.
Chloride Lime, 28s. per cwt.	Petre Salt, 4l. 10s. per ton
Clarke's Compost, 3l. 12s. 6d. per hhd., sufficient for three acres	Potter's Guano, 10l. per ton.
Fothergill's Gypsum, 35s. per ton.	Preparation for Turnip Fly 10s. 6d. per pakt., sufficient for three acres
Fothergill's Phosphate of Lime, 14s. per cwt.	Rags, 4l. to 4l. 10s. per ton
Graves, 6l. 10s. per ton	Rape Cake, 6l. per ton
Guano, Peruvian, 10l. 10s.; Bolivian, 9l.; African, 6l. 6s. to 7l. 10s. per ton, according to analysis	Rape Dust, 6l. 6s. per ton
Gypsum, at the waterside, 55s. per ton	Soap Ashes, 10s. per ton
Highly Concentrated Manure, 30s. per qr.	Soda Ash, 14s. to 16s. per cwt.
Humus, 14s. per qr.	Sulphate Soda, 6s. per cwt.
Hunt's Bone-dust, —s. per qr.	Sulphur for Destroying Worm on Turnips, 12s. per cwt.
Hunt's Half-inch Bone, —s. per qr.	Sulphuric Acid, 1½d. per lb.
Hunt's Stuff Graves, 3s. 6d. cwt.	Superphosphate of Lime, 8s. per cwt.
Hunt's new Fertilizer, 13s. 4d. per qr.	The Liverpool Abattoir Company's Animalized Manure Powder, 2l. 10s. per ton
J. T. Hunt's Artificial Guano, 9l. per ton	The Urate of the London Manure Company, 4l. 4s. per ton
Manure Powder, 16s. per qr.	Willey Dust, 4l. 4s. per ton
	Wolverhampton Compost (Alexander's), 12s. per qr., subject to carriage to London, or forwarded from Wolverhampton









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# THE FARMER'S MAGAZINE.

FEBRUARY, 1847.

No. 2.—VOL. XV.]

[SECOND SERIES.

## PLATE I.

### A HEREFORD OX.

The subject of our first plate is a Hereford Ox, the property of the Right Honourable the Earl of Warwick, of Warwick Castle, bred by Mr. John Thomas, of Cholstry, near Leominster, Hereford.

This beautiful animal obtained the first prize of £30 and the Gold Medal at the Smithfield Show in December, as the best Ox or Steer in the 1st, 2nd, 3rd, 4th, 5th and 6th classes. The Silver Medal was also awarded to Mr. Thomas, as the breeder.

For the genealogy of Mr. Thomas's stock, see "The Herd Book of Hereford Cattle, by T. C. Clayton, Esq.," published by Longman and Co., London.

## PLATE II.

### SIR TATTON SYKES; WINNER OF THE ST. LEGER, 1846.

ENGRAVED BY E. HACKER, FROM A PAINTING BY J. F. HERRING, SEN.

Sir Tatton Sykes (first called Tibthorpe) was bred by his present owner, Mr. W. Scott, in 1843, and was got by Melbourne, dam by Margrave, out of Patty Primrose by Confederate — Sybil by Interpreter, — Galatea by Amadis.

This Margrave mare, bred by Mr. W. Stables in 1836, is also the dam of Vitellius and London. She never ran.

Melbourne, the sire of Sir Tatton, like the sire of Pyrrhus, has had but a short trial as a stud-horse, although, it is almost unnecessary to add, a most satisfactory one. According to the advertisement, by which he is already located for next season at Bonehill Farm, Tamworth, only two of Melbourne's stock have yet appeared in public—the winner of the St. Leger, and The Premier, the winner of the Two-year-old Stakes at Manchester. In fact, this is the first year he has had anything out. Melbourne was a good stout runner himself, and, though supposed to have never been properly prepared, won many heavy stakes against superior fields of horses. He was got by Humphrey Clinker, dam by Cervantes, and grandam by Columbus.

Sir Tatton Sykes is a bright bay horse, with a white reach down his face, and one white foot; stands little more than fifteen hands and a half high. He has a long, lean head, and is rather Roman-nosed, with drooping, large ears, light, straight neck, very oblique shoulders, wide chest, deep brisket, large, long arms, great knees, very short legs, strong pasterns, and fine open feet, turning his toes a little out; large back and fore-ribs, fine loins, very wide from hip to hip, long quarters, tail set on high, great length from the hip to the hock, immense gaskins, long and strong thighs, large, rather curby-looking hocks, and very short from the hocks to the ground, standing with them close together. He is particularly quiet and docile, and possesses every qualification for a race-horse.

#### SUMMARY OF SIR TATTON SYKES'S PERFORMANCES.

In 1846 he started six times, and won three :

The 2,000 Guineas Stakes, at Newmarket, value clear .....	£1,700
The Knavesmire Stakes, at York .....	280
The St. Leger, at Doncaster .....	3,475

£5,455

ON THE IMPROVEMENT OF COLD CLAYS.

BY M. M. M.

Large tracts of land exist in different parts of the country, which are neither profitable to the landowner, nor remunerative to the tenant. Before convertible husbandry was understood and acted upon, the clays were considered the most valuable soils. A good wheat and bean farm was what every farmer sought most anxiously after, while a light sandy or gravelly soil was disregarded. The grass land grew hay, which kept the stock in winter, and the pasture, on clays generally the best, fattened the cattle in summer for the market; while the tillage land grew wheat for sale, and beans and oats partly for sale, and partly to keep the heavy stocks of draught horses, which were required to work the arable land. The great object of every farmer was to get permission from his landlord to plough out a grass field. This grew a succession of corn crops, produced much good straw for his stock, and a good deal of manure, and was moreover much more easily worked, and required less hand-weeding and ploughing; and it was many years before it got the dismal character of "old going" land.

Little was returned to the soil, and hence it underwent a process of deterioration every year. I was examined before a committee of the House of Commons on a railway last session, and in giving evidence regarding a district through which it passed, stated that it was annually getting poorer and poorer. Its circumstances were these:—It was totally grass, the best was mown every year, and little returned to it; the worst was depastured by poor breeding stock, which were annually sold off; and thus nothing was kept upon it but what impoverished it, while there was nothing returned to the land. This was the vale of Mallestang, in Westmoreland, the source of the river Eden, and it is what is taking place daily on the mass of tillage land farms.

The vale of Cleveland, in Yorkshire, much of the county of Durham, Buckinghamshire, &c., were once the great corn growing and valuable soils, on which we depended for our food. They are now barren and stubborn, almost as the rock from whence they were disintegrated. The straw is small, stunted, and poverty-stricken; the corn, though good in sample, is small in quantity, not more is produced than some twenty bushels per acre, while every expense of cultivation is precisely the same. With a prospect of low prices, with

heavy labour, wear and tear, and with very little produce, the clay farmer must starve at the rate he goes on at present; hence a very serious question is opened, "What shall be done for him at this eventful crisis?"

To understand his position, it must be understood that his rotation in the main is fallow, wheat, and oats; sometimes a crop of beans or clover intervene, but this is on the exceptional part of the property, and hence there are two years' rent, tithe, taxes, and labour for a wheat-crop worth some £5 or £6 per acre, and an oat crop worth some £4 per acre. This state of things must soon reduce the farmer to a serf, and the land must soon revert to the owner, to whom it would be a real incubus. It would not repay the expense of cultivation, it would diminish his annual receipts, and hence curtail his powers of improvement, and even then would not pay any per-centage for the capital invested in his land.

We have glanced at the cause of this deterioration. The cultivation of clays is a system of plunder. It is the bleeding to death of a patient by inches, who needs cordials and tonics. To understand this we must take the analysis of a rich soil, and a poor cold clay.

	Poor Clay.	Good Soil.
Water of absorption . . . . .	6.05	4.00
Carbonate of ammonia . . . . .	trace	
Sulphate of lime . . . . .	.03	0.30
Chloride of sodium . . . . .	trace	0.10
Vegetable matter . . . . .	.02	0.60
Water not expelled at 300, and matter destructible by heat . . . . .	3.02	5.00
Silica . . . . .	78.04	74.00
Alumina . . . . .	5.00	3.20
Oxide iron . . . . .	3.00	6.50
Carbonate of lime and magnesia . . . . .	1.08	2.09
Phosphate of lime . . . . .	.01	0.04
Potash . . . . .	.08	0.06

The great difference between the two soils appears to be in the quantity of phosphate, carbonate of lime, and vegetable matter they contain. Taking the phosphate of lime, we find wheat, according to Sprengel, to contain, in 100,000lbs., 400lbs. of phosphoric acid, and oats 70lbs. Hence if these are continually sold off the farm, only the straw is returned, and it contains, (wheat-straw) 170lbs., and oat-straw 12lbs. Hence, unless phosphorus is supplied to the soil by some extraneous process, it must be becoming so poor in this element, as to



grow but very small quantities of the grain which requires the most of it.

On clay soils this is difficult. Bones (the fruitful source of renovation of this material in sandy soils), are unavailable, because it is too cold and inert to decompose them; and the manure made on the farm is little better than rotted straw; and as the straw slowly partakes more and more of the deficiency of that particular mineral in which the soil is wanting, it becomes more and more deficient in its power to produce crops; and hence the *weeds* which require least of this deficient material, become so rank and numerous as to choke and overcome the crop. On this subject Liebig says—"Phosphoric acid has been found in the ashes of all plants hitherto examined, in combination with alkalis or alkaline earths. Most seeds contain certain quantities of phosphates. In the seeds of different kinds of corn particularly, there is abundance of phosphate of magnesia. Plants obtain their phosphoric acid from the soil. It is a constituent of all land capable of cultivation, and even the heath at Limeberg contains it in appreciable quantity. The soil in which plants grow furnishes them with phosphoric acid, and they in turn yield it to animals to be used in the formation of their bones." Hence, bran which is abundant in the phosphates, has been used with great success as a manure on some soils; while on others, it is almost inert. On the former, doubtless because the phosphates were exhausted, and thus returned; while on soils less deficient, it has but little power, not containing any large quantity of the other elements necessary for the growth of the plants it was intended to manure.

The effect of manures on corn is precisely in proportion to the salts they contain, which previous cropping has displaced. Blood, for instance, a substance abounding in phosphoric acid, gives a return in bushels of wheat, from one bushel sown, equal to 14; while in similar circumstances mere vegetable matter yielded but 3 bushels; and of oats, blood returned 12½ bushels, while vegetable matter returned 13; oats containing but a small proportion of the phosphates: and this is doubtless the reason why oats are selected to alternate with wheat, because the small quantity of the phosphate which they take up gives the soil time to disintegrate its fixed salts, and render them available for plants.

We will just adduce one principle more in illustration of this point, and it is this—Salt, or chloride of sodium, is a constituent of nearly all plants. In soils where the aspect is favourable to the sea, it is diffused miles from the coast, by mists and wind. In the great hurricane of 1839, incrustations of salt whitened the windows in this neigh-

bourhood (Thirsk), and even had a distinct saline flavour for several days; and the same was observed at Malton, or within a few miles of the Eastern Sea. Thus, the wind being S.S.W., it was evident that the salt spray had been by that tempest diffused nearly across this island, and it might be one cause of the great fertility of the subsequent years, when we were nearly independent of foreign supply. On some soils salt is perfectly inert, in others it is of great value. Mr. G. Sinclair, in his prize essay, gave the following results on wheat after barley:—"Soil unmanured, 16½ bushels per acre; soil dressed with 11 bushels of salt, 22½ bushels per acre." Wheat after beans:—"Soil unmanured 11½ bushels per acre; soil dressed with 6½ bushels of salt, 21 bushels per acre."

The above are sufficient for our purpose, but the following *fact*, on the authority of Liebig, will complete our chain of evidence. He states that "in Flanders, the loss occasioned by the abstraction of the corn-crops, is supplied by the ashes of wood or bones, and they are of so great value as to be transported for 18 to 24 miles. With every 100lbs. of ashes, he declares as much phosphates are furnished to the soil as 460lbs. of fresh human excrements would afford. If 100 parts of the ashes of the grain of wheat contain of phosphates 76.5 parts, as it does according to Saussure, and that of the straw, 11.5 per cent., 100lbs. of beech ashes supply phosphates sufficient to produce 3,820lbs. of straw, or for 15, 1800lbs of corn."\*

Besides this chemical deterioration, a mechanical injury goes on. The free and soluble particles being abstracted, the ploughing, treading, and kneading of the soil, absolutely puddles the surface, and thus the clays are every year becoming more tenacious, and thus more difficult and expensive to work. This again prevents the filtration of water; they hold it like a pot, and thus the plants are embedded in a hard, cold, cohesive mass, carrying on a vital warfare to spread their minute roots, and expending their powers in a vain search of nutriment of which they are destitute, and which they so ineffectually seek to supply. It is a struggle between chemistry and vitality; chemical sterility and mechanical cohesion conspire to render the corn-plants both small, scanty, and unproductive.

The manures applied, powerless as they are, cease to be useful. The surface-water absorbs even their best qualities, and sends them off into the ample furrows, to which there is a slope so complete as to hasten the process. The plants are the victims of the winter frosts, which have tenfold power on retentive soils, in which stagnant waters

\* See Liebig, Organic Chem., p. 183.

are found, and of the summer heats, which cause them to contract as the water evaporates, and open fissures which admit the drought, so as further to expose the roots to the atmosphere, and thus injure the crop.

What can be done to the clays? What can the landowner, or the tenant, or both do, to remedy a state of things like this, with a prospect of reduced prices? Or are the thousands of clay farms to be given up as barren wastes, and allowed to run wild, growing the semi-aquatic grasses, and grazing geese and wild-fowl? Or are we to be prepared to see them given up to the paupers, on which to live or starve?

The interests and the wants of the community forbid this; each has both a public and personal interest at work, sufficiently powerful to induce both the owner and occupier to combine their efforts and to try to live.

It can only be accomplished by one of these things—*Capital must be expended in permanent improvements. Expenses of cultivation must be reduced in proportion to the produce. More stock must be kept, and more corn produced at less cost.*

The foundation of all improvement is a judicious system of drainage; without this, all other efforts are in vain, and it becomes a question, how and by whom this is to be effected? The nature of the soil renders frequent drains necessary; from 10 to 18 feet apart seems to be a space indicated by necessity. The tiles and cutting are therefore very expensive, and even the cartage of them is a very serious item. An expenditure of £5 per acre will be in most cases necessary, to thoroughly drain cold and stubborn clays. This is an expenditure which no tenant can be expected to make on another's property; and on clay soils no lease, however long, can compensate for such an outlay. A landlord to expect a tenant to expend capital equal to something like from one-sixth to one-eighth of the whole value of the fee simple, would be at once both unreasonable and unjust. Even the cartage of the tiles, when they are at any considerable distance, is an expenditure of capital in the shape of horse power for which the tenant ought to be remunerated.

The only fair and honest mode of improvement by drainage, is for the landlord to be at the whole expense, to have it executed in the best possible manner, and to charge the tenant a proper per centage on the outlay. Generally it will handsomely remunerate the tenant to pay seven per cent. No capitalist would, however, think that six per cent. were a bad return for invested capital, and therefore in ordinary cases that is a fair amount. If, however, the work is precarious, if there is danger of its becoming less effective, as is the case on run-

ning sands, seven per cent. should be paid. On clays generally, six will be sufficient; but he is a very ignorant and a prejudiced man who does not think it his own interest to pay 6s. to 7s. per acre more for land thoroughly drained, when drainage were needed.








The mode of draining clays is a subject of great controversy. It is dangerous to venture an opinion between the two great combatants of the day—Mr. Smith of Deanston, and Mr. Parkes—whether clays are to be drained at 30 inches or at 4 feet. Much as many parties regretted the sudden close of the discussion at Newcastle, when the whole agricultural intelligence of the country was present—the error was, perhaps, more in the determination to lay down *general* rules, and to pursue general theories, than to adapt those rules to special cases—and certainly the one fact abundantly demonstrated was, “That it is an error to lay down any general rule to apply to all cases, where the mechanical character of soils differ so much, and where circumstances must always very much regulate all practical operations.”

The great question is the *depth* of drains on clays, for on sand or gravel it is impossible to get too deep: go as deep as the fall will admit of is the best rule. On clays, however, there is a diversity of opinion. In the minutes of evidence taken before the committee of the House of Lords, we find Mr. Pusey recommends 2 feet 10 inches; Mr. Thompson, 4 to 8 feet; Mr. Bowes, 1 foot 8 inches; Mr. Hutley, 2 feet 6 inches; Mr. Parkes, 3 to 4 feet; Mr. Putland began with 4 feet 5 inches, and afterwards found 2½ to 3 feet answer better; while Mr. Spencer began at 1 foot 8 inches, and progressed to 3 and 6 feet. These are not the whole of the witnesses who have drained clay, but they are sufficient to show that they differ more than anything which could be conceived. They indicate, however, *not* that no progress is made nor that all drainage of clays is an uncertain operation, but that in some districts a much greater depth may be gone to than in others, and when depth is admissible it will answer the best. On the whole, on stiff retentive clays, if we may venture to generalise, after the expressions of opinions so opposed to generalization, we would suggest that, generally, 30 inches would be a safe depth.

The *distance* of drains in clays is another undetermined question. The shallow drainers urge their frequency, the deep drainers allowing greater space between. The evidence above alluded to shows this most forcibly; the distances are given in feet. Mr. Pusey, 30; Mr. Bowes, 18; Mr. Hutley, 25; Mr. Parkes, 24 to 40; Mr. Putland, 26 to 32; Mr. Spencer, 14 to 28; while Mr. Burrell placed them 8 feet 6 inches to 10 feet apart.

The general opinion, however, seemed to vibrate between a margin of 12 to 18 feet.

The material for forming drains seems to be generally settled to be *tiles*. Stones and thorns, and instruments and sods, and various other modes, have all given way to tile draining; and on clay soils materials for making tiles are generally so near that they are the most economical. The various tile machines construct them now with so much facility and accuracy that they ought to be generally adopted. Such a machine as Mr. Charnock's of Wakefield, seems to combine all that is necessary; many other excellent machines are also in use, and materially assist the improver in his operations. The form of tile, however, is still a great source of contention. At one time it was thought that space should be allowed for the water to enter the tile, and hence its form was merely an arch (1) resting either on an independent sole or on its sides, which in process of time got flattened, so as to form feet (2). These feet were turned inwards, and this was objected to because it did not admit the water freely (3). Next the arch was reversed, and the sole made to fit the top (4); and lastly the pipe (5), or perfect cylinder, became fashionable, and even in some soils its ends were inclosed in sockets. These were used remarkably small, one-inch bore being declared sufficient. The great objection was their liability to cant sideways, and if a small tile should do this in a very small degree, it was evident it must soon stop the drainage. The Earl of Tyrconnell, of Kiplin Castle, near Catterick, invented an ingenious foot to place to this tile, which seems to make it all that could be wished, and place it in a position of effecting all of which it is capable. The appended diagrams will give an idea of the progress of tile-making in sections:—

- 1  Ordinary drain tile.
- 2  Drain tile with feet.
- 3  Mr. Charnock's tile, with feet inwards, to save breadth.
- 4  Tile with sole fitting the top.
- 4  The same, without the sole.
- 5  The pipe tile.
- 6  The Earl of Tyrconnell's tile.

The size of the tiles is again a subject of controversy. Mr. Pusey, Mr. Putland, and Mr. Parkes, recommend inch pipes; Mr. Thompson, one-and-a-half to two-inch pipes; Mr. Spencer, one-and-a-half-inch pipes; while Mr. Bowes and Mr. Burrell use common tiles. Mr. Parkes covers the tiles with heath or bushes: Mr. Pusey with clay; Mr. Smith

of Deanston with broken stones; Mr. Thompson with bushes; Mr. Hutley with gravel.

Much practical disagreement as this exhibits on a subject so vital, all agree in the opinion that drainage is the foundation of all improvements, and generally recommend, after efficient drainage, that the ridges be laid perfectly flat. Of the beneficial effects of drainage, authorities on all hands pour in upon us. A very able exposition of the philosophy of these is given in a paper by H. S. Thompson, Esq., of Moat Hall, near Yorkshire, which appears in the "Transactions of the Yorkshire Agricultural Society," No. 7, for 1844, p. 165, entitled, "Remarks on Draining Clay Land." These are to diminish the cold produced by the evaporation of water from the land, to admit the air freely to the soil, and both to be effected by having the rain to sink where it falls. Hence, the majority of good drainers of all systems seem to admit the value of rendering the surface entirely flat; and it is to be doubted whether any field can be thoroughly drained until this is effected. Practice will soon settle several of the other disputed points.

The permanent improvement in soils by drainage seems to be allowed by all witnesses before the before-mentioned committee.

Mr. Bowes says, the estate is increased one-third in value, and that the tenants pay 7 per cent.

Mr. Burrell estimates the increased produce at from 3 to 4 sacks per acre of wheat.

Mr. Balmer thinks it is of the advantage of double rent.

Mr. Dixon says, any tenant would pay 5 per cent. for it.

Mr. Davis estimates the advantage at £1 per acre.

Mr. Hobbs—a gain of from 5s. to 30s. per acre rent.

Mr. Mills—seven per cent.

Mr. Neilson—from 20 to 300 per cent.

Mr. North—double rent.

Mr. Ogilvie—annual value improved 30 per cent.

Mr. Parkes—Cost paid the first year. Rent doubled.

Mr. Putland—10 to 15 per cent.

Mr. Smith—upwards of 10 per cent. In Ireland, doubled.

Mr. Spencer—one-third more corn.

Mr. Thompson—produce trebled.

The next process insisted much upon is subsoiling, which is a process more costly than draining on strong soils; and as it cannot be called a permanent improvement, it falls upon the tenant. That, on soils made dry, it is a useful process, were a truth too palpable to deny, inasmuch as the free admission and rapid transmission of air and moisture is

essential; and that the subsoiling process assists this, is impossible to deny; but the great question is, "Does it pay? Is it to be recommended to the clay tenants as a plan adapted to make their lands grow more corn at a less cost?" It is a very odious thing to say one word which may tend to cramp the energies of the too plethoric farmers—to place one peg on which to hang a single prejudice, or to stand in the way of a single improvement; but the writer must say he has seen no evidence to prove subsoiling to be a profitable process on strong soils; but he has seen subsoil ploughs evidently rusting and useless on the farms of the most zealous improvers; and while he would not under-rate the high authorities for subsoiling, it is his impression that it is more useful on light sands to break the crusted plough sole than on adhesive clays.

Drainage effected, therefore, the farmer will find his farm has greater want of manure. He must therefore *make manure*, and this can only be accomplished by keeping stock; and this, again, demands green crops, instead of his everlasting corn. The manure-making process begins with the stock. Drained land will grow turnips, and these are the foundation of all good farming. Turnips must be obtained. The cleanest and best fallow—the driest and most kindly field must be selected. The turnips must be stored for feeding, and not for rearing stock; these must, however, be economised; they must be cut, and given with cake or linseed compound, or whatever material is cheapest and most calculated for laying on fat. This involves a double profit; the farmer does not depend upon his corn *alone*; he can sell his fat cattle, and his manure is rich in fertilizing qualities to grow more corn and get more green crops. Mr. Joseph Marshall, of Holme Lodge, near Bedale, has introduced a most ingenious mode of cooking food for cattle, which enables a farm to keep almost an illimitable quantity of stock on a farm, by preparing linseed, chop and meal, and combining it with turnips, and which is in practical operation in several parts of Yorkshire, and very successfully. As the process will be described in the forthcoming number of the "Transactions of the Yorkshire Agricultural Society," in a prize essay, the writer will not detail it here, but refer to that publication.\*

It seems as if Divine Providence intended a continual reciprocity between the animal and the vegetable creation. Animals breathe carbonic acid, which is the food of plants, and plants supply carbon for animals to consume, and so sustain life. Animals at death give off their azote and phosphorus,

&c., and plants take them up and feed on them, and again supply them to animals. Lean or growing animals take up the latter, and form muscle and bone, while feeding animals take up the former to make fat. Hence, the excrements of feeding animals are much more powerful manures than those of growing animals, and the man who feeds the most stock will produce the most corn. Hence, in summer clover must be sown, sheep must be depastured, tares must be grown, and the farmer must be made to understand that it is not on corn alone that he must depend. And what if he supplies his sheep with half a pound per day each of linseed cake?—why, that they are sooner fat, and in the market, and their place supplied; and the cloverley on which they were feeding will be found so enriched as to give probably ten bushels more corn per acre; and more corn will be obtained from seeds so treated than on a naked fallow, and with a tenth part of the labour.

A train of improvement is here suggested, which will sooner or later bring round the most sterile farm, and make it productive. But it requires large capital. The often changing stock, the great numbers kept, the outlay for cake and artificial food—all indicate an outlay of capital of ten pounds per acre, instead of six or seven; and where is it to come from? It does not spring out of the ground. The landlord can borrow under the Drainage Act, or otherwise, but the tenant must be satisfied to do the best he can.

We must find a way for the poorer farmer to live. How can it be effected? He must also grow green crops, and thus keep stock, and these crops must be his *first* consideration. They form the basis of every good rotation, and without them no system can long be profitable or successful. In whatever period of the rotation they may be introduced, admitted they must be, or there can be no profit. Green crops not only create and increase the amount and value of the manure, but they have a refreshing influence on the soil. The grasses require different principles from corn; the turnip and the mangel wurzel require different substances again from the clovers, and thus rest is given, as regards privation of certain ingredients necessary to general cultivation. The oldest modes of farming adopt and recognise this. The oldest process of cultivation known was to break up grass to grow corn as long as it would do so, and then to again let it rest to recover. Many a field which would not grow more than two or three quarters of oats on an acre would grow a fair crop of seeds, and these, if consumed with judgment, would leave the soil in a better state for growing a crop than it were before the clovers were sown.

Again, perhaps fallows cannot be dispensed with

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under this system; but they may be placed at greater intervals, and thus less will be lost to the farm, and less payment of rent, taxes, and tithes, while the soil is producing no crop. It is not our intention to enter into an examination of the theory of those who deny the necessity for fallows. True, they say, that gardens have no fallows, but grow one and two crops every year in succession; and that if farms were cultivated with the same care and attention, there would be no necessity for fallows in them. Nobody, however, ever commenced making a strong, stubborn clay, worn out with crops, into a garden, without either bringing lighter soil from a distance, or putting so much extraneous matter into it as to alter its very texture; nor could the *town* manure—abounding in ammonia, and soda, and potash—be procured for every farm, as it is for gardens; and until this is available, we need not expect to see clay farms cultivated without fallow. That the strong adhesive clays may be pulverized, and dried, and rendered much more friable, there can be no doubt; but that they will ever become so friable as to render fallows unnecessary, or to grow turnips without extraordinary exertions, is extremely doubtful. After any rotation, the trampling of horses, the cartage over of the crops and manure, and the very processes necessary to their cultivation, are so many processes of kneading clay; and hence, after the last crop in the rotation, if it is not foul, it is at least a mass of adhesive stubborn clay. This must be turned up by the plough, and perhaps again cross-ploughed, in order that, by a large portion being exposed to the atmosphere, it may get its moisture evaporated as speedily as possible. Hence, a rough fallow exposed to the air of summer soon becomes a mass of hard, brick-like clods, so dry that the plants growing upon them perish. This is effecting one object of fallows—it is destroying the weeds. The effect of heat and the dissipation of moisture is well known. Most bodies expand with heat; soil is different. The abstraction of the moisture from every particle of soil which held it, necessarily causes the particles of soil to cohere more intimately together; and hence, when rain falls, the moisture is rapidly absorbed, and the particles are driven from each other by the repulsive agency of water, and crumble into a friable mass. The application of attraction and repulsion, therefore, effects another object—it makes a favourable seed bed. But another object is to be served. It is well to destroy the weeds, which, being natural to the soil, would soon over-run the exotic plants to be cultivated; it is well to form a soil in which the minute spongioles of the plants may push their tender tongues in search of food; but unless food is supplied to them, all this is in vain. Fallow, by

placing the soil free from moisture, makes it more capable of attracting and absorbing atmospheric fertilizers, as ammonia from the atmosphere, and perhaps carbonic acid gas. The oxygen it attracts also disintegrates the earthy particles it holds, and renders them fit for plants; and thus the three great objects of the farmer—cleanness, pulverization, and fertilization, are accomplished by summer fallows. The poor farmer who wishes to live, and who is aiming at improving a cold clay, and who is deficient in capital, must *grow less corn*. This is a paradox which he cannot understand. His corn pays his rent—his corn keeps his family—his corn pays his interest—his corn is his main stay. Will he not be ruined if he grows less? We do not mean that he must grow fewer bushels per acre, but he must grow fewer acres of corn. Suppose his fallow sown with wheat, this must be sown with seeds, and these must be consumed by feeding stock, and, if necessary, laid two years, and then again fallowed. A process of this kind on a drained farm will be found to restore it faster than any other. We contend not for this, however, as a system, but we suggest the following rotations for cold clays, which, if drained, will, we doubt not, improve and enrich, having in view the removing of fallows as far as possible from each other.

## No. 1.

1. Fallow.
2. Turnips manured, and pulled up to consume with stock.
3. Oats, sown with red clover.
4. Red clover, mown and soiled. Second crop eaten on.
5. Wheat, hoed.
6. Beans, manured, sown in ridges, and hoed.
7. Oats, hoed.

## No. 2.

1. Fallow.
2. Tares, sown in autumn, and consumed by sheep.
3. Wheat, hoed.
4. Beans, manured, and sown in ridges.
5. Oats.

## No. 3.

1. Fallow.
2. Oats, sown with clover.
3. Clover, mown and depastured.
4. Seeds, second year.
5. Wheat, hoed.

All these on drained land will be found to enrich a farm; and surely the animals the system will feed will be as easy a mode of obtaining his money as by dragging his heavy carts to the market with his loads of corn.

We stated that the great desideratum in clay cultivation was to keep fallows as far distant as possible. This is done in various ways; but a very considerable portion of it is accomplished by good and improved implements. Working fallows is a serious drawback in various ways. It is a loss of time and an expenditure of labour, and these the successful farmer must economise to the greatest possible extent. Time is capital; every day a farmer is spending money, paying rent, and taxes, and interest of capital, and wear and tear; and, therefore, all should be accomplished with care—be done as soon as possible. Labour, however, is the great ocean in which all our insolvent farmers are drowned. This must be economised. Implements accomplish this.

By fallowing, his clods must wait for moisture to bring to bear the force of repulsion. This is sooner accomplished by such an invaluable implement as Crosskill's clod-crusher, which will make fine and pulverisable in a day what would perhaps take months, and thus turnips may be sown instead of

a naked fallow. Several fluted and spiked rollers have since been invented, and are all very useful, at one period, and for one purpose or other.

Weeds thus loosened must be got out, and hoed. Finlayson's harrow, and Ducie's drag, and a host of scarifiers and grubbers, &c., are of immense use. Horse and hand hoeing must be adopted, and for this there are a multitude of candidates of great value. Scurrah's horse-hoe for clay land is very difficult to surpass, but there are twenty which may nearly equal it.

To effect the above process, the drill is necessary. Hunter's drill, and a great number of others, are what may be safely recommended, and by the continual stirring of the soil, of which they admit, it is continually in a state of semi-fallow. And above all, manure must be economised, liquid and solid—must be properly managed and supplied: and we may hope that the case of the clay-land farmer is not altogether desperate.

Thorpefield, Thirsk, Dec. 19, 1846.

## ESSAY ON FENCES.

BY AN ESSEX FARMER.

The hedges on all old enclosures in Essex, Herts, and Suffolk, with few exceptions, are anything but what the practical farmer could wish them to be. Great and rapid have been the improvements in every branch of farming since the commencement of the present century; but hedges, the proper making of which would prevent the waste of much good land, and also much trouble and annoyance from weeds and vermin, have been generally neglected. This, in a great measure, is owing to the restrictive clauses in old leases, handed down, as a matter of course, from one period to another, prohibiting tenants from cutting and making the hedges oftener than once in seven years; or taking down any pollard trees, or digging or ploughing nearer than so many feet of the banks; and so tenacious have some landlords been, that the tenants have been afraid to take a single bough off a timber tree, however injurious to them.

I remember that, about twenty years ago, a farmer living near me cut a bough from a tree that hung over a gateway, which pulled the corn off his waggon. The landlord passed by a few days afterwards, saw the bough lying, went to the tenant, and told him that he had forfeited his lease, and intimated that if he cut off another bough he should leave the farm. A few years afterwards this same landlord took two of his farms into his own hands, turned his attention to agricul-

tural pursuits, and became so practically acquainted with the injurious effects of timber and pollard trees, large wide hedge-rows, and small enclosures, that he set to work in right earnest, took down every pollard and four-fifths of his timber trees, cut down all the old hedges, and reduced the size of the banks. Two, three, and, in some instances, four fields, were laid into one; and he is still going on, setting a noble example to landed proprietors.

Happy would it be for the tenantry of England, and the public at large, if every landlord had become so practically convinced of the mischievous effects of timber trees, and high wide hedge-rows, on arable land. After *five-and-thirty-years' experience* in the cultivation of the soil, I feel persuaded that it was never designed by Providence that *corn* and *wood* should grow together. In further discussing this subject I shall endeavour to point out—

- 1st. The injurious effects of hedge-row timber on arable land.
- 2nd. The injurious effects of high wide hedge-rows upon the same.
- 3rdly. The intulity and loss by small enclosures.
- 4thly. The best method of improving old hedge-rows.
- 5thly. The best method of planting and maintaining new hedges on arable land.
- 6thly. The best means of improving old hedges on pasture and grazing land.

7thly. The best method of planting and maintaining new hedges on the same.

FIRST.—THE INJURIOUS EFFECTS OF HEDGE-ROW TIMBER UPON ARABLE LAND.

Every experienced farmer passing through the counties of Essex, Herts, and Suffolk must be struck with the immense number of timber-trees in the hedge-rows, and their neglected state; thousands of them never having been pruned; the lateral branches hanging over the land, scarcely allowing the plough-teams to pass under them.

It is impossible to calculate the damage done to the crops by trees on arable land; perhaps in no one season were their baneful effects more perceptible than during the year 1844. The early part of the summer being so very dry, the roots soon extracted all the moisture and nutriment out of the soil, and it could be distinctly seen how far the roots ran into the corn and turnip fields.

It may appear almost incredible to persons unacquainted with the subject that the roots of trees will run *thirty feet* into the fields, but such is the fact.

I had, last year, a two-acre field of Swedish turnips, sown on two-bout ridges, well manured with farm-yard dung. The crop was good considering the season, excepting one rood on one side of the field, and there the turnips were scarcely worth carting home. In the hedge-row there were ten elm pollards, and three large ash trees. I requested my landlord to come and see the injury I sustained by them. He was kind enough to do so, and allowed me to take them all down.

The damage done by those trees to the tenant's crops on this field, during the last thirty years, I calculate to have been no less than thirty shillings per annum; making, in that period, a loss of £45, which their value to the landlord was as under—

10 pollards at 2s. each.....	£1	0	0
3 ash trees, measuring 170 ft., at 1s. 3d.	10	12	6

11 12 6

supposing that the top wood paid the expenses of taking them down.

There are, in another part of my hedges, three ash trees, that I can prove to have been left for timber when the hedge was made, twenty years ago; and I have not the least doubt but that, during the last ten years, the damage done by them has been 10s. per annum, occasioning a loss to the tenant of £5; and their value, in the estimation of my wheelwright not a month ago, was no more than £1 2s. 6d. (7s. 6d. each).

Ash trees do more injury to the crops on arable land than any other kind of timber tree. When ploughing between the rows of turnips and potatoes, I have seen their white, fibrous roots turned

up by the plough as hick as mushroom spawn, running along near the surface of the land.

I saw, last harvest, many fine fields of wheat and barley very much injured by timber-trees in the hedge-rows. In spaces fifteen, twenty, and in some instances twenty-five feet wide by the hedges, the corn was scarcely one-fourth part so good as in the other parts of the field.

The shade of trees, especially in wet seasons, is very injurious. In the year 1844, when nearly all the small wheats were cut and in shocks, the rain in this county setting in on the 11th of August, it was found on the 14th that under the hedges and trees the wheat was grown half an inch in length, while that in the middle of the field was scarcely grown at all; but even in fine harvests (as every practical farmer knows) it is often very late in the day before the corn under the trees and high hedges is fit to cart.

Where land requires draining the roots of trees often do much injury by choking the drains. Two years ago a field of two acres came into my occupation in a very bad state of cultivation. Three sides of the field were studded with nearly one hundred pollard and timber trees. In ploughing out the furrows to drain the land I found that the roots of the trees actually crossed each other from opposite sides of the field.

From the above statements it is evident to every reflecting mind how truly discouraging it must be to the farmer, after having expended eight or ten pounds per acre in draining, fallowing, and manuring his land, to see his crops depreciated in value 12 or 15 per cent. with so little benefit to his landlord.

SECONDLY.—THE INJURIOUS EFFECTS OF HIGH WIDE HEDGE-ROWS ON ARABLE LAND.

The hedges on old enclosures consist of nearly all kinds of native timber, from the stately oak to the humble dog-rose and bramble; many kinds of which are ill adapted to make a good hedge.

Hedges are seldom cut oftener than once in seven or eight years, and it is no uncommon thing to see a bank five feet high and six feet wide, with wood and bushes growing upon it, from ten to fifteen feet high (see Fig. 1), and a ditch from four to six feet wide, besides a hedge-green three or four feet wide next the ditch, making altogether from fourteen to fifteen feet, occupied by the hedge, ditch, and green.

Hedges of this description do immense damage to corn and root crops by excluding the sun and air, affording shelter to birds and vermin, promoting the growth of weeds and occupying so much of the land that would otherwise produce crops, besides injuring half as much more by their roots

and shade. If ever there was a time when large hedge-rows and timber were an advantage to the landlord, tenant, and the public, it must have been when this country exported wheat, and the only available fuel for the rural population was wood; and when timber was 70 per cent. dearer than at the present time; but this state of things having passed away, we may fairly conclude that it is more advantageous to import timber and coals into the country, rather than wheat and barley.

One hundred acres of land in tillage employs, or ought to employ, on an average, five men and two boys; but one hundred acres of hedge-rows, however large, only create employment one year out of seven or eight; and as good foreign timber for every purpose may now be bought at a very moderate price, to encumber and injure the land with timber and large hedge-rows is both unjust to the farmer and prejudicial to the public.

#### THIRDLY.—THE INUTILITY AND LOSS BY SMALL ENCLOSURES.

I know of no argument that can possibly be brought forward in favour of small enclosures on arable land. They are prejudicial in every point of view; in draining, in carting the manure, and especially in ploughing and drilling; there being so much time lost in turnings, and the loss sustained by the tenant in hedges and ditches is immense.

The parish in which I reside was lately surveyed; and I find, by the map and reference book, that we have 3,495 acres of cultivated land, 166 miles of hedges, and that 265 acres are occupied by hedges and ditches. Some persons may be startled at this statement, or suppose that we have larger hedge-rows and smaller enclosures than in general; but, on the contrary, this parish is more favoured in that respect than most of the neighbouring parishes.

We have 176 enclosures, under four acres: of course each field has its gate and two posts, the cost of which cannot be less than 28s. each, making £246 8s. Now, if these 176 small enclosures could be converted into ten-acre fields, there would be a saving of 158 gates and 316 posts, equal to £221 4s., besides the expense of keeping them in repair. But only enlarge the small enclosures to eight acres and upwards, and reduce the wide hedge-rows to the size Fig. 2, there would be no want of employment for agricultural labourers for some years to come.

#### FOURTHLY.—THE BEST METHOD OF IMPROVING OLD HEDGE-ROWS ON ARABLE LAND.

When I took possession of the farm I now occupy, I found the hedges and ditches very wide, and the banks high. Anxious to improve the hedge-rows, and to bring into tillage all the land I

possibly could, I commenced, as the fields came in course for fallow, by cutting the hedges entirely down. Wherever I found the ditch-side of the bank well studded with wood and bushes, I reduced the bank to one foot high and one foot wide, paring all the old stubs left as close to the bank as possible; but where there were but few stubs on the ditch side of the bank, I left the bank one-and-a-half to two feet high, and one foot wide (see Fig. 2). I then had the ditch cleaned out, and as much of the contents as necessary used in filling-up holes and making the bank uniform; the remainder was thrown out with the earth taken from the bank, and carted on the land. The hedge should be clipped once a year, and it will make a good effective hedge in three years, and may be kept as narrow as the bank (Fig. 2). No stock should be allowed to browse on it for three years.

I have taken down 1,190 poles of bank in this way, and reclaimed two acres of land that are now growing crops equal in quantity and quality to any other part of the field. Now, if so much good land could be reclaimed from the wide hedge-rows on one farm of 200 acres, how much might be obtained, were the same plan generally adopted, in every enclosed county in England! The wood and earth taken from the banks more than pay the expenses, and I have found earth taken from old banks equal, and even more lasting than good dung.

After reducing the banks I have found the sub-soil-plough the best of all implements to eradicate the roots that run out into the land; and would recommend every farmer, once in two or three years, to have, at least, two furrows made round his field with this plough, one furrow as near the hedge as possible, the other six feet off. Let a man attend the plough with a mattock to remove the large roots that the plough cannot break.

#### FIFTHLY.—THE BEST METHOD TO PLANT AND MAINTAIN NEW HEDGES ON ARABLE LAND.

I have seen various methods adopted in making fences, but the experience of thirty-five years has convinced me that, for all agricultural purposes at least, no fence is so effective and economical as a white thorn hedge; in the making of which there are three great objects to be aimed at, viz., to obtain the most perfect fence in the shortest possible time, to occupy the least possible space, and to do it at the least possible expense; all these may be attained by the following method:—Having fixed upon the situation for your hedge, mark out the bank two feet wide, spread thereon some good rotten dung, dig it in two foot deep; then mark out the ditch two feet wide, take off ten inches of the top soil, placing the same on the bank; this will raise the bank to about one foot high and two



feet wide; then finish the ditch two feet deep, sloping the two sides down to one foot wide at the bottom (see Fig. 3). Having the quick ready, strain the line in the centre of the bank, and plant the quick with a dibble, four inches from plant to plant, in one straight line (see Fig. 3). In purchasing quick, if grown on a poor light soil, it should be two years old; if grown on a rich, heavy land, one year is the best age for new hedges, and it should have one strong leading shoot, with strong prominent buds (see Fig. 6).

In preparing for planting, cut out all broken roots, and shorten the others a few inches; cut off all lateral shoots, if any, but the leading shoot must not be cut or topped on any account until it is four feet high, which it will be four years after planting. I have not found anything so cheap and effective in protecting quick on arable land, as spring bushes, ten or fourteen years old, cut into lengths  $4\frac{1}{2}$  feet long, and thrust one foot into the ground, slanting outwards 9 inches from the perpendicular; they should be three inches apart, and the quick should have a good watering, to settle the ground round it. All that is necessary to be done the first year is to keep the ground perfectly clean, by the hoe, which can be done at a very small expense. In the second year the quick should be clipped on each side, and kept clean; the third year the same, and on the fourth year the protection may be removed. The hedge will then be four or five feet high, like a row of trees in miniature, and so thick that sheep cannot possibly get through. The leading shoots may now be topped down to four feet high, and clipped with shears annually (see Fig. 4).

After twenty-four years' experience I have found that if the leading shoot of the quick is not topped, the sap is thrown into the stem, which causes it to increase in size and height more rapidly, and the roots to penetrate the ground more perpendicularly; and if clipped annually close in on each side, it will not be more than a foot wide, twelve years after planting. But, after the lapse of twenty or twenty-five years, should the hedge become too wide, it will be necessary to cut in each side to the principal stem, and shorten that to three feet high (see Fig. 5); here you will have a row of living stakes, a fence proof against sheep or pigs. After this clip annually, as before directed.

Where the land requires deep draining, and where there is much water for the hedge-ditch to carry away, it may be necessary to have larger ditches than those I have described; but where the land is light and dry, ditches may, and ought to be, dispensed with altogether. Where this can be done, the bank will not require to be raised at all; in which case the dung should be dug in two feet deep. I should by no means introduce timber

trees into hedge-rows; but, by way of compensation to the landlord for the loss of them, I would recommend that one per cent. of every tenant's holding be given up to the landlord, to be planted with timber. This would prove a real ornament to the estate, if planted by a skilful hand. The worst land, and where it would be the least injury to the tenants' crops, should be selected. Upon all new enclosures, where the fields are large, I recommend the placing of stiles, to enable sportsmen to pass from one field to another, without making gaps in the hedges. I have had in use five years a very cheap and effective stile for this purpose (see Fig. 7), which persons can pass through with greater ease than they can get over the common stiles.

#### SIXTHLY.—THE BEST METHOD OF IMPROVING OLD HEDGES ON PASTURE AND GRAZING LAND.

It is of the utmost importance to have good substantial hedges, where cattle are grazed year after year. Horned cattle, especially Highland Scots, are very destructive to hedges; and experience convinces me that such hedges should never be cut down, unless they become so hollow and naked at the bottom that the cattle get through them. When this is the case the hedge should be cut down close to the ground, all large stubs should be cut off with an axe, *not with a saw*, as recommended by some writers. I have seen many such stubs die, after being cut off with a saw; the ditch should be cleansed out, using as much of the contents as is sufficient to fill up the holes and make the bank uniform, and the remainder carted away to make bottoms for manure heaps. Should there be gaps in the bank one or more yards long, requiring quick, I have found it a good method to dig out a trench eighteen inches deep, put in some good rotten dung, and plant quick four years old, which should be cut off to within six inches of the ground, that all may shoot up together. This will make a fine hedge in three years, but it must be protected, the first two or three years, by rails or hurdles.

#### LASTLY.—THE BEST METHOD OF PLANTING AND MAINTAINING HEDGES ON PASTURE AND GRAZING LAND.

In planting new hedges I recommend the same method as in arable land, with this difference only—the leading shoot of the quick should not be topped, but clipped in on each side, and allowed to grow up like a straight row of trees. In seven years, if kept clean and well protected, it will be a most effective hedge, affording excellent shade and shelter for the stock.

The hedge must be protected by posts and rails until the quick becomes well established; this is essentially necessary, for if the cattle be allowed to

bite off the leading shoots, the upward growth of the hedge will be greatly retarded. The thinnings of fir plantations saved, one cut through, make excellent rails for this purpose, and oak lop-wood will make good posts. It is impossible for any person that has not seen a hedge planted on this principle to form an adequate idea of the superiority of this method over the old one, of planting two wide rows of quick.

We not unfrequently hear gentlemen complaining that their clipped hedges become hollow and naked at the bottom, whilst the upper part is thick and handsome. The gardener or planter is consulted, but is puzzled to find a remedy, and the hedge gets worse and worse every year; but when hedges are planted on the principle I have laid down, they increase in beauty and efficiency every year; and at the age of twenty years will be far superior to any six feet oak fence, and require no repairs.

In the year 1820 and 1822 I planted two hedges

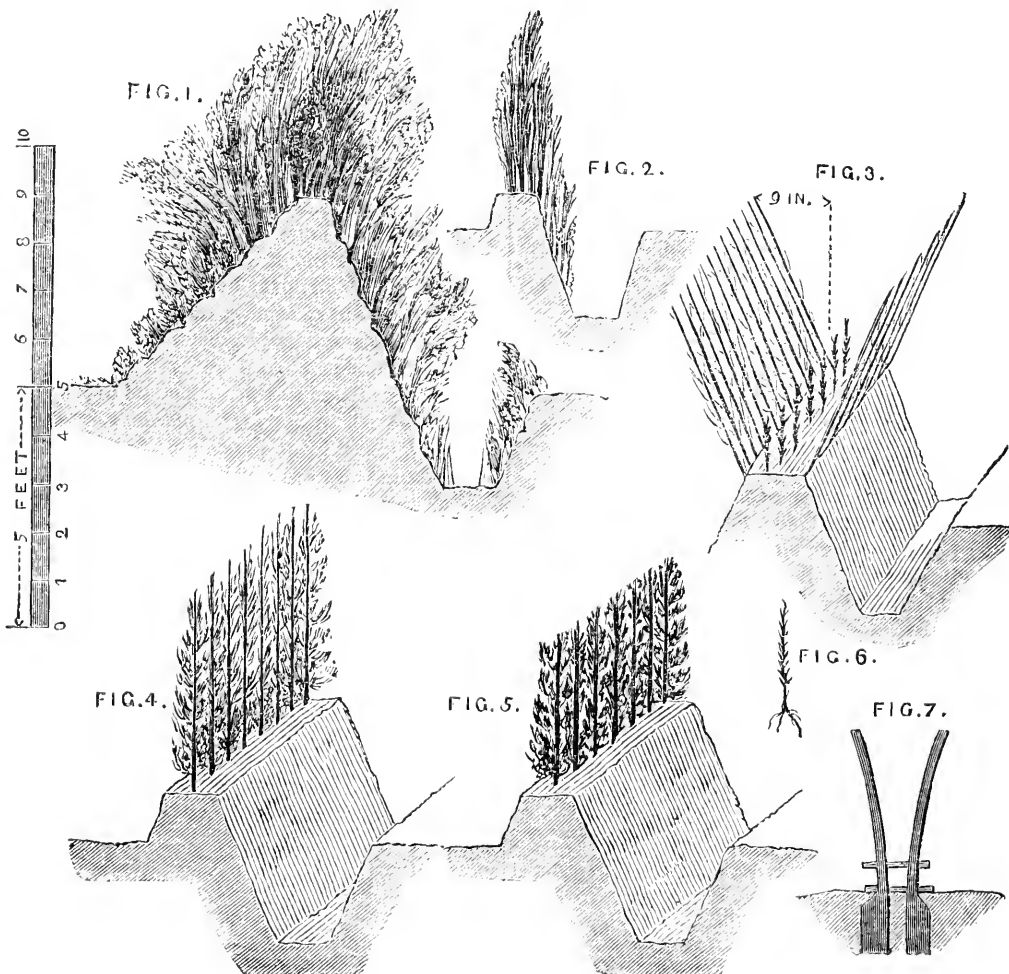
on this principle, and so far from its being possible for sheep or cattle to get through, I can defy even a hare or rabbit to do so, for, perhaps, a space of thirty yards together. Although a determined enemy to timber trees on arable land, I would encourage and recommend them on grazing land, as the damage by the roots is amply compensated by the shade they afford to the cattle in the heat of summer. Oaks are the most valuable trees for upland pasture, ash for sound low-lands, and alder for wet, marshy, and boggy lands.

EXPENSE OF PLANTING NEW HEDGES ON ARABLE LAND (see Fig. 3).

Labour in making ditch and bank	8d.	} 2s. 4d. per pole.
„ making protection . . . .	6d.	
Cost of quick and planting . . . .	6d.	
„ bushes for protection . . . .	8d.	

DITTO ON GRAZING GROUND.

Labour in making ditch and bank	8d.	} 8s. 2d. per pole.
Cost of quick and planting . . . .	6d.	
„ posts and rails, if bought	7s. 0d.	
If cut from the estate, say labour 4s.		



## ON THE IMPROVEMENT OF THE COTTAGES OF THE AGRICULTURAL LABOURERS.

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

*(Continued from page 8.)*

It is with much pleasure that I notice the interest which is beginning to be taken in this truly national question. The letters which I have received from various personal friends as well as strangers; the extracts which have been made from these little essays in many of the chief country papers; all appear to betray the same feeling—that of an anxious desire to promote the welfare, the increase in comfort, and the enlarged intelligence of the invaluable class of hitherto too-much-neglected labourers, the present state of whose dwellings we have been recently considering. In the last volume of this most valuable magazine, p. 479, I had occasion to make some remarks upon the site, the elevation, and the aspect of the labourer's cottage; and at p. 8 of this volume I added some evidence upon the very bad effects arising from a neglect of ventilation, and of a proper supply of wholesome water. One or two other easily secured cottage comforts shall form the subject of this paper. And, first, with regard to the evils of neglected or carelessly-managed sewerage.

If a supply of water is obtained from a well, another source of discomfort and disease to the cottager's family is, with a little consideration, readily guarded against by placing the well at a distance from any tank or drain in which sewage matters are deposited. If it is necessary to sink the tank into a porous and absorbent stratum of soil, the error into which the out-dwelling citizens of London so often fall should be most carefully avoided—that of sinking the tank and the well into the same stratum (perhaps within a yard or two); for from this plan the sewage is certain to find its way into the well, and thence in dry seasons, when the well-water is low and the supply limited, comes that unpleasant taste which the dwellers in the districts around London are wont to erroneously ascribe entirely to “the effect of the dry weather.”

The general want of consideration evinced on this subject is most remarkable, since of the close connection between disease and bad drainage there is abundant testimony. Dr. Southwood Smith observes (Report, p. 3): “It appears that the streets, courts, alleys, and houses in which fever first breaks out, and in which it becomes most prevalent and fatal, are invariably those in the immediate

neighbourhood of uncovered sewers, stagnant ditches and ponds, gutters always full of putrefying matter, and privies, the soil of which lies openly exposed, and is seldom or never removed.” And he proceeds to remark (p. 4): “The operation of these peculiar causes is steady, unceasing, and sure, and the result is the same as if twenty or thirty thousand of these people were annually taken out of their wretched dwellings and put to death, the actual fact being that they are allowed to remain in them and die. It has been stated that the annual slaughter in England and Wales from preventable causes of typhus fever which attacks persons in the vigour of life is double the amount of what was suffered by the allied armies in the Battle of Waterloo.” “I particularize fever,” he adds, in a subsequent page of the report, “because fever is the most obvious and the most rapidly fatal of the diseases arising from the neglect of sewage, ventilation, and cleanliness; but it would be a very inadequate view of the pernicious agency of the poison unceasingly generated in these filthy and neglected districts to restrict it to the disease the most obviously produced by it. Its indirect action is highly noxious, though the evil is not so manifest. It is a matter of constant observation, that even when not present in sufficient intensity to produce fever by disturbing the action of some organ, or some set of organs, and thereby weakening the general system, this poison acts as a powerful predisposing cause of some of the most common and fatal maladies to which the human body is subject. For example, the deaths occasioned in this country by diseases of the digestive organs, by inflammation of the air-passages and lungs, and by consumption, form by far the largest proportion of the annual mortality. Now, no one who lives long in or near a malarian district is ever for a single hour free from some disease of the digestive organs. But disordered states of the digestive organs not only constitute in themselves highly painful and even fatal maladies, but they lay the foundation of several other mortal diseases.”

And it is not the body only which is thus affected by being exposed to these injurious influences, but the mental powers suffer also:—“There is evidence,” continues Dr. S. Smith, “that as they

have not the bodily vigour and the industrious habits of a healthy and independent peasantry, so they have not the intelligence and spirit proper to such a race. One of the most melancholy proofs of this is the quiet and unresisting manner in which they succumb to the wretchedness of their lot. They make no effort to get into happier circumstances: their dulness and apathy indicate an equal degree of mental as of physical paralysis; and this has struck other observers who have had opportunities of becoming acquainted with the real state of these people."

In the Poor Law Commissioners' report on the sanatory condition of the labouring population, there is the following statement, which impressed my mind the more because it vividly recalled to my recollection similar cases witnessed by myself:—"In the year 1836," says one of the officers of the West Derby Union, "I attended a family of thirteen, twelve of whom had typhus fever, without a bed, in the *cellar*, without even straw or timber shavings—frequent substitutes. They lay on the floor, and so crowded that I could scarcely pass between them. In another house I attended fourteen patients; there were only two beds in the house: all the patients lay on boards, and during their illness never had their clothes off. I met with many cases in similar conditions; yet, amidst the greatest destitution and want of domestic comfort, *I have never heard, during the course of twelve years' practice, a complaint of inconvenient accommodation.* Now, this want of complaint under such circumstances appears to me to constitute a very melancholy part of this condition. It shows that physical wretchedness has done its worst on the human sufferer, for it has destroyed his mind." "It sometimes happens to me," continues Dr. Smith, "that in my visits to such apartments, I am obliged, after staying the necessary time at the bedside of the patient, to go into the air or stand at the door and write the prescription; for such is the offensive and unwholesome state of the air, that I cannot breathe it for even that short time. What must it be," he asks, "to *live* in such an atmosphere, and to go through the process of disease in it?"

It is hardly necessary to strengthen this testimony by any additional evidence. I will merely add, therefore, an extract from the evidence of the excellent Dr. Arnott, who, when speaking of the increasing progress of the typhus fever in Glasgow, observed (*Report, p. 47.*) that the medical attendants stated that "it was the most severe amongst the labouring classes, even although the individuals were apparently somewhat robust, *if their habitations were dark, damp, filthy, and unventilated;*" and he continues (p. 50)—"Our inquiries gave us

the conviction that the immediate and chief cause of many of the diseases which impair the bodily and mental health of the people, and bring a considerable *portion prematurely to the grave*, is the poison of *atmospheric impurity* arising from the accumulation in and around their dwellings of the decomposing substances used for food and in their arts, and of the impurities given out from their own bodies."

As relates to house drainage and the defects produced by its neglect upon the health of the inhabitants, the commissioners afford an impressive summary when they say (*ibid. p. 17.*):—"The medical witnesses have brought before us facts in support of their strongly-urged and unanimous opinion, that no population can be healthy which live amid cesspools, or upon a soil permeated by decomposing animal or vegetable refuse, giving off impurities to the air in their houses and in the streets. They state the necessity of preventing all accumulations of stagnant refuse in or near houses, and of substituting a system of house drainage and cleansing, aided by the introduction of better supplies of water into the houses."

It is not very generally understood by even the intelligent middle classes of England, the very pernicious quality of the gases copiously emitted where collections of decomposing organic matters are deposited; let those ignorant of, or indifferent to these effects, carefully consider the following extract from the evidence of Dr. W. H. Duncan, physician to the Liverpool Infirmary, who observed (*Report, p. 139.*), when speaking of the effluvia so pernicious to health emitted by cesspools, privies, &c.:—"The principal gas given out from these deposits is sulphuretted hydrogen, the most deadly of the gaseous poisons, two or three cubic inches causing instant death when injected into a vein, or into the chest or beneath the skin of animals. A rabbit died in ten minutes after being enclosed in a bag containing sulphuretted hydrogen, although its head was left free so as to allow it to breathe the pure atmosphere. Nine quarts injected into the stomach of a horse killed it in a minute; and I have heard it stated that it is difficult to keep horses in high condition in the immediate neighbourhood of large privies, where sulphuretted hydrogen is abundantly given out. Even when largely diluted with atmospheric air it retains in a great degree its noxious properties. A dog was killed by being made to breathe a mixture of one part of this gas, and 800 parts of common air; and air containing only 1-1500th part of sulphuretted hydrogen proves speedily fatal to small birds. If the principal ingredient in these emanations is capable of exerting such destructive agency, we should expect it to have shown its effects occasionally on the men em-

ployed in clearing out the places where it accumulates. Various instances of this kind are in fact on record, in some of which immediate death followed the incautious inhalation of the effluvia in a concentrated form; and in others, where the gases were more diluted, the persons breathing them became faint, delirious, and insensible, or were seized with convulsions even when they ultimately recovered. The most remarkable cases of this kind have occurred in France; but it is not a great many years since four men fell victims to the poison while engaged in clearing out a privy near Brompton; and still more recently an accident of a similar nature happened at Clapham:—Twenty-three children belonging to a boarding-school at that place were simultaneously attacked with violent irritation of the stomach and bowels, convulsive twitching of the muscles, and excessive prostration of strength, and two of them died in about twenty-four hours. The symptoms were ascribed by the medical atten-

dants to the inhalation of sulphuretted hydrogen from the contents of a foul cess-pit which had been scattered over a garden adjoining the children's play-ground. Although these effluvia are breathed by the inhabitants of our courts and back-streets in a state, of course, of extreme dilution, we cannot suppose," adds Dr. Duncan, "that they are on that account entirely harmless: what in a concentrated form is so very deadly, must in a diluted state be injurious to health."

Against the recurrence of these evils it is easy to guard in almost every rural cottage. The citizens have the excuse that they have not gardens into which the house drainage may be conveyed. They have, therefore, been compelled by the legislature to construct expensive sewers, and to pay heavy rates for their maintenance, none of which obstacles to the preservation of health and comfort commonly present themselves in the case of the labourers' cottages in the rural districts of England.

(To be continued.)

## B E E T - R O O T B R E A D .

BY J. TOWERS, MEMB. R.A.S., H.S. OF LONDON, &c.

Considerable interest has been excited by the notice which has been taken of this article of domestic economy; and at a time when the cry of scarcity pervades the land, when "each day's report" brings to light new scenes of desolation—in the sister kingdom at least—and when to the catalogue of woes the progressive rise in provisions reminds us of that long by-gone and almost forgotten period of war, wherein, for more than twenty years, the cost of the loaf was, upon the average, far beyond one shilling—at such a time it behoves every one, who professes to sift and examine any subject which affords some promise of utility, to bring it to the text of experiment.

Beet-root bread has been recommended by high authority in Ireland: the allusion to it in a late number of the "Gardeners' Chronicle," Dec. 19, 1846, was rendered more pointed by the editorial assurance expressed in these words:—"We have had the experiment tried, and we find that the dough rises well, bakes well, and forms a loaf very similar to good brown bread in taste and appearance."

To set the question at rest, so far as individual and trustworthy evidence might be of influence, I determined to act according to the general direction given in the "Gardeners' Chronicle," and therefore selected a perfectly sound root of the purple

beet; and after due cleaning and thinly paring off the outer rind, an equal quantity of fine household flour was taken: these quantities were necessarily small, because the loaf was to be baked in a low iron oven, heated by the kitchen fire. In the usual brick bread-oven the advantage would be great in every way, and of this fact all makers of home-made bread should rest assured; but, in the present instance, it was better that the trial should be made in a defective oven, since, if a good loaf could be so made, the success of a better process would be the more certain.

I obtained what I sought, and can add my testimony to that above referred to, excepting in the two last qualities named—"taste and appearance;" and now to particulars. People generally commit some error in every absolutely new process. Thus: *we* mixed the two ingredients together in the first instance; and thus a doughy mass, so firm and adhesive was formed, that it became difficult to introduce the required quantity of yeast. However, the mixture was made, the dough was placed before the fire in a basin, covered with a cloth; and when the loaf had risen to the expected size (experience must herein instruct the operator), it was placed in an oven, and was, in time, found perfectly baked, and of the ordinary texture of brown bread, which is seldom light and spongy. In common

wheat bread *made at home*, the result ought to be fully *one third* more than the weight of the flour; *that* made with beet ought, I think, to be considerably greater; but herein we require much evidence. However, as an improvement in practice, I would recommend that the yeast, diluted with milk-warm water, adding a tea-spoonful of sugar, should be mixed with the flour; to which the beet-root, rasped when raw, should not be added till the dough be evidently in an incipient stage of fermentation, when the mass ought to be thoroughly kneaded, and set to rise till ready for the oven.

The quality of this bread is good and salubrious; but it is *beet-root*, to all intents and purposes: of dark purple colour, with *very* much of the flavour and sweetness of the beet. Tastes differ; and some, as I found, did not relish it; but I myself found it very palatable, particularly when toasted. While we allow for such distinction in families who investigate, and try for a definite object, it cannot be doubted, if there be truth in the old saying, that "hunger will break through stone wall," this said bread must soon be not only tolerated, but highly valued by those who are too poor to purchase wheaten loaves.

But, as colour may be a disqualification, it ought to be removed by the substitution of the true sugar white beet. Why should we, of England, permit the absence of an improved variety, when we have not been backward to introduce the white Belgian carrot. If the red or purple garden beet yield from 16 to 25 tons per acre, and if, as Dr. Lindly has asserted, "its *nutritive power be as 1,020 to 433*, as compared with the potato," it is admirably qualified to be cultivated as *food* by itself, provided it be properly prepared for table by boiling till quite soft and tender.

They who like to use the raw beet as garnish may thus gratify the eye; but thus it is thrown away. Eaten hot at table, as a vegetable, it is nutritious and palatable; that portion which is not so consumed being cut into slices from one-eighth to one-fourth of an inch thick, and covered with vinegar, produces a delicate fresh pickle or salad: we have had proof of it for many years. Few cultivators can produce more than sixteen tons of potatoes per acre; and then, taking disease into the account, who would hesitate between the two crops?

I tried to change the tint of the beet-bread, having observed that the raw raspings became brown by application of a little powdered lime, which was used as a test of ammonia—(beet-root was said so to develop ammonia—I found scarcely a trace)—but as a few grains of soda did not succeed, lime could not be admitted. We recur again, therefore, to the true white-rooted sugar beet, and strongly urge our seedsmen (Messrs. Gibbs & Co., for instance) to introduce it to their agricultural connexions.

I omitted to state that a due proportion of salt should be added to the flour, as is customary, and finally would state that, in all home-bakings, yeast may be much improved by a little moist sugar—a tea-spoonful to a tea-cup; and, by the further addition of a weak sweetwort, made in a few minutes, by pouring half a pint of scalding water over two table-spoonfuls of ground malt, suffering the mash to stand on the hot hob of a grate a-while, and after cooling till milk-warm, to strain it upon the yeast.

Many a "sad batch," from imperfect yeast, has been avoided by this simple and cheap addition.

## ON THE TREATMENT OF CALVES.

BY S. A. BATES, ESQ., BOURTON HOUSE, NEAR FARRINGTON, BERKS.

In this age of "rage in agriculture" very little comparatively is written on the management of live stock. The farmer's periodicals of the present day seem for the most part devoted to the repetition of various experiments made on arable and pasture land with undreamt of manures. The miracles of phosphates, superphosphates, sodas, salts, and electricity, are crowded most unmercifully upon us; whilst farm-yard dung and the animals that generate it are in a great measure overlooked.

Only fancy, my dear reader, the sensation that would be created in the agricultural world were an island suddenly to be discovered covered with a

thick strata containing in itself all the fertilizing contents of our old-fashioned cow dung! How would the new agricultural mind rush to the mart in eager anxiety to purchase and experimentalize on the newly-discovered substance, when in reality as powerful a fertilizer, but an old and long neglected one, lay in their own yards! Not that I wish at all to decry these very important and useful experiments, as undoubtedly they are in many cases, but I again repeat that for one tried and efficacious remedy for the recovery of cattle from those diseases and accidents to which they are liable, (and which it is well and necessary that every practical farmer

should know how to remedy,) we have in our periodicals at least scores of uninteresting experiments made by uninteresting people on most atrocious descriptions of soils, which, if a person has the patience to read, and the folly to follow before duly considering the nature of his land, the peculiarities of the crop he intends to apply the science to, and many other et ceteras too numerous here to particularize, he will doubtless be disgusted with glorious guano and far-famed gypsum.

How many farmers who really have no money to spare are led to purchase, by reading accounts of its wondrous effects, dry guano at a high price, whilst guano streams run unheeded by out of their own yards into that reservoir of richness, the village horse-pond!

They do this in the fond hope of realizing an additional number of quarters to the acre; and, whether the soil be clayey, sandy, peaty, gravelly, or loamy, the crop wheat, beans, peas, cabbages, turnips, or lucerne, resort to natural (or patent!) guano, salts, phosphates, or rags, as the case may be; and in despair at their failure, from the fact of their misapplication, determine never to try the new-fangled things again, and circulate the failure as the fault of the manure. This is a practice and a conclusion at which many have arrived, but which is highly condemnatory and no less prejudicial to the march of agricultural knowledge; and had these persons duly considered or taken means to have understood the qualities of the fertilizers, the best and proper modes of applying them, and the nature of the crop on which the experiment was to be made, and suited the one to the other, doubtless the result would have been more satisfactory.

But I fear my readers will think the preceding remarks very slightly connected with the treatment of calves, so I will at once set before him my ideas and practices on this point; and although there may be little worthy of regard and still less new in my way of management, yet a chapter on the treatment of any kind of animal is of so rare an occurrence, that on this head it will have novelty to accompany it, if not to recommend it. My reader may imagine we are already stocked with Skellet, Youatt, and Clater on the treatment of cattle; of this I am aware, and great presumption would it be for me to set light by these authorities, for great aid have I experienced from consulting their volumes, in many emergencies; but this age is one proverbial for progression, and no day passes but brings some new thing to light, or perfects knowledge on things already in some degree known; and if weekly and monthly we have the experiments with crops given in such abundance, why may we not have occasionally brought under our notice experiments on the treatment of cattle?

On the management of the calf generally depends the constitution, and, in a great measure, the form of the future animal. There is a very prevalent error in many counties of England that the keeping of a calf well during its calfhood, necessarily entails a doing-bad state of existence during its future life. It was but a few days since a farmer was speaking to me of a calf he had weaning, which he described as not thriving, or "doing bad;" and, indeed, fed as it had been during a portion of its life, I was not surprised to hear it. The reason for giving it rank grass, and making the poor wretch drink muddy water, (and very little of this was in the hole) was, that its owner was fearful of pampering it; and expressed an opinion that a calf highly or well fed never made so strong or hardy an animal as one that was sparingly and coarsely dieted. I immediately as well as I was able disabused him of this (too prevalent) idea; for is it likely that any animal, unless well kept during its youth, will attain that constitutional strength and growth so necessary to a good animal, and which will resist hardship with as much success and for as long a period as those unfortunate ones that by a long continued course of bad feeding (almost starvation) are often pronounced hardy animals?

Should we, to prepare one of our own race for the endurance of hardships in after life, commence in childhood to deny that description of food which would tend to invigorate and strengthen his frame—feed him scantily, and afford him little shelter? Our treatment would be the reverse of this. We should certainly avoid pampering that Scylla of many breeders of cattle, whilst we steered clear of the Charybdis of others—starvation. I have seen many high-bred bulls leading a most *distinguishé* life, fed on the finest meal, the newest milk, or cream, the best hay, and the most delicate roots. This treatment, however, generally converts the beast into a consumer only—he is seldom a producer.

I would recommend a sufficient quantity of good wholesome food to be given to all animals. But, then, the question may be asked, "What is a sufficient quantity?" This must, in a measure, be decided by observation of the appetites of the animals; some consume more and some less than other animals their own age and size. The quantity of food that would fatten one animal would barely keep another in store order, so that their propensities to lay on flesh, and the purposes they are kept for, must all be taken into account before any conclusion can be arrived at as to the sufficient quantity of food to be given.

I may probably enlarge, at some future time, on the keeping and feeding of cows and bulls for breeding purposes. In the present communication, however, I will confine my observations to the

treatment of calves until they arrive at six months' old.

If the calf is dropped during the winter months, it should be kept in a warm and dry shed (or close house) until the spring. The beastlings, or first milk of the mother, should not in any wise be denied the young animal, as it acts as a mild aperient, and tends to free its intestines from a black slimy matter, which, if not removed either by the means nature provides, or by medicines, is detrimental to a perfect state of health.

Heifers' calves should be allowed to remain with their dams for a longer period than those of older cows. For the latter, a week or ten days is quite long enough; but a heifer ought not to leave the shed where she has been lying with her offspring for a fortnight. The calf during this time is of course left perfectly free to roam about the shed, and exercise its feeble limbs, and sucks as often as its appetite leads it. At the end of the ten days or fortnight, however, if the cow is quite recovered from her calving, and the weather favourable, she may be turned into a yard for a few hours in the day, and the calf during this time may be tied in the calf pen. These pens are (or should be) raised platforms, about six inches in height from the floor of the calf-house, and covered with flat spars about two and a half inches wide, leaving a space of a quarter of an inch between each, for the perfect drainage of the animals' bed. The number of pens are determined by the number of calves reared, and each calf is separated from its fellow by a partition about a yard high, of board. On the calf being first tied in one of these pens, observe that the attendant does not tie a noose in the cord that will slip, for oftentimes, owing to the violent strainings of the calf, and the cord being improperly tied, strangulation has ensued. To prevent these occurrences, I would recommend that each calf should wear a head-piece of leather, with a cord attached, similar to those used for horses. This is a more expensive tie than the slip in the first instance, but they last for years, whilst slips or cords seldom last more than one. In most counties of England it is customary for the butchers who buy fat calves, and dealers who buy weaners, to claim the ties with the animals; but in the case of an animal wearing a leathern halter, it could scarcely be expected the owner should give it up; indeed, it would be too large a *chاپentry* to resign to every customer; but the common cord may readily be substituted for the head-piece, and this in most cases will suit the buyers' purposes as well as the more valuable one. The calf should be kept in the pen for the space of five weeks, and during this time should be allowed to suck its mother morning and evening. At the end of this time the calf should be removed from

its pen, and be taken to a good sized yet warm shed, where it can be learned to drink from the bucket. New milk should be supplied it for the space of two months from the time of its being calved, and as by this time it will begin to eat a little hay, or turnips cut small, (if they have been placed in its shed), it may now be put on skim milk, thickened one day with oatmeal and another day with linseed. It is better that as many as six or eight calves be kept together, for the younger ones will imitate the older in eating and drinking, and thus come to take food much earlier than they otherwise would if kept in separate houses. Besides, the warmth of six or eight calves lying together greatly conduces to their individual comfort. Oil-cake, broken very finely, may likewise be placed in troughs nailed about a yard in height on the wall. There is an objection to the troughs standing on the ground, which every weaner must be aware of. Racks for hay, too, should be fixed against one side of the shed, but not at such an awkward height as we often see them placed, as if the calf has to reach and stretch his head and neck to reach its food, the eyes are in the position to catch the hay seeds and dust as they fall, and many young animal's eyes are much weakened by this absurd arrangement. Each animal during its confinement in the calf-shed should continue to wear its head-piece or halter, and before they are suckled let each calf be tied to a staple to be provided for that purpose: for if allowed to run loose whilst the attendant is feeding them, they will crowd round the buckets, and oftentimes, in their eagerness, upset all their food; or after their meal is finished, they will commence sucking each other, in the vain hope of prolonging their meal, which is not only an offensive habit, but attended oftentimes with serious consequences. To prevent this, as I before observed, let the attendant secure each calf separately from its fellows, and keep them so tied for the space of twenty minutes or half an hour after their meal is finished, when the desire for sucking will have abated; and thus they will not acquire a habit which if once acquired is not easily subdued.

I have thus given an outline of the treatment of calves when dropped in winter; and I will now speak of those calved in the spring. For the first month of their lives the same treatment should be pursued as with the winter calf; but by this time the pastures will probably be ready to receive the cow, and as the young one has to make up for its late birth as quickly as possible, it is advisable that both mother and offspring be turned, during the day, into a small enclosure, in which there should stand a hovel or open shed, well littered with straw, and fenced off with hurdles or flakes, in such a manner as only to allow room for the calf



to go in and out, as its humours lead it. In this shed should be kept a small quantity of fresh hay, and likewise a trough of meal for the calf to eat at such times as he likes; but oatmeal or barley-meal should always be added to the food of a spring calf; for the new milk of the mother, and the young juicy grass, both tend to give a looseness and scouring to the calf, which meal is very efficacious in correcting. I heard but a few months since of the success of bean-meal in bringing calves into a thriving and desirable state. This species of diet is objected to I am well aware, by those *old agricultural minds* who will not hear of any young animals having corn; but, for my own part, I have tried it, and in every way it has answered my expectation. I had a dozen calves, which I purchased of a person who was labouring under the error of preparing the animals by *starvation* for a hardy existence, and his treatment had been so eminently successful, that I really feared pampering would fail in restoring them to a *sightable* state; on these wretched calves I tried the bean-meal, allowing each a pint and a half per day, with hay, a field of rough grass to pick over, and a supply of good clean water, and the effect has been everything I could wish. The animals are in perfect health, and not a symptom of heat or fever about them. If bean-meal be given in winter with dry food, a small addition of oil-cake would doubtless be very beneficial, as bean-meal is certainly a hearty and solid species of food.

The operation of castration with bull calves intended for oxen, I have found, is performed with greater ease, and with less injurious effects on the calf, when at the age of one month.

There are a few of the ailments to which calves are liable, of which I will now speak. In an early stage of its existence, the calf is often, from unknown causes, attacked with the disease called *scour*. The recipe given in the "Farmer's Al-

manac" is one I have always found efficacious in putting a stop to the ravages of scour. It is this:—

Prepared chalk	four ounces.
Canella bark, powdered	one ounce.
Laudanum	one ounce.
Water	one pint.

This must be well mixed, and kept in a bottle ready for use at any time. The dose given must be regulated by the violence of the attack and the size of the animal. Two table spoonsful three times during the day is the usual quantity, but more may be given if required.

The remedy for cold and hoose, as given in the same book, is one that should be adopted, viz., good nursing (that is, warmth, and a supply of warm nutritious food. Bleed, and give a dose of Epsom salts, with ginger added.

If your calves get infected with lice, do not adopt the barbarous fashion of using hot vinegar, Scotch snuff, warm tobacco water, and other irritating lotions and appliances, which are far more annoying to the calf than the insects themselves; nor yet the more scientific remedy—"unguentum hydrargyri mitius" which, however mild it may be, is generally too strong for the delicate skin of a calf. Nothing can be more efficacious, and at the same time a more soothing application for the destruction of these vermin, than oil—not train oil, for that is an unpleasant thing, but linseed or salad oil, which recovers the irritated skin, and kills the causes of it.

And lastly, I would impress on all who rear calves the necessity of cleanliness. See that the calves are always well littered; do not allow your servants to place clean straw in their sheds before they have removed the dirty portion, and well swept the floor of the house. No animal in a natural state keeps itself cleaner than one of this species; and, if kept dirty, thriving is out of the question.

#### DARLINGTON FARMERS' CLUB.

The January meeting of this club was held at the offices of Mr. Thos. Dixon, agricultural engineer, their honorary secretary, on Monday, Jan. 4, and was very numerously attended. Mr. Walton, the vice-chairman, presided, and at the opening of the meeting the following gentlemen were enrolled members of the club, viz., Wm. Bacon, Esq., Great Chilton; James Crowe, Esq., Darlington; and Mr. Wm. Robinson, land-agent, Darlington.

The CHAIRMAN then said: Gentlemen, the subject which we have this day met to discuss is,

"Draining—the best depth, distance betwixt the drains, the best materials, and the most desirable fall." This is, I consider, a most important subject, and well deserves our very best attention; for draining, where it is requisite, is the foundation to every other improvement. This subject was proposed by Mr. Chaytor, who I am glad to see here present, and no doubt prepared to favour us with his views upon the subject; it is, consequently, useless for me to trespass further on your time; I therefore at once beg leave to call upon Mr. Chaytor.

HENRY CHAYTOR, Esq., of Clerveaux Castle, said: Mr. Chairman and gentlemen—Notwithstanding the very frequent discussions that have taken place on draining—such is the importance and such the universal interest pertaining to it—so great is still the uncertainty as to the best mode of effecting it, that no apology is required for bringing before you those opinions which my experience has induced me to form. And before I enter into details I may observe, as matter of curiosity, that hundreds of years ago the Romans were acquainted with the art. Their method was, after cutting to fill up with stones, as we practise at the present day; but it is probable that it had advanced no further with them than cutting drains to springs or outbursts of water. Looking at the subject in a more extended view, we shall find that it divides itself into what may be called natural stages of progress. The first and greatest of these was that period when, by the elevation of certain parts of the globe (a process which is going on at the present day), the water ran off into the hollows, forming oceans and seas, and leaving the earth in a fit state for the habitation of man. The innumerable lakes which would naturally be left, would next gradually disappear by the wearing of the channel, forming the outlet of their waters, assisted, perhaps, occasionally by artificial means. The next stage would be cutting large ditches to morasses or bogs; to take away the surface-water, which, as they generally rest on an under-stratum of clay, would be greatly, if not altogether, reduced. Hundreds of thousands of acres are thus drained in our eastern counties, where the rivers are often banked in eight or ten feet above the surface of the land. A main cut runs direct to the river, often with a fall not exceeding one and a-half inch to the mile; and formerly the water was lifted from it into the river by windmills; but this precarious power is now superseded by the steam-engine, of which one of 30 or 40 horse-power will lift 5,000 gallons per minute, and drain, perhaps, 4,000 acres of land: one of the most gigantic operations of the present day is the draining of the Haarlem Lake. The next step was cutting up to springs; or, in such direction as would catch the water and prevent it spreading over the surface. This process seems to have been perfected by Mr. Elkington, who published a book above forty years ago. But the last and greatest refinement, in which we are now more especially interested, is thorough-draining; an improvement so important that no agriculturist who has experienced the comforts of a well-drained field, will rest satisfied till every acre in his possession is so treated. It has, since the general introduction of tiles, spread with a rapidity quite unusual to the tardy movements of the agricultural

body; and I shall now endeavour to illustrate it. And, first of all, it is necessary that we should define precisely the object to be attained, that we may have sound principles to guide us, leaving the application of those principles to the judgment of every one who may put them in practice. The grand object is, of course, to get rid of the superfluous rain-water within a certain time; to carry it off by the drains, instead of by evaporation; and to dry the body of the soil for two or three feet below the surface, and make, as it were, a warmer bed for the crops to lie upon. This water, during the winter months, when evaporation is comparatively slight, completely saturates the land, and remains stagnant; a position that is attended with very numerous evils. It is calculated that about one-half of the water that falls is taken up again by evaporation. Hence it is that the land is drier in summer than in winter, though more rain falls. Those who are conversant with the theory of heat will easily understand what a cooling process it is. When land is drained more water runs away and less evaporates; and it is, in consequence, many degrees warmer than similar soils undrained; an advantage equivalent to placing it in a warmer climate. As different soils require different treatment, it will be convenient to consider them separately under the head of clay, loam, and gravelly, distinctions sufficiently minute for our present purpose. I will commence with the clays, the most important in respect to draining, and concerning the treatment of which there is probably the most difference of opinion. Clays, then, are soils which possess the strongest affinity for water. In addition to its chemical attraction it acts mechanically on them, bringing their particles into such close contact as to exclude the roots of our short-lived crops, and the action of the atmosphere, so necessary to prepare their elements for the use of plants. They are so dense that springs cannot rise through them, unless by the intersection of a more porous stratum. What we have to contend against generally is, what falls in rain, technically called "surface water." It seems to be pretty well established, that on them and all other soils the depth of the drains bear a *certain* relation to their distance apart. What that depth should be is greatly disputed. My opinion is, that if we can dry *all our workable* soil, say eighteen inches, and *one foot below that undisturbed*, we shall do all that is required for the ordinary method of cultivating such land; that is, two feet and a-half, and it *may be* that three feet are better, but beyond that I should not like to go, for many reasons. The roots of plants will but sparingly, if at all, penetrate it, dry or wet, unless it be broken up, which can only be done by trenching, an operation which must be

*occasionally* repeated, just the same as ploughing requires renewal. Notwithstanding that the constitution of land is more or less changed by draining, the inspection of old, deep drains convinces me that, in course of years, a consolidation of it again takes place, which injures their efficiency. I may instance a grass-field I occupy, which had been drained four feet deep many years ago. Its soil is not by any means of the strongest kind, and all the drains are running from bottom water. When making hay in the wet summer of 1845, we were so constantly annoyed by water, even over the very drains, that I determined on re-draining shallow, since which it is quite firm and dry. I have heard of other instances of failure in deep drains, which confirm my opinion. Their advocates recommend them on the score of economy; they can put in one-inch pipes four feet deep and 30 feet apart for some £3 an acre, whilst I cannot drain for less than £4 to £6 per acre. I consider there is no economy in a very small expenditure; if well done, and nothing wasted, the largest outlay will pay the best; and all schemes to evade it will prove, in the long run, unavailing. In Scotland it is common to spend £8 an acre; but tiles generally cost more there than with us. On permanent grass I do not exceed 18 inches deep, on account of its never being disturbed; but even if arable land be trenched it is not usual to exceed two feet, and this would surely be dried by a drain of 30 inches. Professor Johnston justly observes that, "That kind of drainage which is most efficiently performed with a regard to the greatest number of contingencies, will not only be the most permanent, but will be attended with the greatest number of economical advantages." But a more important contingency than that your drains should act well and permanently, cannot be, as that is the chief economical end of their construction. At 30 inches, should I fear consolidation, I have nothing to do but use the subsoil plough. And this reminds me that it is generally recommended to subsoil, to make, for one reason, the drains draw better. The effect of this would surely be less on a four-feet than a 30-inch drain. But not the least advantage of draining is to enable you to plough, to sow, to cart on the land when otherwise you could not; and I find by experience that when land is worked very fine, the surface, if soaked, does not dry sufficiently soon with wide drains. As regards width, I began at 20 feet, then I got to 15, and now to 12 or 14, according to the furrows; 15 to 18 feet is, however, pretty good draining. I now come to the consideration of loamy soils, which are between clays and gravels as regards consistency. There is no kind of which it is so difficult to judge as to draining, the variety is so great. I drained a loam

which had a good deal of clay to the surface, and a good deal of gravel in it below, at 35 feet apart and two and a-half deep. When cut, the water followed the spade, and I had not the least doubt it would be perfectly dry; the drains, filled in with tiles and plenty of gravel from the lees besides, drew effectively so as to produce good turnips, not more than three or four feet on each side. You will observe that I worked it very fine for the turnips, but the wet season of 1845 caused it to run together. I tried it again this last season, and though the turnips were excellent near the drains, between, it was the same as before. The effect produced by working it so fine, is similar to puddling clay. To effect this operation in the best manner, the clay must be dried, and the ground very fine: in this state ram it in behind your walls, and when water reaches it, it will swell and become quite impervious. Working clays, or clayey loams very fine, act just in the same way: when rain falls it becomes, as it were, puddled, extremely retentive of water, and shut up from atmospheric action: if dry weather succeed, a crust is formed, and plants will not thrive until it is broken up. This explains the reason why winter wheats do better on rough land, it is not so easily run together by wet, it remains more open, and is sooner dry. Harrows, therefore, should be as little as possible used in bare fallowing; but the effect is always most seen when turnips are grown. You all know how sad the land is left, notwithstanding the manure and the enormous quantity of roots that pervade the soil; this is entirely the effect of working it fine. Draining is the sole remedy; but I object to working too fine for any crop on soils tenacious of water. Regarding the width of drains from each other, I think the principle must be, that they must be nearer in proportion to the clay they contain, say from 18 to 30 feet, and the depth from two and a-half to three and a-half or four feet. The quality of the subsoil is most important to be considered; but it is decidedly safer and more economical to have your drains rather too near than rather too wide. As regards our last division, gravelly, drains six feet deep at 40, 50, or 60 yards apart will be best, and if that depth cannot be obtained, they may be put rather nearer. These lands often require draining as much as others; the water stagnates below, and rises in noxious exhalations, which also reduces the temperature of the land. The rich alluvial soil on the banks of the Tees would, I have no doubt, be greatly benefited by the intersection of a few deep drains. Of filling in, there are various methods in use, but all must yield the palm to tiles or pipes, whether for efficiency, permanency, or economy of outlay. For the small drains I prefer pipes of not less than two inches in diameter but I consider it

better to have the same capacity in an oval than a circular form; above these a little straw, to keep out the crumbs of earth till it sets, and then plough in the *surface soil*, not the fresh clay, as is the custom with some. Do all you can to get the water into them, and never mind whether it gets in at the bottom or the top. The superiority of tiles consists in their quick discharge of water, which prevents it hanging in the soil, and its delivery is immediately followed by a rush of fresh air up the drains, which must greatly assist their action. I like to see water in the drains before filling in; it points out many a hollow place that would otherwise be overlooked, and if the adjoining part cannot be deepened up to it, a little gravel or clay rammed in will make as firm a bed as can be desired. I prefer pipes, because moles cannot fill them up; because if the bottom softens, as will often happen, they are not so liable to choke up as tiles, and the water runs on a smooth and hard surface. You are secure of the advantage of the whole area, and consequently may use a size or two less with equal benefit; they are, therefore, more economical. For mains I prefer tiles and flats; bearing in mind that as the fall increases a less tile will still run the same quantity of water: I prefer them because they allow an easier junction with the small drains than if pipe were used instead. Drains filled with stones will act well if the run be not too long, and in this respect tiles have an advantage. Unless they are cheaply obtained, and tiles very dear, I should not recommend you to use them; the last, the worst, and most expensive method is filling with thorns. From an opportunity I have lately had of computing the cost, I cannot estimate it at less than three times the cost of tiles, whilst it is not the sixth part as efficient. As I believe there is scarcely a difference of opinion on this head, I need say no more on it. The level, or fall in the drains, and their direction, deserve our close consideration. For the most part we shall be guided in both by the natural slopes of the field to be drained; but there are many cases where we can take our choice. When it is of moderate inclination, or nearly level, it is best to cut straight up and down; when the rise becomes considerable it is better to cut in an oblique direction, and the obliquity should be increased in proportion to the steepness; such drains would surely be of great depth in reference to the soil above them, which must be satisfactory to advocates of deep drains. Water takes the readiest method of finding its own level: this tendency would carry it far down the slope before it got into the drains, even if they were only 18 feet apart, as it has the friction of passing through the soil to contend against as well. Of this I have practical experience. I have seen water running over the

surface of the drain itself, and I think to prevent this all drains should cross the slope if possible, so as to retain all water on the spot where it falls until taken off by the drains. But a chief argument on which I found my opinion of crossing the slope, is drawn from the fact that if a steepish slope be very wet, ridges and furrow made straight up and down will not dry it, but if they be made oblique to the fall they will; that is, so far as their capacity goes; I conclude that drains act precisely on the same principle, only infinitely more effective. I should, therefore, cut one or two mains up and down, according to the width of the field, and branch off the small drains at each side at as great an angle as I could, to give them a sufficient fall into the main. I am speaking of an uniform bed of clay; if various strata cropped out, I should cut them up and down. For choice, however, I would take a field nearly flat, with a very moderate inclination, as I am satisfied the drains act more regularly at both sides of them; but of course we must take things as we find them, in that respect. All open cuts and furrows which tend to accumulate water on the surface, should be avoided, and harrowed up as much as possible, that the field being laid flat, it may act as a grand filter, from which the water will run as clear as crystal, and not surcharged with the fine particles of soil, presenting a muddy stream, as it invariably does when it runs off the surface. I have not met with any analysis of water discharged from drains, and have not had time to investigate this part of the subject, but it would be both curious and instructive to know what proportion of soluble matter is carried off by the drains, and what by the surface. As I understand Professor Johnston will, at the latter end of this month, deliver a lecture to the club, I shall take the opportunity to bring the matter to his notice. In conclusion, I may observe that I have omitted most of those circumstances with which all are now familiar. There is, however, one item of practice to which I may call your attention, which is, that the spits in use in this part of the country are generally too wide; they take more forcing into the earth, it takes more labour to lift them when full, and they make the drain wider than is necessary, they last no longer than narrow spits, as they do not pass the stones so readily; they are, therefore, not so economical, as whatever adds to the labour, of necessity adds to the expense. As regards the general effect of draining, we may expect that its universal adoption will improve the temperature of the climate, and this will be the case, I think, before many years pass over. Those who will not go with the times, will ultimately be compelled to follow them in self-defence. To improvements in agriculture we may and ought to look to

employ that surplus population which now emigrates to add wealth to other lands, to better the condition of those who stay at home, and to do away with the incubus of five or six millions we annually pay to support the poor, and for which we get no return, as well as at least ten millions that we pay to foreign nations for flax, linseed, and adulterated oilcake.

Mr. JOHNSON, of Cleasby, said: From what I have heard and read, together with the experience I have had, I am inclined to think that a little deeper than two and a-half feet (the depth named by Mr. Chaytor) would be beneficial for clay lands; although I must, at the same time, admit that I have drained a great deal at that depth which has answered well; but I am now draining a little deeper than that, which I think will be found to answer permanently better. I have lately also had some conversation with Lord Prudhoe's bailiff on the subject of the action of drains at different depths on his lordship's estates. Originally Lord Prudhoe did not drain deeper than two and a-half feet, but latterly he has been draining four or five feet deep; and the bailiff told me that he thought the deep drains answered best. I likewise do not quite agree with Mr. Chaytor as to running the drains anglewise over the slope; I always run mine up and down the hill, and am persuaded it is the best method, because I conceive that it would require the drains to be nearer each other if they are made to cross the hill, than what it would do if they were made to run up and down, as the drains in crossing the slope would not drain the land to the same distance on each side of the drain.

Mr. Johnson was supported by the chairman, Mr. Nelson, and several others in his views with regard to running the drains up and down the slope in preference to crossing it in a slanting direction. On the other hand, Mr. Chaytor was warmly supported in his views by Mr. Pool and several of the members, particularly in cases where the inclina-

tion was steep, the slanting direction was strongly advocated.

Mr. DIXON, the secretary, said: Where the inclination is very steep I prefer cutting the drains anglewise across the slope in such a direction as to give an easy, though not a rapid fall; and as regards placing the drains at a nearer distance, there is no need of this, for in consequence of the steep inclination of the surface gravitation, will so far assist the water in making its way to the drain as to more than balance against any extra distance it may have to pass on one side more than the other before reaching the drain. But I believe in reality the water has a less distance to travel to the drains when they are placed anglewise across the slope than what it has when the drains run down the slope, for it cannot be expected in a steep hill when the drains run down the slope, that the water will run at right angles into the drain from the point where it falls upon the earth in the shape of rain, certainly not; but it will, as a matter of course, from the effects of gravitation, seek the lowest point, and will, consequently, percolate through the soil some considerable distance in a slanting direction down the hill before it arrives at the drain.

Mr. CHAYTOR here explained that he only advocated putting the drains in an oblique direction across the slope when the hill was steep; but if not very steep, or where the strata cropped out to the surface, he would most certainly run the drains down the slope.

Mr. Pearson and other members gave their opinion and experience, and at the close of the meeting the majority of the members were quite of opinion that the method now detailed by Mr. Chaytor, if efficiently done, would answer well generally, but more particularly his method for clay-lands.

A vote of thanks was unanimously awarded to Mr. Chaytor for his very able address, and the meeting broke up.

#### FIRST ANNUAL REPORT OF THE "NORFOLK AND SUFFOLK" HARLESTON FARMER'S CLUB, 1846.

In consequence of the "Harleston Farmers' Club" having expunged the 11th rule, which prohibited the discussion of political subjects, several of its members seceded, and formed themselves into a club, under the title of the "Norfolk and Suffolk Harleston Farmer's Club." The following is their first report. After alluding to the cause of the secession, it states that—

The committee cannot but express their pleasure

at the success which has attended the formation of the club, not only in regard to the increase of its members, and the interest of the subjects discussed, "which have been of *practical* utility, eliciting much valuable information," but also because all its meetings have been of a character calculated to draw more closely the bonds of unity around those engaged in a similar pursuit, and by the mutual free interchange of ideas and knowledge to increase the

interest in, and conduce to the prosperity of, that profession in which most of its members are engaged, and all deeply interested.

Your committee now proceed to lay before you a review of the minutes of the past year.

At the first meeting, which took place in January, the subject discussed was, "The relative value of different descriptions of roots for fattening cattle, the quantities to be given, with the kind of artificial food best adapted to each."

As the common white turnip possesses but comparatively small fattening properties, it was recommended to be the first given to stock, in order to inure them to the change from grass to other descriptions of food, using with it cut hay and straw, and, by being pulled about a fortnight before wanted, so as to become a little clung, cattle do much better on them. A variety of turnip, called the "red round," was very highly spoken of, both for grazing and dairy purposes—nearly equal to the Swede for fattening; they were considered by some as superior to them for cows, and instances were adduced where a greater quantity of milk, and of a richer quality, was given, by their being fed on them; they also keep well into the spring.

The Swedish turnip for grazing was allowed to be superior to every other root; but doubts being expressed as to their being equally good for cows, a member stated that he had given his cows three bushels a day each, with artificial food, and they had never paid better.

Beet ranked next in the opinion of the club, and being apt to cause cattle to scour, pollard was recommended as a preventive. The remaining portions of the discussion will be found embodied in the resolution—"That the Swedish turnip stands the highest for all fattening purposes, beet next, after them the red round, and lastly, the common white turnip. With regard to carrots, the club is not yet in possession of sufficient evidence to determine on their value, and they are left for future discussion. As to the quantity of each root to be given to a fifty stone beast, from three to four bushels of cut Swedes per day, of beet not more than three bushels, and of Scotch and common turnips from four to five bushels. With regard to the kind of artificial food best adapted to each—with Swedes, oilcake and a portion of corn—with beet, bean and pea-meal; and the latter part of the season, a small quantity of oilcake. With respect to the common turnips, &c., as they are generally given to lean beasts only, it is not deemed necessary, as a general practice, to give artificial food with them."

At the meeting on the 11th February, the subject for the evening was—"The best method of eradicating black grass and hurtful weeds."

The seeds of black grass, lying for a long period in the ground without vegetating, renders its extirpation a work of time, and only to be accomplished by frequent ploughings, autumnal cultivation, and allowing the land, when in a fine state on the surface, to lay late into the spring. One member related an instance where much good had arisen from the land being well trodden down by sheep; and another, in speaking of the red poppy, stated, that by harrowing in winter or spring, when there was a slight frost, the poppies and black grass would chip up and die.

The practice of throwing spear-grass and other rubbish on the banks, or into the ditches, was strongly reprobated by the club as a fruitful source of filling the land with weeds; it should be carted off on to large heaps, where it decomposes, and forms an excellent vegetable mould. Some parties mix lime with it, others salt, and some liquid manure.

The practice of drawing thistles on arable land appeared to be received with most favour, although it is almost impossible to get rid of them. Hoeing was by some deemed worse than useless, for being necessarily done early, the thistle shoots stronger, and if it be deferred until after the coronal roots of the corn strike, they are likely to be injured by being turned outwards on the land.

Rag-weed may be extirpated, and the land-whin, or bust-harrow, materially checked by sheep-feeding in the early spring. The remainder of the discussion is contained in the following resolution:—"That the most effectual mode of destroying black grass is by autumn cultivation and the pulverization of the soil, frequent harrowings of the stubbles where it abounds, early ploughings for wheat, and repeated harrowings before the wheat is put in; and in fallows, by keeping the land flat in the spring as long as possible. With spear-grass, and what is generally called twitch-grass, the fork, with manual labour, is most effectual. Docks and hard thistles to be pulled up by hand. Thistles upon upland pasture may be effectually destroyed by bruising in the summer time, by repeated very heavy rollings, as well as by mowing about the midsummer. And that all rubbish of this nature may be made into a very valuable vegetable mould, by heaping it and repeated turnings; it may then be safely applied to arable land: by the addition of salt, lime, or liquid manure, it becomes a very rich compost. And that where the poppy or red weed abounds, it may be very effectually destroyed by harrowing in light frosts, or on the wheat crop in early spring."

At the meeting in March, the subject which occupied the attention of the club was—"The white carrot; its cultivation and general use, as compared with other roots."

The superiority of the white carrot over other roots for feeding horses and pigs was generally admitted; but no member present had tried them with bullocks.

The gentleman who introduced this subject said, that *he* manured for them, and considered it to be of great benefit to the young plant before it reaches the subsoil. He put his carrots in, in the latter part of April, drilling (not too deep) five rows on a ten-furrow stetch, and four pounds of seed an acre. The seed must be well rubbed to separate it, and then mixed with sand. The plants should be hoed when about three inches high, and left twelve inches apart, for if closer the carrots will not arrive to any size; they ought to be taken up with a three-tined fork, as, if pulled, very many are broken in the land. Another member stated, he grew carrots after wheat, ploughing the land immediately after harvest, and giving it the same number of earths as for beet; *he also* manured for them, and put on the same quantity of seed per acre, but had *six* rows on a ten-furrow stetch, and the plants barely ten inches asunder; but he considered them rather too thick: they cost him 20s. an acre hoeing, singling, and taking up; his horses and pigs were fed on them, the former eating the tops, which they are very fond of; he clamps the carrots up, but does not cover any *earth* over them, and they keep quite as long as beet. A member here said he thought it best to manure *after* carrots, as the muck was apt to make them fangy. This argument was combated by the first speaker, who said, that as carrots were very apt to deteriorate, their being so might have arisen from bad seed; and he cited a case where the produce was doubled by their being manured for; they grew best where the land has a loose subsoil, is fine on the surface, and rolled down tight.

The club arrived at the following resolution:—“That, as far as the evidence which we have before us goes, the white carrot is of more value than any other root crop (in quantity as well as in quality) for feeding horses and pigs; that they are more expensive to keep clean and raise by 15s. an acre, but that is much more than counterbalanced by their greater value.”

At the next meeting, which took place on the 8th of April, the merits of Italian rye-grass and other artificial grasses were discussed.

The CHAIRMAN spoke very highly of the Italian rye-grass as a feeding crop; but, from his own experience, would never attempt to grow it for a hay crop. Coming on in March, and lasting up to May, it is an excellent green food for horses; but if left for hay it becomes wiry, and although a large quantity may be given, the quality is very inferior. This variety requires to be sown thick where in-

tended for feeding, two bushels an acre not being too much: it is a difficult grass to get rid of, on account of seeding very early; he sowed it with barley, and it came the following year.

Of all the artificial grasses, none, in his opinion, equalled the red clover, where the land was in good condition: he sowed a peck an acre of clean clover, and never saw the plant too thick. A discussion then arose as to the practice of sowing rye-grass with clover—some members advocating it because of the much greater bulk obtained, while others opposed it on the ground of its causing the wheat to lose plant, and being very coarse in quality. In opposition to this, it was urged that many were obliged to sow rye-grass from the falling off in the clover, although in most instances it was not grown more than once in eight years. One member stated he had turned his sheep on to the layers in spring, when they will eat the young shoots of the rye-grass, and not touch the clover; by that means he gets it finer. Three quarters of a peck of clover seed and one quarter of a peck of rye-grass appeared to be the usual quantity sown in this district, some adding one quarter of a peck of trefoil. Trefoil was recommended to be sown thick, otherwise it *spreads* on the land, and gets no length. The quantity of cow grass was by some considered superior to trefoil, but it is not so certain a crop. The annexed resolution was then passed—“That Italian rye-grass may be most advantageously grown for feeding purposes, affording a very valuable crop of green food; but when grown for hay, the succeeding wheat crop has been found to lose plant to such a degree that it evidently does not answer for such a purpose.”

The red clover stands the highest for a mowing hay crop, when it can be grown on lands kindly for it, many preferring a mixture of rye-grass with it, as a greater bulk is obtained even on soils considered to be clover lands. Cow grass has been occasionally grown with success, but not so generally as to be considered preferable to trefoil.

The fifth meeting took place in May, when the club proceeded to discuss “The general cultivation of turnips.”

The member introducing the subject, classed it under two heads—viz., light and heavy land. On his light land he always grows Swedes, getting the best manure he can (not artificial); he ploughs five times, and sows about the middle of June; he prefers the Skirving and green-topped Swedes. The former begin to lose quality after Christmas, while the latter frequently keep growing to that time, and are ready to succeed the Skirving. He mixes the muck, *throws* it on the heap, turns it only once, about a fortnight before using, covers it with mould and warts it in. As on heavy land much manure

is required for turnips, he only crops about half his fallows, considering it much better to grow a large crop on a small space than an inferior one on double the quantity of land. The red round he thought an excellent turnip for cows; they, however, required manure, and were a tender plant when they first came up.

The next speaker stated it to be his practice to turn the muck over immediately, covering the top of the heap with mould, which, on the heap being turned over, was mixed with the muck, materially checking fermentation; he strongly advocated the frequent use of the horse-hoe, as greatly assisting the growth of the young plant. Autumn cultivation, too, he considered highly essential towards getting a crop of turnips, one earth then being equal to two in spring. Growing roots on stetches was preferable to balks, the ensuing barley crop being better; he liked the Skirving Swede best, but they will not keep so well as Laing's, and the stock usually grown in this neighbourhood, which are good varieties. An interesting debate then took place on the different descriptions of turnips, the quantity of seed to be sown, autumn cultivation, and the horse-hoe, the result of which will appear in the resolution—"That, on heavy lands, the autumn cultivation is highly desirable, but it requires careful management as to the spring culture, in not getting the land fine too early. That the manure should be well mixed and carefully fermented, and warded in the second time of warding. That the horse-hoe should be continually used as long as the crop and the weather will permit, the hand-hoeing being much better performed with it. That on light land a good crop of turnips may be grown without manure; and if folded on the land with sheep, the after crop will be found much benefited. That great care is required in the selection of seeds. In Swedes, the Skirving are found to yield much more weight for early feeding, but they do not keep so well late in the season—the common purple top holding much better in quality. A description of red round turnips, of excellent quality, has been very advantageously grown, but they require good manuring. That in all turnips a good seed (from three to four pints per acre) is required to beat the fly; and that on heavy land a portion of artificial manure may be well applied."

The club met on the 3rd of June. The subject of discussion was—"Bagging wheat, as compared with reaping and mowing."

At this meeting, which was a very full one, the time-honoured custom of reaping did not meet with a single advocate, the sickle being entirely discarded for the scythe, the superiority of which was pointed out by the member who brought forward the question, who had also tried both reaping and

bagging, or batting. The principal advantages of mowing consists in the great saving of time at harvest, the increased value of the straw, its making better, from the greater surface exposed, and the sheaves not being tied tight, allowing the water to escape at the bands, where, in shorn wheat, it lodges, and causes the corn to sprout: it also assists greatly in keeping the lands clean where they are foul, as the seeds are carted off, which would otherwise be shed on the ground. No damage was ever known to have been caused by wheat heating on the stack, although, where very foul, it ought not to be carted into the barn. One member, who had tried mowing, complained that he suffered from dirt in the sample, but it appeared to be an isolated case. Most of the members mowed to the standing corn—one man mowing while another tied up: by this method they will do two acres in a long harvest day. For the convenience of raking, one member shocks his corn *across* the stetches, taking care to leave spaces for the free circulation of air; another has boys following the men to rake. He considered six men and three boys the best number to go in a company.

The CHAIRMAN then alluded to the system of gleaning, saying that he trusted the English farmer would show to the world that they still felt a deep interest in the welfare of the working classes, and would not deprive them (however justified in so doing they might be) of those advantages in harvest which had been their privilege from time immemorial. This feeling was fully reciprocated by the club, many members stating that much corn was left even after raking.

The resolution following was unanimously adopted—"That mowing wheat is much more advantageous than reaping or bagging, for the following reasons:—It is done in much less time, which is very essential at the most important season of the year: the straw obtained is of much greater value, both in quantity and quality, than the stubble. The land is cleared so as to allow of immediate autumn cultivation, which is of so great service to the next root crop. The crop is much better calculated to make and dry in harvest-like condition by this mode than any other; and as regards expense, the advantage is in favour of mowing."

At the September meeting, the club entertained the subject of "The best variety of seed corn adapted to different lands."

The CHAIRMAN remarked that, of late years, he had observed that the growth of white wheat had much declined in this neighbourhood, while that of red was proportionably increased, which, although not so good in quality, was a better farmers' wheat, producing more per acre. He had practised sowing gleaned corn, and invariably got the best crops



from it: he preferred the Spalding wheat to the golden drop.

A member stated he mixed five or six different sorts of red wheat together, and considers he grows better crops by that method, as they adapt themselves to the differences in the soil; he now always grows red wheat, getting three coombs per acre more than of white; he has tried the long-strawed white Tunstall and eggshell, but they did not succeed.

Another member differed from the two former as to mixing seeds, thinking a better sample and greater quantity may be grown by not doing so. He cannot on his land grow the Tunstall wheat, which requires a good, heavy, deep soil. With respect to dressing seed corn high, it had the disadvantage of retaining chiefly the large kernels, which were grown on ears having but few grains on. Another gentleman said that the golden drop was the best casting wheat he ever grew; he prefers it to the Spalding.

The club then agreed to postpone the discussion on barley, and other seeds, until February, several members undertaking to report then the difference in the yield on their farms between the varieties of seeds.

The club came to the following resolution:—“That, with regard to the wheat crop, red wheats are the most adapted to this district, as they produce more per acre than the white, are likely to plant better, and will bear a more severe winter. That the Spalding appears to have the preponderance for general growth, but the advocates of the golden drop prefer it as the great rival of the Spalding; and it still remains to be proved whether the Spalding is superior, taking into consideration its value in the market as a millers' wheat. The Tunstall appears to be more approved of than any other white wheat, but it requires the land to be in fine condition.”

On the 30th of October, the subject of discussion was “The improvement of permanent pasture,” The proceedings of this meeting being so fully treated of in the resolution, renders but a short

notice of it necessary. It was generally admitted that the management of our pasture land was by far the worst part of Norfolk and Suffolk farming, some members thinking that it would pay better than arable land for good farming, while others feared poor upland pasture would require more manure than they produced. It was deemed very detrimental to upland pasture to feed them close with horses, as also allowing stock on them after Christmas. Several members mentioned experiments they had tried, as forking, &c., to get rid of the land-whin, but nothing checked it so much as early sheep-feeding, which, however, is attended with this disadvantage, that many pastures, if fed off early, will, in the event of a *dry* summer, produce but little all the year. The following resolution was arrived at:—“That it is the opinion of this club that upland pasture is capable of a vast degree of improvement in its management by sheep-folding in the early winter months, and that, to insure a good summer growth, it should not be fed by any stock later than Christmas. That the land-whin (so called), which so generally infests upland pasture, may be almost eradicated by judicious feeding. That manure, when applied, should be put on as soon as possible after Michaelmas; that liquid manure is of very great advantage in improving the growth and quantity of produce; and with regard to mowing them, it is not expedient to do so more than once in three years. Lowland pasture may be very greatly improved (as also upland) by draining, and carting on them heavy soil of a sandy nature; that they should be fed down the latter part of the year as close as possible by all descriptions of stock. Irrigation, where possible, is highly recommended; and with respect to artificial manures, the club has not sufficient evidence to form an opinion, one instance only being noticed where common salt has been productive of good effects, when applied immediately after the crop of hay was removed, producing a great growth of aftermath.

The club did not meet in November; and on the 30th December, 1846, the annual meeting was held, when the chairman and secretary were re-appointed.

## MARTOCK DISTRICT FARMERS' CLUB.—TENANT-RIGHT.

### ADJOURNED DISCUSSION.

The usual monthly meeting was held on Monday December 28th, at the White Hart Inn, Mr. John Francis in the chair.

#### DEBATE ON TENANT-RIGHT.

The CHAIRMAN introduced the discussion by observing that the subject was one of great im-

portance, and the tenant farmers must feel a very lively interest in it; he thought, too, that it was a subject of great importance to the landlords; for if the tenant was placed in a better position, there would be a greater certainty of their receiving their rents, and all parties would go on more comfort-

ably. He did not wholly agree with the resolution which had been proposed : a part of it had his support, but the other part he could not coincide with. The first section, which stated that an immense outlay of capital was required to be expended on the land, before it could be cultivated to advantage, he was going to oppose ; neither was he about to object to the statement that the farmers were debarred from effecting improvements, because they had no security ; he also agreed with the resolution, that the farmer should have security for his capital when laid out on the land. It was that portion that advocated legislative interference that he would alter : it was the method of getting security that they were at issue about. He would not detain them by any lengthened observations, as there were doubtless many gentlemen wishing to address them ; but his opinion was, that the tenant occupied the capital of the landlord just the same in renting land as if he had it in money. If a man laid out £1,000 in land, and offered it to a farmer, that farmer would calculate what amount of rent he would be able to give ; but if he grew tired of his bargain after a certain time, would it be right for him coolly to ask the legislature to allow him to effect what plans he pleased in altering the estate, and for powers whereby he should have reimbursement of the owner ? He saw great difficulty in laying down a system of reimbursement ; one man may think himself paid in three years, another may claim ten, another may consider a longer time not sufficient. The seasons may interfere with some ; others may be unfortunate, and he was satisfied there would be such a difference of opinion about reimbursement, that a legislative enactment would lead to a deal of litigation, and would, in the end, be detrimental to the tenant's interest ; still he would admit the right of the tenant to compensation, but not by legislative enactment ; he thought they had been too long dependent on acts of parliament. The amendment which he would propose to the secretary's resolution was, to substitute for " and a legislative enactment ought to be enforced, &c.," the following : and " that every agreement or lease for letting land should contain a clause insuring to the tenant compensation for improvements effected by him, provided his holding be interfered with previous to the expiration of the term, or if a change of owners occurs."

Mr. J. D. CAVE seconded the amendment.

Mr. JOSEPH STAPLE said that he laboured under a disadvantage in speaking after Mr. Francis, for he made no pretensions to the oratory for which that gentleman was celebrated. He was aware that much had been said out of doors about this question, but, regardless of that, he should state his opinion fearlessly : he only regretted that

there were not more gentlemen in the room. For his part he agreed with the greater part of the resolution their secretary had proposed : the question was, had the tenant any rights ? Now, according to the views of the preceding speaker he did not see that he had any ; for he compared him to the dependent individual who was obliged to borrow money ; but he believed the tenant farmers had their rights as well as other classes of the community. Mr. Shaw had defined tenant-right to be the " right of the tenant to compensation for outlay in the improvement of the soil, when the period of his occupation has not been of sufficient duration to enable him to reimburse that outlay." Now, where land was held under a yearly tenancy, was there any inducement offered for improvement ? The landlord and tenant may be on good terms to-day : to-morrow the tenant might stumble over an old hare, and next day have notice to quit ; or there may be an election of knights of the shire, and the tenant, by voting contrary to his landlord's wishes, may get turned out. Now these things had happened, and might possibly happen again ; for nothing annoyed some gentlemen more than for the tenant to kill the wild animals on his estate, though, with the secretary, he thought it nothing very criminal. Now he had nothing to complain of his landlord ; he believed himself privileged with a good one ; but if he was in a farm that would be considerably bettered by the outlay of capital, he certainly should require security for that capital. It would not do for the tenant to go about draining or high systems of cultivation without a security, yet how was the land to be made to yield more but by extraordinary cultivation ? It had been said that the tenant made his own bargain ; now in nine cases out of ten he thought he did not, but was obliged to take it as the landlord thought proper to let it. The best security for the capital of a tenant, he thought they would all admit, was a long lease. If the landlords would give that, and leave out some of the old clauses, we should not want a better means of security. That the tenant required some security or other, was evident. Would the tradesman lay out money without a security ? Decidedly not. Neither ought the farmer. He did not wish to dictate to the landlords ; they had land, and could do as they liked with it ; but the tenant farmers had rights, and it behoved them to stand up for them. He thought whatever conclusion they came to, that discussion would do a deal of good : it would show the tenant farmers of the neighbourhood that they ought to ask security of their landlords for the good of the labouring classes, that they may farm after better methods, which would require more labour ; and he thought the landlords would also see that by a good im-

proving tenant they were benefited. If laws were granted, and the tenant was allowed to farm as he thought proper, he would lay out his capital fearlessly, go on prosperously, and the owners of the soil would not so often be obliged to distrain for their rents. Thus they saw that the landlords, tenants, and labourers would be equally benefited by the tenant's being allowed security by lease or otherwise. He would defy the farmers of that neighbourhood to cultivate as well as they ought unless they employed more labourers than they had ever yet done. He had long been of opinion that the more labour a person expended on an estate, the better right he had to expect a profit; but he must have a better security than the generality of farmers had now, for the yearly tenant surely could feel no interest in improving his farm by employing more labourers. Now he sincerely wished that the landlords would not think that they wished to annoy them by discussing these things, for he could assure them that such was not the case. They wished to establish the principle that the tenant has a right to security, although he believed their worthy chairman had denied them that right.

The CHAIRMAN begged to put Mr. Staple right on that point: he had admitted the right, and he only differed from the secretary in the means to get that right. He objected to legislative interference, because of its impracticability.

Mr. STAPLE thought they would not be likely to get security of the landlords: some would give it, no doubt; but the majority would refuse. He admitted the difficulty of legislative interference; but he contended that the tenant ought to be protected, and where he laid out money on his farm, and was not allowed time to reimburse himself, he ought to be enabled to demand compensation of his landlord.

Mr. FRANCIS HOOK said that they all knew that the farmer was expected to improve. He was often told to lay out more money, to manage with more skill, and to be more enterprising; but it appears to him that farmers were not wholly responsible for the slow march of improvement; they were sometimes unable to cultivate better, not from the want of capital, but from the want of security not being sufficient to justify them in laying it out, for half the farms in the neighbourhood were let from year to year. Now, when improvements were effected, the farmer was frequently unable to see his money back again until several years had elapsed. He did not approve of leases as they existed at present, and he thought that many farmers objected because they would not be bound to follow the system of farming that was practised a hundred years ago; but he thought if some such agreement were entered into as had been recommended by

Mr. Francis, and if, on the tenant giving up an estate, two independent persons were called in to value the improvements which had been effected, it would be highly beneficial to all parties; but he was not of opinion that the landlord should pay for the improvements. No, he considered it the province of the in-coming tenant to do that; and if this system were practised, it would stop the present reckless competition for farms; men of capital would be more likely to embark it on the land, and we should have more imitators of Mr. Huxtable.

Mr. JOSEPH DARBY asked leave to alter his resolution, by leaving out the word "permanent" from the following part of it: "And a legislative enactment ought to be enforced, whereby on leaving an estate he (the tenant) may claim from its owner compensation for all the capital he had expended on it in permanent improvement, and for the reimbursement of which he had not been allowed sufficient time." Now, it had been suggested to him that there might be various opinions as to what permanent improvements really were: some would not class subsoiling under that term; and though manuring highly, and farming after a high system, would leave its good effects in the land for many years, yet some would not consider his resolution as it now stood advocated security for that description of capital; he therefore asked leave to expunge the word "permanent" from the resolution he had proposed. This having been allowed,

Mr. J. D. CAVE said, they were seeking what was impracticable, in trying to get a legislative enactment on the question; and he thought with Mr. Francis, that even if they succeeded in getting it, it would only lead to a series of litigation, for the landlord and tenant would seldom agree about compensation; neither did he see any reason why the landlord should be compelled to compensate the tenant for every freak he might choose to indulge in: one man may have a fancy to turn grazier, and put up a lot of stalls on a sheep or dairy farm, which would not be of the slightest use to the next comer. If any law was made on the subject at all, it should only have force where agreements had been made. The best way in his opinion that a tenant could be secured was by a lease; he thought if the system of granting leases were reformed—if long leases were granted, made renewable every seven years, with a clause similar to that proposed by Mr. Francis, the tenant would have nothing to clog his efforts in the improvement of the soil. The present system of granting leases, he was aware, was objectionable. It was often the case that a man took an estate, and got it in a high state of cultivation in the first part of the term; while at

the latter part he studied how to rack out of the farm all that he had put into it. But if the system which he recommended were adopted, there would be no inducement for him to exhaust the land.

Mr. HALLET said he was sorry to hear many remarks that had been made that night, which were not in accordance with the principle laid down at the last meeting of that club—that security was wanted by the tenant farmer for the good of the labourers. Now, since that time he had read many statements of many practical agriculturists, who were all arguing on one point—that the condition of the labouring classes required to be improved, and that the means of effecting it was, giving the tenantry security for their capital. Now, when they saw that great landed proprietors, lords, and even dukes, had come forward and proposed that the tenant should have compensation, he saw no reason why we should not, as a Farmers' Club, come to a resolution on the question. Now the question was, which was the best way to get compensation? A great landed proprietor, the Lord Lieutenant of the county, had proposed that it should be done by legislative enactment, and the resolution which their secretary had proposed was founded on those views, to which he should give his support. Some gentlemen seemed to have great faith in leases, but were they not generally drawn up by a lawyer; who placed in them the obsolete forms and customs of other days, and which often caused the lease to be an injury to the improving farmer? He agreed with what Mr. Cave had said respecting leases; but even if we could get the system he advocated, a legislative enactment would be necessary in cases of death, and he believed the principle advocated in their secretary's resolution would act just the same where there was a lease as where there was not. Mr. Cave had said the tenant frequently racked out the farm at the latter part of his lease, and it was for this very reason that an enactment was necessary, which would enable the tenant to farm at all times the same. If he were to die to-morrow, there was no law to ensure to his widow the capital he had laid out on his farm, and he had a great deal of it there; they wanted a law that would give the tenant the same right for compensation as the landlord possessed over the tenant who impoverished his estate.

Mr. WM. HEBDITCH said that when a tenant took an estate it was very desirable that he should have security, but he objected to the term "Tenant Right." He would rather ask for security, or petition the legislature, than demand it as a right. When the landlord let an estate it was just the same as if he had lent so much money, and he expected a suitable return for it, and the tenant could take it or leave it, as he thought fit; if the tenant was to

improve the estate, he would ask compensation of the landlord, and if the land was really improved, he could afford to give it. It was impossible to tell what weal or woe would attend the man who took an estate—he may turn spendthrift, he may be unlucky—and he thought that any law to regulate the relationship between himself and his landlord could not be well applied; he coincided with Mr. Francis, that they should get a clause inserted in their leases that would give compensation for unexhausted improvements, if they could get the landlords in the humour; if not, he considered it a bad job (a laugh). He did not think it any use to go to the legislature about the matter. When the farmer takes an estate, he must try to make the best bargain he can; and if he gets a good landlord, he must think himself fortunate.

THE CHAIRMAN observed, that if the proposed law was established, a man taking land for three years may lay out a considerable sum in guano the second year, and get out every shilling again, and yet lay claim to be compensated by his landlord for it. He thought no legislative enactment could be passed to meet every case, and it would be better done in the way he had proposed.

After a few more remarks from Mr. Joseph Staple,

Mr. JOSEPH DARBY rose to reply. Their differences in opinion were similar to those that had arisen in almost every place where this question had been discussed: some advocated legislative interference, while others thought they should be enabled to induce the landlords to grant them "Tenant Right," by means of leases. Now, if they could induce the landlords to grant them long leases, renewable at seven years, as had been recommended that night, they would not be under the necessity of going to parliament for legislation; but were they likely to get leases? Did the landlords seem at all anxious to grant them? Was it not a fact that fewer leases were granted now than years ago? Where one farmer had a lease were there not six that had not? He was of opinion that they would never effect their object by means of leases. Now, could not the legislature give us cheap law if they chose? They had recently given us an instance that they could, by passing the Small Debts Act. And certainly it was right for the tenant to have a legislative enactment to protect him, whether he made use of it or not; for with it, arbitration could be tried, and the tribunal need not be sought only when that had failed. The former part of his resolution, it seemed, met their approbation; they agreed that a deal of capital required to be expended on the land in that neighbourhood before it could be cultivated to advantage. If they had any doubts on that point, it

was only for them to go out, and view their wet, undrained fields, and their dismal lanes (a laugh); and they would be convinced that a good system of cultivation could not be established before permanent improvements had been effected. Now, would not the farmers of this neighbourhood be considered madmen if they commenced making good roads without a better system of security for their capital than they had at present; for Mr. Hallett had informed them the other day that that operation would cost £145 per mile. Draining was also an expensive work, and a tenant would certainly be foolish to perform it, with his present security; and yet he believed their lanes would never be made good, and much of the land would not be drained, until the farmers did it themselves. But it was not alone for permanent improvements that the tenant farmer wanted security for his capital. In these days every order of men were improving, and the present state of the country required that the farmer should be an improver also. Mr. Hewitt Davis, in the "Farmers' Almanac," gives the following advice to young farmers:—"Never be contented till all your land has been trenched or turned over by the spade a foot in depth." Now, subsoiling was expensive; Mr. Hallett had offered two pounds per acre to any one who would perform it on his farm; and he thought they would agree

with him, that this improvement could not be effected without the farmer had security for his capital; neither would it be safe for him to farm after a high state of culture, for that required the outlay of considerable capital. The law recognised farming as a business; and he thought it ought to give to the farmer, what he understood every Englishman was entitled to—security for his capital, when laid out in legitimate business.

THE CHAIRMAN, after making a few observations, put the question to the meeting, and, on a show of hands being taken, declared the amendment carried. The resolution passed therefore stands thus:—"That an immense outlay of capital requires to be expended on much of the land in this neighbourhood, before it can be cultivated to advantage; and its occupiers are at present debarred from effecting improvements, because they have no security that they shall reap the advantage of them; that the tenant farmer has a right to security for his capital, when expended on the land; and that every lease or agreement for letting land; should contain a clause, insuring to the tenant compensation for improvements effected by him, provided his holding be interfered with previous to the expiration of his term, or a charge of owners occur."

After a vote of thanks to the chairman, the meeting adjourned.—*Sherborne Journal.*

FRENCH AND ENGLISH RATES FOR MERCHANDISE AND CATTLE.

Mr. Salomon's "Railways in England and France" furnishes us with the following comparison of rates for carrying merchandise and cattle on the London and North-Western line, and on the Paris and Orleans and Orleans to Tours Railways:—

LONDON AND NORTH-WESTERN RAILWAY.

Rates for Cattle.

	Oxen,	Calves,	Sheep,	Pigs,
	per head.	per head.	per head.	per hd.

For a distance of 76 miles	5s. 3d.	1s. 3d.	1s.	1s.
Ditto 72 miles	5s. 2d.	1s. 2d.	11d.	11d.

PARIS AND ORLEANS AND ORLEANS TO TOURS LINES.

Rates for Cattle.

Miles.	Oxen,	Sheep,	Pigs and
	per head.	per head.	Calves.

Paris to Orleans..76	6s. 4d.	7½d.	2s. 9d.
Orleans to Tours..72	6s. 4d.	7½d.	2s. 9d.

PARIS TO AND FROM ORLEANS, AND TO AND FROM ORLEANS TO TOURS.

Rates for carrying a ton of merchandise.

	Not classed.				1st class.				2d. class.				3rd class.			
Miles.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.		
Orleans to Paris..76	32	9	18	3	14	9	12	9	12	9	9	1	12	9		
Paris to Orleans..76	32	9	14	9	12	9	9	1	12	9	9	0	12	4		
Orleans to Tours..72	24	2	16	4	12	4	9	0	12	4	9	0	12	4		
Tours to Orleans..72	24	2	14	0	10	9	7	6	10	9	7	6	10	9		

LONDON AND NORTH-WESTERN.

Rates for conveyance of a ton of merchandise 76 miles, being the same distance as from Paris to Orleans.

	Not classed.				1st class.				2nd class.				3rd class.			
Miles.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.		
From London to any distance of 76	15	10	12	8	9	6	7	11	15	10	12	8	9	6		
Do. to any distance of..... 72	15	0	12	0	9	0	7	6	15	0	12	0	9	0		

On the London and North-Western, and on most of the English lines, cattle, &c., are usually charged by the

waggon instead of per head. A waggon will contain six fat beasts, or seven to eight lean; 40 fat sheep, or 50 lean; the same number of pigs; and 30 fat calves, or 40 lean; and the drover or shepherd in charge of a waggon-load is allowed a free passage to boot. The comparison of the merchandise and cattle rates is, therefore, greatly in favour of English railway companies. Carriages and horses, as has been shown, are carried infinitely cheaper in England.

**CATTLE RATES.**—The Norfolk Company have just officially announced the following:—

## FAT CATTLE RATES.—PER HEAD.

TO LONDON FROM	Beasts.		Calves.		Sheep.		
	s.	d.	s.	d.	s.	d.	
Yarmouth . . . . .	each	9	6	3	0	1	3
Norwich . . . . .	„	9	0	2	6	1	3
Dereham . . . . .	„	9	0	2	6	1	3
Wymondham . . . . .	„	8	6	2	6	1	3
Attleborough . . . . .	„	8	6	2	6	1	3
Thetford . . . . .	„	8	0	2	6	1	3
Brandon . . . . .	„	7	6	2	6	1	0

**LEAN CATTLE RATES.**—5d. per mile per waggon (four wheels) no less charge than for twenty miles will be made.

## FARMERS' CLUB HOUSE.

## MONTHLY MEETING OF THE COMMITTEE OF MANAGEMENT.

MONDAY, DEC. 7.

Present—Messrs. R. Baker, J. Beadel, G. Emery, T. Knight, C. W. Johnson, W. Shaw (Strand), J. Tyler, and J. Wood;

W. SHAW, Esq., in the chair.

A House Committee was appointed, consisting of the following members:—Messrs. R. Baker, J. Beadel, W. Bell, H. G. Brandreth, C. W. Johnson, T. Knight, H. Price, W. Shaw (Strand), J. Tyler, and J. Wood.

Mr. Baker vacating the office of chairman to the monthly discussions, Mr. W. Fisher Hobbs was unanimously chosen to succeed him as chairman of the discussions for the ensuing year.

On the motion of Mr. Tyler, seconded by Mr. Beadel, a vote of thanks was passed to Mr. Baker, for the very able manner in which he had presided at the different meetings devoted to discussion.

The following subjects were selected for discussion:—

Monday, January 4, 1847.—“On the advantages the Repeal of the Malt Tax would afford the Tenant Farmer.”—Proposed by Mr. Smith, of Rye.

February 1.—“On the advantages the public would derive from the breaking up of inferior Grass Lands.”—By Mr. Shaw, of Northampton.

March 1.—“Upon the comparative merits of Waggons and One-horse Carts, for the purposes of Agriculture.”—By Mr. R. Baker.

April 5.—“On the action of Chemical Manures, and the best method of making Farm-yard Dung.”—By Mr. J. C. Nesbit.

May 3.—“How far would a well-regulated system of Tenant-right be beneficial to the Landlord.”—By Mr. Shaw (Strand).

June 7.—“Upon the bearing of the present Currency Laws upon Agriculture, and how far they affect the value of Agricultural Produce.”—By Mr. J. Wood.

## GENERAL ANNUAL MEETING.

DEC. 10, 1846.

Present—Honourable W. H. Wilson, Messrs. W. Anderson, R. Baker, E. Ball, W. Bennett, R. Bennett, G. Emery, T. Grainger, W. Fisher Hobbs, W. Hutley, C. H. Lattimore, E. Lawford, C. Lipscombe, H. Overman, J. Pain, W. Purser, W. Shaw (Strand), W. Shaw (Northampton), R. Smith (Burley), G. Turner, J. Wood, &c., &c.

R. SMITH, Esq., in the chair.

The balance-sheet of the past year was read and received.

The following members of the Committee were balloted out, and all, except the last four, re-elected:—H. Price, W. Anderson, C. W. Johnson, W. Shaw, Captain Aitchison, R. Baker, W. Cheffins, W. Bell, S. Grantham, H. Cook, H. Brandreth, and W. Lovell.

The following gentlemen were elected on the Committee:—H. Overman, E. Ball, G. Parsons, J. Pain, W. Bennett, and C. H. Lattimore.

## MONTHLY MEETING OF COMMITTEE OF MANAGEMENT.

MONDAY, JANUARY 4.

Present—Messrs. J. Beadel, G. Emery, W. Fisher Hobbs, T. Knight, C. H. Lattimore, J. Oakley, H. Overman, G. Parsons, W. Shaw (Strand), J. Tyler, and J. Wood.

W. SHAW, Esq., in the chair.

The minutes of the last Committee 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:—H. Ayres, Esq., 25, Lincoln's-inn-fields; J. Bravender, Esq., Cirencester; B. Bond Cabbell, Esq., M.P., 39, Chapple-street, Edgeware-road; J. Donaldson, Esq., Manchester; J. A. Gordon, Esq., Naish House, Bristol; T. Partridge, Esq., Dilbridge, Colchester; S. Swaffield, Esq., Ampthill Park, Beds.; H. Trethewey, Esq., Silsoe, Beds.

## THE LONDON FARMERS' CLUB.—MONTHLY DISCUSSION.

## THE ADVANTAGES WHICH THE REPEAL OF THE MALT-TAX WOULD AFFORD THE TENANT FARMER.

The usual monthly meeting of the Farmers' Club took place on Monday, Jan. 4, at the Club Room, in New Bridge Street, Blackfriars, Mr. Fisher Hobbs in the chair. The subject which stood upon the card for discussion was one of very considerable interest, viz., "The advantages which the repeal of the Malt-tax would afford to the tenant farmer."

The CHAIRMAN, in opening the business of the meeting, stated that at the last monthly meeting the Committee had done him the honour of electing him to that office for the current year (cheers). He felt considerable diffidence in that position to-night, in consequence of the extreme importance of the subject which had very wisely been put upon the card for discussion this evening. No subject could have been better chosen, for there was none which more immediately claimed the attention of the practical farmer than the repeal of the malt-tax (Hear). Mr. Smith, of Rye, would now proceed to open the question for discussion (cheers).

Mr. SMITH said when he undertook the task of opening this question for discussion, he was not aware that it was necessary to introduce the subject so fully as he now found it was expected he should do; he, therefore, feared that he should be very far from doing justice to its various details. He held in his hand a copy of some resolutions passed at a meeting on 5th Oct., 1829, in favour of the repeal of the malt-tax, and which meeting, he was proud to say, emanated in his own district (hear, hear). He was equally well pleased to observe that the present movement in favour of the repeal of that tax originated in the same neighbourhood (cheers). His objections to the malt-tax were founded on the conviction that its operation prevented food from being produced at the cheapest cost; that it impeded the improvement of land; that it checked the employment of the labourer; that it reduced the consumption of one of our staple articles; and was most oppressive as falling in a tenfold degree on the working classes of this country (hear, hear). If the malt-tax were repealed, and the farmer were allowed to malt his own barley, he could fatten his cattle upon it, and raise a much larger quantity, and at much cheaper rate than he was now doing (hear, hear). He was himself, at present, consuming oil-cake to the amount of £400 per annum; now all the food necessary for fattening his cattle he should produce from his own soil if he were permitted, by the repeal of this tax, to exercise his own energies and enterprise (hear). He had said that this tax greatly impeded the improvement of the land, and this was especially the case in Sussex, where the soils were rather stiff; that was certainly not a barley district, but if they had full power to exert their energies, there was no doubt that under draining would be carried out to a much greater extent than at present,

and that would give a greater amount of employment to the labourer. The demand for labour must go on in an increasing ratio with the improvement of the land. Many of the stiff soils would soon be rendered fit for growing the second-rate qualities of barley, which could be applied to the purpose of fattening, and the consumption of barley for malting would beyond a doubt be at least doubled. If this were the case they would require about two millions of acres of land for the produce of barley more than were at present under cultivation (hear, hear). Barley, of all white straw crops, drew the least from the soil, and employed a greater amount of labour than any other description of arable crops. It was supposed that about fifty thousand acres of land were planted with hops, and that about 14*l.* per acre was actually spent in manual labour upon them, the amount of which would be 700,000*l.* If they could only get freedom, there was no reason why that should not be doubled, and if by a repeal of this tax they could produce four millions where they now only produced two millions, why the labourer and the manufacturer must be equally benefited (hear, hear). The towns, let it be borne in mind, were as much interested in this question as any class of this community in the country districts. It had now been clearly ascertained that the labourer paid by far the largest portion of the taxation of this country; his condition, therefore, was of the highest importance, and demanded their warmest sympathy (hear, hear). He concluded by saying that having thus briefly introduced the subject to them, he should leave it in the hands of some friends around him, who would enter more fully upon this important question.

Mr. LATTIMORE, of Hertfordshire, having responded to a call for him by rising, said—Gentlemen, Mr. Smith has given you the outline of this subject of discussion, and if you call upon me for my opinion upon it I shall be most happy to give it you (hear). I think we may first take this question to be a matter of finance and taxation; but before we can freely and fairly discuss it we must, I think, settle one simple point in relation to it, because there is some confusion existing in the minds of many people who hold the opinion that the malt tax, so far from being an injury to the farmer, is a positive benefit to him (hear, and a laugh). Now, before we can enter upon the merits of a question like this, we must ground our opinions and set our minds upon something like a fixity of principle (hear). I say taxation is an unqualified evil in itself; it is a necessary evil, I admit, but that it is an evil there can be no doubt (hear, hear). The question to-night is, whether malt is an article upon which taxation is wisely placed, and whether it ought fairly and justly to be subjected to such a tax? As farmers, you have a deep interest in that question; you are

justified in calling it an evil, and you have to consider whether it is a fair and just burden upon the agriculture of this country (hear, hear). I take it that the malt-tax interferes with the cultivation of land, and restricts the growth of barley, and consequently of all green crops (hear, hear). It changes the mode of culture, lessens the demand for, and the wages of, labour, and diminishes the supply of bread corn and animal food to the people of this country. The present deficiency of food is unquestionably considerably aggravated by the operation of this tax. There is a great outcry just now for an order in Council to prevent distillation from grain; but I take it that no manufacturers in this country would submit to such an interference with their legitimate trade. In the years 1794-5, a period of great scarcity, the same thing occurred. There was, at that time, a great deal of discussion as to the propriety of Government interfering to prevent distillation from grain. But I think that a species of interference to which as free citizens of a free state you ought not to submit; no doubt, however, the good sense of the country will prevent any such interference (hear, hear). The operation of the malt-tax, beyond all question, has decreased the consumption of malt; in 1730, the consumption of malt in the United Kingdom was at the rate of 5 bushels per head for every man, woman, and child. In 1845, the consumption had decreased to the rate of 1 bushel 6 gallons (hear, hear). This tax also interferes, I said, with the mode of cultivation; gentlemen present are aware that many farmers are frequently in the habit of sowing wheat after turnips instead of barley after turnips because they expect a greater immediate return (hear). But you know also, gentlemen, by experience as practical men, that the land is thereby incapacitated for the future production of wheat, and that, therefore, there is an ultimate loss incurred by this desire for immediate gain (hear). Mr. Ayres, in his pamphlet on the Repeal of the Malt Tax, draws a curious comparison between the quantities of wheat and barley sold in the market towns of Great Britain from which the averages are taken, in order to show how the one has remained comparatively stationary, while the other has rapidly and largely increased. The period he takes for the purpose of this exemplification is from 1835 to 1845, as follows:—

	Wheat.	Barley.
	Qrs.	Qrs.
1835 ..	3,927,620	2,033,980
1836 ..	4,393,025	2,429,579
1837 ..	3,889,007	2,070,763
1838 ..	4,064,305	2,480,312
1839 ..	3,174,680	2,403,251
1840 ..	3,850,278	2,291,427
1841 ..	3,913,927	2,225,459
1842 ..	4,091,234	2,576,616
1843 ..	5,302,297	2,777,493
1844 ..	5,456,306	2,834,407
1845 ..	6,666,240	2,468,489

Thus you see, as Mr. Ayres states, that, while the increase in wheat amounts to nearly 75 per cent., barley has made but a very trifling advance (Hear, hear). Another effect of this non-progression has been felt in the diminution of the growth of hops; from 1826 to 1834 there was a positive decrease in the quantity of hops grown in this country. Now, sir, we shall certainly be opposed in this matter by all the great brewers (and this is very natural), as well as by all the large maltsters. There is a reason why it should be so (Hear). Most of the gentlemen of the longest experience in this room will admit that, in their time, the brewing trade has become a close monopoly (Hear, hear); and how do I prove this? I will here again, gentlemen, borrow from Mr. Ayres's figures. Every barley-grower, and every agriculturist, ought to be acquainted with these matters, and being so, I am sure they will not be surprised that they

should be opposed on this question by Mr. Barclay and other large brewers (Hear). I was reading, the other day, a portion of the report of the committee upon the burthens on land. This report contains the names of many eminent agriculturists, and among other names that of Mr. Barclay, the brewer. The house of that gentleman consumes 120,000 quarters of barley per annum, and he is called a disinterested witness (Hear). Now, of all modes of proving disinterestedness, this appears to me to be the most extraordinary (Hear, and a laugh). He is asked, in the course of his examination, what good he thinks would accrue to the farmer from the repeal of the malt-tax? He replies that he does not think it would do the farmer much good, as it would lower the price of the best qualities of barley, and raise the price of the inferior qualities. Now, this appears to me to be rather paradoxical. Did you ever know that increasing the consumption of an article, in any trade whatever, lowered the price of that article? Mr. Barclay says—"I never use any malt but the best." Now, do you think that, if the duty was taken off malt, that system could be kept up which has reared such immense fortunes for the brewers? And yet they call him a disinterested witness (Hear, hear)! "Who consumes the malt of England, after it is manufactured?" says Mr. Ayres; "certainly not those for whose benefit the repeal of the malt-tax is sought. The quantity of malt made in England in 1845 was 30,508,840 bushels; out of this, 24,421,760 bushels were consumed by brewers and licensed victuallers, and 4,304,472 bushels by retail brewers, leaving for the consumption of private families and farmers only 1,782,608 bushels; so that we find about fourteen-fifteenths of the entire quantity of malt is disposed of by brewers. It is not very unlikely that of this quantity the greater part of the beer thus made is consumed in cities and large manufacturing towns. The state of rural districts, as regards the consumption of malt, may be easily inferred, because brewers are not in the habit of supplying farmers with beer. The more probable view of the case is, that a great portion of the industrious classes are not consumers, on account of its cost" (Hear, hear). Brewers and maltsters may tell us that the malt-tax is a benefit, and that to remove it would be productive of injurious effects. But we, as farmers, know better (Hear). We know that the labourer has suffered the most cruel oppression from it. I had a proof of this from a gentleman I met at Halstead, named Cudden; he is a maltster, living at Bungay. There are kind-hearted and generous men in every class of life, and this gentleman, who spoke with a kindness and earnestness which I shall always admire, deserves honour as being the first maltster who ever came forward in opposition to the malt-tax. He seconded a resolution against it at a public meeting (Hear). He stated that he kept a retail shop for the sale of malt, and found that he sold more in July to the agricultural labourers than at any other period of the year. They said to him—"We must have some malt now, if we go without food; we would have more if we could, but in this weather we must have it, at all events" (Hear). In eleven months out of the twelve, however, they cannot indulge in malt liquor, in consequence of the operation of this tax. Now, you, as farmers, suffer from the bitterness of feeling and discontentedness which reign in the heart of the labourer from his privations, instead of that kindness which ought to exist between him and his employer (Hear); but he feels that he does not participate in the benefits derived from his labour. I have known instances where this ill-feeling has been engendered and carried to such a pitch, that men have actually set fire to the very property upon which they worked. If the labourer is not satisfied, your work will not be well done; and, although everything may be smiling around you, he will not move a finger to save your property, but rather



feel a pleasure in its destruction. You may tell me there is the union workhouse in the distance for the poor, and the jail for the correction of the evil-minded; but, depend on it, you had better do what you can to lessen the demand upon the one, and keep out inmates from the other (Hear, hear). I take it you never can obtain from the labourer the full amount of work, unless there be a perfect harmony existing between his mental and physical powers (Hear, hear). When the body is cared for, and the mind borne up by hope, then is the labourer in such a condition as to give you the greatest return for that which you pay him for—his labour. This is a most important consideration for the landlord; for if it be otherwise, the labourer may be reluctant to assist you when your life and property may be in danger, and both may be lost for the want of that assistance (Hear). This is a part of the subject which does not enter into the question of the value of rent, but of the value of land. One of the greatest drawbacks of the operation of the malt-tax is the effect it has in lessening the quantity of food produced. The four-course system of Norfolk has raised the cultivation of that county to great eminence, and the return has been proportionable. You know how much the Earl of Leicester did by introducing a good system, and particularly by giving security to the tenant (Hear); by these means the growth of wheat was increased nearly four-fold, and the quantity of meat raised was also increased in about the same proportion. As good farmers you have a right to obtain the repeal of the malt-tax, in order that you may be enabled to grow green crops to be succeeded by barley, and thus obtain the manufactured article. You have heard a great deal about feeding cattle with malt, and have, doubtless, read an essay by Dr. Playfair in the doctrines of which you are rather sceptical (Hear, and a laugh). You say, "I want to do it in my own way. I don't want Professor Playfair, or any one else, to tell me how to do this." Barley is the only grain which has the quality of becoming sweet and soluble by the application of moisture and heat. Now, by law, you must steep it forty hours, not less; and after that you may keep it as long as you like, until it rots, if you please, provided you pay the duty (Hear). Dr. Thompson has made the following analysis of barley and malt:—

	Barley.	Malt.
Gluten .....	3 .....	1
Sugar .....	4 .....	16
Gum .....	5 .....	14
Starch .....	88 .....	69
	100	100

By this he shows a loss in malting of nineteen parts of starch, and two parts of gluten; and a gain of twelve of saccharine matter (which I believe to be no mean article in fattening cattle) and nine of gum. Now, I am perfectly willing to take the increase against the loss. I will have one, and Dr. Thompson shall have the other. I do not think, however, that either of us would have a very great advantage; for I am sorry to say the grazier's "occupation's gone" (Hear). But I put it to any gentleman to say whether, with these results, barley can, as Dr. Thompson thinks, be deteriorated by malting for the purpose of fattening cattle (Hear, hear). Now, gentlemen, I will proceed to the consideration of another part of the subject; and, in talking of the produce of the land (Mr. Shaw lately introduced to you the subject of agricultural statistics, and a very important subject it is)—in talking of the produce of the land, it behoves you to be well prepared on this point. In looking to the crops of the United Kingdom, we find that some are better farmed than others; Norfolk and Leicester, for instance, taken in the aggregate, are farmed in a superior manner to the rest of the English counties; and we

come to this conclusion, that if the system which is there pursued were pursued generally, the produce of this country would be much greater than it is. Now, I have read some remarks made at agricultural meetings by gentlemen, who say, "We do not despair if the tenant had security for his capital, for without that he can never succeed." Now, if we had that security, I think we should get rid of the malt-tax. I have heard many people state that they could produce one-third more than they do produce, but that the large and necessary outlay of capital, for which they have no security, stands in the way. Suppose, as moderate men, we take one-fourth instead of one-third. I will take one-fourth as the basis of my observations. I will give you a return, according to Mr. McCulloch, of the aggregate annual value of agricultural produce in the United Kingdom, which he makes as follows:—

England .....	£132,500,000
Scotland .....	20,453,375
Ireland .....	44,500,000
	£197,453,375

This, in round numbers, may be called £200,000,000. Now, if I take it that an increase of one-fourth might be obtained, we should have 50 millions per annum more (Hear, hear). In answer to our demand for the repeal of the malt-tax, we are met with this argument, "that it produces to the revenue five millions per annum, and that that sum cannot be spared." Our reply is, "remove this impediment, and we will produce you 50 millions, and feed the people of Ireland into the bargain" (Hear, hear). You will not do your duty unless you put this before the country, and particularly before the inhabitants of the towns (Hear). Put this great evil before the people, and you will have a response from them: they will tell you that they will not support men in Parliament unless they will make themselves acquainted with it, and endeavour to get rid of it (Hear). Gentlemen, we must take high ground. We are charged by many of the public journals with not knowing our own strength. We are told that we wish to get rid of the malt-tax, but do not want to get rid of other excise duties; but I say that if we are to take advantage of commercial principles, we must have commercial advantages. No one can say that this is a political question; it is a fiscal question; and that is the best government for us that will give us the greatest freedom for our industry. But then they say, "Do you want to destroy the public revenue? do you want us to break public faith?" Our answer is: "No, we want you to keep public faith" (hear). You cannot benefit the country unless you increase the demand and consumption of the articles you have to sell. Our duty is so to administer taxation that industry shall not be fettered, but that every one shall obtain the greatest remuneration that the market can give him (Hear). Adam Smith has laid down this principle, that "the subjects of every state ought to contribute towards the support of the government as nearly as possible in proportion to their respective abilities, that is, in proportion to the revenue they respectively enjoy under the protection of the state." Now, we say, with regard to the malt-tax, that they do not contribute according to their "ability" (Hear, hear). We say it is very heavy upon the labourer and upon the farmer. Now, we will take 100 acres of arable land, by way of illustration: upon 100 acres of land, five quarters of malt are consumed as beer given to the labourers: the duty upon five quarters of malt is £5 8s. 4d., and upon the hops 8d., together £5 15s.; and the assessed taxes and income-tax upon this will not be more, rather less, than the tax paid by the malt and hop duty (Hear). Do not let any farmer say it is a light tax; in fact, it is the heaviest tax the farmer pays. Another of Adam Smith's principles is,

"that the tax which each individual is bound to pay ought to be certain and not arbitrary. The time of payment, the manner of payment, and the quantity to be paid ought all to be clear and plain to the contributor and to every other person." The third principle is, "that every tax ought to be levied at the time, or in the manner most likely to be convenient to the contributor to pay it; and that the government should take out, and keep out, of the products of the people as little as possible over and above what it brings into the public treasury of the state" (hear). Now, it is because I believe the malt-tax to be so foreign to this principle that I stand here as an objector to that tax (Hear, hear). I see, gentlemen—as I dare say you are well aware—that the brewers have raised the price of beer 5s. per barrel, which is 0½d. per pot, and the retailers have raised it 1d. per pot. "Ah," but they say, "barley is so dear." I must say that I think farmers live upon high prices at a distance, even though they may have nothing to sell (Hear, and a laugh). I should like to put this question to farmers, Have you forgotten the year 1822, when you had a quantity of barley stained and damaged, and unfit for the market, such as Mr. Barclay says he tells his agents never to purchase (Hear)? Recollect, that if you have high prices the tax makes them higher. I believe, as I said before, that we shall not do our duty if we do not exert ourselves to the utmost to get rid of this tax, keeping in view the principle with which I started, namely, that taxation is an evil, though a necessary evil, and ought to be made as equitable as possible. One would think it so manifest an evil that no one would dispute it; but I am sorry to say that this is not the case (Hear). For instance, there is a writer in the *Cambridge and Oxford Review*, who states that the malt-tax is a good thing (Hear, and a laugh). This writer says, there are three classes of men who oppose the malt-tax: the first, who denounce it as oppressive upon the farmer and labourer; the second, who on historical and constitutional grounds describe it as dangerous and disgraceful; and the third consists of men who regard the abolition of the taxes upon consumption as the most direct means of overthrowing the power of the British aristocracy. Now, this last is, I think, a most monstrous assertion, and the British aristocracy have not to thank this writer for placing their power upon the right of taxing articles of consumption (Hear). This Cambridge and Oxford man propounds doctrines which would be scouted on 'Change. I think, however, that he will do us great service. I thank him for his remarks, and let the aristocracy thank him too ("Hear," and laughter.) There is one other observation that I must make before I sit down, and that is as to the best means of getting rid of this tax; for, after all, that is the point to consider. This is not the first time the question has been before you. It was mooted in 1829; just seventeen years ago. You were then told by your members that it must come off. But it remained on (Hear, hear). Mr. Barclay and the brewers wanted the beer-tax off and the malt-tax on: this was not the wish of the farmers; but they had no power. Well, the malt-tax was actually taken off; but members went and undid their vote (Hear). Have you any earthly reason that they are more willing to take it off now than they were then? You must have self-reliance; work upon public opinion; and as an election is at hand, don't let any sinister influence blind you on this point (cheers). There are two points which you have to contend for; security for the tenant, and the abolition of the malt-tax: let them go together; they are members of the same family; they will not disagree (Hear, hear). Make them your two great points. I am unwilling to think so ill of you as to suppose you could not from your body send a few representatives to Parliament. The landowners have a monopoly, and

must have a monopoly; but why not have a few cultivators too ("Hear, hear," and cheers)? You will never get rid of the malt-tax until you have. If I am asked why I have not faith in those who talk about this measure, I appeal to the past. The evidence of the past is the best guarantee of the future. Men don't alter their opinions or principles all at once. There is nothing of more slow growth than the animal, man; and when he has once reached his maturity, he has certain habits, manners, and opinions, which he hardly ever gets rid of (Hear). It would be little short of a miracle should he renounce his old opinions, and come round and say, "I have hitherto been in error; but for the remainder of my life I will be devoted to your interests and to your service" (Hear). Don't expect it. You must have self-reliance; and no man has so much as the *bonâ fide* cultivator of the land (Hear). Earl Grey told the House of Lords that "he would stand by his order;" and I call upon you to stand by the interests of your order. Then shall you make the land bring forth plenty, the earth smile with beauty, and thus promote the glory of God by increasing the happiness of man (loud cheers).

Mr. SELMES: Nothing, gentlemen, would induce me now to rise, but the great interest of the subject which my friends, Mr. Smith and Mr. Lattimore, have so ably brought before you. In referring to the malt-tax, allow me also to refer to the corn-law. There was a very great amount of talent infused into the debates in Parliament which took place upon that question, both in support and in opposition; and to the representatives of the people, at all events, that question was satisfactorily disposed of. Now, sir, I will begin by inquiring what was the object in making that great alteration in the corn-law? It was grounded upon the principle of the necessity of creating a greater supply of food for the people at a more moderate cost. If I am right in my interpretation of the alteration of that law—if by reason of the increasing population of this country it was found necessary to legislate for the people by creating a greater supply of food, I would ask how can you maintain a tax which necessarily enhances another description of food (Hear)? How, I ask, can you maintain the malt-tax, which, while it restricts the produce of the country, at the same time vastly increases the price of food to the community at large? I feel perfectly justified in advocating the repeal of the malt-tax; it is not a question peculiarly belonging to the farmer, but appertains to every class, especially to the labourer, and therefore I feel in duty bound to come forward and lend him a helping hand. Can we refrain from coming forward now that there is the golden opportunity of giving him wholesome food, and that beverage which he ought to claim as his birth-right (hear)? Can anything be more unreasonable than that the labouring classes of this country should work from sunrise to sunset, and then slake their thirst in a pail of water instead of in that to which they are entitled? We advocate the repeal of this law upon the great public ground, not of our own interest, but that the repeal of no tax would confer so great a boon upon the community at large as this would (cheers). We are told that now the corn law is repealed we must expect to find corn much cheaper. How then are we to meet these low prices when they come into operation, unless we do all we can to obtain the repeal of a tax which presses upon the best interests of the country? Why is the foreigner to be permitted to send his wheat into this country, while we are compelled to pay this tax in the very teeth of good legislation, and when the whole country is crying out against it (hear)? Surely what is sauce for the goose is sauce for the gander. If it is necessary to find a greater quantity of food for the

people, why not extend the principle? Mr. Ricardo has laid it down as a principle that if the importation of corn were at all times free, our farmers would, one year with another, get less for their corn, but that the money which they got would be of more value, would buy more goods of other kinds, and enable them to employ more labour. Now, when the alteration of the corn law was agreed to by Parliament, a very rash conclusion was jumped at by some of our representatives; namely, that it was necessary also to admit foreign cattle. Now how, I would ask, was it ever found out that we could not produce meat enough to feed the people? I do not say that this is not the case; but I do say that while it costs me 8*l.* to fatten a bullock upon oilcake, I could do the same thing for 4*l.* upon malt, if the duty were taken off that article (hear, hear). I say this tax is universally injurious to the interests of the country. Professor Playfair says there is not that virtue in malt which people think; but I am of opinion that as practical men you will think differently. During the last summer there was a great drought; now suppose I could have used malt for the food of my cattle instead of oilcake, why that would have made up for all the deficiency in the grain or hay crops (hear). In Sussex there is not half the rain there is in the north of England, and therefore it would in that part of the country be felt as the greater boon (hear). This subject no doubt applies more especially to the interests of the tenantry of the United Kingdom, but it is impossible to strip from it the advantages which must accrue to the landlord also (hear, hear). Now I wish to show how they as well as the tenantry would be advantaged. When the full tide of free trade sets in, we shall have to compete with low prices; and unless the landlords co-operate with the tenantry in endeavouring to obtain a repeal of this measure, they certainly will have to pay, in common with the tenantry, their fair proportion of the malt-tax (cheers); and when I consider this part of the question, I can have no doubt of the opinion of the landlords and of the aristocracy of this country upon the subject. They will then say that nothing can remedy the evil of which we complain but the repeal of this tax. You will find that their sympathy with the tenantry and poorer classes of the country will induce them to come forward. I have no doubt the landlords will unite with us, gentlemen; their interest and their duty will equally prompt them to do so (hear, hear). There is one other point to which I cannot help alluding before I sit down, and that is the manner in which it affects the condition of the labourer. It is a very great point to be surrounded by good and industrious labourers. It makes a vast difference whether we are surrounded by such as I have described, or by those who feel very little interest in the welfare or success of the farmer. I am sure it must frequently be a painful thing to magistrates to have to inflict punishment on men who have been tempted to crime by the persons with whom their poverty has brought them into connection. How important, therefore, is it, that we should strive to improve the condition of the labourer, both moral and physical (hear). Until we do this, we can never expect him to look upon us with those feelings of cordiality which ought to exist between the labourer and his employer. I consider there is now a golden opportunity for our showing him that we are his best friends; and if we neglect it, we shall deserve all the reproaches which may be cast upon us (hear, hear). Nothing can justify this tax; and we ought to do all in our power to get it repealed. I believe Lord John Russell is not opposed to that which we are endeavouring to obtain: I think his lordship only wants an expression of public opinion to induce him to be with us. I feel, gentlemen, that we have the game in our own hands: if the measure is lost, it will be only

by our own supineness (hear). As a large farmer, I have ever felt most warmly on this question, and I shall at all times be ready to give you my sympathies, and, as far as a reasonable sum of money may be necessary, to assist you with my purse also (cheers).

Mr. HENRY OVERMAN said that, had Dr. Thompson called on any farmer at Glasgow, he would have learned that the month of May was a very improper time to commence feeding cattle with malt; in fact, that it was impossible to feed them successfully with one sort of food, as they required frequent change, almost daily change.

Mr. JAMES WOOD.—I do not know, gentlemen, that I have any new matter to introduce into this discussion, which I consider to have been most ably treated by the gentlemen who come from the same county as myself (hear, and a laugh). I quite concur in what Mr. Lattimore also said as to the pressure of this tax upon the cultivator of the land. The work of the farm cannot be properly done, and the farmer cannot expect to get the greatest amount of labour for his wages, unless the labourer be satisfied (hear). I heard a man say lately—"It is a hard case, master, that there should be so much beef in this country, and we can't get a taste of it: I suppose it all goes to London." Now it is a hard case that they should not have a taste of that which they produce themselves (hear, hear); indeed, I think it most preposterous that they should not (Hear). The party who does them the greatest injury, is the party who throws indirect taxation upon the agriculturist; and as the malt-tax is the heaviest of this species of taxation, we ought to do our best to get rid of it (cheers). For my own part, I never grow a single bushel of barley; our stiff clay soils of Sussex do not answer for it; but I nevertheless think that the abolition of this tax would be attended by great advantages. With regard to the opinions of Adam Smith and M'Culloch, I do not know whether they are quite applicable to our case, as these subjects have been better considered since the works of those authors were published. M'Culloch, for instance, lays it down as a principle that all taxation ought to be direct, but it would be quite impossible to raise sufficient taxation by direct means; and there I think they go beyond what they intended to prove (Hear).

Mr. LATTIMORE: I omitted in my former observations to state something which I intended; and as it is corroborative of a portion of Mr. Wood's remarks, I will, with permission, mention it now. I have it upon the authority of a tradesman in Sussex, and it is to this effect:—"Fifty years ago, every cottage, or nearly every cottage, near Chichester, used to consume a certain amount of butchers' meat; nearly the whole of them brewed their own beer and baked their own bread. Now they were greatly reduced, and appeared to have lost the power of consuming butchers' meat from the year 1826; they appear to have lost the power of brewing their own beer about the same time." I do, therefore, think that Sussex is redeeming its character by coming forward to expose the evils of the malt tax. Taxation must fall upon property or industry, and I believe that the reason why the labourer suffers is, that too great a proportion falls upon industry (Hear), as compared with the property of the country. You are all witnesses of the fact in your own neighbourhood. I will do you the justice to believe that you sympathize with the sufferers; but if you wish to relieve the suffering, you must remove the cause (cheers).

The CHAIRMAN: I beg to thank the gentlemen who have spoken for the able manner in which they have brought forward this subject (Hear). I, for one, have felt for very many years the evils of the malt-tax, and I am more than ever convinced of the necessity of its repeal, for the benefit of the tenant-farmer, the labourer,

and the community at large (Hear, hear). With regard to its being a great obstacle to the increase of production, I am quite sure everybody must agree in the remarks of Mr. Lattimore upon that point; for there are many districts of the country where barley might be advantageously grown if there was liberty to use it for the purpose of feeding cattle. Then barley is less exhausting than wheat crops, and employs, as you all know, more labour than wheat, oats, or any other white-straw crops (Hear, hear). I think, therefore, in this point the repeal would be no light advantage to the country. With regard also to using it for feeding cattle, that is a subject of very great importance. For some few years past, as a grazier and farmer, I have been a considerable feeder of cattle, and I am very much dissatisfied with being obliged to use oilcake for the purpose of fattening them. It is like beer and other things that we buy—adulterated in almost every instance. It is well known that foreigners mix with it a variety of seeds, and the mucilage of bitter almonds. I do think that, as the public call upon us to find out the cheapest rate, we ought to be allowed to feed our cattle in the best manner we can (Hear). With regard to the condition of the labourer, both morally and physically, I think it will have the most important effect. I have considered it my duty to supply my labourers with beer: on one farm the tax alone costs me at the rate of 10s. per acre (Hear, hear). Now, if farmers were relieved from this tax, they would be more disposed to make improvements. But I was more especially alluding to the comfort of the labourer. I have observed that the labourers on farms which allow beer are not in the habit when they leave their work of going to the village beer-shop; and even if they do go and purchase a pint of beer, it has not that prejudicial effect upon them which it has upon those who rarely get a pint of beer during the day (Hear). I believe the repeal of the malt tax would have a considerable effect in keeping the labourer at home with his family, or at work in his garden (Hear). I am quite sure that there have been very few incendiary fires where it is the custom to allow men beer. With regard to the beer-shops, I regard them as a curse upon the country, and think that every one ought to do his utmost to get rid of these obnoxious dens of crime (Hear). Mr. Lattimore has asked us whether we are convinced of the evil of this oppressive tax; and if we are, what is the best means for getting rid of it? I, for one, think we must take the subject upon our own shoulders; for the Legislature will not assist us unless we come forward determined to support and to obtain the repeal of the tax as an act of justice. If we are lukewarm about it, we shall find that some of our representatives will express an opinion in its favour, and then, when returned, not give us that support which they will if the subject be pressed upon them. I think it is our duty to call upon our representatives unflinchingly to give us their support, and if they do not obtain the repeal of the tax, to make it a principle not to return any man who will not frankly and boldly give his decided opposition to the malt-tax (Hear). Whatever I can do in my humble sphere to bring about this great object, I shall feel the greatest pleasure in doing (cheers).

Mr. OAKLEY.—Did you say, Mr. Lattimore, that there is more labour employed in growing barley than any other crops? Because I don't quite agree with that.

Mr. LATTIMORE.—I did not exactly use those terms, but I think that is the case. I said the malt-tax was a preventive to the employment of labour.

Mr. OAKLEY.—I understood you to say that barley employed more labour per acre than any other crop.

Mr. LATTIMORE.—As I believe all good farmers are

agreed that root-crops are a good preparative for barley or wheat, and that if barley were more grown, there would be more green crops, I think, on the whole, it is a just remark.

Mr. OAKLEY: I think with that explanation the statement is satisfactory; but I did not wish it to go forward from this club, as being stated that barley crops, merely as such, employed more labour than any other (hear).

Mr. SHAW (of the Strand): Not having had time to devote attention to this subject, it was not my intention to address you upon it; and I now rise rather to offer a closing remark, and move some resolution for your adoption, than to add anything to what has been so well said upon the question to-night (hear, hear). I cannot, however, refrain from expressing regret that the practical gentlemen here present, who have taken part in this discussion, and understand the subject so well, should not rather have directed their attention to the practical part of the question as affecting the interests of the tenant-farmer, rather than to have treated the subject at large, however advantageous the result may be (hear). Beneficial it must be, and therefore perhaps I may be considered a little hypercritical in making these remarks (No, no); but I say I should have liked it better if their arguments had borne more directly upon two or three points which aggravate this question, and render it a practical evil to the tenant-farmer (hear, hear). I think upon the broad and abstract principles laid down in those authors upon political economy which have been quoted, and upon public grounds and public principles, the same objection might have been taken to this tax as to the duty upon raw cotton (hear). Regarding the question in another point of view; it is indeed hard that the farmer who grows an article upon his land cannot consume that article for the purposes of his occupation (hear, hear). But he is met at the very outset by the exciseman and the tax-collector, and not allowed to use his barley in the manner which would be most beneficial to his own interest as well as that of the country at large. Another evil consequent on the malt-tax is, that it prohibits the use of barley of secondary quality. I quite agree with what Mr. Lattimore said with regard to the evidence of Mr. Barclay, and that the prime article will always fetch its price. But in the last season a large quantity of second-rate barley would have been purchased for malting but for fiscal regulations (hear, hear). I will say nothing about the corn laws or provision laws, but that they no longer exist; that we know them only as matters of history. But can anything be more unjust or unstatesmanlike than that the feeders of animals at home should be restricted by fiscal regulations, and denied privileges in this country which are enjoyed by farmers on the other side of the Channel (hear, hear)? Cattle may be fattened by foreigners upon malt, free of duty, and imported into the metropolis at a much less cost than from many parts of the United Kingdom, whilst the English farmer is prohibited its use. Let practical men look at this, and say whether it is not a case of gross injustice and oppression (cheers). Mr. Shaw concluded by moving the following resolution:—“That the malt-tax being a tax on the raw produce of the soil restricts consumption; limits the use of the secondary qualities of barley; places the British feeder of stock in a disadvantageous position in competition with the foreigner, and obstructs the improved cultivation of the soil; and that its repeal would be advantageous to the tenant-farmer” (cheers).

Mr. SELMES seconded the resolution, which was carried unanimously, and thanks having been voted to the chairman, the meeting separated.

## ON LEASES.

"A tenancy from year to year can never, under any circumstances, be a sufficient protection to an improving tenant for the outlay of his capital."

SIR,—That the above proposition is a just one will not be denied by any unbiased person, who has a correct apprehension of what is included in the phrase "Tenant-Right"—a phrase which I agree with you, Mr. Editor, in thinking better expresses what is meant by the interest which an improving tenant ought to have in the improvements that he makes, than any other which could be selected. But I am even painfully sensible that it is a large question. There are, indeed, so many considerations which enter into it, that volumes might be written upon it, and yet the half of them would remain untouched; and he would display no small amount of cleverness and practical knowledge who could so place the *pro's* and *con's* of the subject before the parties interested, as to enable them, one way or other, to arrive at a correct conclusion. How, then, it may be asked, can you expect to produce such a result by agitating the matter in the ephemeral columns of a newspaper? I answer that I am strongly inclined to think that among the readers of your journal are to be found men who are better qualified to form a correct judgment upon this all important question than could men of the most powerful minds from any other class. From the very nature of the case it must be so, and for that reason alone it is desirable that there should be, as I said in my last, a continuous discussion of it through the periodical press. By the collision of opinions from different persons, and by a sifting examination of every part of the question as new points are brought out, rather than by an elaborate treatise upon it as it may present itself to any individual mind, most conviction be wrought on the minds of those who doubt on either side. Again, I say then, let the discussion go on in your columns, and through the agricultural press generally, and there can be no doubt but truthful results will be arrived at.

In endeavouring fairly to grasp this all important subject, it must be laid down as a principle of universal application, that a considerable increase of production must be achieved upon farms of every description. But there are many who will refuse to admit the practicability of this, and they will at once draw attention to those farms which are in the hands of *first class tenants*, triumphantly asking—"What increase can be expected from these?" It cannot be denied that *without leases* they have been rendered so highly productive that it would manifest a very limited knowledge of what they have done, to refuse them the meed of praise, of fame, and of profit, which is their just right; but it will be doing them no injustice to say that, in the management and application of manures, in effecting a more perfect drainage, in the use of the subsoil plough, in the selection of improved varieties of seeds of all kinds, and in the conversion of inferior grass land into arable culture, even *they* will find a field of enterprise so large as to require greatly quickened exertions. And it will not escape their notice that, in the increased facilities for transit which the numerous railroads now in progress or projected will afford, both for their produce and for the different manures, and artificial food for their stock which they use, they will be most materially assisted and benefited. To assure them of a just return for this putting forth their renewed energies and an increased amount of capital and skill, a *long lease* will afford the only valid security.

But, I repeat, there are many reasons for supposing that this class of tenants will be *least* anxious for the change of tenure which is here advocated. Tracing back the occupation of their farms by their forefathers for some generations, during which the utmost harmony and confidence between landlord and tenant has subsisted, they deem it utterly unlikely that in their case it should ever be disturbed, and they join, with grateful and delighted emphasis, in the old song—

"For the farm I now hold

On your honour's estate,

Is the sough which my grandfather tilled."

But even these fortunate and valuable men may live long enough to learn that there are new elements introduced into the system of letting land, as well as into systems of farming, and that the one will be continually adding importance to the other; and this they may in some cases learn, if they do not weigh the matter well, when it is too late to avoid spoliation and loss, as some of their contemporaries have learned to their cost. Even now, while I write, I have before me the particulars of a case which presents a powerful illustration of the practical evils of *insecurity of tenure*. It is well known, I am persuaded, to many of your readers in the county of Lincoln, for it was not done in a corner. I do not choose to give the names of the parties to the public; for, as the exemplification of a principle is my object, and not an attack upon anybody, that is not necessary; but to divest the statement of all doubt, I am ready to give those names to any gentleman who shall prove to me that he has a right to demand them.

The farm in question had been held in the same families, as landlords and tenants, for nearly 100 years; and no man could have felt himself more secure as to the permanency of his occupation than the late tenant. But let your readers mark the result. During the lifetime of the two proprietors who preceded the present owner, the harmony and good feeling that existed were a source of unlimited confidence and comfort both to the landlords and the tenant; but the latter had the misfortune to follow the former to their last home, when, for some reason or other, the farm came into the hands of trustees. Without tracing the course of events more minutely, it is sufficient to say that a land agent was called upon to look over the farm, and some frivolous and unbusiness-like objections were made to the management of it; and upon the ground of this injurious report, the tenant was served with a notice to quit; and ultimately, although he had drained the whole of the farm, to the extent of nearly 100 miles of drains, had put down new gates at a cost of £2 each to every field, and had otherwise so managed it as to place it, for its condition, in the foremost rank among the farms in this highly cultivated county, he was ejected from it, and it was let to another tenant at less rent by £30 a year, although liberty was given to the new occupier to plough up 35 acres of old grass land! Here then is a case illustrative, I humbly conceive, of the truth of the proposition with which I have headed this communication. It is no business of mine to point to the individual actors in such a piece of injustice: I give the facts as they have been detailed to me by the rejected tenant, whom I happen to know, and to have long known, as a distinguished breeder and farmer, and who, with his family, was driven from the home of their fathers. I am not aware that I have added the slightest colouring to the facts; if called upon, the tenant will be ready to substantiate them, and I doubt not but they will find an echo in the experience of many other ejected tenants in different parts of the kingdom. The use which I would make of them is, to ask—Who among the vast number of yearly tenants in England is absolutely safe against, or protected from, liability to the same summary process?

Before I close this letter, permit me to glance at the more general aspect of this great question of letting land.

Entirely apart from the subject of leases, it may be affirmed that, to an enlightened judgment, taking in but a few of the probabilities and contingencies of the perplexing future, there is much to give rise to anxious apprehension. The size of farms—whether under circumstances of steadily increasing competition they shall be large or small, or a medium between the two, or a mixture of both—the interesting question as to what extent the present race of tenants may be capable of battling with the exigency of the times, or susceptible of being made so—the almost universally admitted fact that a vast number of the present occupiers of farms are struggling with the difficulty and great disadvantage of a *deficient capital*—these all present matter for most grave consideration; but unfortunately so little of serious attention has hitherto been given to such points, that he who is bold enough to hint that they might be ma-

naged better than they are, will be pronounced an innovator and a meddler.

It is, indeed, very easy to say that the regulation of all such matters is in the hands of those who have farms to let; but this I humbly think is only begging the question, and offers to those who should feel, and who *must* hereafter feel, the difficulty most, not even a hint as to the best way of getting out of it. It is precisely because so much is left to the individual judgment of men who, except they were gifted with ubiquity, could not fully grasp, even if they could comprehend the subject (which, however, I deny), that I despair of seeing, so speedily as it will be called for, a remedy for the long train of evils which loom in the distance and overshadow the future. It is quite clear to those who best understand the subject, that to meet the altered position of the British farmer, there must be, however it may be brought about, a *large increase of production*, and that *without a corresponding increase of cost*. The increase of the population to be fed on the one hand, and the perfect practicability of feeding them chiefly from home produce on the other, suggest to the mind the hope that the concurrent and imperative operation of these two causes will produce this result; and in that will be included a provision which every humane man must ardently desire to see, viz.—*A day's work, and a day's pay, for every day in the year, for every man who will do it*. How vast is the amount of good, physical, moral, and religious, which such a state of things would produce, no pen can calculate, much less can I attempt to depict it here. To cultivate the soil of Great Britain, as it ought to be cultivated, would give wholesome employment to three times the number of those who are eligible to agricultural labour, and would feed more than twice the population of these islands. Wholesome employment whenever they need it, and a portion of the land which they till, would make our peasantry really, as well as poetically, "their country's pride."

Yours, truly,

J. WEST.

Lincoln, Dec. 28.

## ON LEASES, AND TENANTS' COMPENSATION.

SIR,—You invite observations upon leases of farms, and upon tenants' compensation for unexhausted improvements.

The more usual term of leases in East Suffolk is eight years—two rounds of the four-course system.

The first four years of the term are passed in improving the condition of the farm—draining, ditching, stall-feeding, &c.; the latter four in redeeming the money so expended; doing nothing not absolutely required by the covenants of the lease, and reducing the condition of the farm as much as possible, in the hope of abating competition for the occupation, and of making a renewed bargain upon advantageous terms.

I beg to suggest a remedy for this evil.

Let the agreement be for eight years certain, and not terminable then, unless either landlord or tenant, at the end of the first four years, gave notice of terminating the tenancy at that period. If no notice were given at the end of four years, the tenant to hold for eight years after the expiration of the first four, and so continue to hold for successive terms of eight years until one of the parties, at the end of the first four gave four years' notice of termination.

Were the conditions of tenancy thus altered, I am of opinion that not much need be said about unexhausted improvements.

Another crying evil is the preference given to landlords, over other creditors, by the power of distraint.

If this were abolished, landlords would be careful to have men of sufficient capital upon their estates; the agricultural poor would be regularly employed, and the productive power of the soil fully developed.

I am, sir, your obedient servant,

Framlingham, Jan. 6.

GEO. EDWARDS.

—Mark Lane Express.

## TENANT-RIGHT.

SIR,—Since I became a subscriber to your paper, it has been filled weekly with discussions on the subject of tenant-right, either carried on by letters addressed to you, or at the public meetings of agriculturists held for the show of stock about this season in various parts of the country. I have perused with attention all that has appeared in your columns, and hope that I do not go too far when I remark that it surprises me that the subject should be so very little understood by farmers generally. The value of leases I do think may be easily demonstrated by putting the following question—Is there a tenant farmer who would lend £1,000 to a person desiring a loan of that amount without having a security thereupon, either by letter, bill, or mortgage, or other satisfactory document of whatever kind? I do not believe there is one. If I am right in my conjecture, carry the matter betwixt landlord and tenant, and put this other query: How comes it, then, that you, a tenant, act so differently in the case of investing your capital on a farm? One of two things must follow—either that you plough and sow, and are satisfied with, year by year, as it is in Scotland termed, "tearing the heart" out of the land you farm; or if an improving and active agriculturist, you, under the year to year system, in reality place completely in the power of your debtor landlord, every farthing you lay out, with a chance of losing both principal and interest, and that too without asking from him any security whatever. Is there the man living who will be so fool-hardy as to risk his capital in this manner? If there be, the sooner he gets a six months' notice to quit, the better it will sharpen his intellect. How different is possession under a lease of proper duration and fair covenant! With it the "hereditary bondsman" becomes *free*. He has in his lease the rules of his agricultural proceedings; he may not, it is true, depart therefrom without paying the penalty, but on the other hand he has his landlord equally bound with himself—he has a series of years of possession as a security for his investing capital with a prospect of return. In case of death before expiry, his children or heirs are secure of the property which he leaves; and no political change, no change of landlord, can deprive him of his rights. He may choose, in the case of an election, to espouse his landlord's candidate's side; but it will be with a feeling very different from what the yearly tenant does: he does it probably with a feeling of the sword suspended over his head—a *notice to quit, if refractory*. The possessor under a lease

"Can look and laugh at a' that"

with the complacent feeling that he is conferring a favour which cannot be extorted.

The only difficulties with a lessee of a farm for a series of years are, taking all things into account, the rent per acre he should offer. In this he must be guided by his own judgment; and it should be formed on an inspection or knowledge of the soil as at entry.

The next point is duration, including the probable period when his ordinary outlay would be returned from increased produce. Extraordinary outlay is easily managed, such as "surface draining," as this should be the work of the landlord, the tenant performing the requisite carriages, and paying a per centage on the landlord's outlay; in case of fencing with stone walls, the tenant there also performing the carriages and leaving the fences in good order at removal. Rotation of crops to be adhered to is likewise an important question. The erection of buildings should belong to the landlord likewise, the tenant being bound to leave them in perfect repair at the expiry, and keep them insured at his own expense throughout the currency of the lease. These—with a proper arrangement for the payment by the land-



lord or succeeding tenant for straw, manure, fallow, and grass, and grain crops, complete the principal requisites for an ordinary lease, and form a security to which a tenant holding under it will at all times look, and can calculate on as a means, at the expiry thereof, with a certainty no year-to-year tenant can. He will do his utmost at the commencement to push cultivation to its highest state, that he may reap as early a return as possible, and he will have matters in a good state at the expiry of his lease, either with the view of again entering on a renewal himself, or with the prospect of drawing a large sum from the landlord or incoming tenant. One thing I have not adverted to, but it is particularly important. In England the tenant should pay no tithes or public rates, whether county or parochial, of any sort; they are always fluctuating, generally increasing, however, and form fairly a landlord's obligation, not that of a tenant. It is evident to every one that tenant-right is mainly a tenant's question. To the landlord, however, it is of importance. His property will be better cultivated, and he will thus find himself a gainer; he will obtain other advantages besides, not to be overlooked, for many is the landlord who requires to burden his property; his rental will be more secure, more ostensible, and, if he require it, the monied man will, from a better security, afford him accommodation at a reduced per centage; while he will be saved the cost of the trafficking year-by-year with those "Gilbert Glopins" who are the pest of the farmer, continually creating distrust and disquietude betwixt landlord and tenant, to bring grist to their own mill.

If you think these few lines worth perusal or notice on this all-engrossing subject, please own receipt in your "Notices to Correspondents."

I have the honour to be

Your most obedient servant,

Dec. 25.

LESSEE.

### ON TENANT-RIGHT.

SIR,—As an old subscriber to your valuable journal, I beg to express the gratification I felt in reading your observations on the subject of "tenants' rights." I think a more appropriate phrase would be "landlords' advantages and tenants' rights." Be this as it may, a more important question can scarcely be brought before the public.

It is supposed, by far the greater portion of the occupiers of land in the kingdom have neither leases nor agreements, relying merely on the confidence of the landlords. Now, however well grounded this confidence may be, I wish to show how inadequate it is to the ends for which it is designed. We all know the uncertainty of human life, and to what changes and chances it gives rise. To insure, therefore, anything like a general improvement in the cultivation of the soil, some legal recognition, or security of the tenants' property, is absolutely necessary.

After what has lately taken place in the corn and provision laws, I think both landlords and tenants have received sufficient notice to "set their houses in order." To suppose the cultivation of the soil is stretched to the highest pitch of human power, is a gross absurdity; some improvement is constantly being made, I admit, but it is partial. The question of tenants' rights will open a new era in the history of agriculture; we shall have to commence *de novo*; and when the tenants' property is fairly and justly protected, *then*, and not *till then*, may we boast of agricultural improvements.

I am as desirous as any person that the landlord should be protected, and enjoy all his rights as landlord; but let the tenants' property be likewise recognized, that, in

the event of any unforeseen contingency occurring, his unexhausted improvements may be fairly considered. When this is achieved, the tenantry throughout the length and breadth of the land will direct all their energies towards the improvement of the soil, by which the value of the landlords' property will be increased, whilst the occupiers of the soil, I trust, will be enabled, with a legal recognition of their property, to bear up against the effects of free trade, &c.

As a large farmer, and having the management of some considerable estates, with an experience of forty years, I venture to give a strong opinion in favour of a more defined understanding between landlord and tenant, for the purpose of benefiting every class of the community.—I am, sir, your obedient servant,

SAMUEL SELMES.

*Knelle, Beckley, Jan. 6.*

—Mark Lane Express.

### TENANT-RIGHT.—LEOMINSTER FARMERS' CLUB.

At a meeting of the Leominster Farmers' Club, held on January 1st, at the King's Arms Hotel, a discussion on tenant-right took place. Frederick Harris, Esq., of the Hill, presided.

Mr. HARRIS, on taking the chair, said the subject for discussion was that of the rights of tenant farmers, and he was well aware, as must be all present, that the difficulties they would have to encounter in the opposition in parliament would be very great to any bill which might be introduced to establish their rights; they would have there the landlords to contend with, and they might advance many arguments against the tenants, inasmuch as they might say, What business had any one to interfere between them and their tenants? To this, however, he would say that the government had interfered between parties, and if they had done so in one instance—he meant the usury act—why not in another? If the government had thought proper to interfere in that instance, it should between landlord and tenant. If any gentleman had anything to say on the subject he should now be happy to hear him.

Mr. BENNETT said he felt satisfied that the land of this kingdom never could be cultivated to the good of the community unless there were secured to the occupier, certainty of tenure, and corn rent varying according to the value of produce; under no other circumstances could the land of this country be tilled as it should be, or the labouring portion of the community be employed as they ought to be. Each should have his fair share to which he was entitled; whilst the landlord enjoyed his, the tenant should have his, and the labourer should be employed at a fair average rate of wages. Labour was a marketable article; and the best way to raise the price of labour was to have a fixed rule to go by in ascertaining the value of land. In the present day there were many schemes afloat for bettering the condition of tenant and labourer; but still, after all, they were charity, in which was sunk the independence of the man. Increase the labour market, and they would do infinitely more good; the labourer would go there an independent man, feeling that he was entitled to the full value of his labour as a matter of right and not of charity, having given a certain portion of labour for the money he received. He had read that Mr. Pusey had prepared a lease for his tenants which had given satisfaction, and worked admirably. Mr. Bennett concluded by proposing that a committee should be appointed for the purpose of drawing up resolutions

on the subject, to be submitted to the club on the second Friday in the new year; the main points for the consideration of the committee to be—certainty of tenure; rent fluctuating with the price of produce, either to be taken as a corn rent or as a corn and meat rent; and as regards improvement for which the tenant during his holding had not been remunerated, the same to be left to an arbitrator—the arbitrator also to take into his consideration all dilapidations that might arise from bad farming.

Mr. BENNETT said, looking at the state of the sister kingdom of Ireland, he was quite satisfied if the legislature of this country did not concede tenant-rights very soon, as a matter of right for the good of the community, the community would find themselves in such a position that they would be compelled to decide the question; and it must ultimately be conceded, because the people must be fed, and if the land were not tilled as it should be, the people must pay more than in common fairness they should pay. If on an acre of land, which ought to grow twenty bushels, only fifteen were grown, the consequence would be that the public must pay more for what they consumed.

The CHAIRMAN said the question was by whom should the improvements be made?

Mr. BENNETT said the tenant would make the improvements if he had a safe holding, as he could then easily get the money; but who would be rash enough to lend a tenant money who had not a safe holding? A persevering industrious man with a twenty-one years' certainty of tenure would be sure to find friends who would advance him money; and land was grateful, and the return for improvements sure if the holding were safe; but if the holding were not safe, then there was no security. It was as Lord Stanley had said, there were many schemes for the investment of capital, but there was nothing so safe as land; they should invest in the soil of their estates, or rather under the soil, for draining his lordship was alluding to, and he believed there was no return so sure. He differed with some of his brother farmers respecting the letting of land: many of them held that there should be no clauses in the lease in favour of the landlords; in this respect he was bound to differ from them, because, although it was by the tenant's capital and the tenant's skill that the land was improved, still it was the landlord's estate, and he must be allowed to have a lively interest in it. If the landlord had no clauses in the lease it would be a one-sided agreement, and if the tenantry asked for what was unfair they could not expect the support of the community; they must seek for their rights in a spirit of fairness, and then they could calculate on receiving the support of the community. He felt quite satisfied that whatever was asked for in that spirit which was for the good of the community would be conceded.

Mr. MASON said if they were to establish a proper system of tenant-right, the landlord would be protected thereby as well as the tenant; he would not be subject to loss by a bad tenant.

Mr. CONNOP said he had not seen anything more concise on the subject than the resolutions passed at a meeting of the Holm Cultram District Farmers' Club, on the 2nd inst., after an adjourned discussion on tenant-right, and with their permission he would read them; they were as follows:—

1st. That it is the opinion of this club that it would be advantageous to both landlord and tenant, as well as the community at large, that the tenant farmer, in the absence of a special agreement to the contrary, should have a legal claim to compensation for improvements on his farm made by him during his tenancy, for the outlay of which he has not been reimbursed at the time of quitting.

2nd. That it is desirable that arbitrators chosen by the

parties should have authority to determine the sum to be paid by the landlord for improvements, or received by him for dilapidation; and that, for that purpose, the farm of an incoming tenant should be viewed by competent persons at the time of his entering.

3rd. That the tenant ought not to be entitled to remuneration for new buildings or fences, if made without the consent of the landlord.

Mr. BENNETT did not agree with the third resolution; he considered all new buildings and other improvements should be left to arbitration to ascertain whether they were really improvements.

The CHAIRMAN—Whether such new building were essentially necessary.

Mr. BENNETT.—Whether the coming-in tenant would derive any benefit from them. The off-going tenant might put up some very ill-constructed or useless building, and then it would be very unfair to expect the coming-in tenant to pay for that.

Mr. MASON.—In many cases it would be to be considered whether the improvements had not been made sufficiently long to repay the tenant.

Mr. GOODE said arbitration would settle that question. With reference to the third resolution read by Mr. CONNOP he most decidedly differed from it, inasmuch as sometimes it happened that a landlord resided on the continent, and could not be consulted by the tenant.

Mr. MASON next read a form of memorandum on tenant-right to be added to existing agreements or leases, by Barugh Almaek, from the *Journal of the Royal Agricultural Society of England*.

Mr. BENNETT.—All the improvements which are lasting improvements, and which the landlord will be paid for by the in-coming tenant, the off-going tenant has a right to ask to be paid for. He thought the tenants might make themselves very easy about the matter, for before long the parliament would be obliged to concede to them their rights; the people would say, here is land which would grow crops to feed us if it were properly cultivated. There was land in the sister kingdom that would feed them if it were properly tilled, but the landlords were careless, and the farms were out of cultivation. O'Connell had said that thirty millions were wanting to feed the people of Ireland—to do that which the landlords should have done long ago. The government was now to find money for the people, instead of the people finding money for the government.

Mr. GOODE.—If the tenant had sufficient confidence, we should not find him running the land out; under the present state of things, he was obliged to say, I must make the nimble ninence rather than wait for the dull eightence. What did Colonel Powell say at the West Herefordshire Farmers' Club? He said—"I could name many, but I will confine myself to one instance, to show how completely unacquainted some men are with the common understanding that ought to subsist between landlord and tenant. A gentleman of considerable landed property, one who was quite inimical to the granting of leases, stated the following case as one in support of his objection: 'A tenant sowed a field of wheat with a very slight dressing; in the following spring he sowed peas, then wheat on the peas, then oats after the wheat, after which he sowed clover and mowed it, and made it into hay for fodder, and sowed wheat on the clover brush this year. What landlord would grant a lease to a man of that description?' The very man to give a lease to; he has proved himself to be an industrious fellow, and it is evident the tenant is labouring under the impression of having given you offence by killing a hare or a rabbit, or some other cause, and that the term of his favour in his mind only existed from Candlemas to Candlemas! Were you to alter your system



and give the man a lease, you would soon discover in your tenant a very different method of working your farm."

Mr. CONNOP.—If we can establish what we are seeking for, that will do away with such a state of things.

Mr. BENNETT.—No matter what advantages accrue to the landlord through your improvements, if the legislature grant us an act, he must pay us, our creditors, or executors, the value of such improvements. A tradesman would have no hesitation in assisting you, because he would see that there was probable security in doing so by act of parliament. He (Mr. Bennett) was very easy about the matter, because he was satisfied that the tenant farmers need not trouble themselves much about it, the community ultimately would have it. He was convinced that what they asked for was only what was fair and right, and that the public would

not long continue to pay more for the quarter loaf than they really should pay for it; they were beginning to get awake to their own interests, and viewed the landlords in their true light, only as part of the community. He made these observations on the broad principle for the good of all.

Mr. CONNOP.—If such rights are to the advantage of the tenant farmer, they would soon be found also to be for the benefit of the landlord and labourer.

Mr. BEDFORD.—The land would let for more money at the next letting.

The conversation now ended. Mr. Bennett's resolution was put to the meeting, and carried unanimously, and the following gentlemen were appointed to carry it out:—Messrs. Harris, Bennett, Bedford, Goode, Mason, Thomas, Connop, and John Carpenter.

The meeting then separated.—Hereford Times.

## AGRICULTURAL SOCIETIES, GAME LAWS, AND LANDLORDS.

DEAR SIR,—As you appear to be unable to divine the reason why the *Times* is endeavouring to abolish Agricultural Associations, the following narrative may serve to enlighten you on this matter.

On the first formation of the West Suffolk Agricultural Association I became a humble contributor to its funds, under the impression that, if the proposed objects of the society were properly carried out, great benefit would be derived therefrom by the agricultural classes in general; first, by the distribution of rewards to deserving labourers; secondly, by the opportunities which the meetings would afford for bringing the best stock in the neighbourhood together, and enabling the public to draw comparisons and form their judgment for general improvement; and, thirdly, by the opportunity which the evening meetings would afford for the promulgation of any information that individuals, from their peculiar situations, might possess, which others were unable to obtain. Impressed with this idea, and feeling it was the duty of every member of the association to afford all the information in his power, for the general benefit, I have at various times introduced subjects for the consideration of the society; and having spent thirty five years of my life in the midst of excessive game preserves, and seen with sorrow the evils arising from the system, I took the liberty, at one of our meetings, to introduce that subject to the notice of the members. But although I can most solemnly declare that, *neither on that subject nor any other which I have introduced to the notice of the society*, have I entertained other than a hearty desire to benefit the owner as much as the occupier of the soil, I did, by so doing, give great offence to some of the leading members of the society, and for which I have been most severely punished. A few evenings previous to the period to which I allude, I had my last farming walk with my late lamented employer, Colonel Rushbrooke. Having perambulated his farm as long as his severe affliction would allow him, we turned, as was our usual custom, into the church walk, which, having paced till long after the dinner bell had rung, discussing serious subjects, both of a public and private nature, he turned round and said—"Now, Denton, I think I have said all I have to say to you, except on one subject"—GAME. What have you to say upon game?" I replied that I had no report to make of complaint from the tenants, nor did I think there was more game on the manor than there ought to be. "Now," he said, "I do desire that you watch strictly the progress of the increase of these animals, and do

*not suffer the mischief to be done before you inform me, as heretofore; and I not only wish you to do so, but to take any opportunity you may have to convey to my constituents my feelings on this subject, now become a public one. I consider the excessive preservation of ground game especially a great injury to the occupiers, and one which ought, in times like these, to be materially mitigated, if not abolished. I am determined my tenants shall not be injured by them."* Thus instructed by so good a man, in his unavoidable absence through parliamentary duties and his affliction, at the ensuing meeting of the agricultural society I introduced the subject to the notice of the members. My lamented friend and employer was taken from me. His son had not been in possession of his estate three months ere I received six days' notice to quit the situation I had held as his father's steward for twenty-seven years, *during which time, I will defy him or any one connected with him to substantiate against me a charge of dereliction of duty, or want of honest zeal in the cause of his father and his family.* I soon after received six months' notice to quit a farm I had held seven years under his father, *upon the improvement of which I had expended all the savings of my past life, and a considerable sum bequeathed to me by my friends*, a large portion of which investment I was compelled to leave for the benefit of others. And this treatment, sir, I received avowedly as a punishment for having had the temerity to introduce that most important subject of game to the notice of the West Suffolk Agricultural Association.

It may be said, sir, that this is a solitary case, arising out of peculiarity of character in the individual; but when I hear that young man justifying his conduct by stating that he had been *taunted* by his friends for suffering his tenants to speak upon such subjects at such meetings—that he has been taunted by his friends for *suffering his tenants to write letters* to the papers upon subjects relating to the affairs of agriculture—that he has suffered them to run riot, and has not them properly in hand—when I hear him thus justifying his ungrateful acts, I am led to believe he is far from being alone in a desire to put down discussion upon any subject not exactly agreeable to them at these meetings, and that the majority of the aristocratic supporters of these meetings do not like that the truth should be spoken at all times, even though intended for their improvement and benefit. And hence, I conceive, arises the hostility of the *Times* against agricultural societies.

I do, however, hope, Mr. Editor, that the severe pun-

ishment I have received will but stimulate my brother tenants to continue their support to the only means afforded them of asserting their independence and vindicating their just rights. Although for doing my duty and giving good advice I have been driven from my native home, from the home of my fathers, from an estate on which myself and my ancestors have farmed with honest industry and unimpeachable integrity for upwards of one hundred years, to seek a living in a distant part amongst strangers for a dear wife and six children,

at the age of fifty-five, having spent half that period in honest service of my persecutor's father—I fear not that God will abundantly reward me for my faithfulness and truth; and I do hope the time will come when my persecutor and his friends will be brought to a sense of the great injustice they have done me, and that they may then feel all that they ought to feel.

I am, dear sir, faithfully yours,

F. W. DENTON.

*Fishley Hall, Dec. 19th, 1846.*

## TO THE TENANTRY OF THE FLIXTON HALL ESTATE, IN NORFOLK AND SUFFOLK.

BROTHER FARMERS.—Or as I would have named you a few months ago,—Brother Tenants, I feel it due to you and myself to address a few words to you respecting my position and yours, as late or present occupiers under a reputed liberal landlord. And I use this public medium as being the surest way of reaching most of you, and also as I have nothing to say but what all the world ought to hear.

Having been praised by some and blamed by others, and both praised and blamed by others, yet I think I ought to say a word for myself. Standing alone as I do, what I say must needs bear hard upon some of you, but I shall

—————“nothing extenuate,  
Nor ought set down in malice;”——

and therefore I expect from all a fair hearing. I am the more entitled to this, because I have deferred this address till the feeling excited in you and in myself by what I have done has grown cold, and we are in a condition to think and judge as it becomes men, temperately but truly.

Had I attached much weight to what I have heard emanating from some of you, I should feel no little chagrin at finding myself alone in opposing the Covenants lately substituted for the Old Leases, and alone too in suffering the extremest penalty. As it is, I am expelled from the home of my fathers, with no thought to cheer me but the conviction that I have done what it was my duty to do, and that I am defeated and punished because no one else did anything but execrate oppression when the oppressor could not hear him.

You know that I refused to sign these covenants;—you know too what means were employed to obtain my signature; I say, you know, because the same means have broken down your own coquettish resistance. The particulars of the fight are of no moment. It is enough that you should see the animus of these proceedings as it was shown first by the threat of a notice to quit; next year, by the notice itself, which was after a few days recalled; and this year, when the rest had succumbed, by my expulsion.

I refused to sign this agreement because on reading it as soon as it was sent to me, I saw what it contained.

I refused, not because I would be suspected of standing out against the maxim proclaimed by dual lips in the 19th century, that “every one should do as he likes with his own;” nor yet because I dispute the right of a landlord to impose terms that may secure his estate from damage; but because I respected my own personal rights, and ought to be secured for whatever skill and capital I might employ.

I did so, in one word, because I could not but regard these articles as hostile to the interest of all concerned in them, or affected by them.

The only explanation I could get was, that they were not intended for rigid enforcement. But if I signed

that paper I should have bound myself by all the obligations, and made myself amenable to all the penalties it laid down; and no opinion I might have formed of the way in which they would be enforced by the landlord, nor any confidence I might feel in the good offices of the steward, could hide from me that by my own act I was subjected to the very letter of their bondage. Besides, have none of you been fined? Have not I been ejected? If not intended for rigid enforcement, how is this? On the other hand, why demand a single signature?

Since I know that some of you have not, even now, attentively read these covenants, let me point out a few of the clauses for your careful study.

Clause 2. “That the said A. B. shall farm and cultivate the arable lands on the four-course system; that is to say, as to one-fourth part thereof yearly in clean summer tilth or with turnips, or other vegetable cattle crop; as to one-fourth part thereof yearly with barley or oats; as to one moiety of one-fourth part thereof with peas or beans; and as to the remaining one-fourth part thereof yearly with wheat; and shall farm and cultivate the said arable lands in the aforesaid order and succession; and no wheat crop shall be taken after a summer tilth without leave and consent in writing of the said R. S. A.”

Clause 3. “That he, the said A. B., shall pay for all arable lands cropped contrary to the said course, order, and succession, at the rate of ten pounds per acre, as an advance of rent during the remainder of the term, and twenty pounds per acre for all the arable lands that shall be cropped contrary to the said system of farming in the last year of the said term—(what this means as a yearly tenure is not very clear)—and ten pounds per acre for mowing any of the old pasture, or taking hay crops two successive years from any meadow without leave as aforesaid; and ten shillings a rod for every rod of mould taken from the backs of banks within three feet of the fences on clay, or five feet on light soils, or the stubbing up or destroying any of the hedges or fences without leave as aforesaid.”

Does not this shut out the possibility of the exercise of any judgment as to the succession of crops, and prevent the adoption of any tested improvement in the system, in a way that must damage both tenant and owner?

Clause 13. “That the said A. B. shall not without the permission, in writing, of the said R. S. A., shoot, course, net, fish, or otherwise sport or destroy game, fish, or wild fowl, on the said premises, nor give leave to any other person or persons so to do.”

Does not the introduction of this clause into a new agreement at this time, betray a most wonderful blindness to the signs of the times?

Clause 14. “That in case the said A. B. shall die four months before the expiration of the said term (i. e., any

coming Michaelmas no lease being granted) it shall be at the option of the said R. S. A. to determine and put an end to the tenancy under this agreement from the Michaelmas day next after the decease of the said A. B., being allowed for all unexhausted improvements in the culture of the lands. But if the said A. B. shall leave a widow, and if such widow, having been permitted to continue the occupation, shall marry again during the remainder of such term, it shall be lawful for the said R. S. A., at any period of the tenancy to determine and put an end to such tenancy without any allowance, except as between the out-going and in-coming tenant."

Read this, husbands and fathers! and say, if in the Providence of God you are called away first, what security is there that they for whom you toiled will reap the fruit of your labour? Skill, time, money, all may be taken away from those to whom you left it, and to whom it belongs of right, on a condition that is as disgraceful a relic of feudalism as has floated down to these days. I know the pretence is that it is but just that the farm should not suffer injury from the efforts of an unskilled husbandman. This justice is not very careful, I think, as to the justice of the means by which it manifests itself! Why, it is serfdom, not tenancy, after signing that clause! you have barely the right to call your soul your own.

Clause 15. "That the said A. B. shall not hold or occupy any other farm, lands, or premises, during the said term, without the license or consent in writing of the said R. S. A. for that purpose first had and obtained."

Can you guess its drift? "To prevent me laying out, on another man's property, what ought to be laid out on this estate." Well guessed; but you are wrong. Suppose you were to hire from one of different politics from your landlord, and suppose an election—a contested election should occur! Do you not see? You are preserved from intimidation, bribery, and expulsion; you are preserved in your immaculate British freedom of opinion, and word, and action,—and all by clause 15! Go and thank your preserver!

Clause 19. "Whereas, the poor have been of late deprived of the advantages of gleaning, by the custom of mowing instead of reaping the wheat crops; it is hereby agreed that the said A. B. shall not, in future, mow any wheat crop without permission in writing from the said R. S. A., or his agent, under forfeiture of the present agreement."

Experience has deprived this kind preamble of any force. But, suppose that on mown fields the poor gathered less glean corn, is the landlord to do what he likes with yours and mine, as well as with his own? Dr. Alison, in his great work on the French Revolution, vol. 1, chap. 2, stating the causes of that frightful portion of modern history, says, under the head of Game Laws, "Tenants were forbidden to mow their corn, lest the birds should not have shelter in the stubble." English birds have much the same habits as French birds.

Now read the whole of the articles through, and bear in mind, 1st, it is a yearly tenure—"determinable at the end of the first year, or any subsequent year, on six months' previous notice given in writing, on either side, for that purpose."

You cannot reckon yourselves settled; you have no assurance that next year you will not be sent adrift. I do not say you will be, but you have no assurance that you will not.

2nd. The substitute for a lease by a proffered allowance for unexhausted improvements, as given in the steward's list, upon which so much applause has been bestowed by some of you, appears to me a mere mockery. It is entirely nullified by the first condition on that list, viz., "The allowance can only be claimed when the separation takes place at the instance of the landlord."

By subscribing to this you have relinquished your claim to that which common justice and the custom of the country would have given you. If your landlord gives you notice to quit, you are to be allowed for unexhausted improvements, according to a scale and conditions made by himself, and called "The Steward's List." Yes, you are to be allowed; but if you give notice, what claim have you? No allowance? None.

I have written, that you might know from myself why I am expelled from my farm. Your praise I do not expect; if I have it, I shall value it when I see you withdrawing your sanction from such arbitrary impositions. Your blame will not turn wrong into right. The endurance of the tangible injury of expulsion may, perhaps, prepare me to endure your censure.

I have written also to induce you to think on your own position. If as a matter of right or wrong it has no interest for you, then see if it does not touch your pocket. In fact, there is not a single point of view from which this agreement will show straightforward and fair.

I am afraid you have thrown away an opportunity of doing a great thing for the working part of the middle classes of England. You certainly have left it to be inferred that in your state of vassalage, you have all the manhood and liberty you want or deserve.

Some amongst you publicly advocate long and unrestricted leases. Do you wish to bring such leases into fashion? Do not expect it so long as you can sign such an agreement. When your practice tallies with your profession, then expect it. Tenant-rights must first be respected by tenants themselves. A subservient tenantry will needs make an overbearing landlord; but a tenantry who take their stand firmly, but respectfully, on their own rights—respecting their landlord's also, and who will not compromise either—they will teach the most unfair and unwise landlords both wisdom and justice. And I more than half suspect that the complaints we hear on all sides of the miseries of the tenant farmer, whilst they applaud your agitation about leases, may be traced to their having put themselves into a position like yours, of subjection to a power they cannot be contented under, and dare not resist. I am, gentlemen, yours,

GEORGE THEOBALD.

Southrepps Lodge, Dec. 8, 1846.

#### ENGLISH LIVE STOCK THREE CENTURIES AGO.

—Polydore Vergil, writing about the beginning of the 16th century, thus describes the cattle and other live stock in this country at that period:—"England is well stored with all kinds of beasts, besides asses, mules, camels, and elephants (?); but there is engendered neither any venomous beasts, nor ravening, except foxes, and in old times wolves; by the which means their cattle do freely stray without harm, almost without attendant keeper; for a mau may see herds of oxen and horses, yea, flocks of sheep, daily wandering and nightly, through hills and dales, through common fields set open for pasture, and through such several grounds as every neighbour may take the commodity thereof in feeding his cattle after the corn is gathered in; \* \* \* a great company of their horses do not trot, but amble; and yet neither trotters nor amblers are strongest, as strength is not always incident to that which is more gentle or less courageous. Their oxen are of the like nature, wherefore many of them are yoked at once in one plough or cart (for both the earth is tilled, and cars drawn, as well with oxen as horses) which also stand man in no small stead as touching the bearing of burden. Their oxen and wethers are beasts, as it were, of nature, ordained for feasting, whose flesh almost in no place is of more pleasant taste; but *beef is peerless*, especially being a few days powdered with salt; neither is it any marvel, for that beast, once realized from labouring, is kept up for their common feeding. In fine, the chief food of Englishmen consisteth in flesh; neither among them do those oxen lack their commendation, which, after long travail [or travel] are killed in their age, albeit their flesh is harder than the other."

## LECTURE ON THE APPLICATION OF CHEMISTRY TO AGRICULTURE.

DELIVERED AT FARNHAM, DEC. 17, 1846.

BY J. C. NESBIT, F.G.S., M.C.S.L., &amp;c.

MR. ATTFIELD said: Gentlemen, on occasions like the present, I believe it is customary to appoint a chairman. I beg to propose John Paine, Esq., to fill that office.

The motion having been assented to by the company,

THE CHAIRMAN said: Gentlemen, I shall not detain you one moment; for we are all, no doubt, very anxious to hear Mr. Nesbit. I am quite sure, at least, that those who heard him last year are very anxious to hear him again. Let us, then, at once proceed to listen attentively to what he has to say.

MR. NESBIT: My Chairman and gentlemen, I assure you that it is with very great pleasure that I once more have the opportunity of appearing before you in Farnham. Having met with such a warm reception before, it is now and will always be a source of gratification to me to meet my kind friends in this part of the country. In the last lecture I had the opportunity of just opening, as it were, the subject of the chemical nature and properties of those substances which you have at work on your farms. It will be my duty this evening to extend my remarks still further into that department of science, and to point out to you, if I possibly can, the natural and proper system of manuring, by which you may best save a penny or gain a pound. You will recollect that on the last occasion I mentioned that there were a certain number of substances found on your farms, a certain number of substances found in manures, and a certain number of substances found in the crops taken from the land. On that occasion I illustrated their nature. On the present occasion I shall speak of them with far less reference to chemistry than to agriculture, and to all those principles which I shall have the pleasure of bringing before you. The substances found in the soil are generally identical with those which you see here (pointing to a diagram). There is potash, soda, lime, magnesia, iron, alumina, silicic acid, phosphoric acid, sulphuric acid, muriatic acid, and fluoric acid. Although there are in nature about sixty elementary bodies, yet not more than those which I have repeated are found in the land; so that, in reality, the chemistry of agriculture is reduced within much smaller limits than general chemistry. Now these substances are found in the land, most of them in plants, and most of them also in manures. I do not know whether the chemical names are well known to you; but, at all events, I shall, in very few words, point out what these substances are. Potash is found in saltpetre—it is the base of saltpetre; and pearlsh is carbonate of potash procured from the ashes of land plants. Soda is found in common salt, and is used for making potash. Lime every one knows, both in the state of lime and in the state of carbonate of lime, which occurs in nature as chalk or limestone rock. Magnesia is the base of common Epsom salts; it is found in most lands to a certain extent. Iron is found in the land in the state of oxide or rust of iron. Alumina is the base of all clays; without alumina you cannot have a clay. Silicic acid is sand; but sand is sometimes soluble and sometimes insoluble, and if silica be found in plants, you are perfectly aware that it must have previously been in solution in water to have enabled the vegetable to take it up. Phosphoric acid is found in bones, of which it is the base; and, in small quantities,

in most soils and rocks. Sulphuric acid, as oil of vitriol, is much used in the agricultural world for mixing with bones. Muriatic acid is found in common salt united with soda; the acid itself is known under the name of spirit of salt. Fluoric acid is found in such minute quantities as to be scarcely appreciable. I have detected it in Farnham hops, but in very minute proportions. I have thus re-introduced the mineral substances which are found in the soil, in the crops, and in manures. There are other substances found in vegetables, but these are provided for most plants by the air. There is charcoal. You all know what charcoal is, and that it is contained in large quantities in vegetables; that substance generally comes from the air. Nitrogen is also supposed to come generally from the air. Hydrogen and oxygen are found in water. You will remember that I said in my last lecture that the atmosphere is composed of oxygen and nitrogen, and likewise contains watery vapour and carbonic acid gas. I now come to treat of manures. Those manures which have been known from ancient times amount only to one or two. Farm-yard dung and the excrements of animals have been known for a very long period; these are the two staple manures. I shall proceed to show whence the manure from animals arises. It has been found in all countries and in all places, that when land has been manured with animal excrements, either in a liquid or solid form, great benefit has been received by the land, and good crops have been obtained; and it has been thought by many that some peculiar action must take place in the animal system by which these manures are produced, and that great benefit is gained by passing food through the bodies of animals. Now let us inquire, for a moment, where these manures could possibly come from. Animals live upon vegetables; all at least of those animals that you have upon your farms. The sheep and the oxen live on vegetable matter. Vegetables are masticated and digested, and a certain portion is then rejected as being no longer fit for the uses and purposes of the animal economy. The matter which is thus rejected by the animal is that which you find beneficial; but you do not discover in that which comes forth from the animal any additional principle; you do not see any principle different from that which entered into the animal at first. The animal has, in fact, abstracted some of these substances. You give your animals certain quantities of vegetable matter; they abstract a certain portion for their own use, and they reject the rest; and it is that which is rejected by them that you find so beneficial to the land. Now the quality of the matter rejected depends very much on the quality of the matter eaten. If you feed bullocks with straw, or chaff, or turnips, alone in one case, and with oilcake in another, you are perfectly aware that the manure in the one case is not equal to the manure in the other. The oilcake manure, if I may so speak, beats the other manure; you give these substances in different quantities and different qualities, and therefore the one manure differs from the other. If you give the animals chaff and turnips alone, the manure is deficient in those things which are required for growing the seeds of the crops. Grains absorb and take from plants the greatest amount of substances. The purpose of the life of a plant is to reproduce its kind, and there-

fore the ear will exhaust every other portion of the plant in order that the seed may be re-produced, and another generation be given. It is for this reason that when you give oilcake, which is crushed seed, to your animals, that which is rejected is richer manure for seeds or grain than the manure furnished merely by chopped straw, hay, or turnips; it is richer because those substances which are thus given out by the animal from having eaten the seeds of vegetables are calculated to reproduce the seeds of vegetables, while that which is rejected by the animal when it has eaten merely hay or straw is calculated merely to reproduce hay or straw. I do not know whether I am perfectly understood in this, but I will repeat, in substance, what I have just said. The whole of the manure which comes from the animal is derived from the vegetables on which it feeds; and if these vegetables are exceedingly rich in certain kinds of things, speaking relatively, you may call the manures rich, because they produce a certain kind of crop which sells for the greatest price in the market. Every one knows, however, that hay and straw will produce more hay and straw than oil-cake alone; because the substance which comes from oil-cake is calculated to give straw too great vigour and too little strength, so that it will not stand well in the ground. You may, in fact, by having too strong manures of a certain kind, throw straw down, instead of giving it strength to stand up. Then the quality of the manure which an animal produces depends altogether on the quality of the vegetable food which you give it. If you feed an animal merely on hay and turnips, the manure will give far less vegetable matter in the succeeding crops than if you feed it on chopped straw, beans, oats, barley, oil-cake, or linseed. These latter are the most valuable substances in the market; and the manure obtained from them is also the most valuable manure. Take the action of the animal system of a full-grown bullock. If a bullock be full-grown, it takes a certain portion of the fatty matters of the food which it eats: those fatty matters go to reproduce fat on its own body; and by the experiments of Liebig it has been shown that a portion of the sugar and starch is also changed into fat, so as to be deposited in the animal system. A certain portion, also, of what is called fibrine—a vegetable albumen, a certain portion of that which you find in wheat-flour, which when you wash it in your hand, it leaves there a sticky matter—enters into a full-grown bullock to form its flesh; and all the mineral ingredients which are derived from the land, and which do not enter into the fat of the bullock, and only slightly into the flesh, go back again to the land: so that you have no loss of mineral matter in the case of a full-grown bullock. If you carefully collect the urine and other ingredients, you have merely the loss of a certain amount of the organic matters of the plants, which they chiefly derived from the air. In using these manures, therefore, for fattening your animals, you obtain a much greater amount of fat and flesh; you have a much better manure than you would otherwise have, because you have a quantity of mineral and vegetable matter which you add to the land in the excrements of these animals. Well, then, all the full-grown animal does is to absorb a small portion of the food, and leave the rest fit for growing vegetables. If you have a growing stock, or animals giving milk, the case is different. Those who know anything at all about cows yielding milk must be aware that the manure given by these animals is not so good as that which is given, from the same quantity of food, by animals that are not giving milk. If you feed young stock, they will not only take a larger portion of the vegetable matter which the plant has derived from the air, but they will also take a much larger proportion of the bone, earth, and other mineral matters contained in the vegetable matter. They must have these while they are growing,

and they therefore seize a larger portion of the vegetable constituents of their food than stock which has attained a certain height. And as the cow has to supply to her young a certain amount of substances perfectly available for the growth of the animal's body, for its bones, flesh, and fat, so its excrements must be deficient to a larger extent in these substances than the excrements of an animal which has not to afford the same supply; so that the effect as regards the manure of the two animals will be quite different. I may mention a singular instance which occurred near Maidstone. A gentleman applied some guano to his hops with the very best result; he obtained a great increase in his hops by the application of about five cwt. His next neighbour bought some of the very same kind of guano, and applied it to his hops, and with no result. The farms adjoined each other; the land was the same in quality; yet, while in the one case the guano did every thing that was wanting, in the other it did nothing at all. I was lecturing at Maidstone soon after, and I had this question put to me by the gentleman who had been successful: "How is this, Mr. Nesbit? I bought some guano, and put it on ten acres of my hop ground, and got a very good result. I supplied my neighbour with some guano from the same bulk, and this was put on hops on land of the same quality, and yet obtained no result at all?" The first thing I said to him was, "Did he manure properly?" "We manured," was the reply, "in pretty nearly the same manner." "How?" I said. "By means of fatted dung," he replied. Well, it seemed quite inexplicable. "But," I said, "what kind of beasts do you keep?" "Oh," he said, "I keep cows." "And what," said I, "does your neighbour do?" "Why, he fats bullocks," was the answer. Everything was explained at once. I happened to have suspended from the wall two diagrams containing an analysis of guano, and an analysis of milk, and these immediately showed that everything contained in the milk of the cows could be supplied also by the guano. The gentleman who had the cows on his farm had exported all these valuable ingredients (pointing to the diagram), phosphate of lime, potash, soda, nitrogen contained in the form of gluten, in the milk. But his next neighbour, who fed his bullocks in a similar manner with oilcake, had such a quantity of these materials put into the ground by the manure of his stock, that the guano produced no effect at all. So that you see the manure varies, not only with the quality of the substances supplied for food, but also with the nature and state of the animals employed in eating. Now, gentlemen, having thus stated—I hope clearly, and if not, I shall be happy to answer any questions that you may think proper to put to me at the close of the lecture—having thus stated what is the nature of the food of animals, I shall proceed to describe the nature of farm-yard dung. But, before I do this, allow me to remark that you cannot have more manure given out by animals than is previously contained in the vegetables on which they feed; that is to say, if you feed a flock of sheep with turnips, you have not more manure than you would have had if you had ploughed the turnips in and caused them to rot in the land; and I believe that by the rotting of the turnips in the land, you would have more manure than by feeding the sheep with them, because the sheep as they were growing would take something away for their bones and flesh; it is clear that they must take something during the period of feeding. If you add oilcake, you certainly get the benefit of it in the manure as well as in the fat and flesh of the animals. I am not speaking in a pecuniary point of view at present; I am not saying whether it is better to plough turnips in or to feed them off: I am merely telling you now that when you do feed off, you merely make use of the sheep to eat the turnips off, and I say that more manure would

necessarily be obtained if you had caused the turnips to rot in the land. So also with every other manure. You know that such is the nature of green crops, that you often find it more expedient and profitable to allow green crops to be ploughed in than to allow them to pass through the bodies of animals in order to undergo decomposition. Now farm-yard dung consists of animal excrements, together with vegetable matter; the vegetable matter is of course derived from the soil and from the air. The way in which you make manure from vegetable matter is to allow it to rot, or to putrefy, or to ferment, with animal excrements. You allow a certain amount of heat to take place, taking care that there is not too much. The sweepings of the straw, the straw which has been under the cattle, and the rejected food of every description, are allowed to mix together and to ferment. A considerable decrease of bulk takes place, a certain heat is given out, and the result is that you get the whole of these vegetable fibres and tissues half-rotted, and capable of being cut with a spade. The bulk of the manure, however, evidently decreases; there is not so much bulk after the lapse of six or eight months as there was at the first. Now a certain action has taken place there. You have had the oxygen of the air always present—the vital principle of the air, that which consumes the coals of a fire or the fat of a candle, you have had in the manure, consuming certain portions of it, and leaving the rest in a state in which it could easily be washed away, easily be made soluble for the use of plants. The oxygen has taken a considerable portion of the charcoal, and you know that in uniting with charcoal heat is given off, whether it unite quickly as in the smith's forge, or slowly as in the case of an ordinary fire, or yet more slowly as in the case of the manure heap. Yet we all know that if care be not taken, a heap of manure will fire and spoil. Now if you take care that through the washing of the rain you have not a loss of any of those substances which are found in the ashes of plants, not one of the constituents will be lost by the mere moisture; all that you can lose is a certain portion of charcoal which goes off in the form of carbonic acid, and a certain portion of hydrogen which goes off in the form of water. I do not say that this is not a loss, and that if you could cause this to act in the ground you would not be benefited; but in general cases no benefit is to be obtained from putting fresh dung, except on heavy clay lands, where mechanical action may be useful to lighten the soil. It is better to allow a certain amount of decomposition to take place in the manure heaps which lie in our yards. This decomposition will take away nothing from the manure heaps but the charcoal and the hydrogen, if proper care be taken. There is a chance, indeed, of one very valuable ingredient escaping—very valuable for some crops, of little use for others—viz., ammonia. Nitrogen is the base of ammonia, and this is valuable for some crops, though in the case of others its value is not so apparent. This, at all events, ought always to be kept, if possible, in the farmer's dung. Under ordinary circumstances much ammonia is lost from the farmer's mixen by fluctuations of heat and exposure to air. The sprinkling of gypsum upon manure heaps, and the keeping them not too light, will entirely remedy that evil. Well, we have seen that the action which takes place upon vegetable matter and upon animal matter is the same. The vegetable matter which passes through the bodies of animals, goes through just the same process, only in a different way, as that which is decomposed in the air. A certain portion is taken away in the animal system; the animal takes it away partly in the body, and partly breathes it out by respiration. When vegetables are decomposed by the action of the air, a certain portion, instead of going to the body of the animal, is taken into

the air. But there is the same result. We see that the whole of the manure comes from vegetables; the whole of the manure which is given by animals, and which you have in farm-yards, comes from the vegetable kingdom. That which you have taken from the vegetable kingdom is received back again. But now where do the vegetables themselves get this from? We know that they contain potash, soda, lime, magnesia, oxygen, nitrogen, charcoal, &c. Where do they get them? We find, by analysis, that many of these substances come from the land: the vegetables get silica, magnesia, lime, potash, soda, iron, phosphoric acid, &c., from the land; they also get oxygen and hydrogen from water; and the great source of all the charcoal and the ammonia is the air. I will not say that all plants have like facilities for deriving their ammonia and vegetable matter from the air; but I will show you instances in which plants do derive all their vegetable matter from the air. It is well known that the lavas of Vesuvius, thrown up red-hot in a melted state by an eruption, when they have got sufficiently cool will produce, by the disintegration of the atmosphere, a soil in which the wild fig, and other plants, grow most luxuriantly. In one of the Cape Verde Islands there is a vast quantity of lava; and this lava is powdered and used in that state, and is a most effectual manure. We know, too, that pine trees are capable of growing where no vegetable matter has been afforded except a few lichens or mosses, such as we see growing on our old walls. If you take an acorn, and put it in the ground, it will grow and increase till at last it is become a large oak, containing thousands of pounds of charcoal, and yet the ground around the tree shall be richer in carbon than before. It could not have derived this charcoal from the ground, because it contains at least more than it had before. The oak has derived its carbon from the air; and the nitrogen and the hydrogen which it contains have also been derived from the same source. Now the fact is, that while the sun shines on the leaves of these plants, they have the power of absorbing the charcoal from the carbonic acid of the air. Carbonic acid is composed of carbon and oxygen. One part in two thousand of the air is carbonic acid. It is only when the sun shines on vegetables, or in the diffused light of day, that plants have the power of decomposing the carbonic acid of the air, retaining the charcoal and liberating the oxygen. That they have this power is a well-known fact, attested by experiments which have been tried again and again. Bousingault put a branch of a vine into a glass tube while the plant was growing; and through this tube was sent a current of air, containing a certain per-centage of carbonic acid. Carbonic acid, you know, is easily detected by the white sediment it produces in lime-water. When the gas was passed through the tube while the sun shone brightly on the branch of the vine inclosed therein, not a particle of carbonic acid issued therefrom. This was proved, by passing the issuing gas through lime-water, which gave no precipitate. As long as the sun shone upon it, not a particle escaped decomposition; the carbon was wholly retained, and the oxygen given out. The experiment has been tried in various other ways. It is now pretty certain that plants generally derive their carbon from the air. Take any soil whatever; take land after a clover crop, you will find that it contains more carbon after you have cut the clover than it did before the clover was sown. A forest in Scotland, which was planted fifty years since, now contains more charcoal than it did at the commencement of that period. Nitrogen, in the form of ammonia, is also derived from the air to a great extent, being brought down by means of rain. It has been detected in rain-water when sought for, and likewise in snow, and is thus known to exist in the air. Whether all plants derive all the nitrogen they want from the am-

monia of the air, is another question. It is not a well-settled point, and we want the experiments of you agricultural gentlemen to decide it. It is ascertained that such broad-leaved plants as turnips, clover, and others of a similar kind, absorb a great quantity of the ammonia of the air; but whether such plants as wheat and barley can derive all they require from the same source, remains to be decided by well-directed experiments. Now, I think we have seen, gentlemen, pretty clearly, that the whole of the manures which you put on the earth under the name of farm-yard dung, came originally from the earth, and from plants grown in the earth. It appears, therefore, that there is nothing extraordinary—no virtue inherent in farm-yard dung which should cause it to be the only manure made use of; but that if you can find other substances similar in composition to farm-yard dung—if such other manures are to be obtained in the market of the world at a less expence than farm-yard dung, it is your duty, as men of business, to look out for those other manures. Having spoken to you thus far on the subject of manures, I now want for a few moments to point out to you the losses you are subject to every year, from the waste of manure, and the way in which they occur. The reason is, that except under certain circumstances, in order to farm well, you are obliged to supply to the soil more manure than you can get from the refuse of the farm. Lest you should think that I am speaking of more than you can carry away on one occasion, let me inform you that this lecture will be published in a newspaper, when it may be read by you at leisure. Therefore it is that I go so fully into the matter; and as I think the last lecture was attended with some practical benefit, I hope the present one will be attended with ten times more. I therefore proceed to speak of the losses to which you are subject on your land. Supposing you do not import manure on your land, you are subject to losses by everything that you export from the land. You export, for example, wheat and barley, &c., and retain the hay, straw, and oats; you are subject to the loss of every mineral ingredient that you export in wheat, which contains a large quantity of phosphoric acid and ammonia; you are subject to a similar loss in the case of the barley; you are subject to the loss of all that is exported in the growing stock; in every shape in which you export from the land you suffer a loss, that is to say, the farm will become less rich, particularly in mineral ingredients and ammonia, than it was before. You also suffer a loss by the action of the water, which descends from the heavens upon your land. This water has the property of dissolving all the most valuable substances of the soil; if it had not that property, the plants could not take up these substances from the soil. It has that property, however; and plants do avail themselves of it by taking up water containing soluble matter. The water does not take up large quantities at a time, and a great portion; but great quantities of them pass to the roots of the plants to give them nourishment, particularly in summer. In winter, however, and particularly in drained land, large quantities of soluble substances pass out of the land every year, because of the action of the water which falls on them from above. If you suppose every pint of rain water to dissolve only one grain, it will appear that the loss of one grain per pint for the rain of a year gives a loss of 840 lbs. weight of soluble matter per annum. Well, then, you are subject to this loss; and it is a loss which is quite unavoidable, for without the action of water you could never grow any plants at all. You might have the same substances in an insoluble form, and you could not get anything to grow. Change the nature of those substances by any action which you can bring to bear upon them, so as to render them soluble, and you at once get a soil capable of affording life to plants.

Now, gentlemen, there are very few farms in the kingdom on which you could repair these losses without importing manure. There are some exceptions, and I will mention them. The first case is that in which there is attached to the farm a portion of marsh land. You may, by means of this marsh land, receive in filtrations from the sea, or from a river, manure which will give sustenance to vegetables. You may have such a yearly quantity of hay grown upon these marsh lands as will provide everything that is requisite to supply the annual loss of the arable part of the farm. It is, however, only in certain localities that this can take place. In another case, you may have running or irrigated meadows, where the water which has passed over other people's land, and received many valuable substances in its course, is allowed to float over yours. By such means you can do without buying manures; you can find enough of manure in the meadow part of the land to supply the loss caused by exporting the products of the arable land. I have been told by some gentlemen of another case, where some farmers export nothing but wheat, and, feeding all the barley and oats on the farm, never buy anything in the shape of manure. I have said to these gentlemen, "I don't doubt in the least that you may make this answer for many years—that is, export all your wheat, while you consume all your barley; for this is no great thing to do for twenty or thirty years. But," I have added, "you will not do that for ever; you will not do it for a continuous series of years; every year the farm will get less and less valuable with respect to all these ingredients; you may obtain more and more of these ingredients from the air; you may obtain more carbon and ammonia; but these will only assist in the exportation of the mineral substances, in aiding their solubility, and in sending them away; and it is impossible that they can be thus constantly exported without eventually bringing sterility. "Always taking out of the meal-tub and never putting in, soon comes to the bottom," as poor Richard says. There are, however, many persons who suppose that they can make all the manures they require on their own farms. To shew that this is not the case, however, I may instance the splendid tobacco lands of Virginia, where tobacco and wheat were exported for a long period. These lands, and other new soils, were first known by the name of virgin lands, as if there were something peculiar in them, whereas in fact they contained a greater quantity of mineral substances than other lands long in cultivation. Wheat and tobacco were exported in great quantities from those lands, and for a long time they were considered incapable of exhaustion; but in 150 years they were actually exhausted. Now they cannot grow anything without the application of manure containing those very substances which had been exported from them in the shape of wheat and tobacco. I will mention another case, the case of the sugar plantations. I happened to be coming from Paris a few months since, when I had for a companion the owner of some sugar plantations in British Guiana and Trinidad. He told me that they could not grow sugar now as they did formerly; that they were obliged to look out for manures. He asked me a great many questions, and I gave him a little information on the subject. I recommended him to use the ashes of the sugar-cane (which are there thrown away) as the best thing that he could have for this purpose. He said it never struck him before, but he would write over at once, and it should be done. A gentleman has lately written over to ask what these ashes contain. They were found by an experienced chemist to contain abundance of phosphoric acid, potash, lime, and soda; and the analysis bore out what I have stated. Another friend of mine has visited Cuba, and what does he tell me? He says the practice there is to go and settle down on a certain portion of virgin land, and



to export all the sugar they can without manure for ten, twelve, twenty, or thirty years; and then, when you cannot get any more from the exhausted soil, to break up the establishment and to go still further into the interior; when the exports from the land have taken away a certain portion of the mineral and other substances, it is found necessary to remove to another quarter; and so they proceed in their course, exhausting successive portions of land, leaving behind them the same devastating traces as are left by the passage of an army which has destroyed and ravaged every thing in its course. The land is left without the power of growing anything at all, an uncultivated waste: this I had from an eye-witness. Well, now, when you cannot supply the necessary manures from your own farm, you must import them; and it will be necessary to speak of the manner of importing manures upon the farm. Manures can be imported upon the farm in various ways. The most general way of importing manures upon the farm, at least near London and other large cities, is by buying the excrements of animals, whether they be of the human kind or of other kinds, which have been deposited in large towns, and those things which have sallied out from your premises, you buy it to return back again. The food consumed by animals and by the human race is collected, though not to the extent that it ought to be, and brought back again to the land; this you pay for—and you derive from it great benefit. Now, there is what is called the London dung. It is always to be had; and it is, no doubt, an excellent manure. If *genuine*, it must contain all that is left from the eating of the wheat, which is the most valuable of grains, and consequently that which is left from it is one of the most valuable manures. It must contain phosphate of potash and soda, together with phosphate of lime and magnesia, and it might be beneficially mixed with other substances. This London dung also contains the excrements of animals, such as horses and cows, which have been fed on turnips, straw, chaff, and hay; all these substances will be exceedingly beneficial to the farmer.

I will now go briefly through the manures which are found most beneficial, and it must then be left to you, gentlemen, to see which of these substances, at the money price, would be most beneficial to your farm. Many persons, whose farms are near the sea, import fish on their land. These fish contain abundance of phosphate of lime and magnesia (bone dust), a very important ingredient; and they contain ammonia, carbon, a little salt, and potash. They are what is called a quick manure; that is, they act quickly; but if you put them year by year by themselves, without applying something more solid, they would not continue to produce a good effect. When those who are near the sea use fish, I would advise them to mix them with other manures, to prevent their quick action from deteriorating the value of the land, by taking more from it in the year than it is capable of affording without injury. There is another most general means of introducing manure on land, though it is not generally known as such, viz., by feeding cattle with oil-cake. This is not generally regarded in that light; but still, it is neither more nor less than a means of manuring land. The oil-cake being composed of linseed which has been pressed from the oil, still contains considerable quantities of carbon and hydrogen, which are derived from the air, and of nitrogen, and forms a very good food for animals; they can derive from it a large quantity of fat, and some flesh; and that which is given out from them as manure contains large quantities of the mineral ingredients, together with a very considerable amount of ammonia. Well, the mineral ingredients and ammonia thus furnished by the oil-cake, is one way of manuring the farm. Oil-cake is very expensive, and it would not pay to feed cattle on it—at least, so many

farmers have told me—were it not for the manure. They feed the animals because the manure which they get is so valuable. They tell me, “We sometimes lose £100 or £150 a year by our bullocks;” “but we must feed bullocks,” they add, “because we thus manure our crops.” When I was lecturing at Maidenhead, and had occasion to speak on this subject, I had to disabuse the minds of certain gentlemen as to the absolute necessity of submitting to a loss for this purpose; whether I was right or wrong you will be able to judge. A gentleman told me last spring, when you will recollect there was a great deal more turnips than the sheep would feed off, at least in that part of the country, that he would give any one £2 an acre to send a flock of sheep to feed off his turnips. It struck me that this was too much; and I said to him, “Do you expect to derive anything from their feeding on the turnips?” He said, “Certainly.” I rejoined, “In my opinion the sheep can give you nothing but what the turnips contain; the turnips will only pass through the bodies of the sheep. Do you not think that £2 spent for guano, with the turnips ploughed in, would give you more manure than £2 paid to feed off sheep?” I had a strong argument to maintain in the presence of a great number of gentlemen. The gentleman, of whom I have spoken, said, “If you will come to me to-morrow morning, at my farm, I will convince you.” I replied, “I will be with you.” I went over the farm in six hours; and that day I gained two converts, the gentleman and his son; and I believe they are now two of the first agriculturists in the neighbourhood. I had time to explain my views to them, and they soon saw that if you could get the turnips to rot in the ground, and were then to apply £2 worth of guano, you would get very much more than you could obtain by feeding off a certain number of sheep merely on the turnips. Well, then, I say that under certain circumstances it may be profitable to you, instead of feeding sheep, to use a certain amount of guano and other matters which may be put on the land, or to plough in your crops. It is a money question entirely; if we can obtain what we want for a pound less in one way than in another, it is necessary, in a commercial point of view, to get that which will cost the least. I do not call upon you to go and try a whole farm full of experiments of this kind; but the next time you are placed in the position which I have described, try an acre or two; and if you find, subsequently, that the crops are as good or better, you will have lost nothing by the experiment, and you will be enabled from your own experience, when placed in similar circumstances again, to do without the advice of a chemist. You see, in fact, with reference to the oil-cake, that the farmer imports the produce of one farm to put on another. Now there is another valuable manure which is well known, though it has only been recently imported. This manure, like all other manures, is derived from the vegetable world. Our rivers are pouring down, year by year, from the surface of the land, bone-dust and potash and soda and ammonia, and a thousand things besides, into the ocean. All the soluble matters of the earth's surface are poured down by the rivers and rivulets into the sea; not, gentlemen, to exist there for no purpose at all. As large and extended a vegetable kingdom exists under the surface of the waters as above them, and the source of animal life in the sea is the same as that which sustains it on land. The fishes feed and browse on the sea-weed, as we call it, and on other plants belonging to the vegetable kingdom in the ocean. The carnivora of the fish kind feed on these fishes, as the fish feed on vegetables; and the birds of the air, having fed on fishes fed on the vegetable kingdom of the sea, deposit their food in places to which they resort. Now, the excrements of these birds—the birds themselves having fed on fish, which contain



large quantities of every element of manure—must afford valuable ingredients. We have immense quantities of these excrements annually deposited all round our own islands, and wherever it can be collected, it is a most valuable manure; but in this country the rain falls in such abundance as to wash away, in the winter, nearly all that is deposited by these sea birds in the dry weather. There are localities, in the earth however, where the rain falls so seldom, or in such small quantities, that it acts scarcely at all upon these excrements, and they go on accumulating till they grow up to many feet in thickness, particularly in those islands which are scarcely ever visited by man, whither the birds resort in immense numbers. Well, now, the excrements of these birds being thus collected in a dry latitude, and consolidated for many years, until they almost have the appearance of a rock, contain almost every essential ingredient for the farm, though not, perhaps, precisely in the proper quantities. They contain large quantities of ammonia. Ichaboe guano contains from eight to ten per cent. : Peruvian guano, ten, twelve, fourteen, and even sixteen per cent. ; it contains, besides, phosphoric acid, lime, magnesia, potash, soda—the two latter in the same quantities, not more than two-and-a-half, or at the greatest, four per cent. Now, as a stimulating manure, guano is a very good thing to apply to land. In all cases where land is heavy, and not apt to germinate as it ought to do, an application of guano will stimulate it to a very considerable extent, and cause the plant to germinate and rise quickly. But if you do not supply the plants with that of which the guano is deficient, for their increased growth, it will, in the long run, do more harm than good. The guano contains the chief acting part of ammonia and bone-dust; but if you do not supply the others, and if the land is not capable of supplying them, you may obtain a bad result from the application of guano. It is a well-known fact that the continued application of guano is attended with bad results. In the vicinities of the parts from which guano comes, near Peru, there are places which become perfectly sterile from its use; but some of these places have been made fertile again by the application of nitrate of soda; and at the present moment there is an exchange going forward of guano for nitrate of soda in the countries which produce these substances. There are certain places in South America where nitrate of soda is found, as we find an efflorescence on the walls of new buildings. Guano is exported from one place, and nitrate of soda from another, and we find the exchange acting in the most beneficial manner. Where guano has been acting, the application of nitrate of soda is found to supply some portion of what is wanted. Guano may be considered as a sort of representative of animal manure. Again, greaves and rags, and all such things, form an exceedingly good manure. These contain large quantities of nitrogen, and are capable, by their decomposition, of giving large quantities of ammonia. They are exceedingly good for those plants which require these substances, such as wheat and hops, upon both of which they are known to produce the best effects. But the application of these alone will bring about a sterility of the soil, which is not desired by the farmer, who wishes to gain year by year, and not one year alone. Now, rags and other things containing large quantities of ammonia are very useful where mineral ingredients have been supplied to a certain extent. I have analyzed the mineral ingredients of the rag ashes, and I found that they contain 10 per cent. of mineral matter, and in that 10 per cent. is a large quantity of bone-dust. The furnishing of ammonia to the soil constitutes, perhaps, one of the principal features of these manures. Now, as I before intimated, we may reckon all the animal manures—such as shoddy, horns, hoofs, trotters, rags, &c.—as acting similarly to

guano. The only difference is, that the guano acts more quickly, because the ammonia is in a far more soluble state, and is capable of being carried into the soil by the first shower of rain. Now there are other manures besides these; there is bone-dust or phosphate of lime. How is it that bone-dust has been found such a splendid manure? Bones have been used in almost all quarters with almost unqualified results; there are very few places in this empire where they have not been found useful. I have heard of their not having been very useful on the Malm rocks (upper green sand); I have heard of two or three cases in which they have been found of no service there; but, at all events, on general soils the bone-dust has been found of great use. It is easy to account for this. I have mentioned to you the action of the rain, which is such that, supposing one pint of water to dissolve a grain per acre, 840lbs. per acre are washed away every year. But you will recollect that, in addition to this, until very lately the plants were taking bone-dust constantly from the ground, and thus providing the material for the bones of animals, without any restitution being made to the land. As for man, all his bones are, according to custom, deposited in certain places, and never return to the land; and, until recently, the bones even of the other animals were never restored to the soil. The consequence was, that soils generally became impoverished in bone-dust. Bones consist of certain kinds of animal matter called "gelatine" and "fat," and of a portion of mineral matter called "phosphate of lime and magnesia." It is a very singular thing that bones deprived of the animal matter act more quickly than fresh bones. The fact is, if you take some bones and bruise them fine, and then take others and burn them, the latter acts quicker than the other. The fat of bones prevents atmospheric action on them: and you know perfectly well that unless they are soluble they are of no use. They are of no avail to the farmer if they are not soluble, and the more soluble they are the better. The burnt bones are, therefore, acted upon much more quickly than the others, though we have a loss of the animal matter. It is to Liebig that we owe the suggestion of making bones much more soluble than even burnt bones. The main fact had been long known. The common method of making phosphoric acid formerly was to take a certain quantity of burnt bones, and to mix them with a certain quantity of oil of vitriol, by which means the phosphoric acid of the bones was set at liberty. The bones consist of phosphoric acid and lime, with a little magnesia; the sulphuric acid seizes upon the lime, and forms sulphate of lime, or gypsum, and liberates the phosphoric acid. Phosphoric acid is quite soluble, as soluble as sugar.

Now that is just the thing which the mind of Liebig applied at once to land. "If," said he, "we can just do the same thing for the land, the first shower of rain will wash this phosphoric acid down the land; it will there meet with lime, magnesia, and other things, and form phosphate of lime and magnesia, but in a state of the most minute division, so that it will be acted upon by the smallest quantity of water. Now, without any exception that I am aware of, where bones and sulphuric acid have been tried, it has been found beneficial for the turnip crop. Turnips have been obtained in abundance by the application of this manure; I have never yet heard of a failure. In almost all soils there is lime, so that the phosphoric acid will find something to neutralize it, and cannot injure the plant. Turnips find the bone-dust prepared for them in the minutest state of division. This manure is also suitable to other root crops. In a general way, you export no turnips from the land; you would take more from the farm land were you to export the turnips year by year. In the latter case, you would take away such a large

amount of potash and soda, and other things which the turnips require, and which the bones do not give, that I think you would find it very difficult to grow them year after year without a very considerable application of other manure. That question may be settled very easily; but in the case of the ordinary turnip crop, it seems pretty well ascertained that if you apply phosphate of lime, you can grow the turnip; and every one knows that if you can grow the turnip you can get the three subsequent crops. Now, with respect to lime, that is an excellent manure. In the analysis which I made of the hop, I found lime, more particularly in the coarser hops. In all cases, I find that lime has done good to the hops, but great care ought to be taken in applying it. I have known parties apply it in a way which was certain to do mischief; they have applied it with manure; and when lime is applied with manure, it must drive off all the ammonia contained in it. I have here samples of manures containing ammonia; there is some beautiful Peruvian guano (exhibiting a small glass bottle containing the substance). I will just show you the effect of mixing lime with this. A friend of mine in Kent, who had found lime good for his hops, having heard that guano was a good manure, mixed the two together, and thus drove out all the ammonia. My opinion is that the best plan is to apply the lime first to the land, and the manure afterwards, so as to let the lime become what is called mild by the action of the air, and after that to apply the manure. This is a specimen of beautiful guano (handing the bottle to the company); you will find no great amount of smell. Now I will take a little lime. There is scarcely any smell, because this lime (exhibiting it) is perfectly dry; and if the guano had been dry, there would have been no smell whatever. Now I will just put a small quantity of water, in order to cause this lime to become slack, for it acts in that state and not in the other. (The lecturer here added the water, and, on mixing the whole together, a strong smell of ammonia was produced.) I may here remind you, gentlemen, that in buying guano you should remember that that which smells the strongest is not the best; the smell merely shows that the ammonia is escaping very quickly. The best Peruvian guano, that which is the driest, has scarcely any smell at all. Now, lime has also an action on the mineral ingredients of the soil, for it liberates the potash and the soda, which are generally in the ground in an insoluble state in union with silica, and the lime which is brought into contact with the silicates has the property of liberating the potash and soda. So that the lime acts in two ways; it acts on the ammoniacal and carbonaceous matters, but it acts more particularly in decomposing the silicates of potash and soda. It is astonishing how soon after an application of lime it will be washed away by the action of air and water, and how soon it will again be necessary to apply it. Now, gypsum, again, is only another application of lime. Gypsum is a sulphate of lime. Every 77 parts of gypsum contain 28 of lime and 49 of sulphuric acid; so that in applying gypsum to land you supply lime also, and in a state in which it can be easily taken up by plants. Potash and soda have also been applied as manures, and, where the land has been deficient, with the very best results. Potash has been applied in the state of saltpetre, and also in the state of woodash or pearlsh, with good results. It has been applied in the state of silicate of potash, and in one case,  $1\frac{1}{2}$  cwt. of silicate of potash being contrasted with other applications, the silicate of potash grew 15 tons of potatoes, while the average of the others was only 10. Soda has been applied as nitrate of soda; but for a series of years, in consequence of containing only one substance instead of a number, it would not be applicable. Saltpetre, also, has been applied with other minerals

with great success in some instances; but the continued application of saltpetre, or of any other manure containing only one or two ingredients, is wholly inadmissible, as they do not furnish all that a plant requires, and, consequently, must tend eventually to impoverish the soil. Now, having thus spoken of each of the substances which are applied as manures—if I have omitted any I shall be happy to be reminded of it at the close of the lecture—I want just to give you the proper means of manuring. Gentlemen, your farm-yard dung contains all that is taken from your land; it is the staple manure; it contains all that is required, and there is not the least doubt that you can always obtain a crop with it. But the question is—What manures, in case of a deficiency of farm-yard dung, shall you use for your land? Some will say guano, some lime, some dung, some potash or soda; some one thing, some another. Let me tell you, that whether you do it year by year, or all at once, you must put on all these ingredients. There is not one of these ingredients but what the plants want, and they cannot grow without them. It is well known, however, that you can find potash replaced by the soda. If there is not enough potash, but enough soda, the plant will take the soda and grow with it, and so also with magnesia and lime; but there must be one or the other. So that if you were to attempt to supply, as a general system of agriculture, only one manure, keeping the rest apart, you would find that you could not farm at all. What I want to point out to-night (though I am afraid I have already kept you too long) is this, that at times it will be necessary to import on your land artificial manure. I wish to impress on your mind the necessity of putting every ingredient the plant requires; that if you want your wheat crop to grow, you must not put one substance only, such as guano, on the land—a substance which contains, besides ammonia, bone-dust, and a very little potash and soda—which would take away from the land instead of putting into it, and in a few years would leave it in a worse condition as regards cultivation than it was in before; but the proper system is, while you take away from your land, to return something which will leave it, if possible, as rich as before, and this can only be done by replacing on the ground that which you have taken out of it. Since I last appeared before you, I undertook an analysis of the hop plant, with which Mr. Paine furnished me, and I have stated the whole of the mineral ingredients which are taken by it from the soil. I have also published a little pamphlet of the analysis, and I suggested certain manures, with a view to the replacing not merely of one of these ingredients, but the whole of them. I reckoned up the expense of supplying farm-yard dung and hay and straw; and I found that you could get the manures for the hop best by buying them as they come from the laboratory of the chemist. I therefore thought it would be well to publish my thoughts for the use of the farmer, saying to him in effect: "I think you will find it cheaper to buy these articles than to obtain them as you have hitherto done." I subsequently analyzed some Kent hops; and the results, which were very much the same as in the first case, were published in the *Journal of the Royal Agricultural Society*. Now, many gentlemen in the room have tried this manure with their hops, and I believe they will be able to tell you the result. Mr. Atfield applied some of it upon three acres at an expense of 3*l.* 10*s.* per acre; and he obtained 435 bushels of hops more than he did from the same land with 20 loads of farm-yard dung at a cost of 12*l.* per acre. That is open for trial by any one who likes to test it. I believe there are three or four other gentlemen in the room who have tried this manure with good results. I believe Mr. Paine has tried one of the manures which I recom-

mended; with what result he will tell you. He tried pearl-ashes and wood-ashes, and found that up to a certain date those spots upon which he put this manure outstripped the others. Last week I heard of another case. When I published the pamphlet, some party in London made the manure as recommended, and sent it down to Sussex. A party who had sold five tons told me, last week, that it had been tried down at Heathfield, and had grown a great deal more. He did not state the quantity, but he said that the person who applied it had sent for him down on purpose to see it. Now, the main point connected with the truth or non-truth of what I have been saying is this, the necessity of using not one manure only, but a mixture of manures. What I want you to do is to supply to the plant each year what it will take out; not to supply a great excess of one thing and perhaps only half of the others, but to let the plant have a portion equivalent to that which it takes out of the land; for it is very certain that plants differ greatly in the amount and quality of the manure which they require. Now these experiments have been tried by some, and I hope they will also be tried by others. With respect to the wood-ashes used by Mr. Paine, I may state that I made some analyses of the wood-ashes and peat-ashes obtained near Farnham, and I shall be happy to give any gentleman the result. In mentioning the wood-ashes, I may state that they contain 29 per cent. of lime, and more than  $4\frac{1}{2}$  per cent. of phosphoric acid; so that they would contain perhaps 11 per cent. of bone-dust. Now a great deal has been said about ammonia, and a great many persons have tried experiments with it. I find that it very much aids and assists bone-dust. The seed of the hop-plant contains far more phosphate of lime than that of any other part of the plant. I took a certain quantity of earth, and boiled it many times until nothing further dissolved, and then with an aqueous solution of sulphate of ammonia, in which I subsequently easily detected phosphoric acid. I have no doubt that the action of ammonia is two-fold; that it helps to dissolve the phosphate of lime in order to give it to the plant, and also that there are some plants which do not and cannot derive from the air all the ammonia that they want. Under general circumstances broad-leaved plants derive all the ammonia that they want from the air; but whether in the unnatural state of affairs in which we cultivate (I call it an unnatural state of affairs because we want five times as great a crop as the plants naturally give), whether nature will furnish as much as they want, must be determined by experiment. I really see grounds for believing that for some plants, particularly those which have not very large leaves, such as wheat, it is requisite, in order to obtain the desired crops, to supply ammonia; but at the same time to furnish them also with the mineral ingredients that may be necessary for their growth. I believe that to be the true system of manuring, and I think that a bad result will follow from the action of strong ammoniacal manures alone. Liebig mentions an instance in which a party grew grapes for making wine. This person obtained large quantities of animal manure from the neighbouring towns, and he obtained great results; but in two or three years he could not get any result. He had robbed his land of all the other mineral ingredients, and he could not afterwards get it to grow anything; whereas, in another instance, a man got the very best continued results merely by manuring his vines with the cuttings that came from them. I have always advised hop growers to put back their leaves and vines in order to take the least possible amount of substances from the soil; and after that, I have recommended them to replace in the soil every substance which they have taken out of it, either in the shape of farm-yard dung or in some other shape. In the same way I advise you not to use

the same dung every year, but to use dung of a different kind. Until chemistry has arrived at a more advanced state than it has reached yet, what you have to do is to take care that if you take away an excess one year you make it up the next, so as to lose nothing on the whole. I am very much obliged to you, gentlemen, for the patience with which you have heard the imperfect address that I have delivered to you; and all I can say, in conclusion, is, that if I have given you only one idea towards the proper cultivation of the soil, I shall be exceedingly happy that such has been the result. If any gentleman is doubtful on the subject of my lecture, or thinks that I have stated what cannot be supported, I hope he will speak, in order that the truth may come out, whatever else may happen (cheers).

The CHAIRMAN said: Gentlemen, I am sure I express the sentiments of every one present when I tender to Mr. Nesbit, on behalf of the company, our hearty thanks for the lecture which he has delivered to us (cheers). Before we separate, many of us may have some questions which we may be desirous of putting. I would just remark at this moment that Mr. Nesbit comes here at his own expense: he does not put us to any expense whatever for the lecture; and I do not think he ought to bear any expense whatever in the shape of travelling expenses.

Mr. NESBIT: I would much rather appear before you, sir, free from any incumbrance. I like to come independently, and I never will appear amongst farmers for the purpose of receiving remuneration from them.

The CHAIRMAN: Allow me to say, Mr. Nesbit, that we are now dependant on you, and what we desire is, that the independence should be reciprocal (Hear, hear).

Mr. NESBIT: There is one subject which I desire to introduce: it is the necessity of your having a farmers' club. Since my first lecture in this neighbourhood there have been already formed one at Alton, one at Guildford, and one at Dorking; and why should there not be one here (Hear, hear)? There are many reasons why farmers' clubs are necessary. It is well known that in large towns there is more interchange of ideas in a day than there is in rural districts in a week; but why should there not be the same interchange of ideas in the country as in the towns? If ever there was a time when it was necessary that farmers should league together, the present is such a time. You find that manufacturers have their chambers of commerce, and everything that is requisite to give them united power; and why should not farmers have similar advantages (Hear, hear)? There is some talk about the repeal of the malt-tax. Well, if you want anything that may be attained by proper means, why do you not unite for the purpose of securing it? If there is any benefit which Parliament can confer upon you, or which science can confer upon you, why should you be deprived of it (Hear, hear)? I happened to dine last Thursday night at the Farmers' Club in London: landlords and farmers were in the room; and one great subject discussed was the necessity of union in spreading farmers' clubs; a necessity which I have urged for years. Farmers require to be more united than they are; they are generally too distrustful of one another—(Hear, hear)—and if farmer A. thinks he has discovered a little secret which will enable him to grow corn better than farmer B., he will hide it from his neighbour (laughter). This feeling will not do. If a farmer gets a new idea, he ought to go to his neighbour and say to him, "There is something which I have discovered: you take it, because we shall all be better if this succeeds; there will not be a single loser, every one will be a gainer." By union you would be more apt to gain information and to receive mutual benefit than by remaining as you do apart. I think that if you were to form a club, not for political purposes, but purely for

advancement in agricultural knowledge, you would receive great advantage. I shall feel very great pleasure in seeing a farmers' club established in Farnham; and shall be very happy to come down to communicate to the members any scrap of knowledge that I may chance to possess. Another subject at present of great interest to the farmer is that of "Tenant-right." I am aware that in this part of the country you are happily, by means of your local customs, possessed of perhaps as good a tenant-right as any Act of Parliament could possibly give; but you must recollect that your brethren in other parts of the kingdom are not so fortunately situated (Hear, hear). They have not the same security for their capital invested in land as the landlord has for his capital (Hear, hear). This is a subject of vital importance to the farmers at large; and one that I most particularly recommend to your notice, as we cannot expect good and scientific farming where there is no security for capital invested. There is another point, gentlemen, which I desire to mention. I believe Mr. Charles Atfield has something to say about his hop manure. I have had applications from several parties in London who wanted me to put my name to a hop manure which they wished me to analyze. This, however, I refused to do. I spoke to Mr. Charles Atfield on the subject, and he advised me to put the manure into the hands of a respectable house in London in whom I could confide, in order to save the farmers the trouble of mixing for themselves; because many farmers will not be at the trouble of buying five or six ingredients at different places. I replied, "I will put the ingredients into the hands of a London house, who will mix these things under my directions; and I will answer for their being pure." You can now, therefore, either mix them according to the directions contained in the pamphlet, or you can obtain them already mixed. I have put the affair in the hands of Mr. John Hunt, of Lambeth, a gentleman well known both in London and the country; and I am persuaded that you could not have a person who would supply you with the proper manure at a more reasonable rate.

MR. ATFIELD said: Gentlemen, having been called upon by Mr. Nesbit to give you an account of the experiment which I have tried upon my hops, I think it would manifest great ingratitude to him for the kindness which he has shown by his lecture if I were to refuse to make a short statement. I beg to inform you, gentlemen, that I had four acres and three quarters of hops. Last year it was all dressed with stable manure; but I was induced by Mr. Nesbit's pamphlet to try three acres with the manure he recommended. The result was that at an expense of £3 10s. per acre, I grew 435 bushels of hops more per acre than with a dressing of twenty loads of our yard dung at a cost of £12 per acre. I think, gentlemen, that our thanks are due to Mr. Nesbit for recommending to us this manure, which enables us to grow more hops than stable manure; and I believe that if you make the same experiment that I have made, you will find it a very beneficial mode of growing hops (Hear, hear).

MR. ALDEN said: One of Mr. Nesbit's pamphlets having fallen into my hands, I saw there a statement of the manure which he recommended as proper for hops; and I tried the manure on two or three pieces of land which had been dunged in the previous year. I picked out an acre here and there, which I acted upon according to the directions. The first thing which I noticed was that my land had a good deal of chick-weed: the weeds soon grew, and where the manure was put, excessively thick. I said, "I think we shall see some hops by-and-bye." The hops, when they came, looked as healthy as possible. I did not go so minutely into the matter as Mr. Atfield did; but I took several friends

to the spot, and said to them, "Do you see any difference?" "Well," was the reply, "here is more bine." I asked, "Are there more hops?" and they said, "Yes." The manure held out, the bine being healthy to the last. I am persuaded that this manure did a great deal more good than horse-dung. I applied dung by the side of it, and it did not act so well. I am convinced that it is an excellent manure, and I recommend others to apply it.

The CHAIRMAN.—What did the mixture contain?

MR. ALDEN.—It contained 3 cwt. of guano, 1½ cwt. of saltpetre, ½ cwt. of gypsum, and 1½ cwt. common salt. The expense was £3 10s. per acre, taking carting and everything else into consideration, and I would certainly recommend others to try it.

The CHAIRMAN.—In all the experiments that I made last year I used the carbonate of potash instead of the nitrate, and I confess that I am very much inclined to attribute the difference between the result in my case and in Mr. Atfield's to that circumstance; I believe it was on that account that I did not obtain so good a result. If that be the case, it shows the necessity of applying nitrogen directly to the soil. I dressed ten or fifteen acres last year on one portion of my land. I put on one cwt. of pearl-ash, three cwt. of guano, about 15 bushels of wood-ashes, and two cwt. of gypsum. I put in some places half a ton of guano, from 15 to 20 cwt. of rags, and 20 qrs. of trotters. In every case where I put Mr. Nesbit's mixture the crop was as good as where I had put on the larger quantity: I cannot say the result was better, but the cost was less. I dressed five rows, containing half an acre, with ½ cwt. of pearl-ash combined with 5 bush. of wood-ashes, and in fifteen rows out of twenty I could see a decided difference where I put on 1 cwt. of pearl-ash per acre. Through that strip I put the ton of rags, and 1 cwt. of pearl-ash mixed with 10 bushels of ashes in addition. In a week after, I could see a decided difference. Then I applied a coating of guano, which made a more decided difference. I could not speak positively as to the result, except to say that the one did quite as well as the other, at a rather less cost. I still adhere to the opinion that nitrate of potash is better than carbonate of potash.

MR. NESBIT.—Allow me to say that the carbonate of potash has not yet been much tried—the pearl-ash is caustic, and it may send out the ammonia. You will recollect that the substance which I insisted upon most was silicate of potash. I will get some of that made, and you will then be able to try it. All I endeavoured to do was to get what I could by analysis. I have since analyzed the hop, and found about 4 per cent. of nitrogen in it; that must be derived from something. It is merely a question of expense. In the case of an ingredient derived from the air or from the soil, no doubt if you put more of it in the soil you will not do any harm; but what I want chiefly to guard against is, parties putting one without the other. I speak against putting ammonia, and strong manures of that kind, alone, because I have known an abundance of cases where there was impoverishment of the soil. It is quite possible that the plants do not like the caustic carbonate of potash. The common pearl-ash, perhaps, might act more beneficially if previously converted into carbonate by mixture with soil and exposure to the air. Or I will send you down a little manure with sulphate of potash instead of nitrate; that will soon settle the question. I think what has been stated shows that there is a benefit to be obtained from the potash.

The CHAIRMAN: I have not the least doubt of that. Let me say, in allusion to pearl-ash, that if you put pearl-ash at all, it ought to be put by itself, and not with guano. I discovered that by experience. I put the pearl-ash on about three weeks afterwards, and I am per-

fectly satisfied that what took place to a great extent in the hop kiln will take place also to a great extent in the land. At what time was your dressing put on, Mr. Allden?

Mr. ALLDEN: I tried it at different times. I tried two acres at the latter end of February, and when I dug it in I reserved one acre on purpose to dig it in later: the latest dug was decidedly the best. I also beg to state that I have acted on Mr. Nesbit's suggestion as to cutting the bines, and it only cost me about 6s. per acre, with a common chaff-cutting box.

Mr. AVENELL: I wish to know which is the best season for putting on lime.

Mr. NESBIT: In all cases lime ought to be put on as soon as possible. In the north of England they put it on in November. There is then an opportunity for its being slaked and washed into the land, and acting on all portions of the soil. The lime is dug in, and gets into the soil. The sooner you get it on the land for the winter the better. It is much better, too, to put it into the land before the winter than after. Practice will assist you in forming a judgment; but my experience is this, that if you put it into the land after the manure it will drive off the ammonia, whereas it will not do so if

you put it there before. It will have time to become mild. Let me now ask if we can have our chairman's assistance in forming a farmer's club?

The CHAIRMAN: I shall be very happy to become a member.

Mr. NESBIT: We shall want a chairman, sir, and I hope you will consent to be the first.

The CHAIRMAN: I could not take the chair.

Mr. NESBIT: Allow me to say that, in such an important matter, you really should be induced to act for the first year, and other gentlemen would afterwards follow in your steps. I really believe that you could not confer a greater obligation on this neighbourhood than by consenting to occupy that position.

The CHAIRMAN: I shall be very happy to unite with you, but I really cannot take an active part.

Mr. NESBIT: There is always a vice-president to supply your place.

The Chairman having at length given an implied consent, after some further conversation, several gentlemen entered their names as members of the proposed club.

A vote of thanks was then returned to the Chairman, and the meeting separated, much gratified with their evening's lecture.

## THE RICHMOND TESTIMONIAL.

It is generally known amongst agriculturists, that a proposition was recently made for the purpose of raising a testimonial to his Grace the Duke of Richmond, as a tribute of respect for the support he has given to agriculture and British industry, and as a mark of the high esteem in which he is held. His Grace declined for himself this testimonial, and expressed his desire that it should be appropriated as a "foundation stone to a fund for the assistance of farmers reduced by adverse circumstances."

A meeting of gentlemen, who are anxious to promote the object desired by the noble duke, was held, on Monday, Jan. 11, at the Freemasons' Tavern, Great Queen-street. There were present—Mr. Hilditch, Shropshire; Mr. Warnes, Norfolk; Mr. J. Meere, Uckington, Shropshire; Mr. Weston, Northampton; Mr. Speering, Hants; Mr. Ellman, Sussex; Mr. Brown, Wilts; Mr. Earle, Hants; Mr. Cheetham, Rutlandshire; Mr. Harriott, Basingstoke; Mr. Burgess, Blandford; Mr. F. Smith, Dorset; Mr. Roddwell, Bury St. Edmunds; Mr. Waters, Winchester; Mr. Holding, Alton; Mr. Loscombe, Andover; Mr. F. Hobbs, Essex; Captain Beasley, Lincoln; Mr. B. Smith, Brighton; Mr. W. W. Burrell, Sussex; Mr. E. Wyatt, Chedham; Mr. Warsopp, Hants; Mr. Lamb, East Sussex; Mr. Samuel Phillips, Mr. Paine, Bedford; Mr. Purchas, Monmouthshire; Mr. McKerrow; Mr. E. Jones, Mr. E. Newbatt, Sleaford; Mr. Ferriss, Wilts; Mr. Pile, Hants; Mr. Onslow, Mr. G. Oliver, Mr. G. Bridger, Winchester; Mr. T. Umbers, Mr. J. Paine, Stockbridge, Hants; Mr. J. Luton, Huntingdonshire; Mr. Hartshorn, Staffordshire; Mr. Biddell, Essex. His Grace the Duke of Richmond was also present. At eleven o'clock

Mr. J. Ellman was voted to the chair.

Mr. WALTER BURRELL, the honorary secretary, read the minutes of the last meeting, and suggested that the first business proceeded with ought to be the appointment of a committee.

Mr. CHEETHAM proposed that the gentlemen present should form a general committee, and that they should appoint a sub or working committee to take measures for carrying into effect the object in view.

Mr. HILDITCH seconded the proposition, which was unanimously adopted.

The CHAIRMAN said it would be very desirable that each and every county should, if possible, be represented in the committee (Hear, hear).

The following gentlemen were then appointed members of the sub-committee:—Messrs. Warnes, Meere, Ellman, Brown,

Earle, Cheetham, Burgess, Rodwell, F. Hobbs, Capt. Beasley, W. W. Burrell, S. Phillips, Paine, Purchas, Newbatt, Umbers, Hartshorn, Hudson, Jones, McKerrow, Bowyer, and G. Bridger, with power to add to their number.

Mr. BURRELL said, as the Duke of Richmond was the founder of the proposed institution, he begged leave to move that the noble duke be appointed its permanent president, and also the permanent chairman of the committee (cheers).

The motion was seconded, and unanimously carried.

The Duke of Richmond then said—Gentlemen, I was asked by Mr. Burrell to come here to-day, and I have therefore attended. I can assure you, gentlemen, that often as I have risen to speak in public on public matters, and often as it has been my good fortune to meet the farmers of this country assembled together in large numbers, I never rose with feelings of more deep gratitude than on the present occasion. Gentlemen, it has long been with me a matter of great pride and satisfaction to feel that I never go by a farm-house, in any part of the kingdom, at the door of which, if I knocked, I would not be sure to find a friend and a friendly welcome (Hear, hear). But, gentlemen, I own that I did not expect anything like the exhibition of feeling which you have recently shown towards me; and I am well aware that it is mainly owing to my having during the period I have lived in this country taken every opportunity of doing all in my power to protect the agricultural interests; and not only to protect them by maintaining laws which I felt in my conscience to be right, but also because I have, to the utmost of my ability, promoted improvements in practical agriculture (loud cheers). I believe, however, that it is not very frequently the case, when testimonials are given, that they are given to individuals who have failed in accomplishing the object which they had in view. If we had beaten the Anti-Corn-Law League last year I should not have been so much surprised at the mark of kindness which has been manifested towards me by the farmers; but the fact of our being defeated renders this expression of their gratitude more valuable, because it shows to me that it comes from the heart; and I am the more delighted at it, inasmuch as it will show the people that the farmers of England will always act straightforward, like men, and that feeling a debt of gratitude to be due for exertions which, however humble and ineffective as those I have endeavoured to render to their cause may have been, yet that they are prepared to discharge it (cheers). Gentlemen, I certainly feel that in this country it is very much required that we should have the means of taking care of industrious tenant-farmers, who may by adverse circumstances, or

by changes which no measure of foresight could enable them to anticipate, and which must occasionally occur in a great country like this, be reduced to poverty (hear, hear). In every other civilized nation I believe there are institutions maintained similar to that which you are now about to establish. I will not, in fact, I am not prepared to enter into the details of what I think ought to be done in this matter. It is enough for me to state that there are a vast number of tenant-farmers possessing a great amount of intelligence and perseverance which have heretofore been brought to bear upon the cultivation of the soil, who have been seen, by the force of circumstances over which they have no control, to go downwards in prosperity until they are plunged into the deepest distress. Surely, then, gentlemen, when we see that such men are exposed to vicissitudes of this nature, we who can afford it ought to do our best to prevent them from going to the very workhouse, perhaps of the parishes in which they themselves had for many years acted as guardians, and in that capacity had shown the greatest consideration and feeling in the performance of their duties. I have been very much attacked for saying that I wished the labourers and their families to go into the workhouse. Gentlemen, I deny it. I certainly felt it was necessary that some steps should be taken to lessen the demands made on the poor-rates of the country; but I know that I never heard of any individual going into the workhouse without expressing feelings of sorrow and regret. And if I entertain those feelings towards the labourers, how much more deeply must I grieve to see those who have been brought up from early life with happy prospects, who had the blessings of liberty at their disposal, and for many years enjoyed a respectable position amongst their fellow men—how much more, I say, must I grieve to see them driven into the workhouse to associate with others who ought not to be there, and assuredly would not, if they had taken proper precaution and gone less often to the beer-shop? (loud cheers). It is because I entertain these views, gentlemen, that I think that an institution such as that which has been suggested to you, ought to be founded for the advantage of the tenant-farmers of this country (cheers). I leave it to you to work out the details, though as a member of the committee I shall be happy to attend and give my best aid in carrying out successfully that which I consider, if you will permit me to say so, a great national object (loud cheers). I will not detain you any longer, as I must attend a meeting of the Protection Society which is to be held in Bond-street. Let me, however, say that I hope and trust that I shall never be found ungrateful to the farmers of England for the esteem they have hitherto uniformly evinced towards me, and that they will find that to the last hour of my life I shall feel deeply grateful for this testimonial of their kindness and confidence; and I think they will agree with me in the opinion that it is better to apply the proposed fund to the establishment of an institution for the benefit of reduced farmers. I thank you, gentlemen, for your kindness in having listened to me for so lengthened a period (cheers).

Mr. HARTSHORN proposed that Mr. Burrell be requested to act as the honorary secretary of the institution, and that he be also requested to nominate an acting secretary at a fixed salary, to be paid out of the funds.

Mr. WARNES seconded the motion, which was carried.

Mr. BURRELL said he would have great pleasure in complying with the request conveyed in the resolution, and would take care that everything under his superintendence was conducted in a proper manner. With regard to the appointment of an acting secretary, if the power of making it were vested in him, he should like to know what was to be the amount of salary?

Mr. WARNES thought it would be better to postpone that question until the committee met.

Mr. W. F. HOBBS thought the appointment of an acting secretary ought to lie with the noble duke and the committee.

Mr. BURRELL said he should not think of appointing any gentleman without first receiving the sanction of the committee.

The CHAIRMAN was convinced that if the question were left in the hands of Mr. Burrell they would be perfectly safe.

Mr. Burrell here read to the meeting several communications which had been received from provincial agricultural societies and from private individuals, upon the subject of the establishment of the proposed institution.

The Essex Agricultural Protection Society stated that they

had not yet had an opportunity of considering the question, but would shortly do so. The East Surrey and the Stockbridge (Hants) societies wished to understand the nature of the project before coming to any decision. The Brigg (Lincashire) Association announced that it was their intention to take the question under immediate consideration. The Cambridge Society expressed their willingness, through the committee, to respond in any way to the appeal which had been addressed to them on behalf of the "Richmond Testimonial," in order to convey their sense of gratitude to the noble duke for his services in the cause of agriculture. A similar communication was received from the Basingstoke Society.

The Chairman of the Sleaford Society here intimated that that society had resolved not to subscribe in their associated character, but the members would go into the matter voluntarily and individually, and he had no doubt that the sum they would collect would considerably exceed any grant that the society could afford to make.

The Southwell Society contributed £25 10s. and the Lincoln and Lindsay Society fifty guineas. Several private subscriptions were also announced from the latter district. The members of the Great Grimsby Society had taken steps to form a local committee for the purpose of collecting subscriptions. They suggested that the tenant-farmers in reduced circumstances should be relieved at their own homes in preference to being maintained in almshouses. The Rugby and Dunchurch Society subscribed ten guineas; and the Andover District Society £10. Mr. Paton, of Barton, sent £2. The Committee of the Newmarket Agricultural Society had postponed the question till their general meeting, to be held during the present month. The Reading and the Warwickshire Societies approved of the object, and requested further information.

Mr. GEORGE HARTSHORN said the Staffordshire Society had unanimously voted the sum of £100 (loud cheering). This would, of course, be independent of private subscriptions.

A Gentleman announced that he had already received private subscriptions in Wiltshire amounting to £60. It was to be regretted that bankers had not been named to receive subscriptions, as he was aware of several parties who were prepared to contribute if they knew to whom they could transmit the money.

Mr. BURRELL said he had received letters from Messrs. Masterman and Co., Messrs. Drummond, Messrs. Coutts, Messrs. Child, the London and Westminster Bank, and the London and County Bank, all expressing the willingness of the parties to receive subscriptions for the "Richmond Testimonial."

The Bradford Society had subscribed £30.

Mr. CHEETHAM said a meeting of the Rutland Agricultural Society had been called, and resolutions come to with respect to the testimonial, which he regretted had not yet been forwarded to Mr. Burrell. He had never attended a more unanimous meeting than that to which he alluded; all parties concurred in expressing admiration of the conduct of the noble duke. It was true, that from circumstances over which they had no control, they had not entered into any subscription towards the testimonial; but the fact was that a few years ago, when agriculture in this country was in a more prosperous condition, the farmers of Rutlandshire built an agricultural hall, and until within a few days there was a debt upon it of £400. A meeting was called for the purpose of taking measures to liquidate the debt, and £200 was subscribed. There was every prospect of the remainder being soon paid off, and then the society would be happy to aid the new institution.

Mr. W. F. HOBBS.—Although the Essex Society had not yet come to any decision on the subject, he was sure they would do so in a satisfactory manner. Essex was the first in the field in the cause of protection, and he was certain it would not be the last in aiding to carry out the object of this meeting (hear, hear).

Mr. BURRELL wished to report the result of the proceedings in Sussex. Seven hundred and eighty-eight people in that county had subscribed £478 12s. 6d. (loud cheers). He also announced that the Worcestershire Society had subscribed £50; the Durham Society 50 guineas; and that the Bedford Society intended to subscribe.

Several gentlemen present subscribed individually.

Thanks were then voted to the chairman, and the meeting adjourned till 4 o'clock, when routine business was transacted.

## THE LONDON FARMERS' CLUB.

## IMPORTANT SPECIAL MEETING ON THE SUBJECT OF TENANT-RIGHT, AS AFFECTING THE LANDLORDS OF ENGLAND.

A special meeting of the members of the London Farmers' Club was appointed to take place at the rooms of the Club, in New Bridge-street, on Monday evening, January 11, at five o'clock, for the purpose of discussing the question "How far would a well regulated system of Tenant Right be beneficial to the Landlord;" the question having, on a former occasion, been discussed with regard to its beneficial influence on tenant farmers themselves. An intimation having been given to the chairmen, vice-chairmen, and secretaries of the local farmers' clubs, the attendance was so large that shortly after that hour an adjournment took place to the large room at Radley's Hotel, opposite, where the business of the evening was proceeded with.

Mr. WM. FISHER HOBBS, of Marks Hall, Essex, presided on the occasion, and was supported on either side of the chair by some of the most distinguished friends of agriculture, and many of the best practical tenant farmers in the kingdom.

The CHAIRMAN: In the month of February last the Committee of the London Farmers' Club brought under your consideration the subject of tenant-right; at that meeting the discussion was introduced by Mr. Shaw (Hear, hear), and I am sure you will agree with me in thinking that the farmers of this country feel indebted to him for the able manner in which he brought it forward (cheers). From that time the subject has been daily gaining ground, and public attention has lately more particularly been drawn to it by the fact of some of the members of both houses of Parliament having taken it into consideration (Hear, hear). The Committee of this Club have therefore departed from their ordinary rules, and have called a special meeting for the purpose of again bringing the subject before you, thinking that it is a question which ought to be brought under the consideration of the agricultural interest immediately before the meeting of Parliament, and believing that the public expression of opinion which will this evening be given will show that it is deemed to be a question of material and paramount importance to the agricultural body of this country (cheers). On the occasion to which I have referred, gentlemen, we limited the discussion to the consideration of the influence which tenant-right had upon the occupier of the soil. But on the present occasion Mr. Shaw has kindly promised to bring forward the subject more especially with reference to its bearing upon the owners of the soil (Hear, hear); and I think you will agree with me in saying that that which is beneficial to the tenant must be beneficial to the landlord also (cheers). Many gentlemen, I am sorry to say, are not of that opinion, and therefore it requires that the subject should be fully explained to you. I shall therefore now say no more than to introduce Mr. Shaw to you for that purpose (loud cheers).

Mr. SHAW (of the Strand) then came forward amid the cheers of the meeting, and proceeded as follows:—Mr. Chairman and gentlemen, I feel it necessary, previously to placing this question before you, to make two or three observations with reference to my position on the present occasion (Hear, hear). I feel conscious that I may be open to some observation, and that you may think I am unnecessarily obtruding myself (No, no). It is therefore that I wish to offer a word or two of explanation as to the circumstances under which this meet-

ing has taken place (Hear). Mr. Hobbs has stated to you that in February last year I brought this subject under the consideration of the Club, and I am fain to hope that the attention then called to it has been productive of some benefit (cheers). You will all have noticed, from the observations which fell from his Grace the Duke of Richmond and Mr. Pusey, at the dinner of the Smithfield Club, that there is some sort of "feeling" about the term "tenant right." I know that the subject is little understood by those to whom it is of the highest importance that it should be well understood—namely, by the landlords themselves (Hear, hear), and that there is an apprehension that in asking for tenant-right we are asking something which is right for you but wrong for them ("Hear, hear," and cheers). Now, knowing that such an impression prevails, feeling conscious that I entertain no such notion, and being convinced that no such idea ever entered into your minds, I proposed to introduce in May next, as well as I should be able, the question in another point of view, namely, to inquire "How far a well regulated system of Tenant Right would be beneficial to the landlord;" and that, too, simply with the view that any erroneous impression which had been created might be thereby removed, and that you, the members of the London Farmers' Club, and the members of other clubs in different parts of the country, might negative in the strongest terms any such intention, conviction, or belief, as that a well regulated system of tenant-right would be prejudicial to the interests of the landlords (loud cheers). It was suggested that, as Lord Portman had already brought this subject under the consideration of Parliament, it was not improbable that he might again bring it forward, in the ensuing session, before May next. Upon the suggestion, therefore, of several members of the club, and taking into consideration that on Tuesday and Wednesday in this week meetings were to be held upon subjects of considerable importance, and hence there would be a large gathering of farmers in London, I thought it desirable to bring the question forward this evening, and thus afford to many gentlemen, who are members of local protection societies and local farmers' clubs, the opportunity of taking part in its discussion (Hear, hear). Lest I should afterwards forget to mention it, I also beg to state that I have great satisfaction in informing you that at the last meeting of the committee of the club we came to a resolution that any local farmers' club should, by the payment of a guinea a-year, have the privilege of sending any one of their members they might choose to depute to attend the discussions of the London club, and who would enjoy all the privileges of a member at those discussions, by which means the local clubs would have better and more frequent opportunities of communicating with us (Hear, hear). I name this because I think it is of the greatest importance that such communications should take place—(Hear)—and, if possible, that we should be concentrated for the purpose of co-operation, as I anticipate that when matters are more matured good will come out of the connexion (cheers). Under these circumstances, then, gentlemen, I appear before you (renewed cheers). My time being very fully occupied, my own wishes would have induced me to postpone the subject until May. I, however, feel great satisfaction in bringing it before you now;



not that I, or the members of this club, may be enabled to adduce such arguments as may be convincing to the country at large, but that we desire to keep the question alive; being satisfied that it is based upon justice, and that eventually (though it may take time) the landed proprietors will arrive at a sound conclusion upon it. For, as was said by a noble lord, formerly Lord High Chancellor of England, many years ago, "if you give the people of England time to reflect they will be sure to arrive at a sound conclusion" (loud cheers). It is therefore to give to the practical men now present an opportunity of recording their opinions, that in advocating this question there is no intention of doing injustice to the landlords of this country, that I now bring it before you (renewed cheers). Having been now for upwards of five-and-twenty years before the public, as a writer upon agricultural matters, and during the last fifteen years week by week—having during that period been required to record my opinions upon some of the most important questions affecting the agricultural interest of this country—it cannot be supposed that, in the course which I have taken, I should have escaped animadversion sometimes amounting to censure. Acting upon the principle inculcated in me from my boyhood, and first impressed upon my mind in the language of the classic writer—

"Parcere dejectos et debellare superbos hic labor hoc opus"—

it has been my constant object to advocate the interest of the tenant farmer, and to endeavour to elevate him in his position (cheers). In so doing I have not sought to improve the position of the tenant at the expense of his landlord; but, believing that the latter was well able to protect himself, and feeling convinced that the former was not in the enjoyment of those rights to which he was entitled, it has been the great aim of my labours to obtain an admission of those rights (Hear, hear). The adoption of this course has exposed me to the charge of seeking to set the tenant against the landlord, of desiring to sever that bond of union which is said to have existed, and still to a great extent to exist, between the owner and occupier of a farm—a feeling not subsisting between the owner and occupier of any other description of property—and to destroy that mutual confidence which should ensue between parties so circumstanced in relation to each other. Now, I am not prepared to yield to any man in my desire to promote kindly feelings between individuals, in whatever relation of life placed—between families, between classes in the same country, or between those families upon a large scale, the nations of the earth (cheers). It may be that I entertain an erroneous view of the best mode of attaining and maintaining that kindness of feeling, that good understanding between man and man; but my experience has led me to the conclusion that in all engagements, especially of business, the more clearly and definitively the nature of the engagement is described, the more explicitly the rights of the contracting parties are defined, and the less any matters are left to chance and circumstances, the more satisfactory has been the result, whether as regards friendly feeling or personal interest (Hear, hear, and cheers). Since I brought the question of "Tenant-right" before this club (just thirteen months), I have had frequent, almost daily, communications on the subject, and, amongst other remarks made, it has been said that tenants have no "rights." Then I say they ought to have them (Hear, hear), provided the acquirement of those rights is not only *not* prejudicial to any other parties, but that the withholding them is an act of injustice to the tenantry, and prejudicial to the landlords themselves (cheers). All who are conversant with the earlier pages of English history, and hence have some knowledge of the feudal system, are acquainted with the gradations by which the cultivators of the soil (styled in these modern

days tenant farmers) have attained their present position. The progressive changes which led to their present state are thus described by the great Lord Kames, he says:—"Lands were originally occupied by bondmen, who were the property of the landlord, and consequently were not capable of holding any property of their own; but such persons, who had no interest to be industrious, and who were under no compulsion when not under the eye of their master, were generally lazy and always careless. This made it eligible to have a free man to manage the farm, who probably at first got some acres set apart for his maintenance and wages. But this not being a sufficient spur to industry, it was found a salutary measure to assume this man as a partner, by communicating to him a proportion of the produce, in place of wages, by which he came to manage for his own interest as well as that of his master. The next step had a still better effect, entitling the master to a yearly quantity certain, and the overplus to remain with the servant. By this contract, the benefit of the servant's industry accrued solely to himself, and his indolence or ignorance hurt himself alone. *One* further step was necessary to bring this step to its due degree of perfection; which is, to give the servant a lease, for years, without which he is not sure that his industry will turn to his own profit. By a contract in these terms, he acquired the name of *tenant*, because he was entitled to hold his possession for years certain." Each of these stages may have been well adapted to the peculiar position and circumstances of those times; but I am of opinion that we have arrived at another important stage, when another and an important change has become essential, and which is, that in all cases where a lease of sufficient duration is not granted, the tenant shall be entitled to compensation for unexhausted improvements on quitting his farm; and here I expect I shall be again met with the charge of seeking to disunite the landlord and tenant. I, however, repudiate the charge, so far as it regards that kindness and friendship which should subsist between them, and must add to the pleasurable-ness of such an association; but I plead guilty to the wish of rendering the tenant independent of his landlord, so far as regards the *security* of his *property*, whether that consists of positive capital, or the result of his skill and industry. I hold that the dependence of the tenant upon the landlord, the existence and effect of that mystic bond between the parties, may have been well adapted to the circumstances of by-gone times, as described by Lord Kames; but they are by no means adapted to the present day (Hear). In order that there may be no misunderstanding as to what we are asking for in seeking to establish a system of tenant-right, it will be necessary to define it. I consider tenant-right to consist of "compensation to the tenant for unexhausted improvements in the land, in the event of his being deprived of his occupation before he has had time to reimburse himself for the outlay." Now, I contend that this question must be tested by the same rules which we apply to other matters of business; and the more nearly assimilated the instances adduced may be to the case under consideration, the greater will be the probability of producing conviction in the minds of those who are sceptical. Many individuals, ostensibly landlords, are in fact but tenants, as for instance, "tenants for life," or "on lives," "tenants for terms of years." Now, I ask such parties, I ask you, many of whom doubtless are, in the course of your engagements, well acquainted with such instances. I ask, will not the possessor of such property regulate the extent and character of his outlay in improvements according to the probable duration of his term? I ask, is not the uncertainty of such a tenure a great obstacle to improvement? The uncertainty of the tenure, in the case of a tenant for life, renders an estate of a large annual rental comparatively valueless—



no capitalist will advance money upon such a property. A tenancy for a term of years is more valuable; being definite, its value can be ascertained. So prejudicially has the tenure of "tenant for life" been found to operate, so effectually has it prevented the improvement of property, that in Scotland, long since, an act of parliament was obtained, enabling the "tenant for life" to borrow money for the purpose of expending it in improvements, and empowering him to charge it upon the estate. To this act Scotland is greatly indebted for the improvement in landed property in that part of the kingdom, so far as the owners are concerned. You are aware that recently an act of parliament has been passed in England, granting the same powers. This affords ample evidence of the drawback upon permanent improvement offered by uncertainty of tenure. The landowners having felt the evil as it affects themselves, and having so far provided a remedy, we now claim their attention to the position of the tenant, the hardship of whose situation is still more aggravated. As regards the occupation of the tenant farmer, I apprehend that it will not be disputed, that in all cases, except where a farm is in the highest state of cultivation when entered upon, and which is rare indeed, time is essential to enable him to obtain a return for his outlay. The commonest improvements require time to execute them, and before the farmer can reimburse himself his expenditure. Every outlay beyond that which is essentially necessary for the cultivation of the year, has reference forward to a return to be hereafter obtained. Whatever the rotation of cropping adopted—whether of four, five, or six years' duration—if a due system is pursued, the tenant's possession to the end of the rotation should be secured to him, or he must be injured. If, as I have before shewn, the owners of property are prevented making improvements on their estates, through want of permanent security, how can it be expected that a tenant, liable to be dispossessed on a six months' notice, should be bold enough, I should say rash enough, to place his property in such jeopardy? If a landowner, not having a residence on his own property, or being desirous of a residence elsewhere, rents a suitable mansion which needs an outlay to fit it for his purpose, he will be generally found sufficiently prudent, or will be so advised by his agent, not to make such outlay without the protection of a lease, lest, when he has expended his money, an advance of rent may be the result. The same prudent course is pursued by all men in other walks of life, and the man who should act otherwise, and suffer from his incaution, would be regarded with no pity; he would rather be looked upon as an inexperienced novice—as little less than an idiot. The farmer is as fully entitled to security, and as deserving of blame if he risks his property without security. This is very aptly put by Mr. Barugh Almaack, in his pamphlet—"Hints to Landlords." He asks, "Who is there that could advise a gentleman to purchase and pay for 400 acres of land without taking some title deeds for security? And if not, who, with common sense and common honesty, can advise ten farmers to lay out their capital on their farms of 400 acres each, so as to double the value of the land, and that without any written or positive guarantee that the owner may not, at any year's end, appropriate the whole of their improvements to himself, without making them the least return or allowance for the money they had laid out under a misplaced confidence in him?" I shall perhaps be here met with the remark that the instances in which the rent of the land could be materially raised are not numerous. My reply is, that I believe the greater part of the land in the kingdom would be materially increased in value—much doubled, and a great deal increased in value one-half—if leases of proper duration were granted to tenants possessing capital and skill. But then it will be said, on a great many extensive

estates belonging to the old aristocracy of the country there is such a mutual, well-placed confidence subsisting between landlord and tenant, that the latter feels perfectly secure, it being the practice never to displace a tenant except under extreme circumstances or great aggravation. Such a confidence is incompatible with independence of mind and spirit (loud cheers). The man who knows and feels that his property—the occupation of his farm, by means of which he provides for himself and his family—is at the mercy of an individual, a man possessing all the infirmities of our nature, who, if he be benevolent, kind, and just, may be succeeded by one who may inherit his estate, but not his virtues—who may, from unforeseen circumstances, by chance or otherwise, be induced or compelled to dispose of his estate—who may be misled by false representations—whose ear may be poisoned by some malicious underling—(loud cries of "Hear, hear")—can never feel himself at perfect ease, can never be inspired with that confidence which imbues the mind of the man who enjoys unquestionable security against the whims and caprices of individuals, or the chance of circumstances, and which is the soul of industry and exertion. Men may, by habit, become accustomed to such a state of things; but it must tend to lessen them in their own estimation, and is, beyond all question, detrimental to improvement. I may here appropriately quote the opinions of one whose long legal life enabled him to thoroughly learn the motives which influence men of all classes of society in the conduct of their ordinary affairs. The late Lord Eldon, when addressing his tenantry at Rusby Ford, in the county of Durham, in the year 1836, said, "It gives me great satisfaction to tell you that I have been informed by those from whom I can receive accurate information on the subject, that you have all of you made improvements in the management of your farms. I cannot but attribute these beneficial effects in a great measure to the alteration you have made in the tenure of your farms in taking them for a term instead of from year to year" (Hear, hear). Such was the opinion of Lord Eldon, who, through a long life, was placed in a high and important position in the state, who was blessed with talents of no common order, and who had great opportunities of observing the principles which regulate the actions of men (Hear). "It is evident to me, as it must, I think, be to you all, that a tenant, who is liable to be removed in a year from his farm, cannot, satisfactorily to himself, make those improvements which he will do when he is sure that he can remain long enough to reap the benefit to himself of those improvements. Here again it may be repeated that almost all large, influential, and extensive landed proprietors, who will only let their farms from year to year, do not eject their tenants. The attempt to meet my demand for security of tenure by asserting that tenants so situated already possess it, is an admission that you consider security necessary. If, then, you be sincere, why not concede "tenant-right," which will not only be a shield of protection against unforeseen contingencies and attempted injustice, but will inspire every tenant with a confidence which will induce him to outlay his capital liberally in the improvement of his occupation. I think I have said enough to show that security of tenure is essential to induce improvement—and that security is best obtained by a lease of a proper duration; but where landlords are unable or unwilling to grant leases, justice to the tenant and a prudential consideration for their own rent-roll demands that, in the event of sudden eviction, compensation should be made for unexhausted improvements in the land. I would again advert to the remarks of the Duke of Richmond. You all attach great importance, and deservedly so, to any observations that fall from that nobleman; for, whatever some may think of the correctness of his views, you are all agreed that

he is sincere and honest in his convictions, and that that which he does and says, he believes to be beneficial to the party on whose behalf he acts (cheers). Now I must confess that if I had been placed in the position of a landlord I should not have liked the observations which his Grace made at the Smithfield meeting (Hear). He says—"I don't exactly like the term 'tenant-right,'" and goes on to observe that "if it had been called 'justice to the tenant' I think it would have been conceded long ago" (Hear, hear). Now I cannot but feel that his Grace must also think, in the absence of "tenant-right" that justice has not been done to the tenant (cheers), because he says "It is justice to the tenant, but we don't like the name given it" (Hear, hear, and a laugh). I hope that observation will make a due impression upon all landlords, and that they will pay that respect to his Grace's opinion on this point which they do to his other opinions affecting their interests (Hear, and cheers). It will not be denied that the want of capital by landlords and tenants is one of the greatest impediments to improvement in agriculture now existing. To induce the application of some of the immense mass of capital with which this country abounds, to the land, is a most important and desirable object. The truth of this proposition is admitted, and the evil in some measure remedied, so far as the landowners are concerned, by the act of the last session, by which loans will be granted to landowners for draining, under certain regulations. The next great and important question is how to increase the capital of the tenantry. I say, grant security of tenure by leases, or give compensation for unexhausted improvements should the tenant be compelled to quit before he has had time to reimburse himself for his outlay. Many tenants having capital will not run the risk of expending it on the property of another without security; enjoying that security, they would readily effect improvements which would in due time be returned with a profit (cheers). Possessing the security of a lease or an agreement securing compensation for improvements, many tenants would be enabled to borrow capital, and then cultivate their farms to a much greater advantage. At present no capitalist will lend money to a man who is exposed to be deprived of the capital he may have invested in his farm at a six months' notice. Scotland has arrived at a high state of perfection in cultivation, nearly, if not altogether, through the security afforded by leases (Hear). The county of Norfolk affords another and signal instance in England. The high state of cultivation in Lincolnshire, the extensive improvements made upon soils of very inferior character, have been effected with the healthy influence of agreements securing compensation for unexhausted improvements, or "tenant-right" (Hear, hear). The question naturally occurs to us to inquire, how comes it that the remainder of England is not as well and as highly cultivated as Scotland or Lincolnshire? Is it the soil, the climate, or the system of management by the occupier? The traveller will, on passing through whole districts in England, see bad crops, land full of weeds, and stunted, miserable cattle; the labourers poor and ill-fed, and their families ragged, and their cottages out of repair, and, exclaiming, "How very far behind these people are!" will naturally inquire the cause. I will hazard the assertion that, in nine cases out of ten, a minute investigation will show that the system of letting, or the absurd restrictions imposed, operate to prevent men of capital and intelligence from entering upon such occupations. On this part of the question I will read you some observations from two parties—the one a Scotchman, and a great authority in Scotland, and the other an Englishman; and although I know that there is a little feeling against these comparisons between England and Scotland, the farmers of this country must admit that

those of the latter have attained a tolerable degree of eminence in farming (Hear, hear). Professor Low, in his work on "Landed Property," makes the following observations on the subject of landlord and tenant:—"Of the conditions referred to for establishing fitting regulations between the landlord and the tenant, the first in order, and the basis, it may be said, of all the others, is such security of possession as shall enable the farmer to employ his capital with advantage. The mere expenses of ordinary culture, which can be replaced within the year, form but a portion of that expenditure which an advancing state of agriculture demands. All the results of the great operations of the farm, as draining, liming, and other costly improvements, are prospective with respect to the returns to be derived; and the capital expended in such works can only, for the most part, be drawn back by periodical returns in the lapse of years. In draining land; in providing for it lime, marl, and other extraneous manures; in adopting rotation of crops, which, to be effectual to their end, must be extended through many seasons; not only is a period required to effect the operations, but a period likewise to recover the funds expended. If a farmer cannot look to the future with security, little can be hazarded by him beyond the expenses which the returns of the year will defray; and not only will all great improvements, but even the most common works of the season, be imperfectly performed. If we shall deny to the farmer that security of possession which is essential to the safe and profitable application of his funds, we may rest assured that his capital will be sparingly expended on another man's property; that the agriculture of the country will never arrive at the advanced condition of which it is susceptible; and that the persons employed in the occupation will lag behind the other productive classes in their means of improving their art and acquiring knowledge. The only fitting security for a man who has capital to employ in the cultivation and improvement of land, is a written covenant, subsisting for a definite and adequate period. Tenancy at will, it must be apparent, so much extended over the richest parts of England, is in no degree an adequate substitute for the lease, insuring to the tenant his right of possession for a determined period. Habit, indeed, may reconcile the tenantry of a country to such a species of tenure, and a kind of confidence may arise that a tenant will not be capriciously dispossessed, nor an unfair advantage be taken of his expenditure; but this confidence, however great, is not to be compared, as the means of inducing men to expend capital on land, with that sense of security and independence which is the soul of industry and exertion. It is impossible to divest the tenant-at-will of the knowledge, that every improvement which he makes upon his farm gives it a higher value to another, and adds to the means of raising the rent against himself. He may have all confidence in the honour of a landlord who is known to him, but what can he know of the feelings of those who, in the course of nature, may inherit the property in which he has invested his capital and earnings—of creditors and legal managers, or even of ordinary agents, on whom, in fact, he is more directly dependant than upon the landlord himself? All the confidence, therefore, which this species of tenancy can inspire, can never afford that security which a man of sense and prudence will require in order that he may lay out his acquired funds largely in the hope of a distant return. The cases may, and doubtless do, arise, in which men will thus hazard their property; but the cases must be the exception to the more ordinary result, and in the far greater number of instances, the occupiers of land, in this condition, will be found to be tardy in laying out the funds which their past labour has acquired to them, and better contented to follow in the track of old experience, and pursue the path which secures to them the means of decent liveli-

hood, than to adopt new and costly improvements, in the hope of returns which they or their families may not be permitted to enjoy. In every part of England are to be found cultivators who cannot be surpassed for spirit and intelligence; but with respect to the great mass of those engaged in agriculture as a profession, all experience shows the injurious effects of the system under which they have been trained. Over the finest parts of England we find a tenantry nearly stationary in their habits and condition, opposed to innovations on established practices, and educating their families as they themselves have been educated. Everywhere they will be found to prefer their tenancy-at-will to all the advantages which a permanent tenure can afford, because they know that they pay a lower rent, and can make it good by smaller exertions. The argument has again and again been used against the extension of leases, that the tenants themselves set no value on them; but to how different a conclusion ought the existence of such a feeling amongst the tenantry of a country to conduct us! The fact itself shows that the absence of leases may render a tenantry, ignorant of the means of employing their own capital with advantage, indisposed to the exertions which improvements demand, and better contented with an easy rent and dependant condition than with the prospect of an independence to be earned by increased exertion. And not only does the system of tenancy-at-will, so widely extended over England, and become, as it were, the habit of the country, react upon the condition of the occupiers of farms, and the means of perfecting their own act; but it affects, essentially and directly, the interests of the landowner and the country. When leases are withheld, it is manifest that innumerable outlays, which under other circumstances would be readily borne by the tenants, must fall upon the landlords. There can scarcely arise a case in which something beyond the expenses of ordinary cultivation is not required to maintain a farm in the necessary state of productiveness; but such outlays cannot, beyond certain limits, be made by tenants-at-will. They must be borne in some form or other by the landlord; and he must either make them directly or indirectly, by lowering the rent to the degree that the farmer himself may be able to make them. It is found, accordingly, that wherever tenancy-at-will is established, either the rents are comparatively low, or the income of the landlord is subjected to a perpetual drain by necessary outlays upon his farms. Every landlord in England, upon whose estate the system of annual tenures exists, feels that his rental is in many cases little more than nominal, from the continual diminution of it, which the necessary expenditure upon his estate requires. Nor is this expenditure a mere diminution of the income to the landlord: it is a loss of capital drawn from the land, which, if expended with economy and skill by tenants secured in their possession, would far more avail for the improvement of the farms of the country than grants obtained from the landlords by custom and the necessity of the case." Now, these are the opinions of a Scotchman on security of tenure as it bears upon the mutual interests of both landlord and tenant (Hear, hear). I will now read to you a few sentences from a book of Mr. Layton Cooke, and I do so principally because you might think the observations of Professor Low peculiarly applicable to the case of Scotland; and any feeling of that sort will, I am satisfied, be removed by your hearing the opinions of an English authority on the same point (cheers). "It being necessary to complete success in agriculture that the occupying tenant should have an extended interest in the land, the propriety of granting leases, subject to proper restrictions, to tenants of capital, skill, and integrity, is a matter of too obvious a nature to need any lengthened commentary. The only question likely

to arise is in reference to the duration of the term. The cultivation of land renders a considerable expenditure unavoidable, and it is often more especially requisite at the commencement of an occupation; while the benefit to be derived from such outlay must in many cases be remote. A prudent man will be deterred from risking his capital in agricultural speculations unless the right and title of his tenure were made so secure as to empower both him and his heirs to hold the land until they had had reasonable opportunity to reap the benefit of the expenditure. The fact of some of the old families having continued their tenants from father to son, for a long series of years, in the same occupation, has created mutual confidence; and has, in some cases, induced a belief of a yearly tenancy upon those estates being as secure as holding under lease upon others: a doctrine which, besides placing the occupier, as it does, in an undue state of dependence, is, to say the least of it, extremely hazardous. A tenant may have every disposition to rely implicitly upon the honour of his landlord, and upon the inclination of the agent to carry into full operation the wishes of the proprietor; but many circumstances may concur to render an extended interest in the land desirable to the tenant; the uncertainty of life being one of the most prominent. Under no circumstances, however, can there be a question, as far as it relates to the tenant, of the superiority of a legal holding of a term of years to the yearly holding, which may be terminated by the whim or caprice of the landlord or his agent." Now there is a small word introduced here, but it is a very important one, I mean the word "heirs," and I do hope that the next step in advance which we shall be able to make will be to obviate that gross and cruel state of things which is so unjust and so unworthy of a good landlord—I mean, that when the tenant dies and leaves a widow and family, that whatever portion of his capital may be buried in the soil, and whatever labour may have been expended thereon, all falls in to the benefit of the landowner (Hear, hear). I trust that one of the next moves made will be to place capital invested in a farm on the same footing, and in the same position, as any other investment would be, under such a contingency, in this country (Hear, and cheers). From the extracts which I have read, you will see that in point of principle there is very little difference between the opinions of the Englishman and the Scotchman. The impression made upon the minds of both are the results of practical experience, and their observations are much the same (Hear), and how it can be otherwise I cannot imagine. If you enter into any other engagement or contract except that of hiring a farm, I do not know any class of men more courteous or more ready than yourselves to say, "Do not risk your property," or "Do not place it at the caprice of any other individual" (Hear). Why, then, there should be any difference between capital invested in a farm and capital invested on any other description of property, I am at a loss to know (Hear). My object to-night, gentlemen, is merely to introduce this subject to your consideration; I do not hope to do any thing more than place it before you for the purpose of discussion. Before I conclude, however, there is another point to which I would call your attention, namely—the notice of six months now required in ordinary cases to be given by the landlord to the tenant. Now, I do hope that this period of six months will be extended to eighteen months or two years (cheers), or that the power will be given to the farmer, by tenant-right, of saying to his landlord, "If you reserve to yourself this right, at least you must pay me for that portion of my property which you acquire by it" (Hear, hear). All capitalists are sufficiently wary not to lend their capital without good security; and hence they will not lend

money to a farmer so circumstanced, as a man liable to be turned out of his farm at the end of six months' notice I say has no security at all (Hear). Another point, to which I would direct your attention, is the power of distraining for rent, which has a most prejudicial effect upon the interests of the farmer (Hear), and is the greatest bar to his ability of borrowing capital (Hear, hear). The case, as put to me by a friend lately, made a great impression upon my mind. Suppose a man possessing capital has brothers; one of them being a farmer, comes to him and says, "I want a little capital; will you lend me £1000." "Have you got a lease?" is the question in reply. "No, I have no lease, I am only tenant from year to year," answers the farmer. "Have you any agreement with your landlord to pay you for unexhausted improvements, if you are obliged to quit your farm?" "No," says the farmer. "Then," says the man of capital, "I cannot lend you any money, because, in addition to your having no security for your money expended on the farm, there is the chance of a distress for rent: the landlord may give you credit, and then pounce down upon you for the rent. If you were a tradesman I would lend it, because I should have your stock as security; but I cannot to you" (Hear, hear). I think this is a very fitting time for discussing and pressing the question of tenant-right, because I am of opinion that the desire heretofore felt on the part of the landlords of this country to retain what I cannot consider as anything but a personal control over the tenant is fast passing away (Hear), which, like some others, will shortly be sent to the "tomb of all the Capulets." There is another question too, namely, that of the game laws, which is of no mean importance as regards the interest of the tenant, which in proper time should command your attention. Once admit the system of tenant-right, and then if the farmer be evicted from his farm, he will be entitled to call upon his successor or his landlord for that compensation which no man can say but that he is now unjustly deprived of (Hear, hear). If a lease were granted for twenty-one years, with proper skill and industry on the part of the tenant, the landlord would be better off as regards his rent-roll than with a tenant from year to year, and probably two or three changes during that time (Hear). I have only now, gentlemen, to apologise for not putting the question before you in a more clear and perspicuous way, and can but repeat what I set out with saying, that I was anxious, at all events, to bring it forward, in order to give gentlemen coming to town the opportunity of recording their opinions thereon, and that upon their going back they might be able to say that this meeting had come to a unanimous vote, that the object in contemplation was not to injure the landlord; that, so far from it, we only ask what his Grace the Duke of Richmond calls "justice to the tenant," and that it is our opinion in that "justice" is involved the advantage of the landlord also (loud cheers). The subject under discussion is—"How far would a well regulated system of tenant-right be beneficial to landlords?" and I hope that the statements I have made have laid the foundation for proving that a system of tenant-right would be beneficial to the landlord. I think I shall be borne out by every farmer present in the assertion that the greater portion of the soil of this kingdom is capable of improvement, and I beg to conclude with the following reasons in favour of a system of tenant-right:—

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. (Loud and continued cheers.)

Mr. WILLIAM BENNET next rose, and said: Mr. Chairman and gentlemen, I cannot but express the great gratification which I have experienced in hearing the observations of our excellent friend, Mr. Shaw (cheers). Through a large portion of those observations I fully concurred with him. There were one or two points, however, in which, not being a practical farmer, he was, I think, a little wide. I wish it to be understood that I say this in a spirit of the most friendly feeling (Hear, hear). One of those points was that in which he laid it down that a lease did not require tenant-rights. He says, "The first thing is the lease, and next tenant-right." Now my idea is, that tenant-right is as fair under a lease as it is in the case of letting from year to year (Hear). I fully agree in, and wish it to be understood that I highly appreciate, the importance of discussing the subject without acrimony and with moderation (Hear, hear). It is proper that we should not regard ourselves as *ex parte* and on one side only of the question, and that we should lose sight of others (Hear); and as the question will come before the landlords, it is very proper that we should put it in such a form as is likely to make them see that it is a matter of right between man and man, and that they have an interest in it as well as ourselves (cheers). With regard to the Scotch system being superior to ours, I do not deny that in the main; but this shows that the lease does not do everything. A gentleman stated to me that, in coming in connexion with a Scotch farmer, he could not but admire the high mode of farming, and said to him, "But do you follow this expensive system quite throughout, to the end of the lease?" His reply was, "No, sir, I am not such a fool (Hear, and a laugh). I would not do such an injustice to my family, because it would be the sure way of either losing the farm or having to pay a higher rent for it" (Hear, hear). This shows that, if you want improvements in cultivation to go on progressively—and it is important to all that they should—you must have the power of getting compensation for

them [Hear]. Now what is the system in Scotland? I don't deny that the practice is to put a good deal into the land in the first seven years of the lease; during the next seven years the farm is kept in a state of about equilibrium; and during the last seven years the object is to drag all out again that you have put in (Hear, hear, and a laugh). Thus farming remains *in statu quo*. You give the tenant a certain security, it is true; but you don't place him in the position in which you ought to place him (Hear). The lease, therefore, ought to be subject to compensations, as well as lettings from year to year, and must be so if we are to go on in making those important improvements which the increased population of this country evidently calls for (Hear). Some reference has been made to Lincolnshire; but, although tenant-right has been partially adopted in Lincolnshire, it is only amongst those who think proper to adopt it; it is by no means general (Hear). I am aware that it would place a landlord in an awkward position were he to refuse it in a part of the country where so many grant it (Hear, hear). But it must be known that in Lincolnshire the tenant has no more claim upon the landlord than elsewhere, unless the landlord chooses to give it (Hear). I would particularly guard myself against saying anything that could be supposed to reflect upon the landlords of the country (Hear, hear); and the more I look at the subject, the more I think we ought to do this (Hear), because, as a class of men, I don't think we should ourselves be a whit more liberal (laughter and cheers); and if the land once went out of the possession of those noble families who have held it for centuries, and passed into the hands of those who have not been accustomed to the rural habits of the people, I think it would be an awful thing for this country (Hear). When we see land change hands, it rarely happens that the new landlord practises the same liberality which has been shown by the old one. I think it due to the landlords to say this, that injustice is the exception, and not the rule, between landlord and tenant (cheers). Nevertheless, we are but asking now for what we believe to be our right (Hear). All men are not equally liberal; and if men are disposed to be so, we must remember that they have not all equally the means of being so (Hear, hear). Then we see many die off; and they are not always succeeded by men as liberal as themselves. Hence it is that we want well-defined rights for *bonâ fide* improvements, for unexhausted improvements. About this there can be no doubt (Hear, hear); and there are people who will come to something like the fair value of these improvements. I do not think we ought to look at this as a difficult matter to arrive at (Hear, hear). In the first place, you must remember what a large amount of property there is that need not be subject to this contingency at all. The tenant makes his claim to compensation only in case of failure of agreement. In the case where, by death, the widow is not allowed to hold, I say there is, in point of equity, just as good a claim to the value of the improvements which have been made, as the landlord himself has to the fee-simple of the farm (Hear, hear). Although we are not annual-parliament men, we know how much more sensitive members are at the end than they are at the beginning of a parliament; and I do not, therefore, think that it would be a bad time to probe them a little upon this subject just now (laughter and cheers). If any of those gentlemen who, on public occasions, are apt to call us the "Proud Yeomanry of England" (laughter), were to bring it before us now, I think such as had voted against "tenant right," would cut but a sorry figure among us (Hear, hear). If we could carry a good strong feeling on behalf of the tenant into the House of Commons, I think the government would be disposed to listen to us, and then I think there would be a tolerable chance of getting the question carried (Hear, hear, and

cheers). In consequence of some observations which I had on a former occasion made, I received a letter from Lord Portman and Mr. Pusey, expressing a wish that this matter should be well digested at the different Farmers' Clubs, believing that it would be very difficult to get any such measure carried until the matter was well understood by the farmers themselves (Hear). The noble lord and Mr. Pusey did send me the draft of a bill upon the subject; but so long as "confidential" was written upon the letters, I felt that I could not make any public remarks upon the nature or character of the communication (Hear). You ought to remember, however, that Mr. Pusey was the first who went into the question of the rights of the tenantry of this country, and he did it in a manner that certainly impressed upon me, that he felt that there were rights that the tenant ought to have, but was not in possession of (Hear, hear). He was one of the first landlords who drew attention to the subjects of hedge-row timber and game (cheers). I think, under all the circumstances of the case, that we ought to appoint a committee, in order to put ourselves in communication with the other body interested in this subject, in order to ascertain the best mode of proceeding, and of preparing a bill which might be unobjectionable (Hear, hear). All we want in such a bill is one or two leading clauses for giving compensation; it need not go into particulars, for the less it did that the better. All we want is, the principle laid down that unexhausted improvements have a right to be paid for (cheers). I do not wish the ensuing session of parliament to pass away without something being done; and therefore, before we separate, I hope we shall take into our serious consideration, how far this meeting would be justified in appointing a committee to confer upon the subject, with a view to an application to parliament (Hear, hear). There is no doubt that rents are higher, in some circumstances, under lease than they are under lettings from year to year. But it is to guard against those grievous cases of hardship, that we wish to have the protection we seek. I know one case of very great hardship, in which a gentleman, of small fortune, hired a farm. There were two brothers and a sister to whom this farm belonged. Well, the tenant went to work in a most spirited manner, and from very poor land drew astonishingly large crops (Hear). It so happened however, that three years after he had been in possession of his farm, one of the sisters died, and the will required that the farm should be sold when any one death should take place in the family. The consequence was that, from the fact of its being in this high state of cultivation, the farm sold at a very high price, and the landlord who purchased it said to the tenant, "I have no intention of turning you out of the farm, but as I bought it at a very high price, I must have interest for my money." Now the consequence was that the mere interest of the money raised the rent of that farm 75*l.* per annum (Hear, hear). Now is this a state of things which ought to exist? (Hear.) Does it give security for good farming? (No, no). The tenant is laughed at for not farming better, and reproached for allowing his liquid manure to run away to waste; but if he does farm well, he does not get that security for his capital to which he is justly entitled (Hear, hear).

Mr. BAKER, of Writtle.—So much has been said, and so ably said upon this subject, that there is a very small field left for me to work upon. Our friend, Mr. Shaw, has given us an elaborate and able opening of the discussion, and Mr. Bennet has followed it up with such practical observations, that I am quite satisfied that if the discussion were to end now, we should not fail to obtain the object which we were desirous of obtaining (Hear). I shall not travel over the ground which has already been laid open, nor take up much of your valuable time. But it appears to me that so long as there

is land to let, and landlords have the control of their own property, they will make their own terms (Hear). It is unreasonable to expect that they should not do so; but it is our duty at the same time to point out to them such terms as will be most beneficial to themselves, and also to the advantage of the tenant (Hear, hear). There is one point of view in which this question has hardly been touched upon to-night, and that is the general and public point. Mr. Bennet certainly adverted to it in some measure, when he said that with the teeming millions of the population of this country, it was necessary to produce from a given number of acres a certain quantity of corn; it therefore behoved the legislature to give such protection to the tenant as would enable him to raise the greatest amount of corn from the land (Hear); and to enable him to do so, the interference of the legislature ought to take place (Hear). For it is impossible to suppose that any general system will be introduced so long as the matter is left to the stronger party who have power over the weaker (Hear), and so long as the landlord has the power of dictating the terms on which he shall let his land (hear, hear). As far as leases go, they are frequently quite as objectionable as lettings from year to year; for there are always in leases provisions which operate extremely injuriously to the interests of the tenant—provisions which operate inconveniently to his occupation and cultivation of the soil, and operate also to the disadvantage of the community at large (Hear). In the first place, where a lease is made with power to assign, but the right being reserved by the landlord of saying to whom it shall be assigned, the landlord ought certainly to be compelled to pay for improvements. This is nothing more than a matter of justice and equity; and if the landlord is not prepared to do so, then the clause giving him the power ought to be abolished. There is another peculiar clause in many leases, which is most objectionable and oppressive; and having had two or three cases come under my notice, I think it right to bring this clause before the farmers of England generally, in order that they may be guarded against in future. There is in the clause to which I am referring a power given to the landlord, which is called the "right of re-entry;" and it is this, that if the tenant be guilty of any infringement of the terms of his lease, or become insolvent or bankrupt, or by any other means shall do or be caused to be done any act contrary to the things prescribed in that lease, the landlord shall have power to take possession of the farm, the same as if the tenant had not had any lease whatsoever (Hear, hear). A case has come within my own knowledge, in which the tenant, overtaken by misfortune, became a bankrupt, through entering into another business, and the landlord thereupon took possession of all the growing crops, all the vested improvements, and everything that could not be removed; and furthermore, made a distress upon the moveables. The consequence of this was, that the rest of the creditors were obliged to take about 1s. in the pound for their debts, when otherwise there would have been from 10s. to 12s. all round (Hear, hear). Now, is this justice? (Cries of "No, no!") Then, in asking to get such enactments abolished, are we insisting upon anything inconsistent with "Tenant-right?" (Hear, hear.) Is it right the landlord should have a claim upon all the tenant's property, on account of some little lapse on his part? (Hear) Another objectionable point in leases is the power for distraining for rent. If the tenant gets in arrear, the landlord has the power of coming down at a particular moment, and seizing, to the prejudice of all the other creditors. What Mr. Bennet stated with regard to the termination of leases is perfectly correct. I made a similar statement at the last discussion on this subject. The fact is, where the improvements are likely to be taken out, it is better to hire a farm after a bad tenant than after a good one; for

the latter will leave nothing in the land (Hear, and a laugh). Were the landlord compelled to repay the tenant in proportion to his improvements, we should have the country improving to the extent of being able to maintain its population, and of placing it in an independent position in years of scarcity (Hear). An allusion has been made to Mr. Pusey: I am quite sure that there is not a person in this room who will not accord to him every mead of praise (Hear); for he is vastly ahead of other landlords on this subject (cheers). At Saffron Walden he was the first who stated that it was necessary that grass lands should be broken up—that pollards should be got rid of—that fences should be thrown down, and that game should be extinguished (cheers). We still find him following up these points, and advocating them successfully; and no doubt the subject will meet with that encouragement which it deserves from the legislature, and that we shall have some alteration in the law to the benefit of the tenant farmers of this country (Hear). But unless we do have some legislative enactment, altering the power of distraint, giving the tenant a vested interest in the improvements of the soil, and giving him also the power of obtaining from the landlord or the tenant in tail, who is the landlord's representative, no good will be done; depend upon it that so long as leases are made upon the principle on which they are now drawn, and renewed from time to time for the purpose of increasing expense, and so long as encouragement is given to long and extended leases the evil will never be got rid of (hear, hear). I shall not now longer occupy your time; a vast deal might be still said on the subject; but as the ground has been so well occupied by Mr. Slaw and Mr. Bennet, I shall conclude by thanking you for the patient hearing which you have given me (cheers).

Mr. LATTIMORE.—I have always felt so deep an interest in this question, and paid so much attention to it, particularly as regards yearly tenancy, that I have listened to Mr. Baker's observations with great gratification; for they tended to confirm me the more deeply in the conviction that, unless we have a complete change in the system, we shall have no independence and security for the capital of the tnantry of this country (Hear, hear). I recently met a gentleman of influence in the commercial world, who appeared to me to have much more enlightened views upon this question than many of my brother farmers; and he made this observation: "I don't understand practical farming; but of this I am sure, that there must be something radically wrong in the present system; for, from my youth up, of all the young men who have entered into the business of farming, I cannot find one that has succeeded in making a competency. For one farmer that makes a competency, you may find a hundred men in other kinds of business who have made their fortunes" (Hear, hear). I think the observations of both Mr. Bennet and Mr. Baker show that there is no chance for the capital of the farmer under the existing system; and although Mr. Pusey (who is a very excellent man, no doubt) may introduce the subject of tenant-right in the House of Commons, and Lord Portman in the House of Lords, there will be no chance for it unless the farmers themselves go to the root of the evil. I have said for some time, at the risk of giving offence to "my order," that they have no political existence whatever. Those objectionable clauses in leases, mentioned by Mr. Baker, show this (Hear). It may be asked why do they sign them? My answer is, because they have no power to help themselves (Hear). They have a large mass of floating capital, which gives employment and produces food for the people, and which ought to claim the protection of the Legislature (Hear, hear). At a time when Ireland is living upon charity, and famine and destitution prevail in that country to a frightful extent, as well as in some parts of Scotland,



the Legislature is bound by every means in its power to give security to the capital of the farmers of this kingdom, and enable them to cultivate the soil in such a manner that a larger amount of produce may be obtained (Hear). I am now speaking to practical men, and I don't hesitate to say that, if this were done, we should, in a very few years, be able to produce at least one-fourth more than we do at present, which in money value would give an addition of fifty millions sterling (Hear, hear, and cheers). Now, I would put it to you whether any subject of such high importance can be submitted to the ensuing Parliament as this of which I now stand before you as the humble advocate (cheers). It is difficult to compute the great annual diminution of capital which is going on in the cultivation of the soil under existing circumstances (Hear). The subject must be laid open in the light of a national law. There will be no advantage in capital employed in land, unless it is amply sufficient for the purpose; in fact, unless you give some surplus, there can be no profit. There must otherwise be loss, and that loss goes on increasing. There is no standing still in agriculture. As there is no legal existence in capital put into the soil, the farmer is obliged to catch it away again when he can. He is obliged to get it away by thrift; because he is dependent upon the caprice—political, social, or otherwise. This circumstance shows that the farmer is not in the position which he ought to be (Hear). Your appearance here, however, inspires me with some hope that you will go to the root of the evil—that you will not trust to any gentleman in the House of Commons, or to any peer in the House of Lords (Hear). I know the case of a landlord who had five tenants in fifteen years: there were four auction sales in the same time, and I will venture to say there will be another within twelve months (Hear, and a laugh). Now I think the system will not blossom in that way (Hear). I ask you, as practical men, whether there must not have been a great sacrifice of capital on the farm upon which this took place? (Hear, hear.) The time has come, gentlemen, when the State must interfere. These changes and this insecurity bring about the moral deterioration of those who suffer under it. It is impossible that the yearly tenant, who holds his little farm, and finds his capital sinking away from him, can maintain his independence, and command the respect of his children and servants, if they find him the slave of some other slave (Hear). In a national point of view, this ought not to be lost sight of (Hear). Why, an independent labourer, with the use of his good right arm, and free from anxiety, is in a superior position to a farmer so circumstanced (Hear). I know that it may be objected to tenant-right, that it would lead to a great increase of valuation. I know this is a drawback; but when a system of this kind generally prevails, you will have a class of farmers who will be called tenants' valuers—a class of men independent and of high standing (Hear).

Mr. MICH.—The object for which we have assembled, is to demonstrate that a system of compensation for improvements made on farms, while it would be highly beneficial to the tenant, would be also conducive to the interests of the landlord (Hear, hear). Wherever you give security, capital is protected; and wherever you take it away, capital is diminished; and the better the situation in which the tenant is placed, the more rent will the landlord be likely to obtain (cheers). I think this is an indisputable proposition; if not, you must agree to take the converse of the proposition, that the poorer the tenant the better off is the landlord (Hear, hear). For there is no doubt but that low rents and bad farming go hand in hand (Hear). Where there is no security, or where there is insufficient security, there must be a limited range of capital. Landlords are obliged in many cases to have an inferior class of

tenantry—poor, humble, and dependent. And why? Because they cannot get men of spirit to take their holdings upon insecure and uncertain tenure (Hear). It is obvious that much capital now employed in trade, manufactures, and commerce, would find its way into agriculture if there were a probability of profit attaching to it (Hear, hear). But, as it has been very justly remarked, in the present state of things men of capital, merchants, shipowners, and others, will not place their sons in so hazardous a position (Hear). They cannot make a return quickly enough. The return from capital invested in farming must always be a slow one; how important then it is that it should likewise be a sure one (Hear, and cheers). It is really past bearing that our property should be in so hazardous and uncertain a position as it is under the present system. We are all agreed, and I think the landlords are in their own minds agreed, that it is to their interest to render the situation of the tenant as secure as possible (Hear, hear). There is the political vote, that worthless thing, the 50*l.* qualification, which should never have passed (cheers). I am not going into politics, gentlemen; for, as it has passed, it is as fair for one side as the other (Hear, hear). But see how it warps our minds; see how it prevents our acting liberally towards the tenantry (cheers). It is, however, your fault if you don't get the measure passed which we are advocating. I have always understood that the buyer has the power in his hands; and if you act properly you will have the power as "hirers." You will travel from county to county, and take land only of those landlords who will give you a proper valuation for your improvements (Hear). I do not myself believe that any legislative enactment will answer the purpose which you expect. I think the effect must be produced by moral force (Hear). Suppose an act of valuation were passed. What is your position? Are you agreed what improvements are (Hear)? Many of my neighbours differ from me upon the point of drainage. Many of them agree with me that drainage is a practical and essential part of agriculture (Hear, hear). But many, on the other hand, deny the utility of draining on strong fallows. Now these are questions which must be all settled before you can carry out valuation for improvements (Hear, hear). But there is no doubt of the fact that the agriculture of this country can never be carried out without such a system of valuation as that for which you are contending (cheers). Be therefore united, agree among yourselves what improvements really are, and enforce them through your local clubs by unison and co-operation; and above all things impress upon the minds of your landlords that without capital no good can be done with the land (loud cheers).

Mr. BLAND appeared as the representative of North and South Wilts. He said: We came up to this meeting for the purpose of convincing the landlords, if we could, that tenant-right would be to their advantage as well as ours; and I think there can be no doubt that if it is advantageous to the tenant it must be to the landlord also. It should be our great object to impress this upon the landlords (Hear). At present the land is not improved because the security is bad. I think, however, we have been looking at the question rather too much with the eyes of tenants. Mr. Shaw made the observation that an increase of rent must grow out of tenant-right (Hear). Now, if we wont allow that to be the case, how can we expect the landlord to believe it (Hear)? But, if we really do believe it, let us stand up boldly and declare before the world, that we do hold and believe that security of tenant-right tends to increase the value of rents (Hear, hear).

Mr. BALLS, of Cambridge: It is just possible that people who come to claim fresh privileges for themselves may not be the most discriminating as to the rights of

others. I think we look at the question too much as a tenant's question, and I am of opinion that the worst evil that could happen in this matter would be scattering dissension between the two classes of landlords and tenants; and that he is the best friend of the tenant who endeavours to cherish a good and kindly feeling between them (Hear). I think some of the remarks of Mr. Lattimore tended to the severance of those who ought to be in the strictest alliance (No, no). I will not make the same observation upon Mr. Shaw's remarks (Hear); for there was so much mind, so much power, so much temper, and so much firmness in his observations, that I acquit him of having said or done anything to create dissension (Hear and cheers). I listened to him with great satisfaction when he said there could be nothing so ruinous, and so much to be deprecated, as that our common interests should be divided (Hear). But have we not been running upon this question solely with a view to our own interests? If you say a tenant ought to have a lease, I go cordially and heartily with you; and I think no gentleman ought to be offended at being asked for a lease: for, if he does not mean to violate his word—if he intends to act honourably towards his tenant—why not give him the lease which will secure to him that which the landholder promises? Then, I think it also only the commonest and sheerest act of justice, that if improvements have been made by the tenant, and he is compelled to quit his farm, that he should receive compensation for his outlay in such improvements (Hear). So far I go with Mr. Shaw, and am ready to co-operate with him; but I differ entirely from Mr. Shaw and Mr. Buller when they say that the landlord has no right to recover for rent beyond the year. If you had a law passed to prevent his recovering beyond one year's rent, you would put it altogether out of the power of the landlord to show any delicacy or kindness towards the tenant. After some further observations, Mr. Balls concluded by saying, I admit we are entitled to leases, and to compensation under certain circumstances; but we are not entitled to deprive the landlord of the power of recovering his rent, or of following his favourite sports (Hear).

Mr. LATTIMORE denied any intention of sowing dissension between landlords and tenants, and retorted upon Mr. Balls the charge of speaking in a tone of bitterness.

Mr. GORE, from the Ardley Farmers' Club, said: I hope in a short time to be able to co-operate with you for the benefit of the farmers of England. Without going into any lengthened details upon the topics introduced by the previous speaker, perhaps I may be permitted to make a few observations with reference to improvements in land (Hear). Now, I think we should regard those as the most important which we term permanent improvements; for I think many farmers are deluded into the belief that producing very large crops over a short period is an improvement. This I regard rather as injuring the land; whereas, with permanent improvements, great benefit accrues to society at large. The more we adopt the permanent system the better. I think that the remarks made this evening show that all we want is fixity of tenure; that the tenant shall receive just remuneration for the improvements he makes, and that return for capital which every man in business is fairly entitled to (Hear, hear). Our real business must be rendering the land fit for production; not by that evanescent and artificial system of producing extraordinary crops for a short period, but by improvements of a permanent and lasting character (Cheers).

Mr. EDWARD AITCHESON: We are here to prove that the landed proprietor is as highly interested in this matter as ourselves. Now it must be perfectly clear that if land is improperly used, or badly farmed, it cannot be to the landlord's interest (Hear, hear). In case of death, where a farm reverts to the landlord, he is frequently obliged to put it into condition before he can

again let it: but a farm ought to be kept up to such a condition, that if A died B could at once take it (Hear). Our object is to prove to the landlords that it is to their interest that land should be so kept up; and in order to enable and encourage the tenant to do this, you must give him security, whether he be a yearly tenant or a leaseholder, that at the end of his term he will receive back that which he has invested in it (Cheers). These are the points which we have to keep in view, namely, to keep the land in such a state that it will always be producing a large crop for the benefit of mankind, in order that we may get rid of that fear which we labour under, that we are obliged to go to the foreigner for our supply (Hear, hear). These are my sentiments on the subject; and I care not whether the case be that of a leaseholder or a yearly tenancy (Hear). The landlord is protected; let the tenant be protected also (Hear, hear). The only way in which we can settle the question is, that the tenant should be paid for that which he has done in the way of drainage or manuring—casting aside all observations with regard to artificial manures, for that question I throw overboard altogether—I say the only way is, that the tenant should be paid for the animal manures that he has put in, and for the number of feet of drainage which he may have made, if the landlord will not do it for him. I should say, if the landlord refused to do it, "Well, I will do it myself; but if I should be compelled to leave at a year's notice, I must be paid for what I have done, and then I shall be enabled to take my 1,000*l.* into the next farm if I wish" (Hear, hear). All we have to say is this: We will do justice to the landlords, and let the landlords do justice to us (Hear, hear, and cheers).

Mr. WEBSTER, of Peterborough, having stated that the local club, of which he was a member, had subscribed two guineas in order to be able to send a couple of representatives to the London Club, proceeded to say: A well regulated tenant-right would ensure to the landlords tenants with capital, and that is what the landlords ought to look to (Hear, hear.) At present the number of farmers greatly increases; but the number of farms does not: the consequence is, that there are so many bidders for every farm that is to let, that the best bidder gets it, whether he has capital to farm it or not. This is a great evil (Hear). If you had tenant-right, it would ensure men of capital, and keep out those men who run after farms, and are not able to cultivate them (Hear, hear). Food cannot be obtained unless you farm extensively; and you cannot farm extensively unless you have security (cheers). When you are asked how far tenant-right would be advantageous to the landlords, you might suppose the example of farming in Lincolnshire and Norfolk would sufficiently show the advantages of it (Hear). In the north of Lincolnshire you may see splendid specimens of farming, and there they have tenant-right; in Norfolk also, and there they have nothing but long leases (cheers). Lincoln heath, a few years back, was nothing but a rabbit-warren; and Norfolk was nothing but sand. In Northampton, on the other hand, agriculture is in a very backward state; at the same time, if encouragement could be given to the tenant as in the districts I have mentioned, it would have a very beneficial effect (Hear, hear). It is a mistaken notion to let land in small occupations. It would be quite impossible that this country could be carried on with small occupations: no man would like a small farm who could take a large one (Hear, hear). One of the gentlemen who have spoken made allusion to agreements in leases; I would rather call them "shackles;" and I look upon them as a bar to all improvement (cheers). Tenant-right would give every encouragement to good farming. Give me a man who can grow wheat every year (Hear, hear); I don't care how he does it (Hear, laughter and cheers). Give me the man who produces



the most food for you (Hear, hear). I don't see why farmers should be smothered up by all sorts of "agreements" (Hear, hear); let them have the same advantages as manufacturers. The mechanic can go, with his skill and his capital, and take out his patent; there is no chain or fetter upon him (Hear, hear); but you scarcely ever hear of a farmer getting rich. Never talk of protection instead of letting him rest on his own industry and perseverance. What damps the energies and enterprise of men a great deal is, that where valuations have taken place, consequent upon improvements made, the rent has been considerably raised (cheers). I speak from experience in these matters (Hear). We ought not to look at this matter as a question exactly between landlord and tenant, but as a great national question (renewed cheers). We ought to look at the advantages to be obtained by increased production (Hear, hear); to look forward to the time when food shall be placed within the reach of every poor person at a moderate price. We ought to look forward to that time, with a view to ascertaining and knowing *who is to supply it*—whether the British farmer, or foreign nations (loud cheers). Tenant-right gives security for the employment of skill and capital: Lord Portman and Mr. Pusey advocate tenant-right (Hear). If it is good for them, it is good for others. It only rests with ourselves to point it out in a straight-forward and honourable way, and no doubt we shall gain our end (Hear, hear, and renewed cheering).

Mr. GEORGE GOWER (of Dilham, Norfolk): I cannot help stating that I have felt somewhat disappointed at the general turn which this discussion has taken. I am myself nothing but a tenant-farmer, and I do not hesitate to say that some of the landlords in our part of the country have viewed this question with a degree of jealousy from the very name given it. It was, when previously discussed, suggested whether you had given this subject its proper name, and whether you should not, in some way or other, have embraced the landlord's side of the question (Hear). It was thought that there ought to be compensation for landlords as well as tenants; for you must know that there are bad tenants, as well as bad landlords (Hear). I am but a tenant, as I said before, but to their honour be it spoken there is no class of men so liberal as the owners of the soil (Hear). Look at the great patron of agriculture, the late Lord Leicester; it is to his liberality that our exertions in Norfolk have been so successful (loud cheers). I quite agree that it is not the possession of a lease alone that benefits the tenant-farmer, but the liberal way in which the lease is drawn up (Hear, hear). I am not one of those who think that the prosperity of agriculture depends on leases; but a great deal more upon a well-defined, well-discussed, and well-understood system of tenant-right (renewed cheers); and that tenant-right must depend on the question being well argued out as to what unexhausted improvements are, and what they are not (Hear, hear). I do not think that this will prove beneficial to the farmers of the United Kingdom by being passed into a law: if the question be practically, and fairly, and amicably discussed, in the various local clubs, so that the gentlemen of this country should see that it is to their benefit, I think they would adopt it without your interfering to pass a law (Hear, hear). This opinion may be contrary to the opinions of those gentlemen who have preceded me in addressing you to-night; still, it is my humble opinion, as the representative of a club in which there are a large number of landholders—(Hear)—and where we have just introduced the discussion of this subject. A large landholder said he thought it was a very odd question (Hear, and a laugh). I explained what I considered it to be: namely, "that if a tenant laid out money in draining, in artificial manures, in feeding beasts, or in marling or claying the soil, and

was obliged to leave the farm at a short notice—these were things for which I thought the tenant clearly had a claim to compensation." (Hear.) He agreed immediately, and told me it was the very system he had adopted in letting his land at a year and three-quarters notice—the tenant to be compensated for all improvements (cheers); and he also agreed to come to the club and discuss it (Hear, hear).

Mr. SHAW (of the Strand): As a matter of form I am called upon to offer a few observations in reply to the discussion which has taken place on this important question; and first and foremost, I beg to offer my thanks to the gentleman who has just sat down, for I think he has been very happy and very effective in the remarks which he has made (cheers), and I am only fearful that, in anything I may say, I may to some extent remove the impression made by those remarks, which I think ought to remain indelibly fixed upon your minds (Hear). I should like to see them strongly impressed elsewhere. Now, he is a Norfolk farmer, and he falls into my views entirely: but he says a landholder, in the county of Norfolk, thought the question of "tenant right a very odd question" (Hear, hear). I have not the slightest doubt that three-fourths of the landholders will think it a very odd question (Hear, and a laugh). I must confess that I was not and am not prepared to go at that railroad speed at which I see some gentlemen here this evening are disposed to go (Hear). I am very anxious to progress in the matter, but I have lived long enough to see how very difficult it is to advance any question in which the landed interest is concerned (Hear, hear), even though it might not possess one-tenth part of the difficulty which this question does possess (Hear, hear). I am much gratified by the efforts of Lord Portman, because I think that it is a step towards calling attention to the subject, and bringing men's minds to bear upon it. Yet I for one am not prepared to take a step in the same direction, by advising immediate application to the legislature (Hear). Since the question was first discussed, I have taken all the pains I could to get it discussed also at the local clubs in the country. I have twice written requesting them to discuss it, and I find that 17 out of 200 *have* discussed it (laughter). Now, no doubt that to a great many of them it appeared as "odd" a question as it was to the Norfolk landlord (Hear, laughter, and cheers). Mr. Bennet thinks the best mode of proceeding is to go to the Legislature for an enactment, and several gentlemen present coincide with him in that view. I think, however, that Lord Portman gives us an immediate answer on that point. Lord Portman said he should be glad to see the heads of a bill, but he thought it was no use going to him until the question was well digested by the farmers themselves (Hear). Now, that is my feeling; and if you think that the fact of 17 clubs having discussed the matter out of 200, amounts to well digesting it, I confess that I do not agree with you (Hear). The primary step is, to disabuse the minds of the landlords, by convincing them of the integrity of our intentions, and the benefits which must result from the system; to discuss it every where, and to discuss it with the landlords themselves, until we satisfy and convince them that our object is a good one, and thus produce a moral effect (Hear, hear). I am perfectly satisfied that it is a question that will gather strength as it grows; all that it requires is to be well understood. I perfectly agree in the sentiment that the landlords will do us justice, if they once understand it, but I feel convinced, at the same time, that nothing that we can do will enable them sufficiently to understand it to admit of speedy legislation (Hear). The gentlemen who are here from the country will return to their different districts, and report the spirit in which we have discussed the question. I felt, when I entered this room,

that I could not if I wished induce you to do anything which should affect the good feeling which ought to exist between landlord and tenant (Hear). But don't let us have ideal friendship, but a friendship based upon and cemented by those common principles which unite all men, whether they be men of business or members of the same family (Hear, hear). It is to secure a friendship with the landlords upon these solid principles, that I am anxious to have this question well understood, in order that it may no longer appear an "odd" question (Hear, hear). I shall now conclude by congratulating you upon what I hope will prove the good effects of this meeting, by calling upon you to discuss the matter whenever you have an opportunity, and to explain it as our friend, the Norfolk farmer, did to the Norfolk landlord (cheers). Giving then all credit to the landlords of this country for good intentions and integrity, I say that I am convinced that when the matter is thoroughly understood, the question of tenant-right will be conceded to you (cheers).

The CHAIRMAN: I have listened, gentlemen, with much interest to the remarks of Mr. Shaw, Mr. Bennet, and other gentlemen who have addressed you. Their opinions generally coincide with mine. I consider, and all have considered, that a defined and well regulated system was essential to a good understanding between the landlord and his tenant (Hear). I did not suppose that at a numerous meeting like this, with gentlemen coming from all parts of the country to express their opinions, that we should be quite unanimous; but upon the whole we are all pretty much of one mind upon this point: namely, that a defined and well regulated system of tenant-right will be advantageous to the country at large, and to the landlords themselves (Hear). I quite agree with the observation of Mr. Bennet, that now is the time to persevere; and I think it will be well to appoint a committee for the purpose of furthering our views and obtaining our object (Hear). It strikes me that our legislators are aware that something must be done to encourage the investment of more capital in the soil; there are not more than two-thirds of the capital so invested that there

might be, if there was a good understanding between the landlord and tenant. This would act beneficially upon the landlord, by increasing his rents; upon the labourer, by increasing the quantity of employment; and upon the community at large, by increasing the staff of life (Hear, hear, and cheers). I am sure that the sentiments which have been expressed to-night will show to the world that the farmers desire to have the question fairly settled; that they have no wish to take any undue or unfair advantage of the question, but simply want it adjusted in a manner which shall be conducive to the advantage of all parties (Hear, hear).

Mr. SHAW then moved, "That a well regulated system of tenant-right would be beneficial to the landlords of this country."

Mr. GAYFORD seconded it; and said, that while he admitted the justice of the principle that the landlord would compensate a good tenant for the improvements made upon a farm, he thought that on the other hand a bad tenant ought to be compelled to pay the landholder for injury done to his property (Hear).

The resolution was carried unanimously.

Mr. BAKER then moved, "That extended security to the tenant, for his investments in the cultivation of the soil, would tend to increase the produce, and preserve the same in a better state of cultivation; thereby enhancing its value, as well as relieving it from the payment of poor-rates, by giving increased employment to the labourer." (Cheers.)

Mr. BENNET seconded the resolution, which was also carried unanimously.

A committee was then appointed to carry out the objects of the meeting, comprising the following gentlemen, with power to add to their number:—Mr. Baker, Essex; Mr. Bennet, Bedfordshire; Mr. Umbers, Warwickshire; Mr. Jonas, Cambridgeshire; Mr. Edward Aitcheson, Sussex; Mr. Oakley, Kent; Mr. Balls, Cambridgeshire; Mr. Smith, Rutlandshire; Mr. Turner, Devonshire; and Mr. Hudson, Norfolk.

The meeting then separated.

## THE RODD TESTIMONIAL.

PROPOSED AGRICULTURAL COLLEGE, AND MODEL FARM.

A general meeting of the subscribers to this undertaking was held at Oliver's Hotel, Bodmin, on Wednesday, 6th Jan., "to receive a report of the funds already raised, and to adopt such other measures as may be deemed expedient."

The Right Hon. the Earl of St. Germans presided.

There was a good attendance of influential landowners; and not an inconsiderable number of farmers. The general spirit of the meeting was that of hearty good will towards the proposed institution, united with a determination to proceed cautiously and carefully, with due calculation of the cost and probable results.

Among those present, we observed W. H. P. Carew, Esq., M. P., the Rev. Canon Rogers, T. J. A. Robartes, Esq., Augustus Coryton, Esq., N. Kendall, Esq., Capt. Hext, C. Rashleigh, Esq., E. Archer, Esq., G. Gurney, Esq., T. Pearce, Esq., E. Stephens, Esq., D. P. Hobblyn, Esq., R. G. Bennet, Esq., T. R. Avery, Esq., J. C. Roberts, Esq., H. Simcoe, Esq., C. C. Hawker, Esq., Rev. G. Coryton, Rev. C. H. Archer, Rev. G. Somerset, Rev. H. A. Simcoe, Rev. Darrel Stephens, Rev. S. Wallis Roberts, Rev. F. Kendall, J. Ward, Esq., Capt. Liddell, Mr. Wallis, Mr. Snell, Mr. Raddell, &c.

A resolution to the effect that the meeting believed that sufficient funds could be raised for the proposed institution was carried, and the following noblemen and gentlemen were appointed as a committee for soliciting support from the different landowners of the county:—

Earl of St. Germans, Lord Vivian, Hon. George M. Fortescue, Sir Chas. Lemon, Bart., M. P., Sir W. Molesworth, Bart., M. P., The High Sheriff, Messrs. Carew, M. P., Rashleigh, M. P., Treclawney, M. P., Robartes, Colman Rashleigh, Charles Sawle, Gwatkin, Coryton, Enys, Davies Gilbert, Lethbridge, Humphrey Wilyaans, Coryton Roberts, Archer, Goldsworthy Gurney, Davey, Andrew, Collins of Truthan, Simcoe, Gully Bennett, The Mayor of Bodmin, Messrs. Avery, Herndon, Stevens, Pearce, Shearn, Rawlins, Hendy, Varcoe, Geach, Wills, Trethewey, Snell, Lakeman, Pollard, Doble, Mark Guy, Charles Parks, and D. W. Raddell.

Thanks were returned to the chairman, and to Edward Archer, Esq., for his efficient services in promoting the undertaking; after which the meeting separated.

## A MEANS OF AFFORDING EMPLOYMENT TO POOR HIGHLANDERS.

BY MR. HUGH WATSON, KEILLOR, COUPAR-ANGUS.

Having lately had opportunity, by personal communication with some of the most influential and extensive West Highland proprietors of land, as also from written information and public newspaper report, of learning of the severity of the distress which the inhabitants of the Northern and Western Isles, as well as many of the inland Highland districts of Scotland, are inevitably doomed to suffer by the failure of their principal crop, unless relieved by an extraordinary interference of the government, or the sympathy and aid of their fellow-subjects, I have been compelled to turn my mind to this distressing subject, both from a sincere desire of using my best endeavours to aid in alleviating the misery of these poor sufferers, under the severe infliction with which it has pleased Providence to visit them, by the failure in their chief means of support, the *potatoes*, the almost total loss of which, for a season, *as food for man*, seems now to be ascertained beyond doubt, as well as to suggest the means of future independence for a portion of the many human beings so afflicted. The first step, of course, must be, to see that starvation is not the almost immediate consequence of the want of food, so far as charity can safely be applied to such a case; and I rejoice to observe that much has been done, and will still be done, in this way. But I hold there is something radically wrong in the management of landed property, where such numbers of human beings are fostered upon it, as cannot be supported by some more proper means than merely *keeping in their lives by the smallest allowance of the poorest food*, and suffering them barely *to live and move*, without being able to turn their industry and exertions to any useful purpose beyond the gratification the chief may feel in lording it over so many submissive vassals, whom, in the day of need, he has not the means of even saving from starvation. Therefore, if starvation is likely to be the result, *for this season at least* let their more fortunate fellow-creatures come forward with alacrity, according as God as blessed them with the means, and raise such a fund as will supply the material of subsistence, till other and more rational steps than have hitherto been resorted to shall be resolved upon by the Highland proprietors, or, if necessary, by the legislature, to prevent the recurrence of so great a national calamity.

The plan which suggests itself to me, as likely

to afford the most agreeable *first step* to the Highlander, is to put into his power to *emigrate* into the more fertile districts of *his own country*, where his labour will be a source of profit to those who employ and pay him, and of infinite advantage to himself and family (if he have one), by at once raising him to independence, while his children will be reared under other notions than *merely to have existence*. For this purpose I would suggest, as a *partial relief*, that it be immediately ascertained, by the clergymen of every agricultural parish in Scotland and the north of England, to what extent labour is required, how many families the farmers of each parish could accommodate with houses and work on their farms, the males constantly for a year, the other branches of the family as the operations of the farm may require. Judging from the want of labourers at present felt in this district, I calculate that each agricultural parish in Scotland would take a supply of not less than twenty families, and be glad to receive them, to fill up the want of labour occasioned by a large portion of those formerly employed in agriculture now removed to the more profitable work on railways and in manufactories. It may be that Highlanders may not be able to work *skilfully* at first in the various departments of farm-labour; but let them begin with their spades, or trenching and draining implements, and be paid in proportion to their dexterity, or by piece-work, and there can be no doubt the able-bodied, *if well fed*, will at least be capable of earning a decent livelihood; while the younger branches of the families, male and female, will be initiated into the best modes of working. Thus our Highlands and islands will be, as must have been intended by the wise Disposer of all events, a source of national blessing and advantage, instead of a load upon the more cultivated districts, and in future years they would become a valuable nursery for supplying industrious labourers to our increasing manufactories, and improved system of farming the soil, which is annually becoming more dependent upon manual labour. In a short time, the first importation of labourers would be moved to better employment, such as they are suited for by their training and education, and thus give room for another, and perhaps more extended relief; and in the end, their present apparent misery will have been only the first great step to their temporal as well as improved spiritual

happiness, by forcing upon them a change in every way for their benefit.

I am ready to accommodate from six to ten families on my own farms; and if this forms any criterion, as I have no doubt it does, of the wants of others, occupying a proportionate extent of land, the relief to the over-populated districts of the Highlands would at once be very great, and almost sufficient for the present emergency. At the same time, it must be expected that a like movement will be made *by manufacturers*, and other employers of labourers; or, if they urge that the Highlanders are not qualified to work in manufactories, let them come forward with present relief from their ample means, and look for their *ultimate return* to the

supply of useful labour the agriculturists will thus have raised up for them, and this perhaps at no very distant period, should their present well-skilled artisans be induced to remove to other countries, as to a certain extent has already occurred.

It consists with my knowledge, that not less than two thousand men can immediately find employment, and good wages, on the line of railway forming from Stirling to Perth, and onwards to Forfar; and other lines are equally desirous of increasing their hands. So that whatever other calamities may exist in the Highlands, the want of employment for their inhabitants at present forms no part.—*Journal of Agriculture.*

### YORK FARMERS' CLUB.

This flourishing society held their second monthly meeting, in their room in Low Ousegate, on Thursday Dec. 10th, 1846.—R. W. F. Mills, Esq., one of the vice-presidents, in the chair.

Mr. White, the secretary, read over the minutes of proceedings since the last monthly meeting, and stated the present number of members to be 126, and announced a donation of books from Messrs. Bellerby and Sampson of this city, consisting of Marshall's County Reports, five vols 8vo. and Evelyn's Sylva, edited by Dr. Hunter, two vols 4to. A vote of thanks having been passed to the donors, the chairman introduced Mr. Ware, of Skirpenbeck, to lead the discussion upon the prevailing disease of the potato crops, and the probable advantages of autumnal planting.

Mr. Ware in a luminous and clever address reviewed the subject of the potato disease, and stated several experiments which he tried: in the course of his observations he quoted some of the most celebrated writers on this most unaccountable disease; and in conclusion, Mr. Ware laid down the following rules:—

1. That those kinds only should be used for sets which have hitherto been found the least injured by the epidemic; the sets not to exceed the middle size, nor to be under the size of a walnut.

2. That the tubers should be allowed to ripen before taken out of the ground, which should be in dry weather, and afterwards be stored in a dry, cool brick or stone building, properly ventilated, with a little quick-lime scattered over them in the proportion of one bushel of lime to 20 bushels of potatoes, and frequently sorted over to prevent sprouting.

3. That the land should be well pulverized and limed in the spring before ridging, and the potato planted whole under the manure, and quick-lime

again scattered over the plants after they come up, the crop to be kept free from weeds and properly earthed up. For autumnal planting he would have the potatoes replanted in ridges, as soon as possible after they were taken up in October or November, and under the manure; and for spring planting he would recommend the latter end of April or first week in May.

At the close of Mr. Ware's observations, which appeared to afford considerable satisfaction, the meeting was addressed by Mr. White, who dwelt principally upon the advantages of the rough sulphate of magnesia as a top dressing, and also as a restorative to the already diseased potato; Mr. O. A. Moore, upon the botanical nature of the plant and its disease; Mr. E. Allen, upon its physiological phenomena; and Mr. Smallwood, whose practical observations met with considerable attention, as they in a great measure corroborated the views of Mr. Ware. The following resolution was then passed, together with a vote of thanks to Mr. Ware and to the chairman, viz. :—

“That whilst unable to assign satisfactory causes for the disease which has lately attacked the potato plant, this meeting recommends greater care in storing the crop; and it further resolved that, in their opinion, autumnal planting of potatoes is the most desirable, or, when that cannot be adopted, planting as early in the spring as the nature of the soil and season will permit. They recommend the use of lime or other manures of an absorbent character. The meeting also concurred in the opinion of Mr. White, on the beneficial effect upon diseased tubers, by steeping them in a solution of the rough sulphate of magnesia as recommended by that gentleman, and that the same salt might be advantageously employed as a top-dressing.

AN IMPROVING AGRICULTURIST.

At the dinner of the Sturminster Agricultural Meeting, the Rev. A. Huxtable, in acknowledging the toast of his health, addressed the company as follows:—

I am fully sensible, that from the kindness of my friend, Sir E. Baker, and from your kindness also, my exertions to carry out improvements in agriculture, so that we may be able to increase the produce of the soil, have been over estimated (“No, no.”). Yet I am encouraged, from your unanimous warmth of approval, to believe that you are of opinion that I have done some good (Hear, hear). Now, gentlemen, as so many farmers, nearly, 300 have visited my farms during the last year, it will not be considered egotistic if I presume to lay before you the principle upon which those farms are carried on. I will begin with the arrangement I have made for my cattle by placing them on boards. These are now, after many experiments, fashioned thus:—A space of four feet in width is allowed to each beast; the boards are grooved behind to prevent their slipping, and a fall of half-an-inch secures the rapid flowing away of the liquid, whilst a boy with a scraper constantly takes away the solid manure—the beasts thus kept are generally cleaner than those on straw. The benefits are—1. That I am no longer limited in the quantity of stock I keep by the amount of straw grown—I want every lock of straw for nobler purposes; in summer to place between the layers of green hay, vetches, clover, &c., when salted, in which I employ it to cut into chaff with alternate layers of turnip tops. Now, with respect to these, I assert that they are worth more for the production of milk, when given in due moderation, than the same weight of turnips. The objection to their use, in the case of dairy cows, is the offensive taste which these, far more so than the turnips themselves, communicate to the milk. Saltpetre will not remove this; but it can be effectually removed by the use of chloride of lime. You can get this from druggists, wholesale, at 4d. or 5d. a pound. Dissolve half an ounce in one gallon of water, add a teaspoonful of this to every gallon of milk—unless the taste be strong, half a table spoonful will be sufficient—churn at least twice a week, and this application, I will undertake to assert, will remove instantaneously all bad taste from the milk, and therefore from the butter; care of course being taking that the churn and all the dairy utensils are previously sweetened. You need not fear the use of the chloride; in such quantities it is perfectly

wholesome; and the only evil of adding too much is that you will give a worse flavour than that which you seek to remove (Hear). I have brought some pats of butter treated in this way, and I beg to ask the chairman and other gentlemen to taste it, and say if there is any taste of the turnip in it. [Sir E. Baker said there was not the slightest taste of the greens in it. He had never before tasted sweeter butter.] The second benefit produced is, that, by keeping cattle on boards, the manure is fit, if required, for immediate use. That which is dropped in one day, by the use of ashes, may, if required, be drilled the next. It was in this fashion that 40 acres of stubble turnips have been grown by me this year. Look at this root, it weighs 2lb., its green weighed precisely the same. If the whole field had been like this, the crop would have been 32 tons per acre; for the turnips were drilled only 14 inches apart, and singled out at nine inches distance. They were not sown until the last week in August, after one ploughing, crushing, and harrowing. And why did not the whole field give roots like these? There are only a few of the drills containing turnips so large, and these are found where, through the unevenness of the ground, a double quantity of manure was uttered by the drill. Instructive difference! If I had but shown more faith in mother earth, and intrusted her with 2 cwt. of guano in addition to my home-made manure, then I could have invited you to come and admire 30 tons of wheat stubble turnips per acre. Oh, if we had but capital enough, and trust enough in the soil, with God's blessing, what a different face our fields would wear (cheering)! I will now refer to my sheep feeding on boards. I consider this method to be now perfect—in French phrase, *un fait accompli*. Mine have done this year admirably. I will state the result of two weighings of a lot of six of those sheep, which were selected as fair representatives of the flock in the house; they were weighed at a distance of three weeks, under precisely the same circumstances:—

	First weight.	Second weight.	Whole gain.
No. 1 . . .	210lb.	227lb.	17lb.
„ 2 . . .	220 . . .	233 . . .	13
„ 3 . . .	215 . . .	220 . . .	5
„ 4 . . .	212 . . .	217 . . .	5
„ 5 . . .	205 . . .	220 . . .	15
„ 6 . . .	196 . . .	210 . . .	14
			—
			69

which gives a gain per week of weight to each

sheep on the average of somewhat more than 3 $\frac{3}{4}$ lb. When they were first "put up," they ate not less than 20lb. of Swedes a day each; but latterly they have not consumed more than 15lb. of roots, one half being Swedes, the other half Dale's hybrids—the 160 sheep ate daily 1 bushel of linseed, which weighed 63lb., and 1 bushel of beans; which gives 5lb. of seed and beans per sheep each day on the average. If we assume the value of turnips to be 15s. the ton, the value of

105 lb.	8 $\frac{1}{2}$ d.
5 lb. of beans and linseed	7
Attendance per sheep	1

Or 1s. 4 $\frac{1}{2}$ d.

to 3 $\frac{3}{4}$ lb. of meat. I need not say that this is "doing well;" but still I am obliged to remark that the vast difference between the several sheep in respect to the increase in weight, teaches us that these calculations ought to be made on a large flock, where we may hope that the various differences will correct each other, and produce a just estimate of what we may hope to effect in the average of 100 sheep. But you must not fail to remark, that a system of management which secures a value to a ton of Swedes of 15s., consumed on the farm, gives a large return. I must next tell you that I have also put my fattening pigs on boards. I almost fear to announce this, lest some wag should call me a man of wood; but you will at least acknowledge this to be better than to be "a man of straw" (a laugh, and Hear, hear). I rejoice to tell you that these also have done well on these "board wages"—so well indeed that I hesitate a good deal to tell you how well. You will not believe the machine or the weigher. I do, because it was accurately attended to. Three pigs, two hours after feeding, at 3 p. m., were weighed Nov. 23, and at the same hour, under the same condition, on Nov. 30. I will give you the weight in pounds.

	First weighing.	Second weighing.	Increase.
No. 1 . . .	135 . . .	150 . . .	15
„ 2 . . .	126 . . .	140 . . .	14
„ 3 . . .	109 . . .	128 . . .	19

No one will believe this last weighing (a farmer exclaimed, "I would not if the man swear to it!"). Nineteen pounds in one week! I credit this, but I cannot expect you to do so, unless I told you how this was effected. But this secret of pig feeding I shall keep till next year, unless the worthy chairman has some yellow cup still left behind as a reward for a fortunate discoverer (a laugh and cheers). Gentlemen, last year, at the Blandford dinner, when, in full reliance on the certainty of chymical principles, I asserted that I

verily believed I could grow a Swede turnip on the dinner table—on that occasion Mr. Rickman, whom I now see present, with great openness declared that I was trying to humbug the farmers. Now, I took this much to heart, and determined secretly, for fear of accidents, to put my principle to the test. But you will observe that nothing can be done in secret at my farm. A chymist, in his laboratory, can essay 100 experiments, and if he fail feel no blush or shame; but my farms are so overrun, and every washtub peeped into, that it is impossible to find a calm retreat for any hazardous trial. In this instance, I cut holes, as you see here (showing the block of wood), about three inches square, and one-and-a-half inches deep—I filled this with decaying sawdust, to keep up a supply of moisture, and the ashes of burnt Swedes; and on the top sowed some seed of the Swede turnip. For concealment I placed the plank under a hedge, which also kept off the sun in fine weather and gave it lots of drip in wet; still they grew, and here are two of them (he here displayed and sent round the room a portion of the plank and one of the Swedes) about 2lb. weight. I am certainly rather ashamed of him; but consider the hard circumstances of his birth and education. Yet surely, here, in this humble experiment, so strikingly confirmatory of the large one on Sutton Beach, which I described in this room last year, a great principle is involved: does it not tell us that no land can be so sterile, no rocks so barren, no acclivity so steep, but the strong sinews of our noble labourers, when directed by science and adequate capital, will render them productive and capable of sustaining human life? I rejoice in the desert spots of our country—they may be hopeless to the plough; but the pickaxe and spade, these can tell them, and they will afford employment and sustentation to millions yet unborn. Let the labourer be well paid, and housed, and fed, and with God's blessing I fear nothing for our country (loud cheers). Those barren hills, I repeat, I love them—they were intended, I believe, as sharpeners of the human intellect—*Labor improbus omnia vincit*. Whence have come all our modern improvements in agriculture? Not from the rich pastures of the lazy Stour, but from stubborn, hopeless lands, where men were forced to think and contrive, that they might live (loud applause). Gentlemen, in these days our fields must do double duty. I will now describe to you how I have tried to get this out of them, both on my chalk and clay farm, in what used to be called the fallow year. On the chalk farm I essayed to grow peas between the drills of mangold wurzel and of Swedes, and I did so with great success. I will only give the particulars of the beach experiment.

PER ACRE.	£	s.	d.
Hoeing out drills, two feet apart, for the peas, and drilling them by hand . . . . .	0	10	0
Peas, two and a half bushels . . . . .	0	18	0
Harvesting them, by cutting off the haulm with the hoe . . . . .	0	5	0

Four sacks of white peas at 32s. . . . . 6 8 0

Gain by this stolen crop . . . . . 4 15 0

And to show that those peas did not injure the mangold wurzel, I may add that I have stored 18 tons of roots per acre. It is important to bear in mind that the pea which I sowed is remarkably short in the haulm, not exceeding nine inches, and also ripens early. If there was much haulm, it is plain that the pea would interfere with or be injured by the interstitial crop (Hear, hear). On my clay farm, I tried another form of double culture—beans and mangold wurzel; the plan pursued here was to bunch them, *i. e.* four holes within a square of four inches was made with a dibbling stick, and four beans inserted; these little squares were three feet apart every way, but so that the squares in each alternate drill were exactly in the centre of the space between two squares of the contiguous drill. This arrangement secured room for the hoe, the sun and wind. The cost of these operations stands thus:—

	£	s.	d.
2½ pecks of beans for seed . . . . .	0	3	5
Labour for dibbling the beans . . . . .	0	5	0
Harvesting them . . . . .	0	6	0
	0	14	5

produce, four sacks, which ought to have been six sacks, but for some farmer's friends in the shape of field mice, which eat the beans as they were coming up. You will observe that I do not charge rent, &c., against this, but against the principal crop which occupies the ground. The mangold wurzel, in this instance, was very fine, not less than 20 tons per acre—testifying the harmlessness of the intercalated beans. The mangold wurzel seed and manure were also dibbled. I must also beg your attention to these two specimens of carrot, the one grown on my chalk farm, the other grown on clay. They are, as you see, very fine; they are not fair samples, but picked specimens; yet they belong to a very good crop; the chalk carrots attaining 15 tons, the clay carrots 27 tons per acre. I need not tell you that this is a valuable produce. From this case, then, we may learn, that both your chalk and your clay soils (if well trained) will, with proper culture, yield abundantly this valuable esculent. In conclusion, I must refer to the oft-repeated question—What are your profits? Now I have always been able to give the cost and profit on any given crop; but, from peculiar circum-

stances, I have a great difficulty in disentangling all the expenses of my farm. Please to remember that I have the kindest landlord in the world, who says, "You may put up what buildings you like, lay down what drains you please, grub up what fences, cut down any interfering timber" (Hear). Now, I have made pretty free use of this licence, as you may see; but as the greatest proportion of my drains, and most of my buildings, &c., are done by my own constant labourers, I avow a great difficulty in arranging these separate items, classifying them respectively under "permanent improvements," on which only per-centage should be charged, and the proper outgoings of a tenant. For one portion of a labourer's day is, with me, given to loading a cart; the other half, perhaps, in making a tank, or putting up a cow-shed. Still I protest against the notion, that a yearly tenant-farmer could, with prudence, make such an outlay as I have made without the security of a lease or of some legal agreement (Hear, hear, and cheers). And yet without the improvements which this outlay implies—without the buildings, tanks, drains, &c., it is quite impossible that many of the returns which I make can be effected. He may, in many cases, grow the roots; but without sheds and shelter, in such a climate as this, how will he make his roots worth even 15s. a ton? The most startling part of the statement which I am about to make is the high estimate which I set upon my green crops. I said, in the commencement, that I did not think our climate favourable for the growth of wheat, and that, therefore, for that crop I think we need a moderate protection; but in the matter of roots we may defy the world. There are many varieties in rotation for the green crop year. On my wheat stubble of the end of August, I may, as you have seen, raise a splendid crop of stubble turnips, and then in the spring I can grow carrots or wurzel, with beans or peas, and Swedes; or I may sow early in September winter vetches, cut them in the middle of May, when in flower, and make them into green hay, and then secure at least 16 tons of Swedes per acre; or if clover was sown with the wheat, and the clover is well dugged in the winter, you can cut it twice, and then get an excellent crop of turnips. This I did, even in the drought of this season, on my hill farm; or, instead of stubble turnips you may drill on the stubble rape, and if well manured it will yield immensely at the end of April, when, of course, you can get a full crop of Swedes. I take then, as the basis of my calculation, that the Swede, or mangold wurzel root, is 15s. per ton, at the least, to be consumed by sheep, or cows, or pigs, on the farm; and that, therefore, my root crop, including the intercalated one, is worth £15 an acre. I assume that the

wheat crop yielded 32 bushels an acre, which at 61s. the bushel, will give £9 12s. an acre; taking the difference, the average annual produce of an acre of highly farmed ground I calculate, from my own returns, to be at the lowest £12 6s. And now I come to the expenses; and the principal charge, which will seem exaggerated, is £3 an acre for manual labour. Gentlemen, this is the item which gives me most satisfaction. Is it not delightful when an able-bodied quiet fellow comes begging for work to know that you can employ him, and that too profitably? I honestly avow that this is the joy and delight and mainspring of all my agricultural pursuits; it is this which to me exalts agriculture far above a mere mercenary speculation, and this I doubt not you feel like myself. But let us ever bear in mind that no money spent on our farms is so productive as that which goes in well directed, well paid labour. I believe God's blessing goes with it. But to return to the average expenses of an acre of land on a farm of 200 acres.

Rent	£1 0 0
Tithes, 5s.; rates and taxes, 5s.	0 10 0
Labour	3 0 0
Horses	1 0 0
Tradesmen's bills	0 5 6
Seed	1 0 0
Manure	1 0 0
Interest on £15 per acre, at 10 per cent.	1 10 0
	<hr/>
	9 5 6
	<hr/>
But the return is	12 6 0
	<hr/>
Estimated profit per acre	3 1 6

Gentlemen, from experience I know three crops can be raised at the expense now given, and thanking you for the kind attention you have given to my lengthened statement, I commend to you the £3 per acre profit, and I wish in the coming year you all may get it (continued cheering, reiterated again and again).

#### THE SUPPLY OF ANIMAL FOOD.

The rapidly increasing demand for animal food is now attracting much attention, and the most profitable and speedy mode of producing it is the subject of general discussion among the breeders and graziers. The extraordinary consumption of the past two years has risen from very satisfactory causes—abundant employment for the lower orders at adequate wages; it is this which has caused so great a demand, and produced the corresponding scarcity in that principal article of food for the poor, mutton.

Every article or paragraph must have its limit; this shall be confined to mutton—the production of mutton; the grand desideratum in the mind of the writer being to produce the greatest weight of food in the shortest time and at the least cost. This must, ere long, be the all-important question. The inquiry will not be between Sussex Downs or Hampshire Downs, fine Leicesters or long Leicesters, Gloucester long-wools or Lincoln long-wools; but which will soonest attain the most profitable maturity. Weight of carcass must ultimately be the great end aimed at; quality of flesh will become a secondary consideration, because the bulk of consumption is with the labouring classes, to whom quality of meat is by no means the main thing. The public must be fed, and that at a cheap rate. In order to obtain mutton of first quality it is a well-known practice and requisite to keep a South-down sheep to its third or fourth year; observe,

not to fatten, but to secure quality of meat. What a waste of time for quality of flesh! This cannot continue, quantity must supersede quality. The Gloucester and Lincoln long-wools are the largest breed of sheep in the kingdom, and will not require more than eighteen to twenty-four months in fattening to full maturity, weighing, at twenty-four, from 22 to 40lbs. per quarter; and where the flock is not required for folding, grazing open downs or mountain pastures, and the like, they will be found the most profitable breed for the producer, and the most beneficial to the public, being the fastest growers, and also quick feeders, realizing the greatest weight of flesh in the shortest time.

Much, very much, certainly depends upon selection and careful breeding; but more closely connected with this than is generally imagined, is the proper management and feeding. No animal intended for fattening ought, at any time, to be allowed to stand still; they must be kept thriving, and while in health this is easy of attainment, in this country, at least, by the use of corn, cake, meal, and the various esculent roots which have become almost indispensable adjuncts to good grazing; warmth and shelter in winter, cool and shade in summer, are equally desirable. It is necessary that the animal should be kept quiet and composed; no restless ones will fatten rapidly, nor will those of predatory habits thrive fast; secure contentment, feed punctually, and the result may be anticipated,



## THE MAIDSTONE FARMERS' CLUB.

October Meeting.—C. G. Whittaker, Esq., in the chair. Subject for discussion: The best substitute for summer fallows.

The CHAIRMAN said that Mr. Elvy's idea was that the best substitute for summer fallows was to farm high, cultivate well, and change the crops as much as possible.

Mr. WHITING said that on much land, where a few years since fallows were deemed indispensable, fallows were either now omitted, or resorted to much less frequently than before. It was of great importance to the tillers of land which it was still considered necessary to fallow—such, for instance, as the large tract of the Weald clays—to know how this improvement had been effected, and whether they could adopt the means which had been resorted to.

Mr. FULLAGER, of Milton-next-Sittingbourne, said that he had some exceedingly stiff clays; but he had drained them, and he was now able not only to dispense with fallows on these clays, but had been able to grow crops of swedes and mangel wurzel, in which he had been pretty successful. He had, in consequence of improving these cold clays, altogether altered his mode of cropping. He did not now grow wheat so frequently, but he grew more when he did grow it. He now grew as much wheat on 40 acres as he used to grow on 50 acres. His course used to be—fallow, wheat, beans, wheat, clover, wheat, and oats; his present course was turnips (with dung), oats, beans or peas, wheat, clover and wheat. He sometimes gave a dressing of chalk to some of his land instead of dung, and it was found to be quite as productive as dung. On land, however, where this was the case, he did not think that the land had ever been chalked before. He had some other clay land, however, which had always been chalked, and on which chalk now seemed to be of little or no benefit.

The CHAIRMAN asked what was the operation of lime or chalk, when placed on the soil?

Mr. WHITING said that lime was more or less a constituent in the formation of nearly all plants, which could not exist without lime; for it was well known to scientific farmers, that if a plant required, say, ten ingredients from the soil, and any one of these ten ingredients was absent from the soil, the plant could not grow, or, at all events, could never mature its seed. Some plants, such as lucerne, sainfoin, and clover, required a great deal of lime, and were consequently frequently made to grow very rapidly by the application of gypsum, which

was sulphate of lime. Chalk, being a carbonate of lime, a compound of carbonic acid and lime, might possibly, during its disintegration by the action of the air and the rains, supply a portion of carbonic acid to the plant, the lime being taken up by some of the acids in the soil which had for it a stronger affinity. Carbonic acid was known to be the principal food of plants. Chalk also operated mechanically by lightening heavy and stiff soils, by expanding and contracting with the variations of atmospheric temperature, in a different degree from the soil which surrounded it, and thus rendering it more pervious to the air. Unslacked lime was also one of the most powerful agents in decomposing the inert vegetable matters in the soil with which it might be brought into contact, thus again rendering them soluble and fit for the food of plants.

The CHAIRMAN asked if the cultivators of the Weald clays could, after draining, adopt the present course of Mr. Fullager.

Mr. T. HAYES, of Marden, said that he thought that beans and wheat might be grown alternately on the Weald clay, as long as the land remained clean. As soon as it got foul, however, they would be compelled to fallow.

Mr. FULLAGER asked whether it was not possible to farm the Weald clays without allowing them to get so foul.

Mr. HAYES said that they sometimes got a wet summer and a wet autumn, and that then it was impossible to clean the land.

Mr. WHITING asked if any gentleman knew of any Weald clay farm which had been well drained, and on which summer fallows had been dispensed with in consequence?

Mr. HAYES said that he did not know of any Weald clay farm which had been wholly drained, although portions of many farms had been drained. If turnips were sown in the drained clays, they were still too wet to permit of the turnips being fed off; and even in drawing the turnips, if it happened to be a wet season, so much harm was done by "stodging" the land, that the effects were observable for the next year or two. More harm was done by this than could be gained by the turnips. Mr. Barnes did not pull his turnips at this time of year, but let them stand for seed.

The CHAIRMAN: He sows his seed in July, and cuts the seed about June.

Mr. HAYES said that the clay mentioned by Mr. Fullager was very different from the clay of the

Weald of Kent, as it did not, he believed, break up in such large blocks, and that it ran much more easily, after a shower, than the Weald clay.

Mr. WHITING said that Mr. Fullager's clay lay above the chalk, in the London clay formation, the Weald clay being below the chalk and the green sand.

After some further conversation a resolution

was adopted to the effect that on light dry land, with high manuring, frequent change of crop, and good cultivation, fallows were altogether unnecessary, and that on clays well drained they might often be avoided; but that on the Weald clays, particularly where much shaded by trees, and after wet autumns, summer fallowing was generally indispensable.

## REFLECTIONS ON OVER-FED ANIMALS.

BY ARTHUR CHERRY, M.R.C.V.S.

The annual shows of fat cattle are suggestive of several important points worthy of consideration. The object of these shows is ostensibly for the improvement of the breeds of those animals reared for the purpose of affording food for man—to produce the largest amount of animal food at the least expenditure of means.

To attain these objects, certain particular points in the form or shape of animals have been found to be requisite, nay, indeed, imperative. The possession of these peculiar points constitute "symmetry;" and in proportion to the degree of development, so is the animal more or less able, under favourable circumstances, to lay on an *excess* of fat.

This power of laying on fat is apart from another peculiarity, which, originally an individual exception, may, by careful selection and attention to the breeding, become permanent. This peculiar quality is that of "early maturity," which some breeds possess in a marked degree. The professed aim of all good breeders has been the union of these two qualities.

An important question arises respecting the best "size" of animals; whether a large or small variety be the most profitable stock. Opinions have been much divided on this point; but from some cause not easily to be understood, unless it arose from the peculiar views of our "fashionable" breeders, the *large* animal has had the preponderance. That "fashion" or some other local or personal view has been the cause, is obvious; because observation and the reasonings of common sense point more to the opposite; namely, that animals of a medium size, or *rather* below it, are those which arrive earliest at maturity, and collectively return the greatest weight from a given quantity of food.

Another important question suggests itself regarding the policy of over-feeding an animal; and that a large number of animals designed for the food of man are over-fed must be apparent to every one; and reflection will shew that this operates in

a double degree or ratio beyond a certain point. The powers of animal life are capable of assimilation in a great degree; but there are limits to this as to everything else; and if the means of attaining fatness be carried beyond this natural medium point, a loss is inevitable. Thus, as an illustration: If the weight of a lean animal be represented by 10, and a given quantity of food be represented by 20, the result being a gain in weight of  $5 = 15$ , which may be taken as a medium, an addition of 20 of food would not produce a further gain of 5, as in the first instance, but would give only an addition dependent entirely on the power of the individual animal, the time in which the food having to be consumed being in each case the same; hence, all that portion of nutriment which could not be assimilated, as also the time occupied in the consumption of this latter portion of food, is double loss to the producer. All practical feeders know this fact; but it is not acted on in the manner or to the extent it deserves; for, simple as it seems, its consequences on a large scale are most important.

Early maturity is, again, a most desirable object, and every effort ought to be made to attain it; for if an animal can be produced which shall arrive at a state of maturity, say at four years old, and another can be brought into a similar state at three years old, there is a gain to both consumer and producer of 1 in 4, or a relative proportion of 75,000 to 100,000. These are no idle chimeras, but practical facts, and which must rule and regulate the producer in his future proceedings.

It may appear superfluous to urge these various points; but not so when we see that associations which were established with the laudable object of improving the breeds of our domestic animals have in very truth outgrown themselves. Can any one, at all acquainted with the cattle-shows of the last twenty-years, say that the last few are what they were in the display of symmetry, or that there has been any gain in earlier maturity? These points

were at their maximum several years since. Size still remains the same; but, alas! where is the straight back, the square quarter, the deep thigh, the good chest? "Echo answers, 'Where?'" It is true we now and then see splendid forms; but these only show that there are exceptions, and shadow forth the general degeneracy in the greater degree. The breeders' adage, that "fat covers a multitude of faults," is too correct to be disputed; but if the faults before alluded to shew through the enormity of these mountains of fat, into what a state of degeneracy must the "crack" stocks of our highly-famed cattle have fallen! It is lamentable to reflect on: even the breeders of these stocks themselves are, at last, aware of the palpable degeneracy which, as *professed* judges, they ought to have foreseen and prevented ere it commenced.

The plain truth is, that for many years past a few stocks only have been the producers of all these obese animals; and from breeding in-and-in, and from pampering, the original excellence is worn out. That benefit was derived from the dispersion of well-formed animals must be admitted; but that was before the degeneracy had become established; the mischief has now gone too far with these "show stocks:" the bad points have existed long enough to be transmitted to the offspring.\* Our old fine breeds are in their full vigour still; and, despite of partial clubs, shows, or whatever else "fashion" may for the time sanction, common-sense will keep them as perfect and as famed as they ever were, as our fairs, and more particularly Smithfield, are daily shewing.

December, 1846.

REPORT ON THE IMPROVEMENT OF WASTE LAND ON THE FARM OF PARKTON, IN THE PARISH OF KILLEARNAN AND COUNTY OF ROSS, BELONGING TO COL. H. D. BAILLIE OF REDCASTLE, M.P.

BY WILLIAM DICK, TENANT.

Having entered to the farm of Parkton, containing seventy acres of arable land, in 1838, and after putting it into good order, my attention was directed to the improvement of a piece of waste land, which stretched in a continuous line along the north-east side of the farm, with the exception of a few patches to the south. I have altogether improved fifty acres, of which about thirty acres have been brought under the plough during the last three years.

The ground was formerly under fir-wood, which was cut and sold about twelve years since, with the exception of a few acres, which are still standing. The surface was generally covered with short stunted heath, the pasturage on which was probably not worth more than 2s. per acre. The soil was a clayey gravel, in some places inclining to peat, on a subsoil of wet clayey gravel.

The ground was trenched twelve inches deep, with the exception of three acres which were taken in with the plough, and about twenty-five acres were partially furrow-drained, at eighteen and

twenty-four feet apart, according to the retentive nature of the subsoil. Large open drains were made to subdivide the grounds into fields.

The expense of these improvements was as follows:—

Trenching twenty-eight acres, at £6	£	s.	d.
per acre . . . . .	168	0	0
Ploughing three acres, and taking out roots . . . . .	6	0	0
Clearing the ground of roots, stones, and levelling . . . . .	62	0	0
3,353 yards of large covered drains, at 2d. per yard . . . . .	27	18	10
2,975 yards of large open drains, at 1½d. per yard . . . . .	18	11	10½
20,398 yards of furrow drains, at 1d. per yard . . . . .	84	19	10

Total . . . . . £367 10 6½

Making an average cost of £11 17s. 1d. per acre.

The first crop was taken in 1843 from about ten acres, which were well limed, and manured with farm-yard dung, and sown with barley, which yielded a pretty fair crop of about four quarters per acre. In the following year, 1844, this ground was pastured. In 1845 it was broke up for oats, which yielded a very fair crop, probably five quarters per acre. The remaining twenty acres were prepared for oats in 1844 by manuring and liming, and the crop was a fair one, at least five quarters per acre. In 1845, this portion was under turnips and potatoes—the potatoes being a good crop, but the turnips were below an average.—Transactions of the Highland Society.

\* A curious fact is stated by W. J. Goodwin, Esq., V.S. to her Majesty, in connexion with the breeding of her Majesty's "creams." The sire and dam, brought from Hanover, of the height of fourteen hands, became, by better management, in the second generation, sixteen or even sixteen and a half hands high; and when these larger progeny are sent back to the country of their progenitors, and submitted to the same management, they return, in the like period of two generations, to the original small size.

## EFFECTS OF RAILWAYS UPON AGRICULTURE.

The following are extracts from the evidence of James Smith, Esq., of Deanston, given before the Select Committee of the House of Commons on Railway Acts Enactments—the minutes of the testimony adduced before which committee have just been issued, pursuant to an order of that House, dated the 25th of August last. The extracts in question relate to the effects of the facilities afforded by railway conveyance to agricultural improvement:—

Have you had occasion to consider the facilities afforded by railway conveyance to agricultural improvements?—Yes, I have.

Will you state generally what you consider has been the result?—I have observed upon those lines that have been in existence for some years, over which I have had occasion to travel, that a very great agricultural improvement of the lands in the neighbourhood has been the result, arising mainly from the cheapness and facility of transport; and I have drawn out some tables to illustrate that. I have one table taking a farm of 200 acres and a six-course shift; the committee are aware that there are different shifts of rotation, and that some lands suit best to be cultivated upon one, and some upon the other. I have taken this farm upon the six-course shift, which is most suitable for the bulk of the medium land of England and Scotland; I have supposed that farm to be in most full cultivation, thoroughly improved, and to be both arable and pasture. I have taken the quantities of green and dairy produce, and cattle, and everything which I can conceive will be exported from that farm, and it amounts to 148 tons. I have then taken the imports, consisting of store cattle to be fed, lime and other matters, such as guano, and the different chemical manures which are now being introduced; and also seed, because the shifting of seed in a good farm is always attended to: and I have supposed that this weight shall be transported upon an average 15 miles, which I think is a very low estimate. The quantity imported will be 197 tons; making altogether, of imports and exports, 346 tons 14 cwt.

That is all for 15 miles?—Yes. Then I have taken the expense of transport by railway at 1d. per ton per mile; on some railways it is considerably higher, and on some lower, but in the present advanced state of railways we may fairly assume that to be the general rate.

For the produce transported, and the manure brought to the land?—Yes; taking it upon the average that I have taken, and also taking the number of persons that will travel to market, and in various ways, at 1d. per mile, the whole amount of charge of carriage for imports and exports is £40 8s. 9d. By the old mode of conveyance the expense would have been, assuming 6d. per ton per mile for the goods, which I find to be as low as you can carry it by the old mode, £142 16s. 3d.

That is for the same distance?—Yes.

On what principle do you assume 6d. to have

been the charge by the ordinary roads?—I speak from my own experience of thirty years. I have had a great deal to do with carting, both for agricultural produce and manufacturing produce, and I have found that I could never get it done under 6d. a ton in England; it costs rather more than that.

In giving an account of the produce of a farm, you deduct for home consumption?—Yes, I do.

Therefore upon a farm such as you have stated, there would be a saving of £102 7s. 6d.?—Yes. Then taking that at twenty years' purchase, it will give £2,047 10s.; if you take it at thirty years' purchase, it will amount to £3,071 5s.

Have you given the supposed rental of that farm?—No, I have not; the rental would be about £400.

This expense, then, would be in addition to the rent?—Yes.

And the same farm which without a railway would be only worth £400, would be worth £500 after a railway was established?—Yes; 10s. an acre more.

You have stated the advantages which a particular farm would have in being able to send its produce to market by railway, and bringing back manures; will you state what is the advantage in respect to stock in particular?—The advantage in respect to stock is very great indeed, both in bringing lean stock from the district in which it is reared to the richer district in which it is fed, and also for the transmission of the cattle, when fed, to the market for the consumer.

Are you able to show to what extent that works?—I have some statement here upon that subject: the rate hitherto charged by railways for the conveyance of stock is pretty nearly the same per mile as the expense of driving, and where the great saving occurs is in the condition of the animals, especially in fat stock; the loss from driving them being equal, in the case of fat bullocks on a drive of from 60 to 70 miles, to the whole expense of the transport; it is at least 5 per cent. upon the value of the bullock.

The advantage as regards the conveyance of the produce is an advantage of so much per ton?—Yes.

Was not the use of manures imported from abroad limited to certain distances from the ports?—Certainly; either from the ports or from canal communication.

The introduction of railways enables them to be sent to much greater distances at the same cost?—Decidedly.

In that way districts which were not able to profit by those manures are now able to do so?—They are.

In consequence of the introduction of railways, have not there been manufactories established in different parts of the country for the manufacture of sulphuric acid for the use of agriculture?—Yes; there has been a very extensive introduction of arti-

ficial chemical manures in consequence of the facility of transport, and I have no doubt that it will very greatly increase.

What manures do you principally allude to?—I allude to Liebig's chemical manures. I have not myself, in my experience, found any great efficacy in those manures, but there are other manures which have been found very efficacious; there are the urates, prepared from urine; there is bone-dust; there are rape-cake and nitrate of soda; and there are mixed manures, consisting of several ingredients chemically combined.

Is not the use of sulphuric acid for agricultural purposes considerably increasing?—I think it is: it is very much used for dissolving bones.

May not railroads be used to carry manures from towns to a much greater extent than was formerly the case?—Certainly.

And in that way the waste that now takes place will hereafter, it may be hoped, be prevented?—To a considerable extent.

Have you considered to what extent railways may be made useful for the purpose of mixing soils?—Yes, I have.

Will you state your opinion upon that subject?—The transport of earths for mixing soils, if the railroads could carry them to the immediate ground where they were to be applied, would be of very great advantage; but the difficulty of availing yourself of the benefit of railways for the transport of the soils is, that the soil must be refilled, in most cases, and carted to a considerable distance.

Railways would be useful only in cases where those earths could be easily obtained?—Exactly.

Take the transport of sea-sand?—Sea-sand in Ireland is carried 30 miles up the country in little carts, and is found to pay the farmer for the carriage when applied to clayey and mossy soils.

And therefore if the charge made for the conveyance of earths was very low, should you think that in that particular case the calcareous sand from the sea shore might be carried profitably for considerable distances into the interior?—I think so; and in many instances where there are moors and waste land, it would be well worth the while of the proprietor, having a railway passing through that district, to construct a tram railway from the railway on to the moor or waste land.

Is not nitre also, and lime, in certain districts, used, which might be transported with advantage to great distances?—Yes.

You are aware of the improvements that have taken place in agriculture, by the introduction of those foreign chemical manures?—Yes.

Is not the utility of them as stimulants limited to a short period?—Bone dust, which is brought very extensively from the continent of Europe to this country, is a very permanent manure. Guano is less permanent, but it has this advantage, that it enables the farmer to grow an extended breadth of green crop, for the feeding of cattle and sheep; and if the green crop is grazed, he is enabled to increase the produce of his farm.

But that requires to be renewed at short periods?—It requires to be renewed at shorter periods than bone-dust, but it has established extra stock manure upon the farm.

But altering the earths would be a permanent improvement of the soil?—It would; a great deal of mossy soil, if you lay on even half an inch, in some cases, of sand, or more especially alluvial soil, it will render that ground productive for many years.

It is necessary, in order that those manures may be made extensively useful, that the charges upon railroads should be very low?—It is.

You have given a calculation of the benefit to a farm on the supposition that the rate per ton shall be 1d. What would the advantages be, supposing the rates were to be reduced to one-half or one-quarter?—There can be no doubt that a low rate of charge would very greatly tend to the increased consumption of manures, and to the transport of earths for agricultural purposes; that would give a much increased produce to the land, which would enable the agriculturist to furnish his commodity at a lower rate; that again would increase the consumption in large towns; and in manufacturing populations it would also create a greater traffic upon the railways, and enable them still further to reduce their rates; and as the heavier articles are more consumed by the working classes, it would add very much to their comfort; and there are great tracts of country which would be cultivated to much advantage, if favoured with railway communication, which are now allowed to lie comparatively barren.

Looking, therefore, to those results, ought not railroads receiving high profits to be obliged to extend branches laterally to districts which want of communication has left in comparative unproductiveness?—I think so; it has occurred to me upon this point, that it would be a great advantage if, by some public authority, the country should be divided as regards railways, into sections, so that there might be systems of railways established for those different sections, according to their respective wants; a system so established would be enabled to provide branch railways into districts which could not of themselves afford to pay for a railway; they would be enabled to do that, because this branch, though it did not pay it itself, would pay as part of a general system, in consequence of the additional traffic that it would bring upon the line.

Referring again to the benefit to agriculture from the introduction of railways, and consequently of cheap conveyance, can you give the committee any particulars of the advantage of the transport of the carcasses of animals, as compared with the old system?—Without a railroad it is impossible to transport fat cattle any greater distance than from 50 to 70 miles, without very great deterioration; but railroads will afford the means of transporting those cattle 300 or 400 miles with great advantage, and in carcasses they may be transported 700 miles; and in that way meat may be brought from the most distant parts to populous districts at a very small additional expense, which, with the expense for transporting either beef or mutton in the carcass, does not amount to more than one-third of a penny for five hundred miles, so that you may have meat nearly as cheap in London as you have it in Inverness. There is another great advantage arising from this easy and cheap mode of transit;

which is, that the little country butchers, who purchase lots of cattle and sheep for the consumption of the town or village in which they may live, always find among those lots a few that are of too good a quality for the consumption of their particular district; and if they are enabled to send them to a great distance to a more wealthy part of the country, they not only supply those rich communities with the superior article that they want, but they can supply it at a cheaper rate; and again, this enables them to sell the medium and inferior animal at a lower rate to the consumer in the country; so that both the rich population of towns are benefited, and the poor of the district where the animals are killed are very much benefited.

Is there not a demand in large towns for picked joints?—There frequently is; and I know, from the inquiries I made in Yorkshire for the Direct Northern Railway, that the butchers are contemplating, when that railroad communication shall be worked out, to send the surplus of their better joints to the London market, which will enable them to sell the inferior parts to the working classes at a lower price.

In short, quick conveyance enables them to dispose of the whole animal in the best market?—Yes.

By the former mode of conveyance there was no possibility of carrying killed meat any great distances?—It was quite impossible. There is another great advantage in killing the animal in the country districts: the offal or inward parts of the animal are available to the working classes of the district, and there is an immense quantity available for manure, which when brought to those large towns is a nuisance, in the country it is of great value.

Have you anything to add in explanation upon the points upon which you have now been examined?—I have several tables to give in illustrating the different points upon which I have been examined. I have no doubt that railroads will do more for communicating intelligence amongst the general community than even the press has done, inasmuch as seeing a thing is much more than hearing of a thing, and there will be much greater progress made in the diffusion of improvement by railroads than by any other means.

#### THE WOOL TRADE OF 1846.

Presents but few points for comment, beyond those which are exercising an influence on the general trade and manufactures of the country; and we regret to say that these have been, during a portion of the year, of an unpromising character. The almost total failure of the potato crop in Ireland, the partial failure in the United Kingdom, with a generally deficient harvest, except in wheat, throughout western Europe, have tended to check enterprise and diminish consumption. To these causes of depression may be added an excessive export of manufactured goods to our colonies and China, during 1843 and 1844, much beyond their requirements, and which has resulted in a limitation of exports of woollen goods and yarns during the past year of nearly a million and a half sterling. Notwithstanding these adverse circumstances, we have to report a steady and almost an average consumption of wools. We believe that, with the exception of the worsted trade, where the curtailment has been considerable, that we are justified in stating the consumption at a full average. Prices are lower, ranging five to ten per cent. less than at this period last year; but we believe that the profits of spinners and manufacturers are still more circumscribed than before. We are glad to perceive that the trade is meeting the difficulties of the time with caution and prudence. Scarcely any speculation exists. The speculation in cotton during the past month has induced some parties to turn their attention to wool as a good investment; but this has not been carried to any great extent.

The importation at this port shows an increase over last year, but in the country generally a considerable deficiency. (The London returns are not yet made up.) The home clip, too, is reported as deficient. We are not quite satisfied of the correct-

ness of this, and think that the deficiency, if any, will be partial.

The great legislative measure of the past session, in revising the corn-laws, calls for remark. We believe that when the present cloud has passed away it will prove of incalculable advantage, not only to the wool trade, but to every trade in the country. The revision of the American tariff is likewise a matter of congratulation to our manufacturers; and we rejoice to perceive that liberal principles of trade are making much progress amongst the great commercial communities of the continent.

Whilst so many causes for caution exist, we do not expect much improvement in prices. Probably at no period of our history was there so much employed labour as at present, but the receipts are mostly absorbed by the high price of all kinds of provisions. The same cause affects the consuming capabilities of our customers abroad, and acts injuriously both on the home and export trade. A continuance of the caution already manifested will be requisite till a greater proportion of earnings can be directed to general purposes.

AUSTRALIAN.—The clip having commenced before the usual period, shipments were accelerated, and the quantity yet to arrive before next May is very trifling. We have noticed a marked falling off in the management of many of the flocks, particularly from Sydney, which, in general condition, have been inferior this season. On the other hand, we are happy to notice that Port Philip wools have sustained the improvement to which we have from time to time alluded; and the relatively higher prices they have obtained bears testimony to the superior care bestowed upon them, while inferior conditioned wools have been much neglected throughout. Colonists will do well to look to this,

as they must be prepared to meet a formidable competition in the wools from the United States, which embrace all varieties of quality, from the common native growth to the pure bred Merino.

The public sales during the year have been well attended, but the system we have before referred to of glutting the market at the London sales, has this season, more than ever, been attended with inconvenience to the buyer, and contributed to an undue depreciation in value, and an unsettled state of trade. The imports from these colonies are progressively increasing. It seems surprising that Liverpool enjoys so small a share of this trade, the more so, as the London market can offer no advantages which we do not possess in a greater degree. This arises principally from the apathy of our Liverpool houses in this matter, and the greater exertions of London agents; as we know that many of the colonists are quite alive to the subject, and most desirous to ship to this market, but the chief difficulty is in getting ship-room. This might be easily obviated, for vessels would prefer coming here, as they can more readily obtain an outward cargo.

**CAPE OF GOOD HOPE.**—There has been a considerable import. The more approved flocks have commanded a full share of attention; but the great bulk has comprised mixed and very inferior descriptions which have been difficult of sale, even at a great depreciation in value. It is to be hoped that the unsatisfactory result in many cases will lead to a more careful classification in future, a great part of those received last year being almost unmarketable.

**SPANISH.**—The decline in value of colonial wools has very much affected this description; and the French competition at the clip having unduly enhanced prices, has rendered the trade discouraging to the importers; but having been so long neglected, it is likely that the present low quotations may encourage a better demand. The latest accounts from Spain fully confirm previous statements of great losses in the flocks from severe drought, and there is every prospect of a serious deficiency in the next clip, which has already led to an advance in prices there.

**PORTUGAL.**—The best parcels of frontier wools have been in fair request, but for other kinds there has been little inquiry. Oporto's have met with a ready sale, particularly best long-stapled parcels of fleece.

**UNITED STATES.**—This article promises, at no distant date, to become of first-rate importance. The present growth is much greater than we in this country have, generally, an idea of, being upwards of sixty millions of pounds weight at the lowest estimate, far exceeding their domestic requirements. It is important to notice the great weight of the fleece, which is nearly double that of any other country producing similar qualities; and when we consider the facilities for extending the production, there cannot be a doubt that, in a short time, the quantity available for export will be very considerable. Moreover it appears, that of late much attention has been directed to the subject in the Western States, with this view, as offering, to some extent, a more profitable return than the cultivation of cotton; and when it is stated that one pound of wool, nearly full blood, can be grown at the same cost as two

pounds of cotton worth 6d., there is every reason to expect that the trade will eventually prove remunerating. The receipts last year were below the previous one, the consequence of former shipments generally not having been attended with advantage; but this is accounted for, to some extent, by the indirect channels through which many of the lots came, and their inferior condition in most cases. Until they are got up with more care, better washed, and more evenly graded, we see little prospect of a profitable result. The greater part hitherto received has been so deficient in these essential requisites that purchases have been attended with extreme hazard to the buyer, which has operated much against their sale.

**PERUVIAN AND ALPACA.**—Here we notice a very large increase. Sheep's wool, with the exception of best qualities, have been difficult of sale, even at receding rates. Since our last monthly circular the market has been nearly cleared of this description, principally taken on speculation. Alpaca: up to May the demand was very languid. During that month there was a large business done, induced by the low quotations. The inquiry again fell off, until within the last few weeks, since which time the sales have been extensive at advancing prices. The Customs' report does not keep Alpaca distinct from sheep's wool. We can, therefore, merely guess at the quantity, which we believe to have been a full average import. The high prices current on the other side have led to shipments of very inferior quality, which we expect to continue till the completion of the contracts entered into at high rates. It is reported that supplies will be very much diminished this year in consequence of the extensive drought, which has caused great mortality in the Alpaca and Llama flocks.

**BUENOS AYRES, &c.**—The trade has been almost suspended, owing to the continuation of hostilities, which, it is to be hoped, are now on the eve of adjustment. We commenced the year with large stocks, chiefly of inferior and middle qualities, burry Mestizo's—the greater part has been disposed of, but the sales of late have been at a ruinous sacrifice, and we see no reason to expect higher prices for these kinds, the quantity of burrs rendering them very unsaleable. The finer descriptions, free of burrs, command a ready sale, and there is also much inquiry for common qualities. Good Cordova is in request. Most of the recent importations have been inferior, and very much country damaged.

**EAST INDIA** continues to increase in quantity; the demand has been good, at steady prices. We have noticed some mixtures of quality in the same marks, which should be carefully guarded against, as these wools are at present held in high repute.

**RUSSIA.**—A considerable falling off in quantity is here apparent, in some measure accounted for by the high freights at the Black Sea. Donskoi has been in limited request, excepting good combing parcels, which have been very scarce. There has been a fair inquiry for Merino and Metis, scoured and brook-washed; also for Zegay's, of which next to nothing has been received for several years, having we believe, been chiefly taken for France.

**MEDITERRANEAN.**—The high freight for some time past, has restricted supplies; in addition to

which our market for most descriptions has held out no prospect of remuneration. Egyptian has increased in quantity, and various direct imports have been received; well-selected long-stapled parcels have gone off freely, but more mixed lots have not been of such current sale. If proper attention is paid to classing them according to quality and colour, particularly keeping the long-stapled separate, all qualities will command a ready sale at full value in this market, and they are gaining favour with the consumers. It is necessary to allude to the great irregularity in the tares of the same mark of wools received from Trieste, which leads to constant complaints, annoyance, and expense, both to importers and brokers. This might be easily avoided by attention to the subject on the other side.

**ENGLISH, SCOTCH, AND IRISH.**—For the two first the demand, though steady, has been rather of a quiescent nature. Stocks in the hands of the trade are very light, and farmers show no disposition to reduce their expectations. Owing to the suspension of French orders, the home demand for Irish has been much greater than for several years past. Scotch wools have been very much neglected, which we attribute in a great measure to the relatively cheaper rates of foreign, which are supplanting them to a great extent.

HUGHES & RONALD.

Liverpool, Jan. 1st, 1847.

## AGRICULTURAL QUERIES.

### SOOT, SALT, AND ASHES.

TO THE EDITOR OF THE MARK LANE EXPRESS.

SIR,—Would you, or any of your readers, inform me whether there would be any danger of soot and salt, mixed with sod ashes, drilled in with oats, at the rate of one sack of soot, one bushel of salt, and one quarter of ashes per acre, being detrimental to the germination of seed; and whether the refuse of rock salt or common salt is preferable? “*JUVENIS AGRICOLA.*”

Jan. 22, 1847.

### HOW TO PREPARE GAS LIME.

SIR,—Perhaps some correspondent will oblige a reader in stating the best mode of treating *lime* that has been previously used to purify gas, before putting it upon the land, and for what crops it is most beneficial.

Jan. 19, 1847.

A NORFOLK FARMER.

### GAS TAR.

SIR,—I shall be obliged by you, or any of your correspondents, informing me whether tar, such as is produced at gas works, is considered good for manure, and *how it can be applied?* Your obedt. servant,

Jan. 20, 1847.

AGRICOLA.

“A Constant Reader” has a large bank, which has been accumulating for years; it consists of earth, sand, clay, peat, and other such materials. He proposes to burn it, and put it on the land for turnips; but previously he would be glad of the opinion of some practical farmer as to the propriety of his doing so.

A correspondent inquires if cattle will do well and fatten with rape-cakes; what quantity should be given to a beast daily; if it should be given alone, or mixed with a proportion of linseed cake; if it should be broken with a crusher or ground into meal; as it is unpleasant in taste, the best method of getting cattle to eat it; and what proportion it bears to linseed cakes for feeding cattle.

SIR,—Neither “A Reader of Southey’s Treatise on Sheep,” nor “Jacob,” inform “Isaac” what kind of salt ought to be used, whether rock or common salt, though I imagine the former; perhaps one of them may now state which. And it would be obliging if any of your readers would be kind enough to state whether lime and soil, which has lain in a heap mixed together for a month or two, would be safe and advisable to be mixed with a dung-heap of stable and fold manure, intended to be saturated weekly with liquid manure; or whether common gypsum would not be better for the purpose of absorbing the liquid, lest the burning qualities of the lime should injure the heap.

I am, sir, yours respectfully,

Dec. 28.

A. B.

A correspondent asks if a common shaped draining tile and sole, manufactured distinct from one another, can be brought to the market as cheap as a tubular tile and sole attached, or a pipe tile and collar, each kind to be of the same diameter and length (say 1½ inch by 12 inches)—which of the kinds would be most beneficial for permanent drainage?

A correspondent inquires whether any of our readers can furnish, or direct him (if published) where to obtain a chemical analysis of the inorganic matter of the grape, peach, nectarine, apricot, plum, cherry, pear, or apple.

## ANSWERS TO AGRICULTURAL QUERIES.

SIR,—A young farmer is informed that the proper time to sow lucerne is in March; the land should be prepared the previous autumn by trenching or deep ploughing, well limed, and a plentiful supply of good old manure ploughed in before winter; in the spring it should be worked very fine, and sown in drills not less than twenty-six inches in width, with 14lbs. of seed to the acre, not put in too deep: if well done it will cut three times the first year. After each cutting, except the first, it should be ploughed with a small ribbing plough, having previously got a coat of *rotten* dung or *urine* put upon it, by going about the inside of each drill and turning the furrow from each side into the middle of the drill; after laying a day or two to dry it should be well harrowed, and all the dirt or weed picked out of it. By pursuing this plan the young farmer will find it will produce most abundant crops after the first year, and may be cut as often as five or six times. Ploughing puts in the manure and loosens the soil, as well as the only efficient way to keep it clean.

A NORTHUMBRIAN IN THE WEST RIDING.



SIR,—I beg to inform a Salopian farmer that the best time to sow gypsum upon clover leys is in March or April, and the quantity from three to four cwt. per acre; the best time to put it on is either early in a mild morning or in a mild evening, when there is a good deal of dew upon the clover; in doing so the gypsum instantly sticks to the plant, and makes its way down to the roots, and is not liable to be swept off by any little wind that might come.

A NORTHUMBRIAN IN THE WEST RIDING.

SIR,—As one of the advocates for compensation on account of improvements made by outgoing tenants, I beg to inform the person who signs himself "A Land Steward," that I am afraid his knowledge as a land-agent has not extended over many years, otherwise he should have known that all outgoing tenants are by law bound to make good all dilapidations, and also subject to penalties, and actions at law, for all irregular cropping, and other mismanagement, done contrary to the custom of the country. As to the extra management being extracted, this wisecrack of a *land steward*, like many others, should have seen that tenant-right once properly established would prevent such an advantage being taken off the land, and will do more for the benefit of the landlords and the improvement of agriculture than all the land-stewards in England ever did in their lives. I hope my brother farmers will never cease their exertions until this, their just demand, IS MADE THE LAW of the land. And when that is accomplished I should propose that all land-stewards should be subject to an examination before a committee of *practical men*, before they can be eligible for such situations, and need I say, Mr. Editor, *how many* would be found wanting?

I am, Sir,

A NORTHUMBRIAN IN THE WEST RIDING.

WALTHAM AGRICULTURAL SOCIETY.—At the annual show of hunting horses in Croxton-park there was a smaller attendance this year than on former occasions; perhaps owing to the Duke of Rutland's hounds meeting on the Lincolnshire side of the Belvoir hunting district on that day; yet, notwithstanding, there was a good attendance of breeders and admirers of hunting horses. The judges were W. F. N. Norton, Esq., of Elton-manor, assisted by Mr. Edward Guy, of Branstone, and Mr. Bradford, of Stonesby, in the absence of the Marquis of Granby and C. P. Leslie, Esq., who were solicited but could not attend. The following is the award of premiums:—Class 1. To the owner of the best four year old hunting mare or gelding, bred within the hunting district, 1st prize, to Mr. Harrison Bland, of Flawboro', for his grey colt by Mundig, 12*l.*; 2nd prize, Mr. March, Wartnaby, for his chesnut colt by Mundig, 8*l.*; 3rd prize, to Mr. Allsopp, of Garthorpe, for his bay colt by Birdcatcher, 4*l.* Class 2. To the owner of the best three year old mare or gelding, &c.; 1st prize

to Mr. Wright, Great Gonerby, for his colt by Birdcatcher, 10*l.*; 2nd prize, to Mr. Harrison, of Garthorpe, for his brown filly by Mundig, 5*l.* Class 3. To the owner of the best in-foaled or sucking mare, calculated to breed hunters; 1st prize, to Mr. March, of Wartnaby, for his brown mare by Sir Gilbert, stinted to Chancellor, 12*l.*; 2nd prize, to Mr. Harrison, Garthorpe, for his grey mare by Amadis, stinted to Sheck, 8*l.*; 3rd prize, to Mr. Croft, Holwell, for his bay mare by Brutendorf, stinted to Sheck, 4*l.* After the show a party of friends dined in the Agricultural-hall, Waltham, and the after-part of the day was spent in discussing various topics connected with the agricultural interest (Mr. Beeson Leabeater, of Thorpe Satchville, in the chair). After the usual loyal toasts—the Duke of Rutland, the Marquis of Granby, &c.—the health of W. N. Norton, Esq., was proposed, amidst loud applause, and many thanks for the kind manner in which he always responded to the solicitations of this association.

HEREFORD FARMERS' CLUB.—Subjects to be Discussed:—Feb. 27. How far a well-regulated system of "Tenant-right" would be beneficial to landlord and tenant. May 29. The best method of preparing and applying bones and guano as manures, the quantity required, and the soil to which either manure is best adapted. Aug. 28. The best system of breaking up inferior grass-lands, and how far beneficial; also the best system of laying down arable to permanent pastures. Nov. 27. The best system of managing breeding cows and of rearing calves.

Died, on Saturday the 9th inst., at his residence, Osnaburgh Place, Regent's Park, W. Youatt, Esq., V.S., aged 70. Mr. Youatt was well-known not only throughout the United Kingdom, but also in foreign countries as a man of the highest talent and ability in his profession. He was the author of the works entitled, "The Horse," "The Sheep," and the "Ox," published by the Society for the Diffusion of Useful Knowledge, having been selected by the Council of that Society as the individual best qualified for the performance of that task. He was a proprietor and joint editor of "The Veterinarian," the first periodical publication exclusively devoted to veterinary matters; had he lived a few days longer he would have witnessed the publication of his last work, "The History of the Pig," on which for some years he has been engaged, and which will be published in a few days, thus completing his series of Domestic Animals. He also edited several well-known publications on the diseases of cattle; but the work which, above all others, displayed his natural character and his universal kindness of disposition, was that entitled, "Humanity to Brutes," in which his appeal on behalf of the brute creation is irresistible, when brought to bear even upon the most callous mind. The veterinary profession has by his death lost its brightest ornament, and his associates a friend whom they will not easily replace.

## CALENDAR OF HORTICULTURE.—FEBRUARY.

**WINTER WEATHER.**—Since the last article went to press, we have experienced little else than stern winter. On the 24th day of November the thermometer indicated 57° of Fahr.; three days afterwards it was reduced to 31°, and on the 30th to 27°. The registers will exhibit the daily state, and to them the gardener may appeal for a comparison of details; it will suffice to say that the average here of all the nights in December was 28.7° or more than 3° of frost; the maximum of the days averaging about 36°. There were two intervals of thaw, but not of a character to render the working of the ground either agreeable or useful; the month ended with 6° and 4° of frost. January came in with gloom and a cold north-east wind; a little snow fell on the 2nd and 3rd, then a thaw with rain, which made the surface unfit for approach. Dense haze and fog obscured the atmosphere till the 8th, then a moderate frost returned, which still prevails; the first gleam of sun was observed on the 11th, and several fine days followed, with great power of sun at, and after, noon.

Seven weeks of winter have therefore already been noted, how many remain in store time alone can determine; but of results we may speak up to the period of mid-January. As a general fact, not one leaf of any one thing has an appearance of suffering. Broccoli, artichokes, cabbage, lettuce (the last defended, however, by throwing about them a few fronds of fern), all appear safe. In the shrubbery, laurustines have not lost their bloom; bays seem perfect; and so, with us, remains a fine and large pittosporum tobera, fully exposed. In 1844—5 all these things perished or were much injured, almost as much as in the tremendous winter of 1838. If nothing more serious occur, though the present force of frost should continue for two months longer, all vegetable nature may come off unscathed, and rouse to life and activity with the greater vigour.

**OPERATIONS.**

There are conditions—mild as is the frost on this day (19th), we cannot insure amelioration. Gardeners always advise diligence in carrying manure, and in renewing or forming methods of protection: they direct that crops of peas should be covered with sawdust, and truly no material is more efficient; also, to seize every open interval to prepare ground for spring operations, but to do this the land must be dryish, and not a mass of mud.

One peculiarity, local at all events, if not general, ought to be recorded:—long as the frost has continued, it has not penetrated the ground; admitting a hard crust of two inches, our trenching, &c., to a considerable extent has been finishing eight days ago with facility; and this day, celery plants have been raised without trouble, simply owing to the protection of a few tiles, covered with a few inches of birch-leaves. However, if open periods occur, and the ground be free, it will be highly proper to trench plots for tree-planting, incorporating fresh turfy loam with the soil of the garden, orchard, or shrubbery.

**TREE-PLANTING.**

If February pass over, the subsequent removal of deciduous trees and shrubs may be a doubtful operation; for should the situation and weather be dry, the first development of rootlets being thereby impeded, there will be no advance; swampy, cold land must be, however, regarded as inimical; and thus between two extremes some difficulties accompany spring plantings. In every case we disqualify the introduction of fermenting dung, being assured that a natural free loam, with fibrous matters, is the safest medium in the first instance. After a tree or shrub shall have been properly deposited, its roots expanded, covered well with light earth, and puddled in with river water, it is good practice to mulch over the surface soil with six inches of long dung. This will doubly protect—that is, from cold and drought; it will operate as manure also throughout the summer, and the rootlets will be attracted upwards without risk of being parched. In this way all the best fruit trees, and the berry-bearing shrubs, can be planted with favourable results.

**VEGETABLE GARDEN.**

All the operations previously recommended for January certainly remain to be performed. Hot-beds formed, forcing-pits lined with leaf-compost; frames that contain lettuce, radish, cauliflower, salad-ing, coated round with fern or straw, and at top by straw-mats; sea-kail and asparagus set to work, the former particularly, in the dark mushroom-house.

Peas in the open ground cannot have advanced; therefore if the frost continue they should be sown on inverted grooved strips of turf, or in boxes or pans, to be placed on a vinery floor till grown an

inch high, when a common wooded brick frame will harden them off. If the ground prove manageable, sow peas, beans, transplant cabbage, and dig open plots.

In common with contemporaries, beet-root deserves every kind of good treatment, a nice light soil, deeply opened, to be manured at bottom. If brown bread (not purple) be contemplated, either pale mangold must be used, or white tap-rooted beet. The middle of the month will be early for any sort; the produce is great, and whether used for bread, or as food alone, is highly nutritive.

#### FORCING.

The second early vinery should be commenced forthwith, a good hot-water machinery offers the best apparatus, as it provides moisture as well as heat. But the loss of heat from waste of fuel is ever to be deplored; the cylindrical boilers, even when coke only is used as fuel, aided by a few pieces of interspersed chalk, send half the heat up the chimney; and when coals are employed, the black smoke, blended with inflammable hydro-carbons, contains a greater proportion of combustible elements: a jet of dispersed steam forced over and down on the burning coal, has been seen to consume the smoke—we now lose 50 to 60 per cent.

The third or late vinery may be excited by the 21st to 28th day. In every case, whatever moisture or steaming is deemed necessary should be employed while the buds enlarge: when they are expanded, the fruit clusters discovered and drawing out, then—as very soon after, the blossoms will open—water must be abandoned till the berries set, otherwise the impregnating farina may be irreparably injured. Many complain of the muscat grapes, including the noble variety called the “Cannon-hall,” as bad setters, and therefore recommend that the farina of some other grape be shaken over the open flowers of the muscats. It is well known that impregnation fertilizes the seeds, not the pulp, and therefore the results may be questionable. Let the gardener closely examine the clusters, and see whether the covering integument be fairly *thrown* off the blossoms (for, in the grape, that represents a hood, fitting downward over the stamens): if it be, and the dust appear well formed and free, the fault cannot be ascribed to impregnation; if it be not, then it may suffice to shake each cluster, with a view to detach the loosened petals. The farina can then act; comparative experiments will tend to illicit truth; in the mean while a high steady temperature during the period required for the perfect setting of the infant berry, will be a powerful accessory.

The pine-apples must be kept steady in their progressive growth by a mild bottom-heat of 75 to 85°, and gentle air from openings made below the level

of the plants, so as to rise and pass over the foliage, not as a cold draught from above. The fruiter must have air, but advancing atmospheric heat by fire and sun during day-light; the nights are of less consequence, as all nature plainly shows that the phenomena of vegetation by night differ much from those of day.

#### GENERAL MISCELLANEOUS OPERATIONS.

Pruning of most trees and shrubs may be performed; gooseberries first as being likely to be in the advance; then currants, cutting these close in spurring order, as before repeatedly directed; raspberries, at the bud below the curves. It were always well to finish by clearing away superfluous suckers, and to reverse the surface of the soil over a layer of manure, but not to dig it. Next follow in order apricot, peach, nectarine, plum, and cherry. Keep all the branches open; shorten the shoots discreetly, according to the modes recommended, and observed. We propose to speak particularly upon each tree, as time will allow; but after all, so much depends upon habit and local circumstances, that Pope's moral axiom, “That which is best administered is best,” may here apply, fertility being always preferable to set rules or precise figures.

Prune the shrubby plants as space and convenience require; turn over the surface, but not before the end of the month. Hunt out and destroy every discovered shell-snail. Sweep, then roll, lawns; do the same by gravel walks, and take away litter.

Flowering plants are to be protected from wet, snow, and severe frost; with these are included auriculas, potted pinks, carnations, verbenas, chrysanthemums, &c., &c. Sow seeds of annuals in pots and pans of fine earth, to be raised under glass. Do not dig, or remove anything from, the flower beds till fine weather be confirmed.

The green-house will require much cleanliness, more of free air, a prudent increase of root moisture, and rather more fire-heat. Aphis will soon attack the geraniums and roses; therefore tobacco smoke ought to be resorted to as a preventive. Persons may grow their own tobacco, by sowing the seed of true Virginia, in pans, for final removal as other tender annuals: more of this in proper time.

The plant-house, or temperate stove.—Now see to incipient growth; raise the heat to 55°. Plunge gloxineas, &c., in the sand or saw-dust bed, over a tank. Directly after the first growth of the buds, re-pot the bulbs, shaking off old external soil, in shallow broad pots over charcoal drainage; and mix some bits of the coal with leaf-mould and white sand, as soil—some add loam and heath-mould. Do the same by Gesneræ; turfy, free loam and heath mould, will apply to most mixed collections.

METEOROLOGICAL DIARY, 1846-7.

BAROMETER.			THERMOMETER.			WIND AND STATE.		ATMOSPHERE.			
Day.	8 a. m.	10 p. m.	Min.	Max.	10 p. m.	Direction.	Force.	8 a. m.	2 p. m.	10 p. m.	
Dec.	22	29.00	in. cts.	29	42	32	Westerly	gentle	fine	sun	fine
	23	28.70	29.84	31	38	32	E. to North.	lively	cloudy	cloudy	cloudy
	24	29.16	29.38	27	34	32	N. to East	gentle	cloudy	cloudy	cloudy
	25	29.55	30.00	28	32	25	N. by West	lively	haze	sun	fine
	26	30.16	30.30	29	32	31	N. by West	brisk	fine	sun	fine
	27	30.37	30.44	29	35	27	N.E., N.W.	brisk	fine	sun	fine
	28	30.45	30.40	18	33	32	N.E., N.W.	gentle	fog	cloudy	haze
	29	30.40	30.47	31	37	32	S.E., S.	calm	cloudy	cloudy	cloudy
	30	30.50	30.50	29	32	31	S. East	calm	cloudy	cloudy	cloudy
	31	30.50	30.41	26	28	28	S. East	gentle	cloudy	sun	cloudy
Jan.	1	30.30	30.15	26	34	34	N.E., East	calm	cloudy	cloudy	cloudy
	2	30.00	29.80	31	33	30	E. by North	brisk	cloudy	cloudy	cloudy
	3	29.70	29.64	28	33	33	East	brisk	cloudy	cloudy	cloudy
	4	29.74	29.74	34	44	40	E. by South	gentle	cloudy	cloudy	cloudy
	5	29.80	29.87	42	44	42	S. by East	gentle	haze	haze	cloudy
	6	29.95	30.05	38	44	42	N. by East	gentle	fog	fog	fog
	7	30.08	30.08	40	42	42	East	gentle	haze	cloudy	cloudy
	8	30.09	30.16	38	43	34	E. by South	lively	cloudy	cloudy	cloudy
	9	30.30	30.30	33	35	32	E. by South	lively	cloudy	cloudy	cloudy
	10	30.39	30.20	28	33	30	E. by South	lively	cloudy	cloudy	cloudy
11	30.13	30.08	26	32	29	E. by North	lively	fine	sun	cloudy	
12	30.03	29.90	28	38	32	E. by North	lively	haze	sun	cloudy	
13	29.86	29.87	29	34	31	East	gentle	cloudy	sun	fine	
14	29.98	30.02	29	36	31	East	gentle	fine	sun	fine	
15	30.02	30.02	26	36	30	E. by South	gentle	fine	sun	fine	
16	30.00	30.06	27	33	29	East	brisk	fog	cloudy	cloudy	
17	30.09	30.10	27	29	28	East	brisk	cloudy	cloudy	cloudy	
18	30.10	30.10	29	30	31	N. East	brisk	cloudy	cloudy	cloudy	
19	30.10	30.09	31	32	30	N. by West	gentle	cloudy	cloudy	cloudy	
20	30.04	29.99	29	32	32	S. West	calm	cloudy	cloudy	cloudy	

ESTIMATED AVERAGES FOR JANUARY.

Barometer.		Thermometer.		
High.	Low.	High.	Low.	Mean.
30.77	28.89	52	11	36.1

REAL AVERAGE TEMPERATURE OF THE PERIOD.

Lowest.	Highest.	Mean.
29.63	35.24	32.435

WEATHER AND PHENOMENA.

1846.—Dec. 22, beautiful; 23, much rain; a hint of snow and sleet; 24, hazy, very damp; 25, a most beautiful Christmas day; 26, here begins that high state of barometer which lasted seven days; 27, 28, fine and sunny; the last was however hazy; 29, a change of wind; 30 and 31, quite cloudy, and calm; a trace of snow on the 29th and 30th.

LUNATIONS.—First quarter, 25th day, 6h. 36m. morning.

1847.—Jan. 1, gloomy and chilling; 2, snow; singular heavy gloom; 3, snow twice, and a thaw; 4, 5, some rain; 6 and 7, another yellow foggy period; the barometer rising, and continuing high; 8, cooler; steadfast gloom, and also on the 9th and

10th; first sun this month; 12, 13, 14, 15, fine and sunny; 15, fog, then cloudy; 16, 17, east, biting wind; black weather; 18, veered westerly; 19, the same rather more broken; 20, west by S. at last, and light snow in the evening. Frost very gentle throughout, very mild.

LUNATIONS.—Full moon, 1st day, 2h. 42m. afternoon. Last quarter, 9th day, 6h. 40m. afternoon. New moon, 17th day, 45 m. after midnight.

REMARKS REFERRING TO AGRICULTURE.

The frost, considering that it has endured, with a few days' intermission, since Nov. 27, has been gentle; nothing is injured, though nothing has advanced. On the evening when the report closes a change is indicated, and as every snow here has passed immediately away, a third thaw may be established. If so, for a time the earth will be wet, though the small quantity of rain for many weeks, and scarcely one inch of snow at any one time, will ensure a rapidly drying staple. At present all is well, and the farm-yards full of corn; surely these high prices will ere long give way, a heavy reverse will then startle those who "withhold the corn."

Maidenhead Thicket.

J. TOWERS.

## AGRICULTURAL REPORTS.

## NORTH LANCASHIRE.

The weather for some time back has been, upon the whole, favourable for the operations of the farmer. At the commencement of harvest we had heavy and frequent rain, which being accompanied with a high temperature, caused some of the wheat to sprout, but no serious damage was done, and no samples have hitherto appeared in the market which have suffered much from the weather. The latter end of harvest was, however, very fine, and barley in particular was scarcely ever known to be in such fine condition as during the present season, and the maltsters say they never knew it *come* so well; every grain is good. As to the yield of the crops, wheat seems to be regarded as about an average; it yields well from the straw, though the crop appeared in many instances thin on the ground; and many fine samples may be seen in the market weekly. Oats are regarded as fully one-third less than an average crop on the best soils, and about half on soils of a poorer description; and besides this the quality was never known so poor; the potato oat particularly has entirely lost its characteristic, and is "*bearded like a pard.*" Barley also is considerably below an average, and some of it wants body, but it is sound and good. Beans, which are not much grown in this district, except along the shore, and in the island of Walney, are almost a failure, and very few are to be had. Turnips in most places are small, and what is still worse, many of them are not likely to keep; they have already begun to decay, and I have been told by one or two farmers that they do not expect to save more than half of their late turnips. Should this be the case, and the winter prove a protracted one, keep is almost certain to be scarce before any grass can be expected. The farmers of this neighbourhood have not yet got sufficiently into the habit of storing their turnips early in the winter; for when properly stored they keep better and are more nutritious than when left in the ground exposed to every change of weather. The ploughing of stubble has gone on very steadily, and is now nearly completed; the frost, though severe while it lasted, not having interrupted it for any length of time. Some of our earliest farmers have commenced ploughing lea, but the ground is now too dry for that purpose, though there is every appearance of snow or rain before long. Our grain markets have lately risen so rapidly that even the farmers have begun to express their anxiety as to what the consequence will be; they know that extravagantly high prices must cause a stagnation of trade, and that sooner or later a reaction must come. Wheat is now 52s. 6d. per load, being 5s. per load higher than in December; Oats, 31s. to 36s.; Barley, 18s. 6d. per 96 quarts. Potatoes have lately been selling at 1s. 6d. to 1s. 8d. per stone of 14lbs., and very few to be had. Notwithstanding the present high prices, the labouring classes are tolerably well off, for work is plentiful and

wages are high. The Furness Railway gave the labourers in this neighbourhood a lift, and it is not yet completed, while the Furness and Whitehaven is about commencing. Added to this, draining was never more extensively carried on than during the present season, landlords and tenants becoming daily more sensible, that their true "*protection*" lies in good cultivation, not in legislative enactments; and that skill and capital, "*practice with science*" (with security of tenure), are the surest defences against an INUNDATION OF FOREIGN CORN.

*Low Furness, Jan. 21, 1847.*

## SOMERSETSHIRE.

As there appears little matter to report on as regards operations in husbandry, it may not be out of place to make some remarks on the present state and prospects of the corn trade, &c. Hitherto the anticipations of the writers, contained in former reports, have not been very far from according with what has since transpired. In your extracts from the writers of the *Bankers' Circular* (an authority which, we are quite willing to admit, is deservedly well thought of in the trade) there is an attempt made to reconcile their statements made in September with the experience we have now arrived at, and concluding with opinions regarding the future. We must remark that it is a query if it would not have been better policy not to have attempted this reconciliation, but rather to have acted on the admission that, particularly in the corn trade, the wisest may be out. It was no doubt correct that the stocks of old wheat in the farmers' hands were very large, much beyond an average; this, we admit, is fully borne out, and still applies to this period; but we cannot admit that their view respecting the crops of 1846 were, or have, more decidedly since proved correct. The experience derived from thrashing has, with very few exceptions, shown a great deficiency, and in weight there is more than 2lbs. per bushel less than an average. Beans, barley, and oats, but particularly the latter, show a deficiency on the test of experience. But there is one cause for the rise in the prices not dwelt on in the *Circular*; it should be grounded, most decidedly, as the cause of the rise, and its sufficiency ought to have been very apparent: we mean the *consumption*. The failure of the potato crop was known almost to its full extent in September; enough was known to prove that by far the largest source of food of Ireland had failed, and that there was, to speak within bounds, no less than six months' total deficiency of that food on which a very large portion of the Irish depended for subsistence, and in Great Britain more than three months' for half its population: this, even at present, is nearly proved by the increased consumption of bread (leaving out peas, beans, rice, &c., as substitutes) of more than 30 per cent. As regards the stocks in the farmers'

hands, we do not think it much exceeds former years at this period—at any rate, not to the extent supposed by some—and believe it will be found that much larger stocks have been held at the large importing depôts. We are quite disposed to think we may have a pause in the advance, if not a dulness, accompanied by some depression in price; but we certainly do not look forward, for this four or five months, to any decided reaction; and the present prices, in that period, may be exceeded: an impetus may be given to ordering wheat from abroad by our high rates, but at home there will be little disposition to hold. The increasing wants of Europe, and more particularly France, will, we think, prevent an overdue importation into this country: the only fear is its insufficiency to our wants. Since our last report wheat has touched, in some instances, for prime old, 11s.; much has been lately sold at 10s. Flour as high as 3*l.* 5s., the general price being 3*l.* 3s. per 280lbs. Bread, 9½*d.* to 10*d.* per 4lbs.; but this week there has been an increased feeling amongst the millers that our prices are relatively gone up too high; and there is much less doing—an increased number of sellers at the above prices, with a decreased number of buyers, and inclination to submit. This applies to barley, which would not realize equal to the preceding week. Not so with beans, which have risen from 8s. to 10s. per qr., and the best new ticks have fetched 7s. more this week. Oats are also dearer, 28s. to 30s. being easily obtained for 34 to 38lbs. per bushel, and higher for greater weight. There are symptoms of early sowings of spring corn, and the land is preparing for peas and beans; and it is likely, for seed purposes, the spring corn will still advance in price. Our meat market has been dull. Mutton lower, as well as beef, and poor stock has somewhat partaken of this depression, and it is now found that on sheep and cattle the prices at which they have been purchased this six months past will scarcely be returned to the sellers of fat stock, to say nothing of the loss of keep. In cows with calves there is some depression, but they are still very high, and, if we can judge from the price of calves to wean, from 25s. to 35s. each, there is a very unusual number about to be reared this year, the price being more than one-third higher than usual. Bacon pigs are getting very scarce, and are worth 9s. to 10s. per score; porkers and half-weaned ones are much lower, and poor ones are almost unsaleable at very low prices. Most of the cheese taken to market has been sold, but at depressed prices; the trade complain of a want of demand. Very little doing in wool; stock very light.—*Jan. 22.*

**REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.**

Notwithstanding the imports of live stock from abroad during the month just concluded have been comparatively small, arising from the severity of the weather, the cattle trade in London, as well as in the large provincial markets, has been somewhat inactive, and in some instances a slight depression has taken place in the quotations. We regret to

state that the epidemic is committing extensive ravages in various parts of the country, where great losses have been sustained by our principal graziers.

The following are the supplies on offer in Smithfield since our last:—

Beasts.....	14,893	Head.
Cows.....	620	
Sheep.....	94,680	
Calves.....	842	
Pigs.....	2,250	

The numbers shown at the corresponding periods in 1845 and 1846 were as under:—

	1845.	1846.
	Head.	Head.
Beasts....	13,802	16,420
Sheep....	112,690	87,500
Calves....	783	800
Pigs.....	2,704	2,513

Annexed are the prices obtained in the month just concluded:—

Per *slbs.*, to sink the offal.

	s.	d.	s.	d.
Beef.....	from 2	8	to 4	6
Mutton.....	3	8	to 5	2
Veal.....	4	0	to 5	0
Pork.....	3	8	to 5	0

Comparative statement for 1845 and 1846:—

	Jan., 1845	Jan., 1846.
	s. d.	s. d.
Beef..	2 8 to 4 2	2 6 to 4 4
Mutton	2 10 4 4	3 10 5 4
Veal..	3 8 4 10	4 8 5 10
Pork..	3 0 4 6	3 10 5 2

The principal droves of beasts have been derived from the following districts:—

	Head.
Northern districts . . . .	3,500
Eastern ditto. . . . .	2,400
Western ditto . . . . .	3,100
Other parts of England . .	2,950

The remainder of the supplies have been derived from the neighbourhood of London, from Scotland, and abroad.

Imports in the past month into London.

Oxen.....	66
Cows.....	564
Sheep.....	4,334
Lambs.....	180

Total..... 5,144

At the outports about 800 beasts and 2,050 sheep have been landed, principally from Holland.

Newgate and Leadenhall markets have been well supplied with both town and country-killed meat, owing to which the trade has ruled heavy, at barely late rates. Beef has sold at from 2s. 6*d.* to 3s. 8*d.*; mutton, 3s. 6*d.* to 4s. 6*d.*; veal, 3s. 10s. to 5s.; and pork, 3s. 8*d.* to 5s. per *slbs.*

The arrival of carcasses from the country has comprised 750 carcasses of beef, 6,000 ditto of mutton, 300 ditto of veal, and 2,206 ditto of pork.

## REVIEW OF THE CORN TRADE DURING THE MONTH OF JANUARY.

In our last monthly notice of the grain trade we endeavoured to prepare our readers to expect a further material advance in prices of corn, laying before them our reasons for supposing that the upward movement had not then reached the maximum point. What has since occurred proves that our opinion was not without good foundation, all articles of food having steadily increased in value during the month now about to terminate. The primary cause of this state of things has unquestionably been the disease by which one-half, if not two-thirds, of the potato crop of the United Kingdom has been destroyed. This calamity was not fully appreciated in the first instance, but within the last few months it has made itself felt in all its rigour. The loss of such an immense amount of food would, under any circumstances, have been a severe infliction on the country; but when, as was the case last season, the crops of all spring corn turned out seriously deficient, and the produce of wheat fell short of an usual average, high prices became inevitable. The result has been a vast amount of suffering and misery even in England, whilst in Ireland and the highlands and islands of Scotland large numbers of the people have actually died from want.

We have always questioned whether, when a country is visited by so lamentable a dispensation as a scarcity of food, it be in the power of the Legislature to afford much relief. The Government are, however, blamed, with some show of reason, for not having made an effort in November instead of January to do all that they were capable of doing to alleviate the sufferings of the poor. That they would have met with no opposition from the Conservative body, if they had then thought it proper to open the ports temporary for the free admission of grain, cannot be doubted. It is, however, useless to argue about what might have been done; the point now is, how are we to obtain a sufficient supply to meet our wants up to next harvest.

The ministerial plan of remitting the duties on importations up to September next, and the suspension of the navigation-laws for the same period of time, has been cheerfully conceded by the Opposition side of the House; but will this, coming as it does now that our wants have become known all over the world, have the desired effect? We much fear not. This at all events is certain, that foreign

countries will require high prices to induce them to part with any portion of their stocks, the harvest having been quite as unproductive in many of the principal grain-growing states on the Continent as in Great Britain. Bearing this fact in mind, we are clearly of opinion that the value of food will continue high until another harvest shall have been gathered, even with the facilities now offered to import free from all parts of the world.

The weather has, during the greater part of January, been highly seasonable; the frost has at no period been very intense; and though the young wheat plant may have suffered more or less from the keen easterly winds which have prevailed from time to time, we do not think that any material injury has been done.

The impossibility to do much out-door work except that of carting manure on the land, and the temptation which the high prices current have held out to farmers to thrash freely, have caused the markets in the agricultural counties to be well supplied.

Many parties appear to be still of opinion that the growers have large stocks on hand; and it is very common to hear men, not practically acquainted with the subject, clamour about farmers holding back supplies. If, however, any one will be at the trouble to examine the accounts of the deliveries, or look at the extent of the sales at those places where the returns are made for compiling the averages, they will easily satisfy themselves that a larger proportion of the crop of 1846 has already gone into consumption than is at all usual at this early period of the year; and we feel fully persuaded that the farmers, as a body, have a less quantity of wheat on hand than in ordinary seasons at the corresponding period. The fact is, that the consumption has been enormously great, the extreme dearness and the very bad quality of potatoes having naturally had the effect of causing a vast increase in the use of bread among all classes of the community.

The time is now approaching when the preparation of the ground for spring corn claims the attention of the agriculturists, which with the fact just alluded to, viz., the smallness of the stocks left on hand, will probably, ere long, occasion a very sensible falling off in the supplies. Meanwhile no assistance of consequence can be looked for from

the north of Europe till the end of March; but we are inclined to think that the suspension of the corn and navigation laws, and the very high range of prices here, may have the effect of procuring us some cargoes of wheat and Indian corn from the Mediterranean originally intended for France. Still we can see no reason to anticipate any fall of moment in the value of that article.

As regards barley some reaction has taken place. The permission granted to distillers and brewers to use sugar will, no doubt, tend to lessen the consumption of barley and malt; but whether this will be to the extent expected, strikes us as somewhat questionable. The experiments hitherto tried have not been on a sufficiently extensive scale to prove very clearly whether sugar will, after all, be so much the cheaper article as to induce its adoption generally. Unless the saving in price be something considerable, the manufacturers of beer and spirits are likely to adhere to the old, instead of using a new article; and as sugar has recently run up in price, whilst barley has fallen several shillings in value, the matter is still in a very undecided state. It will, of course, be a simple question of profit—whichever pays best will have the preference.

We shall not refer particularly to other kinds of grain in this place, but reserve our remarks relative to oats, &c., till they come under our notice in regular order, when we proceed to give an account of the occurrences at Mark-lane. We cannot, however, pass over the reported deficiency of oats in Ireland and Scotland. Mr. Labouchere, President of the Board of Trade, estimated—when speaking on the condition of the Irish, a few nights ago in his place in Parliament—the crop in Ireland at one-third less than an average; and from private information, on which we have every reason to place reliance, we fear that the falling off is fully to that extent: when to this is added the almost total loss of the potato crop, no surprise can be felt that oatmeal should have reached the high range it now bears in the sister isle, being actually dearer there than the best flour is on this side of the channel. In Scotland the demand for oatmeal has likewise greatly increased by the failure of potatoes, and the dearness of the article has in some instances driven the people into acts of insubordination; riots having taken place in various parts of the country, where the populace have opposed the shipment of corn by force.

The trade at Mark-lane has throughout the month been in a state of considerable excitement: at times there has been something like a lull, but this has at no period lasted above a day or two; and on the whole, the upward movement in prices of all articles may be said to have continued almost with-

out a single pause, the only exception being that of barley, which has certainly of late felt the influence of the Government interference with the laws relating to distillation.

Proceeding in our usual order, we shall, in the first place, confine our notice to wheat.

The arrivals coastwise into London have been decidedly small, which has no doubt been caused by the high range of prices at other large consuming towns. For some time past, wheat has been more valuable at Liverpool, Newcastle, and several other places, than in the metropolis; and a considerable proportion of the shipments from the east coast, which might otherwise have come to London, have been directed to those places where the prospect of profit was the greatest. The receipts from Lincolnshire, Cambridgeshire, and Norfolk have therefore been somewhat less than usual; but the falling off has been partly made up by rather increased deliveries from the neighbouring counties of Kent and Essex.

Nearly the whole of the wheat which has been brought forward for sale at Mark-lane has consisted of fine qualities, and the condition has likewise for the most part been good, proving that though the yield per acre may have been short last year, the quality was decidedly better than in common average seasons. The town millers have taken all that has been offered, without much hesitation. On Monday, the 4th Jan., the stands were cleared at prices 3s. per qr. above those previously current. On that day week the demand was not so active, but there was no giving way, indeed a further rise of 1s. to 2s. per qr. was insisted on, to which the caution manifested by purchasers was principally owing. The Monday subsequent to the meeting of Parliament, and after it had become known that foreign wheat was to be admitted free of duty for six months (a circumstance which would in ordinary times have been followed by a material decline), factors exhibited quite as much firmness as at any previous period; owing, however, to the change which the weather underwent about that period, the condition of the samples was soft and damp, and buyers were therefore less inclined to purchase freely. Really good dry qualities brought former terms without difficulty; but the general runs having been deteriorated in value to the extent of 1s. to 2s. per qr., some slight concession had to be made before these could be disposed of.

The transactions in foreign wheat have been large during the month: besides what has been taken for local use, considerable purchases have been made by country buyers; and the demand on Irish account has progressively increased in magnitude. The rise which has been established in prices since the close of last year will perhaps be best shown by



giving the present value of some of the qualities most in request. The more common descriptions, such as Odessa, Danube, &c., have lately realized 68s. to 70s. per qr., principally for shipment to Ireland; whilst for superior Rostock from 75s. to 78s., and the best Danzig over 80s. per qr. have been paid. The deliveries from the granaries have been very large, and many of the principal warehouses are nearly empty; it is not easy to ascertain the exact quantity remaining at this port, but in estimating it at between 150,000 to 200,000 qrs., we shall probably be pretty near the truth. Just previous to the meeting of Parliament there was a great desire to buy bonded wheat, it having become known that Government would in all probability take off the duty. Most of the holders being quite as well aware that this would be the case as the speculators, rose their pretensions accordingly, and few bargains were consequently concluded. Now there is little or no difference between the wheat still under lock and that free, as the whole will forthwith be liberated.

The export of wheat from hence to France has for some time ceased, the start which prices have taken here having raised our quotations above those current in the French markets.

The inquiry for flour has scarcely been so lively as might, under all circumstances, have been expected. Many of the London bakers persist in viewing the advance as one brought about by speculation, and still adhere to the hope that a reaction will occur. Under this impression they have, throughout the month, bought only from hand to mouth; but the increased cost of the raw material obliged the millers, early in the month, to put up the top price to 65s. per sack, at which it has since remained. Norfolk and other kinds of country manufactured flour have come slowly to hand, many of the northern markets having afforded more remunerating rates than Mark-lane—here it has been difficult to obtain 55s. per sack for good households, whilst at Newcastle the same quality has met a ready sale at 57s. per sack. American Flour has moved off somewhat slowly of late, the terms asked (42s. to 43s. per barrel) being rather above the usual relative proportion between sack and barrelled flour.

In the commencement of the month the scarcity of fine barley for malting was so great in this market as to cause a very rapid rise in its value. At the close of December, the top price was, it will be recollected, 54s. to 55s. per qr.; shortly afterwards it rose to 60s., and ultimately as much as 70s. per qr. was paid for a very superior parcel, whilst moderately fine Chevalier brought 65s. to 66s. per qr. These rates, it may be easily supposed, induced great exertions to be made by farmers to give us a supply, and with somewhat in-

creased arrivals coastwise, a few cargoes of foreign dropped in. This was just about the time that the Government plan of allowing the use of sugar in distilleries began to be talked of, and from that time up to the present, malting barley has receded 7s. to 8s. per qr. from the extreme rates mentioned above. On grinding sorts the reduction has not been so great; good, heavy samples being still worth rather over 50s. per qr.

Malt has also been influenced by the alteration in the distillation laws, and from 88s. per qr., the highest point attained for choice quality, it has receded to 85s. per qr.

Oats have, throughout the month, come very sparingly to hand, and this has not been the case alone in London, but at all the leading markets in the kingdom. The fact is, that England has of late years been so accustomed to look to Ireland for the greater proportion of her supply of oats, that they are comparatively little cultivated on this side of the channel. The failure of the potato crop in Ireland, and the consequent extra demand for oatmeal in that country, have of course left a much smaller quantity for shipment, and not one-fourth of what we are accustomed to receive has this month come forward from the sister isle. Under these circumstances the dealers have had to draw freely on their old stocks, to keep their regular customers supplied; and we believe that London has rarely been so bare of oats as it is at this moment. The natural effect which must follow when the demand for an article exceeds the supply—viz., a rapid rise in prices—has taken place, and this grain is now nearly 10s. per qr. higher than when we last addressed our readers. The neighbouring farmers have been induced by this state of affairs to send all they have been able to muster to this market, and the appearance of a good many small lots of English on Monday, the 25th inst., gave a check to the upward movement. Unless, however, these supplies should be followed up, which is not probable, quotations are likely hereafter, when the seed demand commences, to be even higher than they are at present.

The value of beans has been more or less influenced by the rise in oats, and the supplies of the article having been on a moderate scale, sellers have been enabled to establish a rather important advance, handsome samples of English having recently been sold at 50s. per qr., and Egyptian at 48s. to 49s. per qr.

Peas have participated in the upward movement, fine white boilers being now worth 63s. to 65s., and grey and maple peas 53s. to 56s. per qr.

Several fluctuations have taken place in prices of Indian corn, but at the close of the month the article may be quoted some 3s. to 4s. per qr. higher

than at the end of December. The business done in the London market has been almost exclusively for shipment to Ireland, for which purpose cargoes to arrive, and having instructions to call at Falmouth or Cork for orders, have met a preference. In parcels on the spot the transactions have been comparatively unimportant, indeed there has been little or nothing to offer, the cargoes originally intended for this port having all been directed to Ireland.

It is yet too early to know what effect the announcement of the measures proposed by our Government to encourage the importation of grain may have produced abroad; there is, however, no doubt that it will lead to an immediate and important rise in prices, and it may perhaps even cause foreign states to prohibit the export of corn. The immediate effect of the legislative plan may therefore, perhaps, be rather to increase the difficulties than to afford greater facilities to merchants in procuring the supplies this country is admitted on all hands to stand so much in need of. The states most likely to take the alarm, and adopt precautionary means to guard against allowing the export of the corn their own people may need, are France, Holland, Belgium, the Neapolitan and Papal states, and perhaps even Austria. In the Baltic we do not apprehend that any such measures will be taken, and from America we may safely calculate on receiving large importations. The continued rise of prices here has been closely followed abroad; and even by the last accounts, when the suspension of our corn and navigation laws had not yet become known, wheat had risen to 60s. per quarter as well in the northern as in the south-eastern parts of Europe.

A letter from Dantzic, dated 18th January, informs us that large orders had been received there on British account, and that some rather important contracts for spring delivery had been closed at high terms, say 63s. to 64s. for fine high mixed, at 54s. to 58s. per quarter for secondary descriptions. The stock in warehouse was estimated at about 80,000 quarters, of which by far the greater proportion was of ordinary qualities, really fine parcels being very scarce. During the year 1846 the shipments of wheat from that port had amounted to 24,768 lasts. Dantzic is nearly the only place in the Baltic where any stocks of wheat are held. At Königsburg the quantity on hand at the close of the year was scanty in the extreme; and at Stettin, Rostock, &c., the deliveries from the growers have, during the winter months, been less than in ordinary seasons. By the most recent accounts from the different places named, red wheat was nowhere to be had below 60s. per quarter, and it is pretty

certain that the next reports will advise us of a further advance. At Hamburg stocks are small, and the recent exciting reports from this side appear to have produced considerable effect on the wheat trade. On the 22th inst., the river Elbe was still frozen up, but a good deal of business had been done for spring shipment: good red wheat on the spot had realized 65s., and at outports 63s. per quarter free on board; barley had been more freely offered, and good heavy qualities, to be shipped from the Danish Islands at first open water, might then have been had at materially reduced rates. In Holland and Belgium prices of grain continue too nearly on a par with quotations here to render either exports from this country to the Netherlands or exports from thence probable. In some parts of France the scarcity appears to be nearly as great as it is in Ireland; and though the government have removed all restrictions on importations, still the supplies have fallen short of the demand. Our advices from America reach up to the beginning of January. The price of flour was then still comparatively moderate at the leading ports of the United States; but there can be no doubt that the advices taken out by the last two steam-boats from hence will have had the effect of materially rising the value of that article, as well as the prices of wheat, Indian corn, &c., on the other side of the Atlantic. We are still in the dark as to the quantity of bread-stuffs the Americans may be enabled to send to Europe; but we are strongly inclined to think that public opinion has over-rated the capabilities of the United States, though at the same time we feel satisfied that all that can be spared will be forwarded, our prices being now very tempting.

## CURRENCY PER IMPERIAL MEASURE.

JANUARY 25.

WHEAT, Essex & Kent, red ..	70	76	White ....	75	82
Do., new ..	75	78	Do., new ..	80	85
Norfolk and Suffolk....	70	75	White ....	75	80
RYE, new .....				50	60
INDIAN CORN .....	56	60	Extra ....	65	67
BARLEY, Chevalier, new....	58	64	Malting ..	58	61
Distilling .....	51	53	Grinding ..	43	48
Scotch .....	48	53	Irish .....	—	—
MALT, Brown .....	73	73	Pale Suffolk		
Ware pale .....	81	83	& Norfolk	78	81
			Chevalier ..	83	87
OATS, English, feed .....	33	38	Potato, &c.	39	41
Irish, feed .....	34	37	New .....	38	39
Do., Potato .....	38	40	Do. ....	38	40
Scotch, feed .....	36	39	Potato .....	39	41
PEAS, Essex and Kent, white boilers, new .....				52	56
Maple, new .....	53	55	Blue .....	77	81
Grey or Hog .....	53	54	Do. non-boilers..	—	—
BEANS, Tick..	47	51	Harrow..	48	49
Long Pods	46	53	Windsors	68	78
FLOUR, Town-made and first country marks, per sack..				60	65
Norfolk and Suffolk .....				50	58
Stocks and Yorkshire .....				48	5

FOREIGN.

WHEAT, Danzig and Konigsberg, finest high mixed	75	80
Do. mixed	70 74	Saale Marks, Anhalt 70 75
Silesian and Stettin	70 73	Mecklenburg.. 70 75
Pomeranian	71 75	Polish Odessa .. 65 70
BARLEY, Hamburg, Konigsberg, Dantzic, and Russian		
maltng	50	58
Do. distilling and grinding	48	52
RYE		
OATS, Dutch and Friesland, Brew or Poland	35	40
Danish or Swedish	34	37
Russian and Mecklenburg	34	37
BEANS, Small or Pigeon	50 55	Egyptian... 46 48
PEAS, white boiling	none	Grey or hog .. none
FLOUR, Danzig, per brl. of 106 lbs.		
American	40 43	Canadian..... 40 42

IMPERIAL AVERAGES.

Week ending	Wheat.	Barley.	Oats.	Rye.	Beans.	Peas.
Dec. 12th	60 3	48 1	26 5	42 11	45 0	48 7
19th	59 10	42 11	26 3	43 1	44 8	48 10
26th	61 6	43 2	26 10	43 7	45 6	49 4
Jan. 2nd	64 4	44 3	27 2	46 10	45 10	49 8
9th	66 10	46 5	27 10	46 4	47 0	51 7
16th	70 3	50 0	29 6	50 8	49 0	51 11
Aggregate average of the six weeks which regulates the duty.	63 10	45 0	27 4	45 7	46 2	50 0
Comparative Average.						
Same time last year	56 8	32 3	22 10	34 4	38 4	40 6
Duties Payable in London till Wednesday next inclusive, and at the Outports till the arrival of the mail of that day from London	4 0	2 0	1 6	2 0	2 0	2 0
Do. on grain from British possessions out of Europe	1 0	1 0	1 0	1 0	1 0	1 0

PRICES OF SEEDS.

JANUARY 25.

The change in the weather had some effect on the Cloverseed trade to-day, the breaking up of the frost having given a slight stimulus to the demand; but as, on the other hand, supplies from abroad may be looked for somewhat earlier than was before expected, no rise took place in prices. Other sorts of seed sold much as on this day week.

Rapeseed, 22l. 25l.	Irish, -l. -l.
Linseed, Baltic, 44 48	Odessa, 45 48
Mustard, per bush, white 8	10 brown, 9 10
Carraway, 41 43 new, 42 44	Coriander, 10 13
Hempseed, 35 88 per qr.	Trefoil, 17 19
Canary, 55 58 fine, 60 62	Tares, winter, 6s. 0d.
Linseed Cakes, English 13l. 13l.	10s. per 1000
Linseed, English, sowing 50 60	crushing 44 48 per cwt.

BUTTER, CHEESE, BACON, AND HAMS.

Dorset Butter, per firkin	s. s.	Cheese, per cwt.	s. s.
Fresh Butter, 14s. 6d. per doz.	54 —	Double Gloucester	62 64
Irish, do., per cwt.	—	Single do	52 62
Carlow, new	104 —	Cheshire	56 84
Sligo	80 —	Derby	58 66
Cork, 1st	98 100	American	52 54
Waterford	98 100	Edam and Gouda	40 56
Foreign Butter, per cwt.	—	Bacon, new	64 66
Prime Friesland	114 —	Middle	— —
Do. Kiel	102 —	Hams, Irish	92 —
		Westmoreland	96 —
		York	112 —

HOP MARKETS.

BOROUGH, MONDAY, Jan. 25.

Fine samples have been in steady request, and their value has undergone no change; other descriptions move off slowly at the currency of this day week. Sussex pockets, 80s. to 88s.; Weald of Kent ditto, 85s. to 96s.: Mid and East Kent, 95s. to 130s.

WORCESTER, (Saturday last.)—Our market for the last two or three weeks has shown evident signs of revival; and to-day there was a very decided improvement, the demand being brisk for Hops of every description at better prices, with a great scarcity of fine samples, which sell readily at 86s. to 92s. per cwt. In yearling and old Hops there is not much doing.

POTATO MARKET.

SOUTHWARK WATERSIDE, Jan. 25.

In consequence of the contrary winds of late, there were but few arrivals to this market during the past week. The consumption was very small, caused by the high prices, and but few sales were effected, the buyers being in daily expectation of a more liberal supply.

The following are our present prices:—

York Regents	s. 200	s. 240	s. Kent and Essex Regents	s. 200 to 240
Lincolnshire & Cambridgsh. Regents	140 to 180		Ditto Kidneys	200 to —
Kidneys	140 to 150		French Whites	140 to 170

HIDE AND SKIN MARKETS.

Market Hides, 56 to 64lbs.	s. d. 0 2½	s. d. 0 3	per lb.
Do. 72lbs.	0 3	0 3½	"
Do. 80lbs.	0 3½	0 4	"
Do. 88lbs.	0 4	0 4	"
Do. 96lbs.	0 4½	0 5	"
Do. 104lbs.	0 5½	0 6	"
Calf Skins	4 6	6 6	each.
Horse Hides	13 0	0 0	"
Polled sheep	4 8	5 8	"
Kent and Half-breds	4 4	5 2	"
Downs	3 6	4 6	"

WOOL MARKETS.

BRITISH.

LEEDS, Jan. 22.—The transactions of the past week have been generally limited to the present wants of the consumers, and not very extensive in amount. In prices there is no apparent alteration.

WAKEFIELD, Jan. 22.—We have had few sales passing during the week; and without altering our quotations, we quote a heavy market at late rates.

LEICESTER, (Wednesday last.)—There continues a fair amount of business doing in Wools, about the quotations of last week: if any change, it is a shade in favour of the buyer. The upward tendency of the corn markets, and the advance in the rate of interest by the Bank of England, have excited great caution in this market, and amongst the principal consumers of Wools in the Yorkshire markets.

LIVERPOOL, JAN. 23.

SCOTCH.—There has been a little more doing in Laid Highland wool this week at former rates. In White Highland little doing. The demand for Cheviot is still confined to the better classes; other kinds, both of Cheviots and Cross, are neglected.

Laid Highland Wool, per 24lbs	7	0	to	8	0
White Highland do	10	6	to	11	0
Laid Crossed do .. unwashed	9	0	to	10	6
Do. do.. washed	10	0	to	11	6
Do. Cheviot do.. unwashed	9	6	to	12	0
Do. do.. washed	12	0	to	15	6
White do.	22	0	to	24	0

FOREIGN.—There has been less animation in our market this week; still a fair amount of business has been done at about former rates.

FOREIGN.

From the manufacturing districts our accounts are not encouraging.

Accounts of Jan. 13 from Breslau state that although the result of the Leipzig New Year's Fair for wool and cloth was rather unfavourable, still it was more favourable than had been anticipated. A buyer from Ham-burgh took some quantity, and there were a few purchasers on foreign account.

It is stated, in accounts from Leipzig, dated the 7th inst., that the supply of woollen goods at the New Year's Fair was 50,000 to 60,000 pieces, being a large quantity. A moderate business was done, from one-third to one-half being sold. Good fabrics were at former rates generally, but many of the other descriptions were 1 d. lower. Buckskins and other light articles were neglected, but the proportion of fine cloths in the market was not large. In Zollverein fabrics, especially those of mixed woollen and cotton, a moderate business was done, but far below the usual average of a New Year's Fair. English manufactures sold as well as could be expected. On the whole the result of the market was not considered very favourable, but this refers to other articles quite as much as to textile fabrics.

LEEDS, Jan. 22.—The demand for Wool this week has been steady, and prices are firm. There is considerable difficulty in obtaining supplies from the growers to meet the rates of these markets.

BARK.

Per load of 45 cwt.

English, Tree	£13	0	to	£13	10	0
Coppice	13	0	to	14	10	0

LIVERPOOL (DUTY FREE)—Quercitron, 8l. 6s. to 9l. 6s.; Dutch Oak, per ton, 4l. to 5l.; German, 8l. 10s. to 6l.

TIMBER.

	£	s.	d.	£	s.	d.	
Baltic Timber, per load of 50 cubic feet	4	0	0	to	4	12	6
Yw. Deals, per standard hundred	15	10	0	to	19	0	0
Deck Deals, per 40 feet 3 in.	1	5	0	to	1	10	0
Pipe Staves, per mille	90	0	0	to	110	0	0
Lathwood, per fm. of 4 feet	5	10	0	to	6	10	0
Petersburgh, Riga, and Archangel	16	0	0	to	18	10	0
Yw. Deals, per stand. hundred	14	0	0	to	14	10	0
White	16	10	0	to	18	10	0
Yw. Battens	4	0	0	to	4	10	0
Riga Logs, for 18 feet cube	75	0	0	to	115	0	0
Stettin Staves, per mille of pipe	3	6	0	to	3	10	0
Swedish Timber, per load	25	6	0	to	27	10	0
Gothenb. Yw. Deals, per 100 12f. 3in. 9in.	22	0	0	to	25	10	0
White ditto	14	10	0	to	17	0	0
Yw. Battens, per hd. 12 ft. 2½ in. 7 in.	29	10	0	to	30	0	0
Christiania Yw. Deals, per hd. 12ft. 3in. 9in.	27	10	0	to	28	0	0
White	17	0	0	to	20	0	0
Quebec and St. John's Spruce Deals, per 100, 12 ft. 3 in. 9 in.	15	0	0	to	17	10	0
1st qual. yw. Pine Deals, per st. hd.	12	10	0	to	13	10	0
Second do. do.	20	0	0	to	27	0	0
Red Pine Deals, per hd. 12ft. 3 in. 9 in.	4	0	0	to	4	10	0
Red Pine Timber, per load	3	10	0	to	3	15	0
Yw. ditto	2	10	6	to	4	0	0
Birch ditto	4	0	0	to	4	7	6
Elm Jitto	5	15	0	to	7	0	0
Oak ditto	52	10	0	to	62	10	0
Standard Staves per mille standard	14	0	0	to	16	0	0
Puncheon ditto							

MAHOGANY, &c.

Mahogany, St. Domingo	41d.	to	1s.	9d.	per foot.
Cuba	4	to	1	0	
Honduras	4	to	1	2	
African	4	to	0	5½	
Cedar	4	to	0	5	
Rosewood	9l.	10s.	to	15l.	per ton.
Bahia	9	10	to	12	

PRICES OF MANURES.

Subjoined are the present prices of several sorts of Manure:—

Agricultural Salt, 32s. per ton	Muriate of Ammonia, 20s. to 24s. per cwt.
Aikalies, 28s. and 42s. per cwt.	Muriate of Lime, 6s. per cwt.
Boast and Co.'s (Bow) Inorganic Manures, from 6s. to 11s. per cwt., according to crop	New Bristol Manure, 8s. per qr
Boast's Guano, 9l. 9s. per ton	Nitrate of Soda, 16s. per cwt.
Carbon, 12s. per qr.	Nitrate Potash (saltpetre), 25s to 26s. per cwt.
Chile Ion, 21s. per cwt.	Patent Disinfected Manure 13s. 6d. per qr.
Chloride Lime, 28s. per cwt.	Petre Salt, 4l. 10s. per ton
Clarke's Compost, 3l. 12s. 6d. per hhd., sufficient for three acres	Potter's Guano, 10l. per ton.
Fothergill's Gypsum, 35s. per ton.	Preparation for Turnip Fly 10s. 6d. per pakt., sufficient for three acres
Fothergill's Phosphate of Lime, 14s. per cwt.	Rags, 4l. to 4l. 10s. per ton
Graves, 6l. 10s. per ton	Rape Cake, 6l. per ton
Guano, Peruvian, 10l. 10s.; Bolivian, 9l.; African, 6l. 6s. to 7l. 10s. per ton, according to analysis	Rape Dust, 6l. 6s. per ton
Gypsum, at the waterside, 35s. per ton	Soap Ashes, 10s. per ton
Highly Concentrated Manure, 30s. per qr.	Soda Ash, 14s. to 16s. per cwt.
Humus, 14s. per qr.	Sulphate Soda, 6s. per cwt.
Hunt's Bone-dust, —s. per qr.	Sulphur for Destroying Worm on Turnips, 12s. per cwt.
Hunt's Half-inch Bone, —s. per qr.	Sulphuric Acid, 1½d. per lb.
Hunt's Stuff Graves, 3s. 6d. cwt.	Superphosphate of Lime, 8s. per cwt.
Hunt's New Fertilizer, 13s. 4d. per qr.	The Liverpool Abattoir Company's Animalized Manuring Powder, 2l. 10s. per ton
J. T. Hunt's Artificial Guano, 9l. per ton	The Urate of the London Manure Company, 4l. 4s. per ton
Manure Powder, 16s. per qr.	Willey Dust, 4l. 4s. per ton
	Wolverhampton Compost (Alexander's), 12s. per qr., subject to carriage to London, or forwarded from Wolverhampton











# THE FARMER'S MAGAZINE.

MARCH, 1847.

No. 3.—VOL. XV.]

[SECOND SERIES.

## PLATE I.

### A SUFFOLK CART STALLION.

The subject of the first plate is a Suffolk Stallion, bred by the late Mr. H. Bennington, of Framlingham, in the county of Suffolk. He was got by Mr. C. Plant's celebrated horse "Captain." His dam was a very superior mare got by Mr. Artes' horse.

He is rising seven years old, stands  $16\frac{1}{2}$  hands high, possesses great bone and substance, and is of a beautiful bright chesnut. He obtained the first prize of 40 sovereigns in July last, at the Royal Agricultural Society's show at Newcastle, as the best stallion of any age for agricultural purposes; having been exhibited by Mr. Nathaniel Barthorpp, of Cretingham Rookery, near Woodbridge, in whose possession he still remains.

It is worthy of note, and perhaps not out of place in the present notice, to state that at the eight meetings of the Royal Agricultural Society, the first prize was taken four times by Suffolk horses. In 1839, at the Oxford meeting, by Mr. T. Freeman, of Henham, Suffolk; in 1841, at Liverpool, by Mr. Thomas Crisp, of Gedgrave, Suffolk; in 1845, at Shrewsbury, by Mr. Henry Cross, of Boyton Hall, Suffolk; and last year (1846) by the subject of our plate, there being twenty-one competitors. He will travel this season in Norfolk and Suffolk. Professor Low, in speaking of the Suffolk breed as adapted to agricultural purposes, in his work on Practical Agriculture, says—"This breed is in great request in the counties of Suffolk, Norfolk, and Essex, where it is preferred to every other for the plough. The Suffolk punches have been long remarkable for the trueness with which they perform their work, and in an especial degree for their steady exertion at a dead pull."

## PLATE II.

### A PURE GALLOWAY BULL.

Our second illustration is a Portrait of the Galloway Bull called "Scaleby," the property of Mr. John Marshall, of Long Park, Scaleby, near Carlisle, which obtained the second prize of 10 sovereigns in the first class of bulls of any breed calved previously to the 1st of January, 1844, at the Royal Agricultural Society's show at Newcastle, in July last. He was then seven years and ten months old.

He was got by a Galloway bull called "Tom Thumb," the property of Mr. Thomas Wannop, of Holme House, near Carlisle. "Tom Thumb" was selected from one of the best stocks in Galloway, and won the first prize in Galloway when two years old: took the prize at Penrith when three, at Brampton when four, and at Carlisle at five years old.

The dam of the subject of our engraving was bred by Mr. Wannop, and was got by a bull called "Charlie," purchased by Mr. Wannop out of one of the best stocks in Galloway, his grandam was bred by Mr. Warwick, of Warwick, near Carlisle, the celebrated breeder of Galloway stock.

"Scaleby" was never beaten by any of his own class, having, when under two years old, at Carlisle, in 1840, won the first prize for that age, given by the East Cumberland Agricultural Society. In 1841, he won the head prize for aged animals, beating a celebrated bull selected from Sir James Graham's stock at Netherby, and several others. In 1842, 1843, 1844, and 1845, he bore away the head prizes given by the East Cumberland Agricultural Society. In 1846—besides taking the second prize of the Royal Agricultural Society as stated above, for which there were three competitors, he won the head prize of £10 given by the Cumberland and Westmorland Agricultural Society's show at Carlisle, beating six others.

## ON THE IMPROVEMENT OF THE COTTAGES OF THE AGRICULTURAL LABOURERS.

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

In previous numbers of this magazine I have had occasion to offer some remarks upon the want of care evinced in the construction and choice of the site of the farm-labourers' cottages. These remarks were founded upon pretty extensive observations in the south of England. I have had few opportunities, it is true, of visiting the cottages of the more northerly districts of our island; but from the observations of those whose evidence I shall now adduce, it is too certain that the evil exists in an equal if not to a still greater degree on the border counties of England and in Scotland, than in the portion of England south of the Humber.

Mr. George Smith, an architect of Edinburgh, has given in an essay printed in the transactions of the Highland Society of Scotland (vol. iv., p. 205), several plans for labourers' cottages. From his observations it is quite evident that in the northern portion of our island the neglect of comfort, and of the rights of decency, have been very commonly as much neglected as in England. He says:—"Each married cottager requires a certain accommodation, either for convenience, comfort, or decency, and by a proper arrangement this can be given at but little expense. It is yet too much the prevailing custom (would that a like indifference to the future tenants' comfort had not been too often evinced in England!) of landlords and farmers, when about to build their labourers' houses, to contract with a mason to build a row of hovels, giving to each so much internal space of length and width; and this being roofed over, the only finishing is a door, two small windows, and a rough coat of plaster on the walls, leaving the tenant to fit up the interior as he is able, or may think proper. He commonly divides it with one or two close-boarded timber beds, leaving the longest end for the living-room, which has an opening for the smoke, and a hearth-stone at one end; but there is seldom a grate; and the floor is made of clay puddle, or earth composition. When the cottager has a family, this sort of dwelling is ill-adapted for the preservation of decency."

"The general practice," adds Mr. Smith, "of making the cottagers furnish their own bedsteads is by no means commendable. The landlords ought to take this into their own hands, and have strong hard wood bed-frames fitted in to suit as fixtures for the cottages, or rather give them iron bed-frames, which are now so much approved where there is a

risk of vermin (these iron bedsteads are manufactured in Edinburgh at 30s. each). It is much to be wished that those close timber-beds were abandoned; but to effect this the landlord must fit up the few fixtures wanted for every cottage, and by giving them two distinct apartments, well lighted and ventilated, and by adding a pantry, cellar, pig-house, and privy, the poor cottager will then have every comfort that his station entitles him to; and if there is a piece of ground attached, he may have his cow-house. These necessary comforts would tend to the decency, and even the refinement of their lives.

In the following observations I most cordially agree, although the immediate subject of this paper is the *agricultural* labourer's cottage:—"It would be of immense advantage to the health and morals of the *town* labourers if they could be induced to live in the suburbs, in rows of detached cottages, in place of huddling together in the crowded parts of the towns. Is it not evident that to remove the poor from a situation where vice, crime, and profligacy, sickness, disease, and pestilence, exist in their most fearful and concentrated forms, to the suburbs, where these destructive agents exist in a more *diluted* state—where the poor would have the physical advantage of freer and better air, and the moral advantages of greater exposure to observation—would be to effect a great good, not only for this class themselves, but also for the whole community?"

Of the highly beneficial effect upon the body and upon the mind of the cottager of domestic comfort, it may be useful to remind some few of our readers. The object we have in view, in fact, can hardly be illustrated in too varied a manner; the proofs cannot, in so important an object, be too copious, for it is one argument, one adduced fact, after all that will at length convince and arouse to action the landowner.

"The habitation of the labourer," very correctly observes Mr. George Nicholls, (*Jour. R. A. S., Vol. VII., p. 16*), "taken with all its accompaniments, forms perhaps as important a consideration, in connexion with his every-day comfort, as any other circumstance appertaining to his position in life. If the labourer be enabled to return from his daily toil to a cheerful home, and there see his family in comfort around him, it will

conduce to health of body and contentment of mind. It is not a highly ornamented cottage which the labourer needs; what the labourer really requires is a habitation sufficiently roomy and substantial for the comfortable accommodation of his family, and furnished with appliances to answer his and their daily wants; and this assuredly ought to be provided for him, or he ought to possess the means of obtaining it. There ought always to be the means for a decent separation of the sexes at night, and this can hardly be effected with less than four rooms. Yet how many instances are there in which families are crowded together in two rooms, or even in one room, outraging all decency; in which youths and girls, approaching to the state of young men and young women, occupy the same sleeping apartment, and that sometimes the same in which their parents sleep! Is it possible that such improper interminglings can take place without demoralizing results?"

The testimony of the ill effects produced from the want of separate apartments and from over-crowding upon the morals of the population in a rural district is thus described by the clerk of the Amphyll union (*Rep. by Chadwick, p. 122*):—

"A large proportion of the cottages in the union are very miserable places, small, and inconvenient, in which it is impossible to keep up even the common decencies of life. I will refer to one instance with which I am acquainted. A man, his wife, and family, consisting in all of eleven individuals, resided in a cottage containing only two rooms. The man, his wife, and four children, sometimes five, slept in one of the rooms, and in one bed, some at the foot, others at the top; one a girl above fourteen, another a boy above twelve, the rest younger. The other part of the family slept in one bed in the keeping room—that is, the room in which their cooking, washing, and eating were performed. How could it be otherwise with this family, than that they should be sunk into a most deplorable state of degradation and poverty? This, it may be said, is an extreme case, but there are many similar, and a very great number that make near approaches to it."

And adds Dr. Gilly, the canon of Durham, when earnestly and eloquently pleading on behalf of the border peasantry, after describing the sheds in which they are placed, 24 feet by 16, crowded with eight, ten, or even twelve persons (*ibid, p. 124*). "How they lie down to rest, how they sleep, how they can preserve common decency, how unutterable horrors are avoided, is beyond all conception. The case is aggravated when there is a young woman to be lodged in this confined space, who is not a member of the family, but is hired to do the field-work, for which every hind is bound

to provide a female. It shocks every feeling of propriety, to think that in a room, and within such a space as I have been describing, civilized beings should be herding together without a decent separation of age or sex. So long as the agricultural system in this district requires the hind to find room for a servant of the other sex in his cabin, the least that morality and decency can demand is, that he should have a second apartment where the unmarried females, and those of a tender age, should sleep apart from himself and his wife. Last Whitsuntide, when the annual lettings were taking place, a hind who had lived one year in the hovel he was about to quit, called to say farewell, and to thank me for some trifling kindness I had been able to show him. He was a fine, tall man, of about 45, a fair specimen of the frank, sensible, well-spoken, well-informed, Northumbrian peasantry—of that peasantry of which a militia regiment was composed, which so amazed the Londoners (when it was garrisoned in the capital many years ago), by the size, the noble deportment, the soldier-like bearing, and the good conduct of the men. I thought this a good opportunity of asking some questions. Where was he going? and how would he dispose of his large family (eleven in number)? He told me they were to inhabit one of these hinds' cottages, whose narrow dimensions were less than 24 feet by 15, and that the eleven would have only three beds to sleep on; that he himself, his wife, a daughter of six, and a boy of four years old, would sleep in one bed; that a daughter of eighteen, a son of twelve, a son of ten, and a daughter of eight years old, would have a second bed; and a third would receive his three sons of the ages of twenty, sixteen, and fourteen years. 'Pray,' said I, 'do you not think that this is a very improper way of disposing of your family?' 'Yes, certainly,' was the answer; 'it is very improper in a Christian point of view; but what can we do until they build us better houses?'"

As an encouragement to our continued exertions in behalf of such cottage improvements, it is most important to notice the very united testimony of the members of the clerical and medical professions, upon not only the ill effects produced upon the mental and bodily health of the poor, by the neglected and uncomfortable state of their dwellings, but also the good effects produced by a better training and education, and from generally adopted habits of cleanliness, aided by the removal of noxious sewerage, and stagnant waters from their little dwellings and gardens. Upon the first head, we may read with advantage the observations of Mr. Nicholl and Dr. Gilly, to which I have already referred; and upon the last, those of Mr. Smith of Deanston, and Mr.

Dean of Tottenham, which I shall next proceed to adduce.

One of the most certain modes of gradually effecting the great object of the improved health and comfort of the dwellers in country cottages, is to give their inmates a better, a more useful kind of education than they now receive; to inculcate useful every-day *facts* in their childhood and maturer age, and not, as is too frequently the case, to rest content with teaching them merely words and sentences; but to teach them to practice a little forethought, and not to take a cottage merely because it looks like a cottage, but to consider its situation as regards health, its conveniences, and its comforts. In the report of some valuable inquiries on the condition of the houses occupied by labourers in the town of Bradford, in Yorkshire, by Mr. Smith, of Deanston (Report, p. 156), a case is stated, showing the ill effects of a want of consideration in this respect. "In one street," observes Mr. Smith, "where some houses of a better class have been built, the one rising above the other up the steep, the drainage of the upper houses falling in upon those below causes constant ill-health to the inhabitants, and fever is seldom absent from the locality. Near this situation, in a cellar, I found a wool-comber and his family. He told me he had formerly lived on the heights, in a dry situation, where he and his family enjoyed a fair share of good health; but that, since they came to live in the cellar, they have been visited with much sickness. He said he had come to that house for cheapness of rent; and I was able to show him, by reckoning up all the losses of wages from the sickness of himself and family, which he detailed to me, that he was a loser to a greater amount than the whole rent of the healthy house he had formerly occupied. He said he saw the force of what I said, and declared that he would look out for a house better situated. One beneficial effect of giving the people greater intelligence, by a more complete and proper education, would be to enable them to appreciate the importance of placing themselves as far as possible in localities favourable to health."

The injurious effects upon the *character* of the labourer produced by want of cleanliness, a regard to decency, and to the ordinary comforts of life, have never been regarded, in the construction of the peasants' cottages, with sufficient attention. And yet the non-observance of these have ever been fraught with wretchedness to their inmates, and annoyance even to their neighbours. "The moral influence of filth and discomfort," remarked Dr. Southwood Smith (1 Rep., p. 15), "has never been sufficiently attended to. That influence is in the highest degree anti-social. The wretched state of his home is one of the most powerful causes

which induces a man to spend his money on strictly selfish gratifications. He comes home tired and exhausted—he wants quiet—he needs refreshment; filth, squalor, discomfort in every shape are around him; he naturally gets away from it if he can." And at p. 29 of the same valuable report he adds—"I have already more than once expressed my conviction that the humanizing influence of habits of cleanliness, and of those decent observances which imply self-respect—the best, indeed the only real foundation of respect for others—has never been sufficiently acted on. A clean, fresh, and well-ordered house exercises over its inmates a moral no less than a physical influence, and has a direct tendency to make the members of the family sober, peaceable, and considerate of the feelings and happiness of each other. Nor is it difficult to trace a connection between habitual feelings of this sort, and the formation of habits of respect for property, for the laws in general, and even for those higher duties and obligations, the observance of which no laws can enforce; whereas a filthy, squalid, unwholesome dwelling, in which none of the decencies common to society, even in the lowest stage of civilization, are or can be observed, tends directly to make every dweller in such a hovel regardless of the feelings and happiness of each other, selfish, and sensual; and the connection is obvious, between the constant indulgence of appetites and passions of this class, and the formation of habits of idleness, dishonesty, debauchery, and violence—in a word, the training to every kind and degree of brutality and ruffianism. This is what any man who has at all turned his attention to the subject would expect, and a demonstration of its truth appears to me to be afforded by the fact that in the worst districts of which we have been speaking, and in the most wretched of the hovels in these neglected districts, live, and from their birth have lived, that portion of the population out of which come not only the pickpockets, the thieves, and those other degraded and profligate persons who constitute the ordinary pests of society, but also in general our great criminals, violent and reckless men, who every now and then perpetrate, in cold blood, with a savage callousness, deeds which fill the whole country with disgust and horror." And when Mr. Thomas Cubitt was examined before the same commissioner (2 Report, p. 277), he observed, when speaking of the poor of London—"If we gave them a better atmosphere, we should keep their minds in a better state; they would be much more desirous of preserving neatness than they are at present."

The objects, then, for which I have contended are certain, if once accomplished, to repay the owner of such dwellings for all the care and atten-

tion he may bestow upon an improvement by which the public are so much benefited. The public, too, are not only interested by the improved comfort and cleanliness of their poorer neighbours' cottages, but by the removal of stagnant waters from land around their dwellings the general health of the district is improved. It was stated by Mr. James Dean, of Tottenham, a very intelligent and extensive land-surveyor and civil engineer (and with his evidence I will conclude this paper), that, "in the district near Tottenham, as well as in other parts of the country, the imperfect drainage that has already taken place has improved the climate altogether: there is less of cold, less of fog, less of ague and rheumatism in the parts where the improvement has taken place. Formerly the cold, morning fogs in the spring and autumn ranged from eight to ten feet high near Tottenham; where the drains have been opened, by cleansing, scouring, and deepening,

they are not half that height. I speak of a district at the foot of Stamford Hill, heretofore known to coachmen as the coldest between London and York. By further improvement, I believe that the evil may be entirely removed. It has been my remark, in travelling from one end of England to the other, during the last forty years, that fogs diminish in number and in height, according to the drainage. The drainage which has been carried on in South Holland, in Lincolnshire, has reduced the fogs to one-tenth of what they were forty years ago. The diminution of these morning colds and fogs have a very beneficial effect on the alacrity and industrial habits, as well as the health, of the population. Fevers and other diseases from the decomposing refuse left to accumulate amongst the *more populous* districts now take the place of the rheumatic attacks and intermittent fevers that were formerly prevalent."

### SKETCH OF A PLAN,

HAVING FOR ITS OBJECT THE PRESENT ALLEVIATION AND ULTIMATE REMOVAL OF THE PERIODICAL VISITATIONS OF DESSTITUTION IN THE HIGHLANDS AND ISLANDS OF SCOTLAND, BY THE COMBINED ACTION AND JOINT CO-OPERATION OF THE GOVERNMENT PARISHES, AND THE PROPRIETARY; PRESENTING A PRECIS OF THE MEASURES AND GENERAL POLICY WHICH SHOULD BE ADOPTED TO PRODUCE A THOROUGH REFORMATION IN THE HABITS AND CIRCUMSTANCES OF THE HIGHLAND POPULATION.

As an application was made to me from an influential quarter, to draw the outline of a comprehensive plan, based on new and sound principles, and founded on my own experience and knowledge of the necessities and interests of the mother country and the colony, having for its object the present alleviation and ultimate removal of the periodical visitations of destitution in the Highlands and Islands of Scotland, I promised to give my immediate attention to the subject, and have thrown together the following suggestions. I hope, however, that whoever may peruse this draft will do me the justice to read it from the beginning to the end before passing any opinion upon its merits; for the various interests it deals with are so considerable, and the apparent immediate sacrifices it requires from each are attempted to be so fairly and nicely balanced the one against the other, that by overlooking any one part of the plan, the burden would infallibly appear to be unequally divided. It must be kept constantly in view that this is a national as well as a local question. It is impossible, in our highly artificial system, that one member can long suffer, however remote and inconsiderable, without ultimately and seriously discomposing and agitating the whole body politic. If

one member suffers, the whole body will naturally suffer and sympathise with it.

It is proposed to effect the desirable end which I have been directed to pursue, by emigration on a plan not hitherto suggested, combined with a radical improvement in the condition of those who may be destined to remain behind in the mother country.

An opportunity should be furnished, with all convenient speed after the necessary arrangements can be completed, to those families inclined to emigrate to Canada, as the passage to this colony is the least expensive, and the country, taking everything into consideration, the best adapted for agricultural settlement.

The expense of their removal and establishment should be divided between government and parishes in the following proportions:—

A free passage and maintenance on the passage should be afforded by the government to these peaceable and industrious, though necessitous individuals, to Canada, induced by every reasonable prospect of their establishment in the colony, advantageously to the mother country; and this boon should be afforded to them with greater satisfaction and alacrity than to criminals, who, it is now ad-

mitted, are too frequently rendered vicious at home by neglect and necessity. But, on the arrival in the colony, they should not be deserted by the government, but kept under the superintendence of the government emigration agents, who should be instructed to provide single males and females with work—*i.e.*, suitable engagements to work when attainable in their districts—and to see to the settlement of families upon lots of land, and the economical expenditure of the funds to be supplied for their temporary maintenance, furnished, as they will be, with the necessary means in the manner to be presently detailed.

£6 for each individual is the estimated amount required to maintain a family of any number of grown persons, until they can get sufficient from the land to support themselves. Of course, families emigrating, as I am supposing, would be composed of individuals of various ages, so that £6 would be, in the present case, an estimate so ample as to leave a surplus beyond maintenance of considerable amount. Besides, if the money were outlayed in the purchase of necessaries in large quantities under government superintendence, instead of being expended in small sums by inexperienced emigrants, of whom advantage is too frequently taken, the £6 I have fixed on as the usual estimate in common cases would appear still too ample. Everything considered, in the present case £5 would appear to be sufficient. Any surplus that may remain would be beneficially expended in the purchase of a cow, pig, seed-corn, or implements. But, in most cases, the emigrants will themselves be possessed of a small amount, no doubt arising either from the savings of wages, or the conversion of their little all.\*

In this way a family of five persons could be disposed of in the colony for £25, or two hundred individuals for £1000 sterling.

In addition to providing a free passage and maintenance at sea, the government emigration agents in the colony, besides the duties above detailed, should be instructed to engage for a brief period a sufficient number of workmen and neighbours to instruct the inexperienced emigrants in erecting their log-houses, and in felling and clearing the forest.

But so far as pioneering for, or assisting emigrants is concerned, I do not see that this could not be effected through a proper application of convict labour.

Having had occasion to visit Canada for the

purpose of administering large estates in that country, every facility was freely afforded me of forming a correct opinion of the subject of the employment of convict labour in Canada. I have often heard it canvassed, and it has undoubtedly caused much surprise and speculation among economists and statesmen both at home and abroad, that England, no less distinguished for well-judging liberality than for practical economy, contrary to every dictate of reason and prudence, with a boundless tract of fertile land within three or four weeks' sail of the mother country, should persevere in sending criminals on a voyage of as many months, and at an enormous expense, to New South Wales, with no corresponding advantage to justify the outlay.

The views now to be suggested, regarding the application of convict labour, have been strongly urged by men of great experience, and particularly insisted on by Mr. Porter, and other political and economical writers. But although I dwell on this subject here, it must not be considered as an essential part of my scheme: I do so because the suggestion is comparatively new. It is merely incidentally introduced; my original proposal being, as stated in the text elsewhere, that the government should employ skilled labourers to instruct and assist the emigrants at the outset. If convict labour should be employed to clear two acres for each family, and build log-houses for bodies of emigrants, the convicts should never be allowed to come into contact with the emigrants; but these preparations should be made in selected localities, before the arrival of the emigrants in the colony. The clearing band of convicts would thus be ambulatory, and after pioneering for one body of emigrants, in one locality, would remove to perform the same duties in another, without ever coming into actual contact with the emigrants at all. The necessary accommodation of log-houses could be constructed by the convicts for themselves, in each new locality they might remove to, in a few days; and in the mean time they could live under canvass.

It is well known that Australia, from its long continued droughts, can never compare, as an agricultural colony, with our provinces in North America; and, even if a crop is reaped, how comparatively valueless it is, when there is no ready means of transport by lakes and navigable rivers, such as abound in North America. Though its pasture-lands may still attract a few pastoral settlers, it can never become a densely peopled country, so as to afford an expanding market, and rapidly increasing employment and encouragement, to the impatient commerce and manufactures of the mother country, which, with an hourly increas-

\* In cases where the emigrants are utterly destitute of funds of their own, the government should supply them with the necessary seed for two acres, a cow, and implements of hand tillage.

ing population at home, so loudly call upon us by every consideration of prudent forethought to provide.

The prospective importance, then, of Canada, so far as we can at present judge, would appear to give it, with its comparatively large population, superior claims on public attention to New South Wales, as an outlet for our surplus population and products; and thereupon a doubt naturally suggests itself, whether a regular supply of convict labour might not be more judiciously and cheaply applied than at present, to the clearing and enclosing of lands in Canada, constructing roads, bridges, and dwellings, and removing insalubrious waters by surface-drainage, under proper direction; thus relieving emigrants from the multiplied hardships and difficulties which the backwoodsman is at present doomed to encounter at the outset, in the attempt at settlement in the forests. I do not see that a better opportunity could be selected of testing the applicability of convict labour in Canada, than in reference to the present proposal for sending the surplus population of the Highlands to the colony. A small band might be tried, who might act as pioneers for the emigrants, and assist them in erecting their log-houses, and even for a time in clearing the forest.

But I am convinced that it would succeed on a large scale. I am prepared with satisfactory evidence to establish, that if such facilities were offered, not only would the number of emigrants be multiplied, but their ranks would be yearly swelled by the addition of very many families of small means, but of respectability, who are deterred from emigrating, solely by the difficulties at present opposed to a first settlement in the forest.

It may be objected, by those not sufficiently informed, that cleared and cultivated farms can be had in the colony for purchase, at the present moment. This is true; but such farms are only disposed of after the seller has completely exhausted the soil, by a ruinous process of overcropping, for years systematically practised; so that a purchaser cannot restore the fertility of such a farm, unless by incurring a large expense for manures and labour—an expenditure which the present circumstances of the colony would by no means or reason justify. The grounds cleared under government superintendence by convict labour, as I am proposing, and exposed in the market to public competition, would fetch high prices, as they would be placed in the hands of purchasers cleared (and with a log-house built, perhaps), but not exhausted—ready for occupancy, but recommended by possessing in their integrity the tempting treasures of a virgin soil. This is on the supposition that convict labour is applied on a large scale, to prepare

farms for the public market, which would be undoubtedly, if prudently and systematically conducted, a remuneration to government. But, in reference to the emigrant Highlanders, they merely require the co-operation of convict labour in the outset, to build log-houses and clear an acre or two of land for each family.

But while on this subject, I may remark that I am prepared with evidence to show, that if convict labour were employed on a large scale, to prepare farms for the public market, the demand for such farms would be commensurate with the supply, and that government would, by prosecuting such a course, be amply and speedily indemnified by the land sales, and that for their whole outlay, by a constant and increasing annual revenue from this source, which would compensate the mother country for all expenses of conveyance of convicts, management, and all incidental expenses of every description. No contamination could possibly accrue to the present population from mingling with characters considered unfit to associate with their fellow-beings at home, as they would either be employed in reclaiming wastes as above proposed, beyond the verge of present civilization, or on public works of such a nature, when not so employed, that none save those entrusted with their direction would by necessity come into contact with them. There are many such works awaiting, that very evidently demand the attention of government, and they are of such a description as to ensure ample and speedy repayment of any judicious expenditure to be made upon them.

As regards the convicts themselves, it is but fair that they should be compelled to make compensation to their fellow countrymen, whom they have injured, in any profitable manner that can be devised, for their past delinquencies. In a moral and reformatory point of view, being doomed to years of hopeless and profitless toil would very probably operate as a salutary check on reckless vice, and would in the end, no doubt, operate successfully against the commission of offences. And if relapsed criminals, and those convicted of grave offences, were condemned to expiate their crimes under the rigorous control and moral training which should accompany the course I have recommended to be pursued, not only would the juvenile culprit, who has yielded to temptation in a moment of weakness, cease to have his feelings blunted and his sense of virtue totally obliterated, by association in our prisons with the hardened and shameless villain who glories in perfecting the tyro in his nefarious arts, but the convicts themselves would have every opportunity of reformation afforded them, under circumstances in every respect the most favourable for aiding and encourag-

ing their restoration to virtuous courses. But to return to our immediate subject.\*

In connection with this recommendation, I may remark that the enlargement of agricultural possessions, and pasture farms of all descriptions, is steadily progressing; and many of the cottiers and small tenants who have thus been deprived of their holdings, with large or increasing families, influenced by such a prospect as the proposal I am making holds out to them, would not fail to avail themselves of the tempting prospect of independence on fair terms, when they considered the facilities and inducements offered, and the solid advantages which must accrue to themselves immediately, and to their children both immediately and prospectively, by their timely removal to a field where there is ample scope for the employment of their industry, with every reasonable prospect of corresponding remuneration; and this before their scanty means are dissipated in unavailing struggles after the achievement of independence in this country, under circumstances which preclude any rational hope of ultimate success. I have been encouraged by the best wishes of the proprietary when offering these suggestions, who are not slow to express the judicious and benevolent hope that if their late and future tenants, who may have been or may be deprived of their holdings by the irresistible progress of improvement, are to remove to the colony at all, they may do so at once, while the price of their farm stocking and the compensation for amelioration are yet in their hands; and that they may not unwisely remain deliberating, continually descending lower and lower in the scale of respectability, till the last remnant of their scanty means is about to disappear, before they finally make up their minds to bid adieu to their native country.

As to the part of the colony in which these emigrants should be located, various suggestions present themselves to one acquainted with the colony. In point of economy, it would be better to settle them in Canada East (late Lower Canada), as land is cheaper, and the expense of sending them up the country would be avoided. If the emigrant's rapid and immediate prospect of success is alone to be

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\* It is thought by some that this laying of farm to farm has proceeded too far, and that it would be advantageous, as leases of large pastoral farms fall in, to disjoin a portion of the richer haugh lands, for the purpose of being parcelled out into fifty-acre farms, to be distributed among the more industrious and intelligent cotters upon the estate. It is but fair to introduce this marginal qualification, as this opinion is entertained by many men of experience, and whose suggestions are entitled to great weight, and to the most respectful consideration.

considered, he would no doubt have the advantage of a better climate and more fruitful soil in Canada West (late Upper Canada). But if mere policy shall be held the paramount consideration, it would be more advantageous for the interests of the imperial government to have the emigrants located in Canada East (late Lower Canada), as an infusion of British blood would be attended with permanent and salutary effects among a disaffected French population.\*

The funds to provide the £5 for each individual emigrant should be raised in either of the following ways:—

The £5—the only cost to parishes—would be applied to support the emigrant after arrival in the colony, until he could procure a sufficiency of produce from the land to support himself. Any surplus over this would be expended on the purchase of seed for the two cleared acres I have already proposed should be prepared for him, either by convict labour, *previously to his arrival in the colony*, or by the assistance of skilled labourers, hired by the government, under the superintendence of the government emigration agents in the colony—the emigrants themselves co-operating and assisting in the work. Let it be particularly observed that on no account would or could the emigrant, by my plan, come into contact with the convict, as the band would be removed, to complete their labours in another locality, before the emigrants would be put in possession of their lots.

The number of families who are destined for emigration, as well as that of single individuals, should be ascertained in each parish, through the agency of the parochial boards, without delay. And it would be well if the inducements offered, of free passage and temporary comfortable maintenance and protection until established fairly in the colony, should be the means of ultimately inclining all the surplus population in every parish of the highlands and islands to take advantage of the opportunity proposed to be offered them.

On the ascertainment of the number disposed to emigrate in each parish, the parochial board should at once agree to raise the necessary amount in one sum, at the lowest rate of interest practicable, so as, once and for all, to remove the affliction and discredit of these fearful periodical visitations—in a word, to mortgage such an amount of the rates as may seem advisable in the circumstances of the parish.

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\* An objection may be urged by some unacquainted with the strictness of convict superintendence, that they might easily effect their escape in Canada. It would be quite out of place to enter into detail on this subject here, otherwise this objection would immediately disappear.



The money could be either procured on the easiest terms in the open market, with or without government guarantee, or, what would be better (if not furnished by the commissioners for the reduction of the national debt), I think I could devise a plan sufficiently advantageous for both the borrowers and the government, by which the money could be procured on easy terms, either as a permanent loan, or providing for the eventual redemption of principal or interest.

It has been suggested to me from certain quarters that government might be induced to advance the amount on the same terms as those fixed in the Drainage Act.

Even taking money at the large interest of four per cent. (perhaps one per cent. too high), then for £1,000, or a charge of £40 a-year, two hundred individuals could be removed to the colony, not to starve, but with the certainty of every reasonable precaution being taken for their ultimate comfort.

Surely, in every point of view, this would be a more economical, not to say humane course, than to remain inactive and heedless, only to witness their periodical visitations, at every repetition increasing in intensity, and becoming certainly more frequent, until many districts in this country are reduced by continued neglect to as lamentable a condition, moral and physical, and that from pure necessity and inevitably, as the most destitute districts of a sister country.

The arrangement for the reception and location of these emigrants in the colony could be easily effected with the provincial government on the following terms:—

By this plan, no paupers would be sent out to burden the colony, because the means of their comfortable subsistence and establishment would be provided, so that there could be no reasonable objection on that score: on the contrary, the expenditure of £5 for each individual in the colony, with the prospect of gaining an orderly and respectable body of settlers to improve the wilderness and strengthen the country, would naturally and strongly predispose the provincial government to the arrangement, if properly represented and negotiated.

It will be clear that the provincial government will be no loser by supplying the land on the following terms:—

The provincial government should grant leases of lots of land of from 25 to 50 acres, as may, on consideration, be judged most advisable, to endure for twenty-one years.

The price of each lot to be fixed at the selling price of government lands in the district where the emigrants may be settled. The lots should be set at such a price, in fact, as the lots would be exposed

at by the government to public competition and sale in the usual way.

That in granting leases for twenty-one years of these lots, there should be no rent paid for the first three years of the currency; but that the yearly payments should be so apportioned for the remaining eighteen years of the term as to cover the interest of the purchase price; full power being reserved to the settler to purchase the freehold, and take the charter for the land he occupies, at any time during the lease when most convenient for himself, at the price named in the lease, and, of course, thereby saving all future payments of rent; or, in the option of the tenant, to pay such a yearly sum as to cover principal and interest before the expiry of the term; or to pay, from time to time, over and above the fixed rent, such sums as may extinguish the claim for purchase price before the expiry of the term.

It does not appear how any objection could be offered to such an advantageous arrangement by the provincial government, if a proper representation were laid before it.

#### EMIGRATION.

It is confidently hoped that the plan proposed of providing a home for the emigrant on his arrival in Canada, under the immediate auspices of the government, and the continued protection and instruction afforded him, would tend to remove the prejudices against emigration hitherto manifested even by parties in the most abject poverty. It is most natural for a father of a family to hesitate before he abandons the claims he has for support in the mother country, scanty and meager as they may be, for the uncertain support and aid in a strange land, where, under the present system of emigration, he is put down to contend with every difficulty. Comparatively few have nerve or intelligence to overcome these difficulties if left to themselves, and rapidly sink under them, leaving their families in the greatest misery. Their fate is soon learned at home, and effectually chills any endeavour to prevail on others in their locality to follow their example. So much for the surplus population destined for emigration.

I must now consider the course to be pursued as regards those who may be destined to remain at home in the mother country.

It is very clear that it will not do for the future to depend so entirely on the potato crop as hitherto. It is even extremely doubtful, in one point of view, how far the introduction of the potato has proved a blessing to some classes in the highlands and islands. It no doubt was the means of supporting a more dense population, and its cultivation was eagerly adopted, as requiring less labour than the

usual crops formerly cultivated. But what has been the consequence? Besides that this delicate vegetable falls in many districts a frequent victim to the August frosts of the mountains, the partial or total failure of the crop, from whatever cause arising, never fails to bring all the evils of famine on a people placing their main dependence on this esculent for support. Their crops of bere and oats, being liable to injury from early frosts and mildew, are no longer regarded as the main stay; and the more widely the potato culture has become extended, the more overwhelming and deplorable has become the destitution which a failure of this staple never fails to entail on the miserable and helpless cultivators.

However precarious and little desirable this mode of life may appear to those having an intimate acquaintance with the all-pervading love, with the undying enthusiasm felt by the inhabitants of a poor country for their native glen and mountain-side, and for the habits and homes of their forefathers, their predilections for a life of irregular exertion, and dislike to anything like continued labour, it will be no surprise that they so readily adopted the cultivation of a root of such easy culture and abundant produce in favourable years.

The kelp manufacture, which afforded employment to considerable numbers, is now, no doubt, superseded by a foreign article. But the extension of our fisheries remains still to be prosecuted, affording an ample field for remunerative employment. But the introduction of these improvements will be a work of time. No precipitate reformatory changes have ever been attended with success. The people must be weaned from their slothful and improvident habits by gentle persuasion, coupled with persevering firmness, and by commending and rewarding any display of intelligence or merit. All the heavy responsibility of the maturation, adaptation, and working of the reformatory process, will rest with the proprietary of the country, their commissioners and sub-agents; and their experience will be the best guide as to the measures most applicable in their several localities.

But they must now be instructed, in clear views, of their own interest, at least that portion of the population destined to remain at home.

Instead of depending so much on the potato, corn must be grown by every family in a certain proportion, so as to preclude the chance of utter destitution, in the event of such a calamity as a recurrence of the destruction of the potato crop, and a partial failure of the herring fishery—both of which inflictions are to be encountered this unfortunate year.

But this cannot be effected without an addition to the present extent of arable land held by cottiers.

And as parishes are to be so heavily burdened in providing the funds, which will be required as above, for the removal of the surplus population, it is probable that government will permit the construction of the Drainage Act to be extended to trenching and fencing as well as draining. A requisition to this effect should immediately find its way to the proper quarter, if it should not have already done so. Immediately on the assent of government being obtained to this extended construction of the act, then enlargement of crops should be proceeded with to supply work on the spot to the starving people.

But food will be required to enable the work to proceed. The necessary supply of food should be provided by the government, and forwarded to the spots where required, in the government ships; or depôts should be formed at the most convenient points, and supplies of food dealt out to the labourers at the lowest price sufficient to defray cost and charges, to the extent of the sums contained in the applications made for loans by the several proprietors in each parish; the proprietors taking upon themselves all the risk and responsibility of satisfying the government inspectors under the Drainage Act of the sufficiency of the work in every respect as required by statute at present. Or where proprietors are conducting works of improvement at their own expense, instructions should be given to sell to them freely at the same price any quantity of provisions they may require to feed their operatives. Besides this, the government should decidedly employ their steamers and other spare ships in providing a sufficiency of good seed-corn for the next crop, as the people are at this moment eating their seed-corn to keep body and soul together.

Unless decided and effective measures are forthwith adopted, the miseries of 1847 will only be a foretaste of greater miseries to come.

Ample stores are accumulating at Odessa and elsewhere, ready for export, if shipping could only be obtained. All that is wanted is the means of transport.

That a supplementary act be applied for in the next session, giving the government better terms than those stipulated for in the present act, so that principal and interest may be repaid to the government in full within the period fixed for redemption. Thus, while government will be no loser in the long run, the condition of the destitute population of the highlands and islands will be permanently improved, and one element of social danger threatening the general well-being of the country removed; and, therefore, nothing but the grossest mismanagement and wilful supineness can ever reproduce such a state of things as unhappily exists at this moment.

## DRAINAGE ACT.

We believe the spirit of this act to be of the very best description; it is meant to provide employment for the people, along with a permanent improvement of the resources of the country. In considering its details, public attention has been directed to inquire whether the expense of trenching and fencing come under the scope of its provisions, for in very many cases, without this, drainage would be inoperative. Application has been made to the official parties on the subject, and a favourable answer given. We are of opinion that the provisions of this act might be farther extended, with the greatest possible advantage to the encouragement of planting—an improvement fully calculated to attain the objects in view under the present act.

There are whole districts—and we may venture to say there are in every district of Scotland, and particularly in the Highlands, tracts of land where the planting of timber trees, and the necessary enclosures, would afford employment to the poor, and eventually be of the highest importance to the nation as well as the proprietors of the soil. It would provide occupation to a class of men quite unfitted, from age and infirmities, to engage either in clearing and draining land, or any other heavy labour. Many of these plantations are absolutely required for shelter both to the arable grounds, which may now be reclaimed, and those already under cultivation; and indeed, in most cases, without shelter, arable grounds will be utterly useless. It is well known how valuable they prove even on lands adapted only for pasturage.

We do not wish to be misunderstood on this point; these remarks are not meant to undervalue the importance of extending the arable lands, and providing employment for a large class of able-bodied labourers. We are desirous to extend the boon for plantations, and for work for those only able to carry them on. It is not enough to provide for the robust and strong labourer, he can always command the market; it is proper and desirable to put it within the reach of the weak, especially when, if our views are correct, it can be done with so much advantage to the community.

## TRAINING SCHOOLS.

We have treated of pauperism in two classes—emigrants, and those to remain at home. While providing for the former, some remedial measures are equally necessary for the latter. *Much can be done* by the judicious application of labour on the part of the cottier himself; but he requires instruction, and of a practical nature, which he can understand and employ. We do not think this is to be attained by lectures, or by awarding prizes, leaving

the people to find out for themselves the best mode of improving the productiveness of their land. These plans have been tried and failed. It is proposed to have training schools under the management of the landlords, as the parties most interested, and erected at their expense, in such localities as they may judge fit. These schools to have a suitable extent of land attached to them. The pupils to be selected for their good conduct and intelligence—to be boarded in the establishment in a manner suited to their station; and their work on the farm, it is believed, will repay the cost. A practical resident farmer to superintend the agricultural operations, under a committee of the landholders.

In this way we think the agricultural peasantry will receive a sound practical education, and will be fitted either to labour profitably their own possessions, or hire their services to other parties. They will acquire a knowledge of the best modes of management, and thus be able to increase the fertility of the soil in their hands or management. But it would require a fuller detail of our views to bear out all the advantages to result from this system of tuition. Without something of this kind to instruct the poor peasant, he will never be rendered independent, or able to contend with the privations he is now enduring, not only in seasons of scarcity, like the present, but in the ordinary state of our climate.

Nothing less than a comprehensive scheme can produce any permanent benefit. Palliatives applied in the case of all social questions are positively hurtful. The disease goes on below the surface: it may be slowly, but always surely. The solicitude of the people reposes, and the vigilance of the government sleeps. A long-suffering, well-conducted race, with strong local attachments like the destitute Highlanders, will bear much without complaining; but the day is at hand, if it should not have opened, when they will be placed in circumstances utterly desperate and unbearable; when disease and poverty—and, who knows, but superinduced and ever-attendant depravity—may so tend to alter the distinctive character of a virtuous people as to give the government, the proprietary, and the people of this country cause to regret that they should have delayed an expensive, a troublesome, but an imperative duty so long as to multiply tenfold the cost and the difficulty of its accomplishment.

By the plan I have ventured to sketch, no material immediate pecuniary loss will accrue to any party, when compared with the vast importance of the object contemplated. The parish will certainly not be an ultimate loser, even in a pecuniary point of view; while the social gain will be immense. The government will be an immediate loser only to the extent of passage and maintenance, and a very

trifling expenditure towards employing experienced labourers as instructors, for a brief period, to the emigrants, to initiate them into the duties of a settler; if, indeed, government should decline availing itself of the suggestion of employing convict-labour for this purpose, and as pioneer preparation for the emigrants, which it could do at no cost—for convicts must be fed, and clad, and superintended, at all events—and where more cheaply than in a cheap country? Some new arrangement is at present contemplated, at all events, regarding convicts;

and this would appear a very opportune time, therefore, for making any such suggestion to the government. In return for this outlay, government will enjoy the security and satisfaction arising from the knowledge of having timeously removed an element of social danger and ultimate possible discord from one locality, where it has already realized the perfection of misery and helplessness, to another where it can be productive of nothing but prosperity and strength,

OBITER DICTUM.

## ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

The Council resumed their sittings for the session on Wednesday, the 3rd of February, when a monthly meeting was held at the Society's House in Hanover-square, at twelve o'clock; present, the Earl of Egmont, president, in the chair, Duke of Richmond, Earl of Ducie, Hon. Colonel Howard, M.P., Sir Robert Price, Bart., M.P., Colonel Austen, M.P., Thomas Raymond Barker, Esq., S. Bennett, Esq., Humphrey Brandreth, Esq., W. R. Browne, Esq., Colonel Challoner, F. C. Cherry, Esq., J. Evelyn Denison, Esq., M.P., S. Druce, Esq., John Ellman, Esq., R. Garrett, Esq., Brandreth Gibbs, Esq., R. M. Gillies, Esq., W. G. Hayter, Esq., M.P., W. Fisher Hobbs, Esq., John Hudson, Esq., W. H. Hyett, Esq., S. Jonas, Esq., Rev. C. E. Keene, John Kinder, Esq., Colonel Mac Douall, W. Miles, Esq., M.P., Philip Pusey, Esq., M.P., F. Pym, Esq., Professor Sewell, W. Shaw, Esq., W. Shaw, jun., Esq., J. V. Shelly, Esq., R. A. Slaney, Esq., Robert Smith, Esq., W. R. C. Stansfield, Esq., M.P., George Turner, Esq., and Thomas Umers, Esq.

*Finances.*—Colonel Austen, M.P., Chairman of the Finance Committee, presented the report on the funds and accounts of the Society, to the last day of the month of January just ended; from which it appeared that the funded property of the Society stood at £7,000 stock, and that the current cash-balance in the hands of the bankers had amounted to £4,747. The chairman then proceeded to explain that this balance at the banker's was made up of £1,200 received as a subscription from the town and neighbourhood of Northampton towards the expenses of the country meeting to be held this year in that locality; of £1,106 received as arrears of subscription; of £554 as life-compositions to be invested; and of £1,887 as the remaining available balance to meet current charges. He also reported to the Council the payment of £100 by the Duke of Northumberland on account of the prizes awarded on his Grace's foundation; and submitted to the Council the usual quarterly returns connected with the income, expenditure, and liabilities of the Society, and the investment of funded property. This report was confirmed by the Council, and the special recommendation of the committee unanimously adopted—That an investment should be made in the purchase of £1,200 stock in the public funds, for the purpose of supplying the deficiency in the stock account occasioned by a sale of

stock to that amount required to meet the inconvenience resulting from an excess of expenditure over receipts at a former country meeting of the Society.

Mr. Pym, Chairman of the Collection of Subscriptions' Committee, reported to the Council the arrangements in progress for carrying out the views of the Council agreeably with the report submitted and confirmed at the Monthly Council in December, and the extension of powers granted to the Committee by the resolution of the Council on that occasion.

The Northamptonshire Union Banking Company were appointed the local bankers of the Society for the period of the Northampton meeting in July next.

*Implement Prizes.*—On the motion of Mr. Shelley, the Council proceeded to the consideration of the prizes for implements, to be awarded at the Northampton meeting. The following subjects and amounts respectively of such prizes were unanimously agreed to:—

Heavy land plough .....	£10
Light land plough .....	10
General drill .....	15
Turnip flat drill .....	10
Turnip ridge drill .....	10
Scarifier .....	10
Chaff-cutter .....	10
Draining tile and pipe machine .....	25
Draining tools and instruments .....	15
Draining plough (including £10 added by Mr. Slaney) .....	25
Harrow .....	5
Drill presser .....	10
Churn .....	5
Weighing machine .....	10
General steaming apparatus .....	10
Skim or paring plough .....	5
Subsoil pulverizer .....	10
Horse seed-dibbler .....	15
Linseed crusher .....	5
Oue-horse cart .....	10
Thrashing-machine (applicable to horse or steam power) .....	20
Portable or fixed steam-engine .....	50
Corn-dressing machine .....	15
Agricultural harness .....	5
Broadcast-distributor of manure .....	10
Gorse-bruiser ..	10
Grinding mill .....	15
Miscellaneous awards .....	10

The President having announced his intention to give a prize of £25 at the Northampton Meeting for the most approved Model of a permanent Rick-yard, and Mr. Slaney a prize of £10 for the Plough best adapted for the purpose of filling-in the Soil cast out of Drains, the Council gave instructions to the Secretary respecting the terms and conditions of the Society's Prize-sheet and its immediate publication.

Mr. Brandreth Gibbs, as Honorary Director of the Shows of the Society, submitted for the approval of the Society various alterations in the Regulations connected with the exhibition at Northampton. These suggestions were received with thanks, and unanimously adopted.

*Royal Veterinary College.*—Mr. Fisher Hobbs having brought forward his motion on the subject of the annual grant made by the Society to the Royal Veterinary College for the purpose of promoting the application of Veterinary Science to the pathology and diseases of Cattle, Sheep, and Pigs, Mr. Denison, M.P., detailed to the Council the circumstances under which that grant originated, and the willingness of the College to afford the fullest investigation into the mode in which they had endeavoured to carry out the views of the Society.

On the motion of Mr. Shaw, seconded by Mr. Shelley, the following committee was then appointed to confer with the College on the subject, and report to the Council the course which had been pursued for the purpose of attaining the objects proposed by the Society, viz., the Duke of Richmond, Mr. Evelyn Denison, M.P., Mr. Fisher Hobbs, Mr. S. Bennett, Mr. Miles, M.P., Mr. Shaw, Mr. Shelley, and Mr. Brandreth.

*Vice-President.*—On the motion of Mr. Shelley, seconded by Mr. Miles, the Marquis of Downshire was unanimously elected one of the Vice-Presidents of the Society, in the place of the late Sir Charles Morgan, Bart.

*Notices of Motion.*—1. Mr. Shelley to move at the next monthly Council, on the 3rd of March, the appointment of a Committee for the selection and recommendation of Judges for Implements at the Northampton Meeting, from nominations made by the Members at large, at the General Meeting in May.

2. Mr. Brandreth to move, on the same day, that as the object of the Council in offering specific Prizes for particular descriptions of Implements is to draw the attention of Implement Makers to the improvement of those implements in particular, it is advisable that in future the Prizes for Implements shall be settled a year and a half previous to the Meeting at which those Prizes are to be awarded, namely, to be settled at the first council in December for the Meeting to be held on the ensuing July twelvemonth.

3. Mr. Bennett to move, at the same time, that there shall be three Stewards for the Implement Yard, as for Stock; and that in both Yards one of the Stewards shall retire every year, and a new one be appointed in his place.

Mr. Gillies favoured the Council with communications from Mr. Daniel Webster and Mr. Clay, of the United States, respecting a new mode of preparing Indian corn as food for cattle; for which, on the motion of Mr.

Miles, M.P., the thanks of the Council were voted to Mr. Gillies.

Numerous communications were announced for the consideration of the Weekly Meetings.

The Council then adjourned to Wednesday, the 10th inst.

A weekly Council was held at the Society's House, in Hanover Square, on Wednesday, the 10th of Feb.; present, the Earl of Egmont, president, in the chair; Sir Robert Price, bart., M.P., Barugh Almack, Esq., Col. Austen, M.P., Philip Bennet, Esq., M.P., Dr. Calvert, F. C. Cherry, Esq., Brandreth Gibbs, Esq., W. Fisher Hobbs, Esq., John Kinder, Esq., A. Majendie, Esq., F. Pym, Esq., Professor Sewell, William Shaw, Esq., Professor Simonds, Thomas Turner, Esq., and Henry Wilson, Esq.

Communications were read from Mr. Read, on Mineral Poisons, used as therapeutic agents; from Mr. Clayton, on Drain Pipe and Tile Machine, and Draining Tools; from Dr. Murray, on the "Lightning Field" in Jamaica; from Mr. Lister Maw, on White Carrots and Potatoes, and on over-fed animals exhibited as breeding-stock, with a suggestion for the appointment of Mr. Arthur Cherry as Veterinary Reporter on the condition of animals exhibited at the Society's Shows; from Mr. Osborn, on Tillage; from Mr. Reay and Mr. Chambers, on Potato Disease; from Mr. Williams, on Roads and Self-supporting Schools; from Mr. Bate, on Training Schools and Model Farms; and from Mr. Mayer, on Agricultural Education. For all which, and for a copy of Mr. Mechi's work on Drainage just published, the thanks of the Council were ordered.

*Suspended Animal Sensation.*—Professor Sewell exhibited to the members present a machine (constructed by Mr. Hooper, of Pall Mall East, on the principles laid down by Mr. Robinson, of Gower Street) for the inhalation of sulphuric ether by large quadrupeds, for the purpose of suspending their animal sensation, and performing any required operation upon them while in the state of such induced insensibility; and gave a most interesting detail of the result of his experiments on this important subject at the Royal Veterinary College. Having first ascertained the influence of the vapour on a healthy lamb, he proceeded on the following day to amputate the limb of a diseased sheep, and to perform the operation of dividing the nerves of the foot in a horse, with perfect success, and without the slightest apparent pain to either of the animals thus operated upon. He had also made experiments on the apparatus essentially required for the purpose of inducing this state in the smaller animals of a farm (as colts, calves, lambs, pigs, dogs, &c.), and found the application so simple and inexpensive, as to lead to a hope that every painful operation would soon be performed under the deadening influence of this vapour on the animal economy. An interesting discussion then ensued, in which Mr. Cherry (Veterinary Surgeon to the Army), Mr. Turner (President of the College of Veterinary Surgeons), and Professor Simonds (of the Royal Veterinary

College), communicated the results of their respective experience on this subject. At the request of the President, Professor Sewell undertook to report the result of practical trials suggested by his lordship, connected with the simplest and most economical modes of introducing the vapour of ether into the respiratory organs of animals.

The Council then adjourned to Wednesday, the 17th inst.

A WEEKLY COUNCIL was held at the Society's House in Hanover-square, on Wednesday, the 17th of February; present—The Earl of Egmont, president, in the chair; Lord Portman; Hon. Granville Dudley Ryder, M.P.; Sir John V. B. Johnstone, Bart.; Barugh Almack, Esq.; W. R. Browne, Esq.; Dr. Calvert; F. C. Cherry, Esq.; W. Y. Freebody, Esq.; Brandreth Gibbs, Esq.; John Kinder, Esq.; Colonel Mac Doull; Ashhurst Majendie, Esq.; William Miles, Esq., M.P.; H. Manning, Esq.; John Read, Esq.; Professor Sewell; Professor Simonds; R. A. Slaney, Esq.; S. R. Solly, Esq.; W. C. Spooner, Esq.; Thomas Turner, Esq.; and Henry Wilson, Esq.

*Potato Disease.*—Mr. Shaw Lefevre, having transmitted to the Society, on the part of the Lords of the Committee of Privy Council for Trade, various documents addressed to that department of H. M. Government on the subject of the Potato Disease, those communications were received by the Council with thanks, and read before the members at that meeting, when an interesting discussion ensued on the practical bearings of that important question; and the attention of the Council was especially called by Mr. W. R. Browne to the consideration of the substitutes to be recommended for planting during the present season in lieu of potatoes.

Sir John Johnstone stated that the potatoes in the vicinity of his residence, in Yorkshire, were all affected last year within the period of two particular days, as if struck by a blight; the beans and peas had been also, to a certain extent, been smitten in the same way. Mr. Miles had found his celery and broccoli affected by a brown spot upon the leaves, which immediately resulted in the decay of the plants. He had, however, not yet heard of potatoes being affected with the prevalent disease in the neighbourhood of copper-works. Lord Portman had been informed that the disease prevailed to a great extent in the West Indies. Dr. Calvert would inspect and report upon the microscopical illustrations of diseased specimens.

*Beet-Bread.*—Mr. Briscoe, of Fox Hills, Surrey, forwarded to the Council specimens of household bread, made, under his directions, by Mr. Duer, baker, of New Bond-street, of equal parts of mangold-wurzel pulp and fine wheaten flour in one case, and of equal parts of the same pulp and wheaten flour from which the bran had not been separated in the other case; the juice having been pressed out of the pulp, and no water used in the making of the bread. Mr. Briscoe informed the Council that this bread had been found very palatable, and could be made for half the price of that in ordinary use. The thanks of the Council were ordered to Mr. Briscoe for this mark of attention.

*Australian Potatoes and Wheat.*—Mr. Majendie, of Hedingham Castle, Essex, reported to the Council the testimony of the Bishop of Tasmania, and of the Rev. T. J. Ewing, chaplain of New Town, Van Dieman's Land, in favour of the excellent quality of the Australian potatoes, which had been found to remain perfectly sound and free from disease during the voyage to England. The variety brought home in the "Jane Frances" is known in the colony as "Brown's River Potato," and the supply was as good when the vessel arrived off the Lizard as when she first set sail. These potatoes had been packed in small hampers and kept in the steward's store-room, agreeably with the plan which, in the captain's opinion, preserved them in much better condition than any other; and, had the captain been aware of the scarcity in England, he could have brought six times the quantity packed in the same manner, although not a regular cargo, as the potatoes in this case would probably have become heated. Mr. Majendie expressed his intention of presenting a supply of these potatoes to the Council for trial among the members; and he was authorised by Lady Franklin to state that, should the Council think it desirable to write out to Australia for a further supply, it would give her much pleasure to be the medium of communication in the attainment of this object, as well as in that of obtaining also from the colony a supply of the finest seed wheat grown in that part of the world for cultivation in England. The Council ordered their best thanks to Lady Franklin and Mr. Majendie for these communications.

*Potato Planting.*—Mr. Edmund Williams, of Mount Pleasant, Maury County, State of Tennessee, communicated to the Council the favourable result he had obtained by planting potatoes in furrows of which the bottom was covered with cotton-seed, and the whole filled in deep with earth, the cotton-seed remaining in the ground, under such circumstances, without vegetating. From 3 ounces in weight of seed potato he obtained a produce of 17lbs., under unfavourable circumstances. He ascribes the success of his plan to the oily nature of the seeds, and to the protection which they afford to the potato plant in the early stages of its growth, in consequence of their mechanical texture and their resistance to rapid conduction of heat.

*Copper-smoke Disease.*—Professor Sewell exhibited to the Council various specimens of the joint-bones of animals which, from living within the influence of the effluvia from the copper-mines of Swansea, had become diseased by accumulations of irregular masses of bony matter concreting about the joints, and by decay in the substance of the natural bone, similar to that resulting from the injurious effects of mercury on the animal system. He thought it singular that the effect of this mineral contamination of the atmosphere, which was thus found to be so injurious to the animal functions, should, as stated by Mr. Miles, appear to arrest the progress of disease in the vegetable structure of the potato.

*Northampton Meeting.*—Lord Portman, chairman of the General Northampton Committee, took that opportunity of apprising the Council that the date of the

Northampton meeting would be a week later than originally intended and conditionally settled in December, in consequence of the county assizes, which it appeared, from information received by the Committee at their meeting of that morning, were fixed to be held in the week conditionally selected by the Council; and that, accordingly, the country meeting of the Society would be held at Northampton in the following week, namely, in that commencing Monday, the 19th of July next, the principal day of the show being the Thursday in that week.

*Cut-straw Litter.*—Mr. W. R. Browne laid before the Council the report of Mr. Bennett, M.P., and himself on their personal inspection of the plan pursued by Mr. W. Browne, on his farm at Winterbourne-Stoke, in reference to the cutting of straw and employment of it as litter for his stock, agreeably with the request of the Council at a former meeting, when Lord Portman called their attention to the subject. It appeared, from this report, that Mr. Browne had about fifty head of young cattle in stalls, their food, whether green or dry, being cut for them, and that they were all littered daily with cut straw, which effectually absorbs all moisture. The stalls are cleaned out every second week, and the manure thus obtained is fit for immediate use. The cattle were found clean and doing well. The straw is cut into pieces of from one to two inches in length, by means of a steam-engine (employed for the general use of the establishment), at an expense of one shilling for each four hundred bushels. The manure, from its short texture, does not interfere with the working of the implements employed in the land, and in the spring may be employed as a top-dressing for wheat without obstructing the operation of the hoe. It may be applied to turnips with great advantage after they have been thinned out. It may then be mixed with the soil by the hoe, and in dry seasons and dry soils such application of cut straw manure will, they think, be attended with great advantages. Coarse salt is sprinkled occasionally on the manure-heaps, for the purpose of preventing their becoming over-heated. The report concludes with a reference to the admirable economy of Mr. Browne's farm, his largely-increased expenditure of labour judiciously applied, and his liberal adoption of such improvements as practice combined with theory has sanctioned. On the motion of Lord Portman, seconded by Mr. Miles, the best thanks of the Council were voted to Mr. Bennett and Mr. Browne for the favour of this report, and for their kind attention to the request of the Council.

In reply to an inquiry, made by Lord Portman, whether Mr. W. R. Browne, if again undertaking the management of a farm, would adopt the plan under consideration, Mr. Browne stated that he was so fully satisfied of its advantages, that he should certainly not hesitate to do so.

The Council then adjourned to Wednesday, the 24th instant.

#### NEW MEMBERS.

Francis Fuller, Esq., of Abingdon-street, Westminster, was elected a governor.

Alderman, Robert, Farndish, Wellingborough  
 Anderdon, J. L., 3, New Bank Buildings, London  
 Batty, Benjamin Rockley (J. P.), Finney, Huddersfield  
 Benn, Thomas, Greenbank, Whitehaven  
 Biggs, James, Desborough, Kettering, Northampton  
 Blackman, Alfred, Beckley, Rye, Sussex  
 Boyle, Richard, jun., Hull  
 Brooke, John William, Sibton Hall, Yoxford, Suffolk  
 Burrell, John, Farnham St. Martin, Bury St. Edmunds  
 Burrell, Walton, Westley, Bury St. Edmunds  
 Cooke, William Fothergill, Eliot House, Blackheath, Kent  
 Crosland, I. S., Burbage House, Hinckley  
 Davies, Rev. Lewis Charles, Ynyshir, Abersystwith  
 Davey, George, jun., Buckland, Faringdon, Berkshire  
 Dougill, John, Finthorp, Huddersfield  
 Dyson, Thomas, Esq., Manor House, Braithwell, near Rotherham  
 Falcon, Thomas, Workington, Cumberland  
 Freestone, Thomas, Irthingborough, Wellingborough  
 Frost, Captain Charles, Hull  
 Fuller, Francis, 20, Abingdon-street, Westminster  
 Hartley, Thomas, Gillfoot, Whitehaven  
 Hunt Robert, Aldeby, Beccles, Suffolk  
 Jelley, Thomas, Tickencote, Stamford  
 Jones, Charles, Poole Keynes, Cirencester  
 Johnson, Henry, Stamford, Lincolnshire  
 Johnston, Captain James, Ashfold, Crawley, Sussex  
 Laidler, Matthew, West Fenton, Wooller  
 Laidler, Thomas, Fenton, Wooller, Northumberland  
 Lamprell, William, Little Bradley Hall, Newmarket  
 Lewis, Israel Harris, Gallant's Court, East Farleigh, Maidstone  
 Maidens, Thomas Robert, Brinkhill, Spilsby, Lincolnsh.  
 Mercer, William, Newton, Warrington, Lancashire  
 Mills, John, Burford, Oxfordshire  
 Nicholson, John, Kirk-by-Thore, Bridgend, Westmoreland  
 Oakley, John, Esq., of 182, Piccadilly  
 Papendick, Mrs., Glasbury House, Glasbury, Radnorsh.  
 Parr, Thomas Cart, Cossington, Leicester  
 Partridge, Thomas, Dilbridge Farm, Colchester, Essex  
 Peploe, Captain Daniel Peploe, Garnston, Hereford  
 Powell, Harrison, Esq., of Toft, near Cambridge  
 Raynbird, Hugh, Hengrave, Bury St. Edmunds  
 Ryder, Hon. Granville Dudley, M.P., Westbrook, Herts.  
 Scott, William Stephenson, Seal, Farnham, Surrey  
 Scurr, Rev. Robert William, Rector of Shenley, Stony-Stratford.  
 Small, Rev. Harry Alexander, Rector of Haversham, Stony-Stratford  
 Stevens, John Templeman, Seaborough, Crewkerne  
 Steward, Anthony Benn, Chapel House, Whitehaven  
 Upton, Col. The Hon. G. F., 15, Berkeley Square  
 Ward, William Henry, Lincoln  
 Whincup, Francis, Ketten, Stamford, Lincolnshire  
 Wilde, George, 1, Cambridge Square, London  
 Wilkins, Henry, Westbury on Severn, Glouc.  
 Williams, John, M.D., The Grove House, Denbigh  
 Worthington, Isaac Jackson, Lymm, Warrington.

## TENANT-RIGHT.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

SIR,—When I submitted my query on improvements and dilapidations made or occasioned by out-going tenants, I did not expect to draw abuse upon my fraternity, whose championship I have neither the ability nor the disposition to undertake.

I have not the means of knowing if I possess the experience in which your Northumbrian correspondent appears to revel, yet I *am* acquainted with the remedy a landlord has against an *out-going* tenant for dilapidation, if by chance he is worth “powder and shot.” All I had a desire to learn was if the two sides of the question are to be considered in the shape of a debtor and creditor's account by the *appointed* valuers, or to be adjudicated upon separately? It is not impossible that the valuation may be all on one side only; for I *presume*, as heretofore, improvements will be undertaken and dilapidations incurred *at the will of tenants*. Security for the former is far superior to that afforded against injury by the latter.

I am misunderstood if I am supposed to be unfavourable to compensation for improvements by tenants, *particularly* if they bind themselves (as in fairness they ought) to a liberal system of management *annually*. I foresee the difficulty and delicacy would then be greatly less on the part of landlords in removing bad tenants. The forbearance at present exercised on this head is one of the greatest drawbacks to agricultural improvements. The plea that “I and my family have lived so long,” &c., will then be obsolete, and the best system of farming will very properly become the main consideration.

I am, &c.,

February 13th.

A LAND STEWARD.

We invite the attention of our readers to an advertisement containing the prospectus of an institution for providing a assistance to tenant farmers reduced by adverse circumstances, to be called the “Richmond Institute.”

“The Committee for managing the Institution held a meeting at the Freemasons' Tavern, on Wednesday, the 10th inst.

“The plans for carrying out the intentions of the institution were settled, and in a few days will be extensively circulated.

“The communications already addressed to Mr. Burrell, the honorary secretary, contain gratifying promise of influential and extensive support.

“We trust the kind intentions of the noble President of the Institution, his Grace the Duke of Richmond, will be fully appreciated by the country at large, being com-

pletely separated from any political tendency, and entirely devoted to charitable purposes.”

It will be seen that some very material alterations have been made in the constitution of the Institution as set forth in a prospectus previously issued. A class of subscribers of £1 annually, to be called “members,” have been added; they will be entitled to attend the annual meetings, and are eligible as members of the managing committee. For the general details we refer our readers to the advertisement. It is passing strange that while almost every other class has an asylum for members reduced by adverse circumstances, no such provision has, as yet, been established for farmers.

BROMSGROVE.—FARMERS' CLUB.—At a quarterly meeting of the farmers' club for this town, held at the Golden Cross Hotel, on Tuesday the 16th Feb.: present—Mr. Josiah Greening (in the chair), Mr. H. Parkes, Mr. Jos. Creswell, Mr. T. Hill, Mr. R. Heynes, Mr. Maund, Mr. H. F. Fardon, Mr. John Holmes, and others. Mr. Maund commenced a discussion on the “Injurious effects of trees and hedges on agricultural crops,” and after considerable argument the following resolution was proposed by Mr. Maund, seconded by Mr. H. F. Fardon, and carried unanimously—“Resolved: That the club is of opinion that the best method of raising a good and efficient quick hedge is to plant the quick on the level ground, without bank or ditch, to strengthen it at the bottom and throughout by judicious pruning, and never to plash it.” The question so far as regards trees was adjourned until the next quarterly meeting, to be held on the third Tuesday in May. On the motion of Mr. Heynes, seconded by Mr. Holmes, the thanks of the meeting were given to Mr. Maund for introducing the subject. A vote of thanks to Mr. Greening for his conduct in the chair was, on the motion of Mr. Creswell, seconded by Mr. Holmes, carried unanimously, and the meeting separated.

SEED POTATOES.—We regret to state that all our exertions to obtain potatoes for seed have turned out a failure. France has prohibited the further exportation. The Azores have likewise stopped the shipment, the drain of Indian corn from that quarter compelling the authorities to fall back upon the crop of potatoes, to prevent a dearth of provisions themselves, in proof of which the shipment of Indian corn is stopped as well. We have tried Russia both by steam and sailing vessels; both parcels brought were landed in a bad state, and dishearten us from further attempt. We have sent our instructions for a supply from Bermuda, which will be our last resource. It is now very evident that Ireland must fall back on grain food, and must look to the present situation as a providential warning upon the futurity of depending upon so precarious a root as the potato.—*Letter from Messrs. Keeling and Co. to Mr. Dominick Kennelly, Merchant, Cork.*



## ON THE MANURES OF THE FARM.

BY THOMAS SULLIVAN.

The following fundamental principles of husbandry should ever be kept in view in the practice of every intelligent cultivator: viz.—first, that the soil (in order to yield the maximum produce) should be effectually relieved of redundant moisture, by complete drainage; second, that it be loosened and pulverized to a considerable depth; third, that it be maintained in a state of increasing fertility, or at least prevented from becoming exhausted, by regular and liberal applications of enriching manure; and fourth, that it be kept perfectly free of weeds. In other words, the great primary objects which the enlightened husbandman will constantly aim at are, to render his land dry, deep, rich, and clean, and to keep it so. There are, it is true, several other important particulars which it is absolutely essential to have properly understood and practised before agriculture can be said to be fairly on the road towards perfection—such as the skilful culture of such plants as are the best adapted to the soil and climate of particular localities, and such as yield the greatest quantity of most valuable produce; the judicious selection, breeding, and rearing of live stock; and the erection of suitable and sufficient buildings for their accommodation; the formation of necessary roads and fences, &c. There is still another particular, which is admitted by all to exert a powerful influence in promoting agricultural improvement; I mean the granting of leases on fair and equitable terms—leases which, to be of real advantage to both landlord and tenant, must be of a duration commensurate with the improvements to be effected, and the money to be expended by the latter, besides being free from all useless or mischievous restrictions and burthensome obligations.

My object in this paper, however, shall be to endeavour to impress upon agriculturists the importance of bestowing increased attention to the manures that are or may be manufactured and prepared on the farm; and I may observe at the outset that I shall not puzzle the unscientific reader with any abstruse speculations regarding the necessity that exists for the application of manure to the soil, or the manner in which its different constituents operate in promoting the growth of useful plants. Although I intend the following observations to be purely practical, yet I am fully sensible that there is no branch of farm management on which chemistry has thrown so much light, as on the management and application of manures;

therefore those who are desirous to comprehend the subject thoroughly must make themselves acquainted with the leading facts of that science. It is now universally admitted that practice and science must be united, and go hand in hand, to ensure success. The mere scientific man is too apt to despise experience, and to consider farming an empirical occupation, based upon vague and ill-defined opinions; forgetting, however, that all knowledge is founded on experience, and that all sound theory consists of certain principles or conclusions drawn from a large array of facts, ascertained chiefly in the school of practice. But, on the other hand, the farmer that relies exclusively on his own experience and the prevailing customs of the locality in which he resides, and disdains to seek and avail himself of the aid of science in the cultivation and improvement of his land, evidently stands very much in his own light; in short, the mere routine practitioner is unable to advance beyond the limits of his own experience, and cannot derive much information from favourable results arising from the adoption of any particular course of management, or to guard against the recurrence of such as are unfavourable. Experience, however, is quite sufficient to satisfy us that few soils, if any, will continue to yield equally abundant crops for any considerable number of successive years, without the addition of some fertilizing substances in lieu of the matters required and abstracted by the plants; that by the application of manure to our land increased crops are produced; and that the value of such crops depends very much on the quantity and quality of the fertilizing matters we can accumulate, and our skill in applying them to the soil. The collection and management of manure is therefore a most important branch of practical farming.

The dung made on the farm by the consumption of its produce by the domestic animals is the principal manure on which the farmer should depend. Other manures may now be resorted to when those of the farm-yard are inadequate; but here I must observe that, under a proper system of mixed husbandry, very little extraneous substances should be required; and certainly there cannot be a better criterion by which to estimate the propriety or impropriety of the system of farming pursued in any district than the quantity of manure produced and skilfully prepared on individual farms. Far be it

from me, however, by this remark to undervalue the fertilizers of commerce, or the other extraneous manures with which agriculturists have for some time been acquainted, when used as *auxiliaries* to the home supply. Whilst every person must acknowledge that many of these substances have been, and are, of considerable utility, it must also be admitted that their chief advantage consists in enabling the farmer to augment his stock of home manure, and thereby in future years to render himself less dependent on extraneous supplies. Some of these substances, such as *genuine* guano, bone-dust, &c., are of unquestionable utility, their efficacy as manures being placed beyond a doubt, by the results of the numerous trials that have been made with them in all parts of the kingdom. Very many, however, of the innumerable "fertilizers" now brought under the notice of farmers are quite worthless, whilst the efficacy of others remains to be further confirmed by repeated experiments. But even granting that these extraneous substances—the manures of commerce—possess all the fertilizing properties ascribed to them by their respective manufacturers and venders, still the propriety and economy of largely resorting to them is, I think, exceedingly questionable. If a sufficient quantity of farm-yard manure can be produced at home (as assuredly it may to a very great extent, by judiciously preserving and economizing the large quantities of valuable substances now suffered to run to waste, or to lie in a state worse than useless), it is quite clear that much of the money annually paid for extraneous manures is needlessly expended.

The means of augmenting the quantity of home manure, to which I shall first advert, is that of increasing the produce of those green-crops which are consumed on the farm. Without an adequate supply of green food, stock cannot be maintained in a thriving condition during winter, nor manure be produced in any considerable quantity; and it is also well known that the excrements of animals fed on nutritious food are much more enriching and valuable than those of cattle more scantily supplied; for example, the dung of stock fed on oil-cake is much better than that of those supported on turnips; and, in like manner, the latter is greatly superior to the manure produced by cattle furnished only with straw and a limited allowance of roots. Straw and green crops, then, constitute the foundation of the manure heap; and the increasing of these materials is obviously the surest mode of maintaining and augmenting the productions of the soil. Cattle that are well fed and plentifully supplied with litter produce a large quantity of rich and valuable manure, which again is the means of raising an abundant crop of turnips or other green

food. Indeed, no system of farming can be said to be far advanced towards perfection unless a full proportion of the cultivated land is devoted to the raising of green crops, and the whole of the manure produced by their consumption again applied to the production of food for live stock. When once the farmer succeeds in growing an abundant supply of green food, such as turnips, potatoes, carrots, parsnips, mangle wurzel, clover, &c., he insures not only the proper maintenance of his stock throughout the winter and early spring months, but also the augmentation of his manure heap, the improvement of his land, and an increased quantity of corn. It is evident, therefore, that the judicious culture of green crops, particularly turnips, as being the most easily raised, is the foundation of good husbandry, and is justly entitled to be ranked as the first and most important means of increasing the stock of our best and most certain of all manures—the dung of the farm-yard.

The next means of increasing the manures of the farm-yard, to which I shall advert, is that of *soiling* horses and cattle, *i.e.*, supplying them with clover, vetches, oil-cake, &c., in houses and yards, during the summer months, wherever it may be found practicable to do so. The opinion has frequently been expressed and advocated by certain parties, that the pasturing of grass by any description of stock is in most cases an injudicious and wasteful practice, inasmuch as the same extent of land would, it is contended, maintain a greater number of animals by cutting the grass, and giving it to them in houses and yards; but this I think is exceedingly questionable, in some cases at least, and much difference of opinion prevails on the subject. Nevertheless, it is, I believe, pretty generally allowed by all parties, that work-horses and grown cattle, at least, may with advantage be fed on cut grass, &c., in houses and yards, to a much greater extent than at present; and while admitting the apparent impracticability of house feeding on a very extensive scale during the whole of the year, I must observe that so far as this goes, I have some reason to coincide with the advocates of soiling.

With regard to the summer management of work-horses, there can be no doubt of the impropriety of the general practice of turning them loose in the pasture field, in the intervals between the hours of labour. It cannot be otherwise than prejudicial to the animals, after working five hours or so, to be compelled to undergo the additional fatigue of collecting a scanty bite, and to endure the teasing of numberless flies into the bargain; whereas by supplying them with clover and rye-grass, in the stable, they soon get themselves filled, and, consequently, have more time for rest and sleep. Being in the shade, they are also free from the

annoyance of a host of flies. Work-horses might further be advantageously kept in the stable over-night upon cut grass, more frequently than they generally are; and though on very extensive farms it might be impracticable to support all the horses in the stable night and day while they are idle, yet there can be no question of the propriety and advantages of doing so when they are steadily at work. In many parts of the country cattle are fed during the summer months upon vetches or clover and oil-cake; and, as the practice possesses many advantages, it is fast extending itself to other localities. The animals are in most instances kept in open yards with sheds, to which they may retire at pleasure, which is certainly a much better plan, and more conducive to health, at least in summer, than the usual practice of tying them up in close ill-ventilated houses. Milch cows are frequently kept in the house at night, and during a part of the day; even sheep, which of all our domestic animals seem to be the least adapted to confinement, are occasionally subjected to house-feeding, and recent experiments show that the practice is attended with considerable benefit.

There are some serious, though certainly not insurmountable, obstacles to the adoption, on a large scale, of house-feeding during the summer months, even though the farm could furnish an abundance of clover, &c., for the purpose. An adequate supply of straw for litter, without which horses or cattle cannot be kept comfortably in houses or yards, is often not easily or cheaply obtained in summer. But though this circumstance may, to a great extent, render soiling impracticable on extensive farms, yet the same objection cannot be urged against the practice on small farms, where only a few cattle are kept, as a sufficiency of litter may commonly be obtained by the collection of weeds, ferns, rushes, and other matters of a similar kind, which abound in most parts of the country. Much has been said and written in reference to the advantages to be derived from soiling; but certainly not the least important of these is the increased quantity of excellent manure thereby produced; the solid and liquid excrements of the cattle are also preserved, and can be applied to the land more beneficially than when dropped on the pasture fields; not that the dung and urine are thus entirely lost, but it is very evident that much of their valuable properties are dissipated by exposure to the weather. In conclusion, therefore, house-feeding or soiling is an important means of increasing the stock of manure upon the farm, more particularly when the urine is carefully preserved.

But even where house-feeding may be regarded as impracticable during certain months in the year, there can be no doubt but that very great improve-

ment might be effected on the present practice of totally neglecting the dung dropped by the cattle in the fields. No argument is necessary to prove that such droppings are rendered worthless by the influence of the sun and winds: indeed, the rank herbage produced on such spots is more or less poisonous to the stock compelled to eat it. Hence we see numerous tufts of grass in every pasture-field, while the grass all around them may be eaten quite close to the ground; a similar effect is observable in the unequal appearance of the succeeding grain crop; some spots being over luxuriant, and the rest, perhaps, not so heavy as would be desired by the farmer.

Most of the fertilizing properties of the droppings of horses and cattle are dissipated by atmospheric influences, so that in fact the land derives comparatively little benefit from them, when allowed, as they most generally are, to remain where they are dropped. The dung of horned cattle differs considerably in this, as in other respects, from that of horses. The former, it is well known, decomposes but slowly, and becomes quite dried up, on exposure to the weather. The dung of the horse being of a different nature from that of the cow, is much sooner deprived of its fertilizing properties on exposure to the weather, so that in the course of a few days it becomes like chaff, and is almost useless as a manure.

Now this waste of most valuable substances—the droppings of horses and cattle—may, to a great extent, be prevented by the exercise of a little care and attention on the part of the farmer. Two methods may be adopted for this purpose, both of which are easily carried into effect, and occasion but little expense. The dung shortly after being voided may be scattered with a shovel over the surface of the ground; on large farms this would afford sufficient employment to a man, who should go over every field in which stock are kept grazing, at least once a day, and distribute the droppings evenly over the surface. By this means the whole of the field would be equally benefited, no part being more manured than another, and the grass would grow evenly, without any spots being too rank or unwholesome for the animals to consume. This plan is, however, somewhat defective, inasmuch as the most valuable constituents of the manure, after being scattered over the surface of the field, are liable to be dissipated by the influence of the sun and drying winds. The most judicious practice therefore is to collect all the droppings as soon as possible after they have been voided, into one or more heaps, in the corners of the pasture field, to be there formed into a compost with earth or other absorbent matters, and afterwards applied as a top-dressing to the land, or to the least productive

parts. Where a considerable number of cattle are kept, it may require a man and a boy with a wheelbarrow to remove the droppings; but that their wages will be amply repaid to the farmer admits not of a shadow of doubt. The excrements dropped upon the roads, and the passages leading to the fields, should also be collected together and regularly conveyed to the manure-heap, so that nothing may be permitted to go to waste. Either of these methods of applying the droppings of cattle is incomparably superior to the practice which prevails even in the best cultivated districts, of neglecting them altogether; but for the reasons already assigned, the latter is that which we most strongly recommend; its utility is so apparent, and the expense so very insignificant, it is singular so little has hitherto been done in the way of adopting it. When cattle are not, or cannot conveniently be fed in houses or yards, the farmer should certainly make every exertion to secure the greatest benefit from their droppings in the pasture fields; and I know of no way by which this desirable object could be cheaper or better accomplished than by the plan already referred to. Employment would thus also be afforded to children and aged persons incapable of more laborious work; and it is almost needless to observe that the money so laid out would be much more usefully employed than in the purchase of foreign fertilizers of questionable character.

The next means at the farmer's command, of augmenting the quantity of home manure, and of rendering himself less dependent on extraneous supplies, to which I beg to draw the attention of agriculturists, is the careful preservation, by means of underground tanks or reservoirs, of the urine of the domestic animals, and its judicious application to the land. The importance of saving and economizing all the liquid manure of the farm-yard is a subject on which a great deal has already been said and written; but it cannot, I think, be too frequently or prominently brought under the consideration of agriculturists, for there can be no doubt of the gross negligence and mismanagement every where observable in the treatment of this valuable fertilizer. Were it possible to express accurately in pounds, shillings, and pence, the loss sustained by many farmers in permitting the urine from their stables, cow-houses, &c., and even the liquid matters escaping from the dung-heap, to run to waste, polluting the horse-pond or nearest brook, I have no doubt but that a sum would be obtained, even at the most moderate calculation, which very few farmers would be disposed to cast heedlessly away. We would certainly consider that man most improvident who would be so regardless of his own interest as to allow his corn or his cash to lie carelessly

scattered about his farm-yard, or to suffer either to be carried off and deposited in the nearest pond or brook; but if it be true as Liebig (no mean authority) asserts, that "with every pound of urine a pound of wheat might be produced, and with every pound of ammonia which evaporates a loss of sixty pounds of corn is sustained," it requires no argument to show that the farmer, who permits the liquid manure from his houses and yards to run to waste, is acting just as unwise and improvident a part. This culpable waste of the means of increasing the productive powers of the soil, may to a great extent be attributed to the circumstance that, generally speaking, no adequate importance is attached by the farmer to any article of produce which cannot be carried to, or is not saleable for cash in, the market. But it may truly be said that the exigencies of the country, and the present position of agriculture, require that nothing should be wasted which could be turned to useful account.

Why, it may be asked, do such extensive tracts of land lie uncultivated in almost every quarter of the kingdom, but which under proper management, and by the application of enriching manure, would undoubtedly be rendered as productive as much of that at present under a kind of tillage? Why are turnips and other green crops so little grown in many parts of the country, in proportion to the extent of land which, under a proper system of farming, might and ought to be devoted to their culture? and why is it that the coasts of Africa, and the rocks and islets of the Pacific, have to be explored for the means of enriching our fields and increasing our crops? It is certainly because so little importance is, generally speaking, attached to the fertilizers (solid and liquid) of the homestead, and so little attention bestowed on their preservation; it is because precisely similar matters are permitted to lie unheeded about the houses and yards of many farmers, or to flow uninterruptedly to some stagnant pool, neighbouring brook, or other convenient outlet. But when essentially the same substances, though perhaps differently combined, are imported from distant regions, and purchased at a high price, most farmers are scrupulously exact in economizing them. Not a pound of guano is suffered to be wasted, though hogsheads of urine may be permitted to flow heedlessly away from the farm-yard. We hope, however, that the period is not remote when our farmers of every class will look more to home, and depend less on the manure market for the means of increasing the productiveness of their land. In Flanders, and other parts of the continent, where the efficacy of liquid manure is duly appreciated, the annual value of the urine of the cow is estimated at £2; and we cannot have a better guarantee of the fertilizing properties of urine than the high value

attached to it by the industrious Flemings, by whom it is used as a universal manure for every description of crop. Now if the urine of a single cow is worth £2 a year (and this sum is usually paid for it in Flanders), the amount of loss annually sustained by the agriculturists of the United Kingdom will be allowed to be enormous, when it is remembered that, at a moderate calculation, one-half of the urine produced by the domestic animals is permitted to run to waste.

It is not intended to give in this place anything like a detailed account of the chemical properties of liquid manure, or to advert to the various methods by which it may readily be preserved and applied; my principal object in this paper being merely to induce, if possible, the agriculturists of the kingdom to pay more attention than they have hitherto done to the collection and economical employment of this invaluable fertilizer. I am satisfied that when the intelligent and industrious farmer once earnestly sets about the preservation of liquid manure, including not only the urine from his stables and byres, but also the rich and valuable drainings from his dung-heap, the means of effecting so desirable an object will not long remain a desideratum.

Liquid manure is applied to the land either in conjunction with the dung of the farm-yard, which always holds in suspension more or less of the urine of the animals; separately, by means of a liquid manure cart; or in combination with absorbent matters, such as dry vegetable earth, peat, road scrapings, &c., forming with them a rich and valuable compost. Each of these modes of application has its advocates, and considerable diversity of opinion prevails regarding their comparative merits, arising, however, in a great degree from the different circumstances in which different agriculturists may be placed, and by which alone the propriety of any particular mode of conducting this as well as other branches of farm management can correctly be estimated. The plan most generally recommended, if not the most usually adopted, is that of constructing a tank or reservoir in a convenient position contiguous to the farm buildings, into which all the urine from the stables, cow-houses, and other offices is conveyed by means of pipes or underground drains, covered with flags.

*(To be continued.)*

## COURSE OF LECTURES ON BOTANY IN REFERENCE TO AGRICULTURE.

BY CHARLES JOHNSON, ESQ., PROFESSOR OF BOTANY AT GUY'S HOSPITAL, &c., &c.

AT MESSRS. NESBITS' AGRICULTURAL AND SCIENTIFIC TRAINING SCHOOL, KENNINGTON LANE, LAMBETH, NEAR LONDON.

### LECTURE II.

Our preceding lecture was dedicated to the detail of a few of the advantages that have already resulted from the knowledge of a simple fact in vegetable physiology, namely, the influence of the external organs or parts of the flower in the production of the seed. It is a subject on which we might dwell at much greater length, as manifesting the vast importance of a branch of study that the practical cultivator, regarding it generally in the light of an abstract science, has hitherto considered rather as an amusement for the idle speculator, than as intimately connected with the practice of his profession, and illustrating those processes of his art that have been established by the slowly accumulated experience of himself and his predecessors. But this early stage of our inquiry is not the fitting place to extend our remarks upon the action of organs whose operation can scarcely be comprehended without reference to their own ultimate structure, in other words, to the minute organs or vessels of which they are themselves built up; and this observation applies not only to the flower, but to every part of the vegetable fabric; every product

of the plant, whether cultivated for food, or as adapted to the other almost innumerable wants and purposes of man, nay, its very existence, is dependant upon these.

A vegetable is a living being, and, as such, is made up of parts or members, all more or less influencing each other, and united and simultaneous in their operations for the growth and preservation of the whole. Some parts, when cut through, appear solid to the naked eye, others present a minutely porous appearance; but under a microscope or strong magnifying glass the apparent solidity of the hardest and closest wood disappears. It is in these small and all but invisible cavities that the vital functions of the being before us are to be traced; it is here that are elaborated the starch, the gluten, the gum, the sugar, and the other proximate principles of our food; here are formed the tannin, the dye, the medicine; the production of the wood, the bark, the differing fibre of the flax and cotton, and the increase of the universal substance of the plant itself, are all of them processes dependant upon the economy of these mysterious recesses.

The prying eye of curiosity is sometimes at fault in its endeavours to penetrate the sources of organic action, but a glance is often sufficient for the speculative mind of man to work upon and form a hypothesis, which a second will enable him to improve into a theory, and although we positively know but little, that little enables us to assume a great deal, and this is especially the case as regards the science of vegetable physiology, or that which treats of the natural laws regulating the growth of plants and their productions, as just referred to. In giving you a general outline of the action of these laws, and endeavouring to explain the structure through which they operate, I shall avoid as much as possible reference to what is merely supposititious, relying upon the statement of facts, and such conclusions as, though in our present state of knowledge they are incapable of being positively demonstrated, are still so closely accordant with what we really do know, that, until they are contradicted by facts, we are justified in regarding them as such themselves.

Divide the stem of any common plant transversely or crosswise, and examine the section with a microscope, it will present the appearance of network, the meshes of which are of various sizes and figures, some perhaps regularly hexagonal, or six-sided, like the cells of a honey-comb, others more irregular, others square, and some circular; the circular ones are generally disposed in groups, which are sometimes scattered, sometimes arranged at corresponding intervals in a concentric manner. If we divide the same stem perpendicularly, or lengthwise, we find the angular meshes presenting a nearly similar appearance, shewing them to be small membranous cells or cavities, while the circular ones are discovered to be sections of little tubes, more or less elongated, and narrowing towards each extremity so as to terminate in a point, and farther, that they are disposed in longitudinal layers, or threadlike bundles. These cells and tubes are denominated the elementary organs of the plant; and minute examination of them shews that, independent of differences in form, size, and disposition, they vary greatly in structure, and are probably subservient, in consequence of that variation, to the performance of different functions; these functions, however, are, in our present state of knowledge, very imperfectly understood: of many, and those perhaps the most important, we are altogether ignorant; while others are little more than surmised from their apparent connection with some obvious fact in vegetable growth, such as the rise and distribution of the sap, &c. So very minute are the elementary organs of plants individually, and so obscurely revealed are their physiological phenomena, even with the assistance of the most

powerful microscopes, that few observers agree in their accounts of either, beyond the admission of certain general facts.

The simplest definable form of the vegetable tissue or substance appears to be the cellular, namely, that presenting in division the angular meshes just referred to; each of these meshes is the section of a cell, consisting of a very delicate transparent membrane, rudimentally globular, but assuming different figures in consequence of being pressed upon by others in the growing plant: when equally pressed on all sides by similar cells, the globe becomes twelve-sided, and of the form denominated by mathematicians the rhomboidal dodecahedron, which being divided in either direction, presents a hexagonal outline, resembling the cells of a honey-comb; where the pressure is unequal the regularity of the cells is variously affected and distorted, and they become more or less oblong and rectangular, or present such a diversity of figures in different plants, and in different parts of the same, that the delineation of them would require a far greater space than our confined limits will admit, or the subject before us justify the dwelling upon, where a hasty outline will answer the end proposed, without entering into minutiae belonging to the more obtruse and philosophical portion of the science. Cellular tissue constitutes a very considerable portion of the substance of all plants; the pith is wholly composed of it; so is by far the greater part of the bark, and the external covering of the more delicate organs; while, filling up the interstices left by the disposition of the woody and other tubular tissue, it seems to be almost analogous to fat in the animal economy, and, like that, increases so much, under certain circumstances, as to alter materially the general aspect and condition of the plant; it is indeed that part of the vegetable fabric that is the most influenced by cultivation. The magnified views in fig. 1, will convey some idea of the arrangement of the cells, and especially of the origin of their angular outline, which is very beautifully seen by the assistance of a microscope, or even by a good magnifying glass, in a thin transverse slice of the stem of the common raspberry, or that of any other plant in which the pith is not invested by a very thick cylinder of wood. The size of these little cells varies from the fiftieth to the thousandth part of an inch in diameter, their average bulk being about midway between these estimates. In the earlier stages of their existence they are filled with a fluid in which a multitude of little coloured bodies, only visible under a very high power of the microscope, are seen floating with greater or less rapidity; a phenomenon apparently as intimately connected with that of vegetable life as are those of the lymphatic and arterial canals to animal existence.

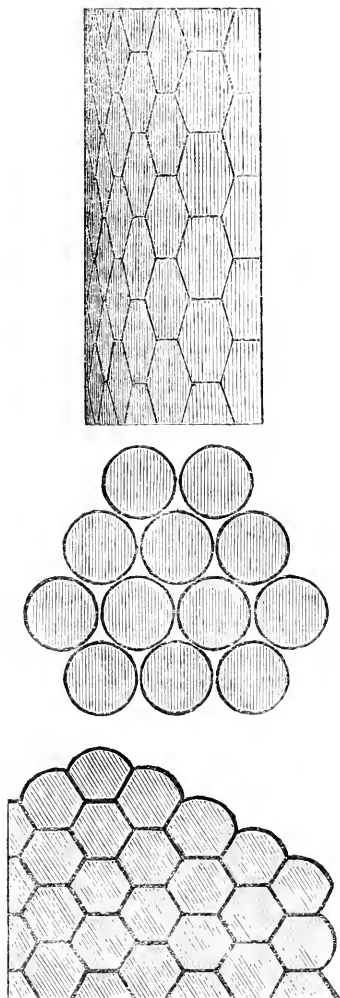


FIG. 1.—CELLULAR TISSUE.

Cellular tissue has been justly denominated the basis of the vegetable fabric. The simplest of all known plants exists as a single globular or oval cell; those a degree higher on the scale are composed of similar cells, more or less elongated and attached end to end like the beads of a necklace; then come others more complicated by the attachment of cells in breadth as well as length, the lower or meaner of which present mere shapeless or irregular masses, while the remainder of the series, ascending by successive grades of structure, may be traced by the eye of the naturalist through a thousand varied and improving forms, so beautiful, so admirably adapted to the fulfilment of the offices allotted to them by Providence, as to force themselves upon the attention of man, though too distantly connected with his immediate interests to admit of his due appreciation of their value. Un-

der myriads of modifications, which our space will not permit us to investigate, this tissue constitutes the whole substance of the lichens, sea-weeds, mosses, and other allied and equally neglected families of plants. However different in appearance such cells are from the little tubes with which they are found associated in all the nobler classes of vegetation, there seems at present to be scarcely a possibility of question that the latter are not merely the results of their super-development; in other words that the tube, under whatever form it may exist, is but an elongated cell, or the breaking of the cavities of several into one. These, however, are speculations that we may hereafter refer to more particularly; let us look previously at the tubes themselves, and note what is known or understood respecting their uses in the economy of the growing plant, and first at those which compose the principal substance of the wood, its harder and tougher portion, called woody-fibre.

If the diameter of the cells just described is so small that without assistance from the microscope we are generally unable to distinguish their cavities, that of the woody tubes is frequently much less, and in some plants not more than the five thousandth of an inch. Fig. 2, represents a small

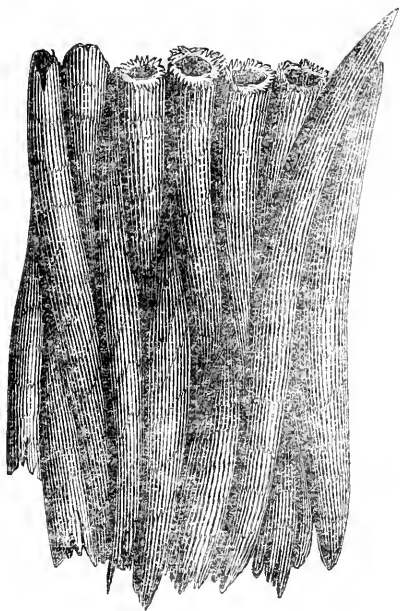


FIG. 2.—WOODY FIBRE.

fragment of oak wood highly magnified, showing it to consist of such tubes closely disposed upon each other, so as to occupy the smallest possible space, and leave no openings between them, the narrow tapering or attenuated extremities of each generally lying between the broader portions of those that lie around them. These tubes extend in

the form of continuous bundles or layers from one extremity of the plant to the other, sending out branches into the leaves and other subsidiary organs, and giving strength to, and maintaining communication between all its parts: they constitute the channels through which the sap ascends and is distributed, a fact readily ascertained by cutting into the stem or branch of a vine, birch, or any other tree in the spring, when that fluid may be traced as flowing from the mutilated vessels of the wood. The passage of the sap through this medium, though certified by long observation and repeated experiment, would appear to those who examined the vegetable texture for the first time, or without a previous acquaintance with the natural phenomena connected with organization, as an inexplicable mystery, no apertures being discernible under the highest powers of the microscope, through which the cavities of the woody tubes communicate with each other. The discovery, however, by Mons. Dutrochet, of the permeability of vegetable and animal membranes, or that they are capable of transmitting fluids through their substance, although destitute of any apparent passage of communication—a phenomenon to which he gave the name of *Endosmosis*—has contributed greatly to the elucidation of this and other physiological facts, that were as stumbling-blocks to the philosophy of our forefathers. The demonstration of this important fact is easy, and within the reach of those even whose means of scientific inquiry are the most limited, as instanced in one of the earliest experiments of Dutrochet himself: he filled the swimming bladder of a carp (any other small bladder will answer the same purpose, and any fluid heavier than water) with a thin solution of gum, and, placing it in a glass of water, observed that the bladder swelled out and became heavier, in consequence of the water being attracted through its substance by the weightier fluid within: he reversed the experiment by filling the bladder with water, and placing it in the mucilaginous solution, under which circumstances it lost weight, by the water passing out instead of in. It was afterwards ascertained by numerous experiments that plants placed in water draw it up through the thin tissue of their cells and woody tubes, and acquire a great increase of weight: which they lose again, at the will of the experimenter, by simply adding to the water in which they stand some soluble substance, sugar for instance, that renders it heavier than their contained juices. The force of this attraction, and of course the facility with which the fluid passes, is very considerable; water holding half its weight of sugar in solution raised pure water through membrane with a power capable of sustaining the pressure of a column of mercury of 127 inches in height, a power

nearly four and a half times greater than the pressure of the atmosphere which sustains the mercury in the barometer, and raises the water in a common pump. On the cause of this curious phenomenon philosophers are not agreed: it is probably only one of those numerous instances that are from time to time brought to light by inquiry into the hidden processes of nature, of the general tendency of matter to maintain an equilibrium among its particles; but the permeability of the vegetable membrane being established, it is not necessary to our present purpose to pursue the subject farther: we have only to consider, as a natural consequence of the development of the living plant, that the sap becomes thicker as it ascends from the root, drawing after it the thinner and more recently imbibed fluid, to account for its successive rise through the minute vessels above described—a rise so rapid that several quarts or even gallons are obtainable daily for weeks together by tapping the trunks of some tropical trees.

The fibre of hemp, flax, and of many other plants employed in different parts of the world in the manufacture of cloth, cordage, &c., consists of these woody tubes; and some idea of their extreme tenacity may be formed from the examination of the finest flaxen thread by a microscope, which shows it to consist of a considerable number of tubes. The membrane composing them, though delicate and transparent, possesses much strength and elasticity in most plants, and in all cases is greatly superior in that respect to the cellular tissue, the membrane of which is comparatively brittle; the difference in the strength of cotton and linen thread is an instance of this, the former being cellular, the latter woody tissue. The wood of the fir tribe appears to be very dissimilar to that of ordinary trees and herbs, the tubes being marked with dots or apparent pores, surrounded by a series of concentric circles; similar markings are observable in the woody tissue of a few other tribes, but only such as, like the plants in question, produce aromatic or resinous secretions, whence they have been generally regarded as glands; their structure is, however, at present very imperfectly understood, and not anything is known respecting their functions; if really openings, they constitute a remarkable exception to the closeness of the corresponding tissue in other plants.

The name of duct has been given to various comparatively large tubes or vessels, generally associated with those of the wood, but always distinguishable from them by their greater diameter. The large pores, frequently observable by the naked eye in a transverse section of wood, are the divided cavities of the vessels so called, which are sometimes distributed through the layers of wood, but



more commonly form themselves distinct layers or bundles. Many vessels of different structure have been confounded under the general name of duct; and being wholly unacquainted with their offices in the economy of the plant, much diversity of opinion exists among physiologists respecting their classification and relative uses. Some are angular, and very evidently formed by the breaking of cells longitudinally into each other, or by the absorption of the dividing membrane; others are dotted with apparent pores; a third kind are more or less distinctly marked with spiral lines, sometimes continuous, occasionally broken at irregular intervals, as though a spiral thread contained within a membrane had had its coils separated and ruptured in places by the longitudinal growth or extension of the membrane; a fourth series, called annular ducts, consist of concentric rings, or perhaps of the coils of spiral threads so broken as to present the appearance of such, and held together by the membranous tube containing them. These larger tubes are disposed in a similar manner to the smaller ones of the wood, and resemble them in being more or less narrowed or conical at their extremities: several of their forms, and there are some intermediate between those described, approach so nearly to the following form of tissue, that it is difficult to conceive them other than more imperfect or disturbed modifications of the same, viz., the spiral vessel.

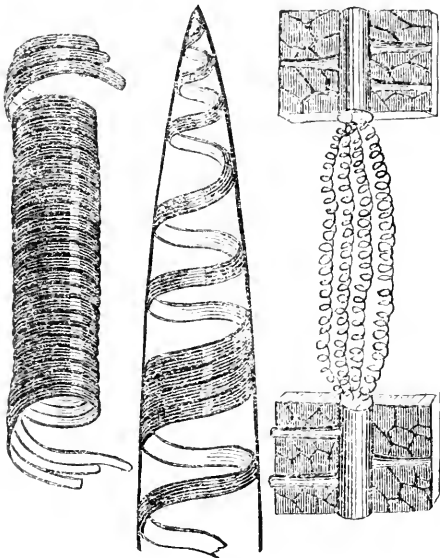


FIG. 3.—SPIRAL VESSELS.

This last form of the vegetable elementary organs consists of one or more filaments coiled spirally within a very delicate membranous tube, similarly attenuated towards either end as are those of the

wood and the duct, but, unlike the spirals apparent in some of the latter, capable of being drawn out like a spring when the part containing them is broken. They are very advantageously seen by breaking carefully across the leaf of a rose or strawberry, or the young brittle shoot of the rose, and drawing the parts slowly asunder as exhibited in fig. 3. The spiral coils are in most instances so close together as to appear to form the tube, and the membrane which invests them is so exceedingly fragile as to break between each coil of the spire when it is drawn out, so as not to be readily discernible, unless occasionally when the extremity of the filament is relaxed, as represented in one of our figures. Each spiral is generally composed of a single filament or thread, but in some plants the number of parallel fibres twined in the same direction is very considerable; one of the figures exhibits a magnified view of a portion of such a vessel from the stem of a banana, consisting of three threads or fibres; but in this, and many other plants of the same and allied orders furnished with compound vessels, there does not appear to be any regularity in their production. Decandolle remarks that the number of threads composing each spiral of the plant just referred to varies from seven to twenty-two; but they are sometimes formed of a single thread, and I have found in the same portion of the stem no fewer than eleven different modifications of these curious vessels, varying in the number of their threads from two to twenty-nine, the largest number which has, to the best of my knowledge, been met with in any plant. The size or diameter of the spiral tube is exceedingly variable, the largest being about the three hundredth or four hundredth of an inch, while in some cases they are not above the two thousandth or three thousandth. They are variously distributed, but chiefly in the young stems or shoots, in which they occupy that cylinder of woody substance that immediately surrounds the pith, called the medullary sheath, and in the stalks and veins of the leaves and other organs which are modifications of them and originate from the sheath in question. They are of very rare occurrence in the root, and still more so in the bark and the true wood, or that which in after periods of growth forms around the first year's layer. Where the tissue of the stem is not stratified, and the pith or cellular substance does not form a separate cylinder or column in its centre, as in the liliaceous orders, palms, and others belonging to the same great natural class, the spiral vessels accompany the bundles of woody fibre and ducts that lie dispersed through its mass, and are present often in such abundance as to constitute the most remarkable feature in their internal structure; from the stems and bases of the large

leaves of the banana and plantain they may be drawn out by the handful, and in the West Indies are sometimes collected in this way for tinder.

The use of the spiral vessels in the vegetable economy is, like that of their other minute organs, rather to be surmised than demonstrated. A very general opinion, from the earliest period of their discovery, regarded them as organs of respiration; hence their denominations of "tracheæ" and "trachenchyma," alluding to their supposed correspondence in function with the trachea (or wind-pipe) and air-tubes in the lungs of an animal: to those of insects their structure presents a remarkable parallel. They are generally filled only with air; and although instances may occur in which they are "gorged with fluid," such instances are rare, and probably either accidental, or arising from one of those morbid changes to which the minuter portions of the vegetable fabric are unquestionably liable, although their causes are hidden in consequence of our imperfect knowledge and slender means of inquiry. The opinion, however, founded only upon analogies, that may be rather fancied than real, seems of late years to have been gradually losing ground in the estimation of some of the best physiologists, although they have been hitherto incapable of substituting a more plausible hypothesis; and the principal argument that can be adduced against that previously entertained consists in the fact, that the spiral vessels of plants are not in immediate connection with the surface pores or stomata, nor even with the air-chambers with which the latter communicate, and hence differ from those accompanying the breathing apparatus of an insect. When, however, we reflect upon the permeability of the vegetable membrane to a comparatively gross fluid like the sap, the passage of one so thin and infinitely more diffusible as air can scarcely be denied, even though it had to penetrate to a much greater depth than to the interior of a leaf, an organ the structure of which is so strictly accordant with its supposed and almost experimentally-proved function as the vegetable lung.

Under whatever conventional name the elementary organs are known, however great the apparent difference of their structure, and diversified their functions or offices, the deep and unwearied researches of modern naturalists, aided by the increased powers of observation placed at their command by the improvement of the microscope, have led to the conclusion that they are all only so many modifications of the cell, while the wall of the cell itself is probably merely consolidated mucus, assuming the form of membrane or fibre, according to laws of which we are at present ignorant. That changes take place of one kind of tissue into another at different stages of the growth of the plant is

unquestionable, as well as that such changes are correspondent with alteration of function; but it is no less certain that the simple cell contains the rudiments necessary to the formation of the other organs, and especially the spirals, which in their most perfect state appear to be the most complicated of the whole series. "There is no doubt," observes Dr. Lindley, speaking of the different kinds of vegetable tissue, "that all these forms are in reality modifications of one common type, viz., the simple cell, however different they may be from each other in station, function, or appearance. For, in the first place, we find them all developed in bodies that originally consisted of nothing but cellular tissue; a seed, for instance, is an aggregation of cells only; after its vital principle has been excited, and it has begun to grow, woody tissue and vessels are generated in abundance. We must, therefore, either admit that all forms of tissue are developed from the simple cell, and are consequently modifications of it; or we must suppose, what we have no right to assume, that plants have a power of spontaneously generating woody, vascular, and other tissues, in the midst of the cellular. Mirbel has lately reduced the first of these suppositions to very nearly a demonstration; in a most admirable memoir on the development of *Marchantia*, he speaks to the following effect:—"I at first found nothing but a mass of tissue composed of bladders filled with little green balls. Of these some grew into long slender tubes, pointed at each end, and unquestionably adhering by one of their ends to the inside of the sac; others from polygons passed to a spherical form in rounding off their angles. As they grew older, other very important changes took place in certain cells of the ordinary structure, which had not previously undergone any alteration: in each of these there appeared three or four rings placed parallel with each other, adhering to the membrane, from which they were distinguished by their opaqueness; these were together analogous to annular ducts. The cells which became tubes did not at first differ from other cells in anything except their form: their sides were uniform, thin, colourless, and transparent; but they soon began to thicken, to lose their transparency, and to be marked all round from end to end with two contiguous parallel streaks disposed spirally. They then enlarged, and their streaks became slits, which cut the sides of the tubes from end to end into two threads, whose circumvolutions separated into the resemblance of a gun-worm." In these cases there can, I think, be little doubt that the changes witnessed by Mirbel were chiefly owing to the development of a spiral thread in the inside of the tissue.

There is much diversity of opinion as to the mode in which the elementary organs of vegetables are

multiplied during the advance of growth, and the rapidity with which that growth proceeds in certain plants is such as to render actual observations as to its source exceedingly difficult; speculation has therefore sometimes taken the lead where sober inquiry has proved at fault, pointing at results almost too startling even for human imagination to receive as truth; and yet, when we contemplate from day to day the increasing size of many plants in ordinary cultivation—a gourd, for instance, or vegetable marrow, adding to its circumference nearly three inches in the course of the 24 hours, and the stem which bears it extending its length between five and six inches during the same period, common sense would pause ere it questioned the truth of records much more marvellous. The rapid growth of the common mushroom has become proverbial, but some other individuals of the class of fungi greatly exceed it in that respect; the *Phallus* or stink-horn sometimes elevates itself six inches from the ground in the space of an hour; the *Bovista gigantea*, or great bull puff-ball is recorded to have grown in the course of a single night from a mere point to the size of a large gourd, the actual measurement of which is not mentioned, but on a moderate computation of the diameter and number of the cells, it has been estimated to have increased at the rate of 4,000,000,000 of cells in every hour, or upwards of 66,000,000 in a minute. It is true that much of this enlargement may have arisen from the distension of the cells individually; but even if this be admitted, the force of development and the vast increase of weight, which can only be accounted for by an appropriation of nutriment so rapid as almost to elude conception, leaves sufficient of the wonderful to impress upon our mind a just idea of the grandeur of that vital energy which inspires and regulates the growth of bodies thus low in the scale of organic nature.

The force with which the minute organs above described are produced and enlarged is no mere supposition, but a fact within the reach of attestation by those who will condescend to observe its operation; the root of a tree descending through a crevice will break and dislocate the hardest rock; cellular tissue, not harder in substance than pith, has elevated a weight with the power of a lever; the latter effect is not unfrequently seen in the growth of fungi under stones and heavy blocks of timber; and the following anecdotes, both, I believe, referring to the same circumstance, and copied from the *Hampshire Advertiser* of July 1830, are recorded by Professor Burnet as affording a striking instance of this power: "At different times, several of the stones in the pavement in the town of Basingstoke, were observed day by day to be rising gradually from their beds, until they were some inches above

the ordinary level: under one of these, which weighed seven pounds, a large mushroom was found, that measured a foot in circumference." The other case is recorded by Mr. Joseph Jefferson, who says: "A toadstool, six or seven inches in diameter, raised a large paving-stone an inch and a half out of its bed; and the mason who had the contract for paving was much enraged at the idea that a weak fungus should have lifted so heavy a weight. But his uneasiness was much increased, and even his alarm excited, when, about a month after the injury had been repaired, the adjoining stone was lifted in a similar manner, and two mushrooms, not quite so large, were found beneath it; for it seemed doubtful whether the whole town of Basingstoke might not want repaving during the term of his contract. The stones were nearly of the same size, each being twenty-two inches by twenty-one; the last stone raised in this manner was weighed, and its weight proved to be eighty-three pounds." The hardest of such fungi are, in the growing state, so soft as to yield to the pressure of the finger, and so brittle as to be shivered to atoms by the slightest blow; yet the organic force with which their tender tissue is developed is capable, acting in millions of points, in the growth and distension of their individually invisible cells, of elevating an inert mass of stone which the strength of an ordinary man would with difficulty raise from its plaster bed.

Such are some of the facts connected with the minute anatomy of plants, the farther examination of which, and of the laws of their growth, will furnish the subject of a succeeding lecture.

## AGRICULTURAL STATISTICS.

### ST. PETER'S FARMERS' CLUB.

At the suggestion of Mr. Shaw, of the Strand, the question of the benefits to be derived from Agricultural Statistics was discussed by this Club, on the 19th ult., when the following resolutions were carried unanimously:—

"1. That it is desirable farmers should possess accurate statistics of agriculture, shewing annually the number of acres in the United Kingdom planted with grasses, grain, and roots; specifying the several quantities of each kind, and the probable produce of each per acre.

"2. That it is desirable some respectable organised body of agriculturists should undertake to obtain the statistics; and that committees be formed of or from the several Farmers' Clubs existing in the country, to devise and suggest the best means and the probable expenses of collecting the information required in their several localities; and that this and the foregoing resolution be forwarded to the London Farmers' Club."

JAMES SMEED, Sec.

## THE LONDON FARMERS' CLUB.—MONTHLY DISCUSSION.

## SUBJECT—THE ADVANTAGE THE PUBLIC WOULD DERIVE FROM THE BREAKING-UP OF INFERIOR GRASS-LANDS.

The usual Monthly Meeting of the London Farmers' Club took place on Monday, Feb. 1, at the Club House, 39, New Bridge Street, Blackfriars, Mr. Fisher Hobbs in the chair. The subject which stood on the card for discussion was that stated in the heading of this report, and was introduced by Mr. William Shaw, jun., of Northamptonshire.

The CHAIRMAN, in opening the business of the evening, said—Since our last Monthly Meeting, the Committee of this Club thought it desirable to call a special meeting of its members upon the subject of "Tenant-right;" and I think you will agree with me that, from that meeting much good has resulted (Hear), and that the Committee were right in going to the utmost limit of their powers in having that meeting held. I am happy to tell you that the subject is progressing very favourably, and that in the course of a few days a bill will be introduced into Parliament for the purpose of carrying out the objects we had in view (Hear, hear). No doubt the bill will meet with considerable opposition; but as a general election is at hand, I hope those who profess themselves friendly to agriculture will prove themselves to be so on the question of Tenant-right (Hear). It may be desirable for the Committee again specially to call you together once or twice during the ensuing Session of Parliament; for there are subjects of importance which it will be well to bring before you, and they have but one feeling in these matters, which is to make themselves useful to the practical farmers of the country (cheers). The subject which will be brought before you for discussion this evening, is the advantage which the public would derive from the breaking-up of inferior grass-lands. Amongst practical men there can, I think, be but one opinion of the importance of this subject. Those gentlemen who live in arable districts will agree with me that, in travelling throughout the country, we cannot but feel surprised at the vast extent of grass-lands we see in comparison with the arable land (Hear.) The greater portion of the grass-lands of this kingdom is moreover very badly managed. One-third part of those grass-lands is of a decidedly inferior quality, and might be advantageously broken up and converted into arable land, thereby employing more than double the present number of labourers, producing more stock—that is to say, more beef and mutton—and at the same time go through its rotation in growing green crops. (Hear, hear). I shall not go into the details of the question, because Mr. Shaw has kindly consented to introduce the subject to you (cheers); and he will no doubt do it in that practical way which will enable you fully to enter into its merits. The feelings of farmers being so much in favour of the plan proposed, I have no doubt they will explain their views in such a

way as to draw the attention of the landlords to it, and convince them that it is to the interest of all that the greater portion of these grass-lands should be broken up (Hear, hear).

Mr. SHAW (of Northamptonshire) then came forward and said: The question before us, namely, the advantage of breaking up inferior grass lands, is of such deep interest to every reflecting mind, and of such vast importance to the community at large, that I have often been surprised that it has not attracted more attention (Cheers). In forming a judgment upon a matter of such acknowledged importance, it will be imperatively necessary that every hereditary and preconceived attachment which our aristocracy and gentry have for grass land should be laid aside. The great opposing fact with which I may be met, namely, that of a large quantity of land already under the plough being by bad management brought into a state of sterility rather than of fertility, must be discussed on its own merits (Hear). That much misunderstanding as to the reciprocal interest of landlord and tenant, as to the proper occupation and cultivation of land, has existed is certain; and I believe I am not far from the truth when I say the cause of this misunderstanding is the want of a thorough definition, whether legal or otherwise I will not now stay to inquire, of what is a landlord's property on a farm, and what is a tenant's. Indeed, I am corroborated in this opinion by the first authority of the day on agricultural matters. The Duke of Richmond, when speaking on the subject, regretted that instead of "tenant-right" it had not been termed "justice to the tenantry." I think it would have been better if His Grace had called it "justice to all parties" (Hear). Mr. Pusey also forcibly styled the want or possession of tenant-right "life or death to the agricultural interest." I will cite an important observation which fell under my own notice, but which I feel bound in fairness to state was made in an off-hand way, and certainly was never intended for publication. One morning, after the hounds had found and gone away, not wishing to follow, I fell in with an honourable baronet, and knowing that he often visited at the mansion of the noble lord to whom the estate on which we were riding belonged, I ventured to open a conversation with him on farming, and endeavoured as well as I was able to impress upon him the fact that in a very short time the greater portion of the large tract of grass land which lay before us for nearly fifty miles in extent must come under the plough. The honourable baronet very kindly and frankly replied that it was not worth his while to build and to drain whilst he could let his land as he now did; and besides, its present state prevented it having

its guts ploughed out (Hear, and a laugh); after which had been done, he might take it and hang it about his neck. I mention this circumstance to show that there exist feelings which must be laid aside in discussing this question (Hear, hear). We have now arrived at a new state of things—namely, that of a young, active, intelligent race of tenantry, ambitious of providing enough to feed an immensely increasing population; and the only human means of accomplishing this duty to the community at large, as well as to the landlords themselves, is a combination of talent with an outlay of capital. Such a combination ought to be regarded as the best possible guarantee to the landlord against dilapidation (Hear). It should also have the effect of releasing the tenants from the trammels which have, I believe, been inadvertently imposed through the advice of agents, who, to speak fairly, thought and acted in accordance with their knowledge of the times and circumstances (Hear). Before I enter fully into this subject, I would wish to guard against being thought an advocate for ploughing up every piece of grass-land at present. I candidly own I think a portion of real good feeding pasture a great acquisition to every stock-farmer. While, however, I express strongly my opinion in favour of retaining the real feeding pasture, I am equally desirous of ploughing up all those denominations of pastures commonly termed store-land (Hear). It will be allowed that the more exalted situation in which a man is placed in life, the greater duties he has to perform, and the larger the portion of his duties are due to the labouring classes—to that great body which is so properly and deservedly toasted on all public occasions; and as it is well known that all they require is a good market for their labour, I conceive these duties cannot be fulfilled while this species of land lies in grass. The very fact of a man occupying all grass-land—say 300, 500, or 1,000 acres—which will require as many thousands of pounds for their proper management as there are hundreds of acres, and those thousands, or those lumps of money, changed from one pocket to the other with comparatively no resort to labour, is in itself enough to show that the rights of labour are, in such cases, set at naught. (Hear, hear). It would be a curious subject of inquiry, whence spring these hereditary attachments for grass lands? It is evident that very nearly all the present pasture land has, at some time or other, been under the plough. Whether it is the result of the unsettled condition of a country almost incessantly at war, and frequently involved in domestic troubles, which had so thinned the population that there was not a good demand for corn, and the price of labour being raised by the pressing demands of the army, causing grass lands, from the little labour that was required on it, to remunerate the occupier better than the plough; or whether such lands had, under the old and imperfect systems of agriculture, become exhausted, and were laid down in grass with a view to recruit their fertility, it is difficult to say. It is true that certain lands laid down in grass will restore their fertility, but it is also becoming daily more evident that its production and its powers of employing labour are totally inadequate to meet the wants of this great country. (Hear). Unfortunately, the present race of

farmers are suffering for the sins of their predecessors. There were times when prices of wheat were so high, that money-loving men were tempted to take land with the view of getting all out of it they could, without reference to its future condition; while, on the other hand, the easy, careless farmer was enabled to indulge his disposition and cultivate his land in so indifferent and lazy a manner, that it seemed to be doubtful whether he cared about producing any crops or not. Circumstances are now changed. We have before us the facts of an immensely increasing population, the encouragement given to the arts and sciences, the necessity of comprehending that all-important philosophy—I mean the philosophy of nature, which makes us acquainted with its wonderful laws, with its grand mechanical powers, and with its ingenious and admirable application of them to numberless purposes of human industry, convenience, and comfort. (Hear, hear). For a very long period it has been the custom of the midland counties grazier to derive a supply of full-aged beasts at prices corresponding to the price of beef from the western and northern districts; but the facility of communication afforded by steamboats and railways—those grand promoters of production—has caused the best beasts, that formerly used to come here from those districts to be, comparatively speaking, fattened at home, and sent by these easy modes of conveyance direct to London; consequently, the midland counties, where the majority of the grass lands lie, are placed in a worse position than they formerly occupied. (Hear). The knowledge of the importance of early maturity—a quality quite opposed to the wants of a complete grazier, and which, mark you, can only be obtained on ploughed lands—the necessity, also, and value of good manure, have taught the breeder that he requires no grazier or middleman to take his profits. (Hear). The two interests of the breeder and feeder are, therefore, becoming diametrically opposed to each other. I am becoming more and more confident in my opinion and assertions that there is not, and never can be again, a profit for two men in one bullock. (Hear). The breeder must in all cases be the feeder, and the feeder the breeder; so that the grazier or middleman, no matter how clever he may be, will have no power to help himself. I would appeal to the judgment of any grazier who is grazing to get a living—I do not mean men who buy beasts to put before the parlour window to be looked at—whether the view I am now taking is not a correct one. (Hear, hear). In order, however, to bring the question more decidedly before you, I shall without hesitation assert, that in a short time such an occupation as that of a complete grazier will not be found, unless he be his own landlord, and obstinately refuses to follow the times. (Hear, hear). I may be told that grass land is managed at little expense, and produces a good rent. Excepting under rare and peculiar circumstances, such as land subject to floods, and the very first-rate pastures, I would give more rent for the same quality of land under the plough than in grass; and the fact of the latter being of so little trouble, or in other words, the not employing a proper portion of labour, is one of the main arguments against it (Hear, hear). However, the tide has

already set in ; the sons of the great Leicestershire graziers, who formerly looked with contempt on farmers, are now taking the farms that have been there hitherto comparatively disregarded (Hear, hear). What scientific discovery, I ask, can be expected from a complete grazer (Hear), whose principal employment is gathering cow-dung and "spudding," or, more probably, on account of cheapness of labour, mowing thistles ? His principal tact or forte, that of looking out for a good lean four-years-old bullock, is taken away from him by the breeder. If he has spirit enough to use oil-cake to feed his cattle, it is at a loss to himself. He will even tell you that draining does grass land more harm than good ; he has no power, in dry seasons, of assisting the growth of natural grasses by stirring the soil and encouraging the atmospheric influences. In fact, the less he does in the way of outlay of capital in improvements, the better for him (Hear, hear). His intellects become blunted by such a condition ; he turns to a brace of greyhounds, a gun, and a hunter—perhaps to his ruin (Hear). I repeat, however, the struggle has commenced—the two interests being opposed to each other, of breeding by one man and feeding by another ; and it requires no remarkable acuteness to see which must give way (Hear). Many landlords are opposed to having their grass lands brought into a state of cultivation through a want of confidence in the tenants, and of their ability to manage it. I have repeatedly, in public and in other places, asserted that the tenants were making a rod for their own backs by the careless and exhausting manner in which many were farming their lands (Hear). Had it not been for these slovens, I will never believe that such prejudices would have been formed, or that such stupid restrictions would have been placed on tenant farmers—too frequently unrelenting to the good as well as to the bad (Hear). Formerly, a man with money might go into this county or that, and take land for a few years, and in that short period take all the condition out of it, and then leave it. But it is not so now ; the demand for land, and the consequent difficulty of getting a farm, and the great necessity for increased production of human food, have placed the tenant farmer, and even the landlord, in a very different position (Hear, hear). No man now, even if he has money, can take land with the view of working an immediate profit out of it. On the contrary, he must, in by far the majority of cases, lay out money for the first seven years of his occupation ; consequently, it is only to the men of known experience and capital that the landlords should intrust the cultivation of their estates, and whose spirited cultivation ought to be sufficient to induce them to lay aside every prejudice (Hear). It is indeed most gratifying to us as tenants, and gives us increased confidence to see them supporting a society like the Royal Agricultural Society of England, as well as schools of agriculture ; all evincing an anxiety on their parts to unlock the treasures of the soil, and to entrust the cultivation of their estates to men whom they know to be desirous of improving not only their own soils, but agriculture generally (cheers). Thus much on matters prefatory. I proceed now to examine the particular question as to the advantages which the labourer, landlord, farmer, and the community at large

would derive from the breaking up of inferior grass lands (Hear). After the most mature consideration, I have come to the conclusion that with the exception of first-rate grazing pastures, real meadow or irrigated land, and some few favoured spots around the homestead (even if such spots are not of first-rate quality) are the only lands that should remain in grass ; and that it would be to the advantage of all classes of the community to break up and cultivate every other species of grass lands. To prove this broad assertion, I shall now enter into the proposition, and endeavour to show the individual and collected advantages which will accrue to all parties. First in order I have placed the advantage to the labourer ; and most gladly do I here (as I have elsewhere) admit that this is the right ground on which to advance the success, the comfort, and the happiness of all other classes ("Hear," and cheers). It will be unnecessary to use a long argument, or take up much of your time in endeavouring to convince you that increased employment is an advantage to the labouring classes. The average outlay of manual labour on these inferior grass lands does not exceed 5s. per acre. The cost of manual labour on anything like a well cultivated ploughed farm will exceed 30s. per acre—in many cases it reaches 40s. per acre ; so that the advantages on the side of increased employment on ploughed land, at the lowest cost will exceed 500 per cent. This fact alone is sufficient with an increasing population of 400,000 annually, to outweigh every objection (Hear). I do not go so far as to say that on all tillage land the labourers are better off than in the grazing districts, because I am aware that in the latter the average rate of wages exceeds that of the former in the west of England. This arises, however, from the fact that the villages in the grazing districts are for the most part thinly populated, and that a great number even of these inhabitants are employed in manufactories ; and the proprietors of many of those villages determinedly refuse to enlarge their cottage property, so that the poor are driven to those places where cultivation or handicraft employments are going on. A great part of the work done in the fens of Lincolnshire and Cambridgeshire is performed by strangers ; and many of them, I have reason to know, are from the grazing districts. But, independently of the advantages of increased employment, I have no hesitation in asserting that the labourers in a well-cultivated district are of a more active, intelligent turn of mind, and more handy in manual labours generally, than those in the complete grazing districts (Hear). Look also at the family of the one in the former. See the boy of ten years of age begin with earning his fourpence per day for scaring crows : see him advance to increased pay by dibbling corn and hoeing it ; by hoeing turnips in summer, and cutting them for sheep in the winter ; as well as by performing many other kinds of light, healthy, and useful labour, which it is unnecessary for me to enumerate (Hear, hear). On the Duke of Bedford's farm, at Woburn, as many as forty boys may be seen doing all the light work on the farm ; and so general is the notion of their extreme handiness, that when they arrive at a certain age, and require more than the standard price for their labour, they are looked after with avidity by all the

neighbouring farmers (Hear, hear). Many of them, I know, can hoe turnips as well as a man. Secondly, the advantages to the landlord are, that by an outlay of capital in building and draining he will receive an increase of rent through the medium of a higher rate of interest for the money expended, than if that capital were employed in the purchase of more land (Hear). On this part of the subject I wish to speak with as much plainness and decision as possible, because I know there are men who, to gain their object, have painted the immediate advantages that are to accrue to the landlord from breaking up pasture land too flatteringly (Hear). Placing a farm under the management of an intelligent tenant, giving him power to break up such-and-such inferior grass lands, enables the landlord to take an increased rent, not for the purpose of an immediate temporary benefit to himself, which would in the majority of cases be far from judicious or politic, but he will secure to himself such an increased rent as will pay him good interest for the money he must necessarily expend, and without which outlay such lands, under coming circumstance, I firmly believe will neither return to their owners their present rents, nor feed and employ the increasing population. I will cite a case in point, which, I think, will go further than argument, and answer my purpose better. A friend of mine, occupying 600 acres of all grass land—some very good, the rest only middling (but which had time to become good, for he told me it had never been ploughed in the memory of man)—with no meadow ground, but some portions of which were called meadows, and were annually mown, told me that for the last seven years he had not realized a shilling beyond five per cent. for his capital. I may with truth say that he is a very careful young man (Hear, hear). The year before last having bought in his cattle unusually low, in consequence of the preceding dry summer, and the trade for meat being unusually good, the scale has been temporarily turned; but so confident is he that his success is only of a temporary nature, that he went to his landlord determined, if possible, to effect a change. The terms he proposed were of the following description:—If he would allow him to break up 300 acres of the inferior pastures or grass lands, build him necessary premises, and drain his land, he would pay him seven per cent. for the outlay, by giving him the increased rent, on the 300 acres proposed to be broken up, of 10s. per acre; or, if that was not enough, to insure the said interest for the necessary outlay, he would give him as much increased rent as would make it up to him. I cite this case because I am anxious to show in what direction landlords are to look for remuneration. They are not to expect immediate advantages by breaking up grass land, excepting in case of its being of very superior quality, and then, undoubtedly, it would be immediate, because the outlay would be comparatively trifling, and the return would be large (Hear). The great general advantage it would be to the landlord is that it would be the best as well as the most patriotic way of increasing his income, would give him the power of doing away with the coercive principle of driving the poor from their native soils to other parishes for shelter and employment—I would I could say domestic comfort—

which is known to be the case in many of the grass land districts. I believe this is a strong and clear case, applicable to the description of grass lands which the increasing population of this great country demands should be brought into cultivation; and upon it I shall rest my argument for the advantage to the landlord, as the proposition demands. Next in order come the advantages to the farmer; they are many, and, like the advantages to the landlord, of a prospective and permanent nature. Hence the necessity of that all-important principle which must be united with agricultural improvements—I mean security of tenure—a point which cannot be overrated, but which on this occasion I shall simply mention (Hear, hear). I admit that a man may break up a piece of grass land, and crop it for a few years, without bestowing much labour or manure upon it; consequently, he will reap immediate advantages from it. But in the majority of cases, and with a view to permanent advantages, a great expenditure will be required in the shape of draining, liming, fencing, and levelling. These are positive necessities, which every landlord ought to stipulate to be done before he allows his land to be broken up, and which a tenant with right views of permanent success will feel it his duty to attend to (Hear, hear, and cheers). It is to such tenants that a landlord or steward should intrust the breaking up of such lands, in order that no further mismanagement may be carried on, and that the public may not be prevented from receiving the benefit of increased production from increased cultivation (Hear, hear). One of the objects I have in view is to show that without ploughed land, from the changes which have already taken place, a grazier will not be able to meet the farmer, or keep his position. But to enumerate the principal advantages to a stock farmer in having ploughed land: In the first place, clovers, vegetables of many kinds, straw, and corn, will in dry seasons, by good cultivation, grow when the natural grasses will not; secondly, it gives him the important power of breeding and rearing cattle (which are so much wanted, and which is the only legitimate way of productive stock-farming) in one-third less time than could be done on grass land, if done at all profitably. Thirdly, it enables him to feed his cattle so much better. For unquestionably, with a mixture of ploughed land and feeding grass, a more regular supply of good beef and mutton can be made, as well as bread-corn produced. Fourthly, by keeping more cattle during the winter, he has less occasion for going to market in the spring of the year, when every thing is dear; consequently he makes his profits more certain, and his business more regular. Fifthly, by keeping the cattle off the grass land in the winter, it would feed much more stock during the summer; and the present slovenly practice of allowing so much rough grass (or old fog as it is called) to remain on the land, to its injury, until the ensuing spring, to meet the wants of the growing beasts, would be completely avoided. Sixthly, the advantages which cannot be overrated, of concentrating, not only manure, but manure of a better quality, and of applying it with scientific care to the crops, or parts where it is most wanted. Seventhly, and the last reason which I shall

now enumerate, is the increased power which it would give the farmer of employing the surplus labourers (whom he is bound to maintain at nearly as much expense as if they were profitably employed), if not to immediate, yet to ultimate advantage (Hear, hear). These are some of the advantages—though far from all, for it is impossible to overrate them—which a stock-farmer would derive from having ploughed lands; and they are advantages which will, I am persuaded, enable him to encounter the increased difficulties with which he has to contend, and will pay him also good interest for the money he may expend (Hear). The advantages to the public are so apparent, that it would be only a reiteration of what has been already so frequently said, to repeat them. Take any given area of and, except the first-rate old feeding pastures and flooded meadow ground, break it up, and farm it on the improved system of rotary tillage, green crops and corn alternately, and I will, without fear of contradiction, assert that it will produce as much beef and mutton as it did in pasture, and the other half will be a benefit to the public by growing corn (Hear, hear). Besides, it is equal, in fact, to doubling the number of acres in the country where the grass land exists. From increased employment to the labouring classes would spring increased production from our own native soil, and this is increased wealth (Hear, hear). Now, if this will not strike the most careless observer, and still more those who are interested in the question, I know not what will. To illustrate these arguments I will take the following:—

**ONE ACRE OF STRONG LAND.—DEBTOR.**

	£	s.	d.
1 acre vetches, seed 3 bushels, at 6s. 3d.—18s. 9d., succeeded by white mustard, requiring 1 bushel seed per acre, at 10s. . . . .	1	8	9
1 acre barley, seed 3 bushels, at 4s. . . . .	0	12	0
1 acre seeds, 14 lbs. clover, 10s., $\frac{1}{2}$ bushel Italian rye-grass, at 7s. per bushel . . . . .	0	13	6
1 acre wheat, seed 3 bushels, at 6s. 3d. . . . .	0	18	9
1 acre beans, seed 2 $\frac{1}{2}$ bushels, at 4s. 6d. . . . .	0	11	3
1 acre wheat, seed 3 bushels, at 6s. 3d. . . . .	0	18	9
6 acres, labour upon, at 5s. per cars . . . . .	10	0	0
Ditto, tradesmen's account upon, at 10s. per acre . . . . .	3	0	0
Ditto, horse-keeping account upon, at 2s. per acre . . . . .	7	10	0
Ditto, insurance of, at £10 per acre—£60, capital in stock against death, fire, hail-storm, grubs, &c., at 4 per cent. . . . .	2	8	0
Ditto, interest upon, at £8 10 per acre, laid out in buildings (£5), draining (£3 10s.), &c., £51, at 7 per cent., or 11s. 11d. per acre . . . . .	3	11	5
Ditto, rent, at 30s. per acre, rates and taxes at 2s. 8d. in the pound, or 4s. per acre . . . . .	10	4	0
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	42	6	5
£10 capital, at 17 $\frac{1}{2}$ per cent., £1 15s., or the acreal profit of £1 15s. 0 $\frac{1}{2}$ d. . . . .	10	10	3
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	£52	16	8

**CONTRA.—CREDITOR.**

	£	s.	d.
1 acre vetches, succeeded by white mustard, will keep 25 sheep for 20 weeks, at 4d. per head per week . . . . .	8	6	8
1 acre barley, producing 5 $\frac{1}{2}$ quarters, at 30s. . . . .	8	5	0
1 acre seeds . . . . .	3	10	0
1 acre wheat, producing 4 $\frac{1}{2}$ quarters, at 50s. . . . .	11	5	0
1 acre beans, producing 5 quarters, at 36s. . . . .	9	0	0
1 acre wheat, producing 5 quarters at 50s. . . . .	12	10	0
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The profit on the 6 acres . . . . .	£52	16	8

**ONE ACRE OF LIGHT LAND PLOUGHED.—**

**DEBTOR.**

	£	s.	d.
1 acre turnip-seed . . . . .	0	5	0
1 acre barley, seed for 3 bushels, at 4s. . . . .	0	12	0
1 acre seeds, clover-seed 14 lbs., at 10s. per stone, $\frac{1}{2}$ bushel Italian rye-grass, at 7s. per bushel . . . . .	0	13	6
1 acre wheat, seed for 2 bushels, at 6s. 3d. . . . .	0	18	9
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4 acres, labour for, at 30s. per acre . . . . .	6	0	0
Ditto, tradesmen's account on, at 10s. per acre . . . . .	2	0	0
Ditto, horse-keep, at 20s. per acre . . . . .	4	0	0
£5 per acre laid out in buildings on the 4 acres, £20, at 7 per cent. per annum, or 7s. per acre . . . . .	1	8	0
Insurance of capital in farming stock, £10 per acre, or £40, at 4 per cent., against fire, death, hail-storm, wire-worm, &c., &c. . . . .	1	12	0
Rent 30s., and rates and taxes 2s. 8d. in the pound, total, 31s. per acre . . . . .	6	16	0
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	21	5	3
£10 capital, at 17 per cent., £1 14s., or about the acreal profit of £1 13s. 8 $\frac{1}{2}$ d.—or for the 4 acres . . . . .	6	14	9
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	£31	0	0

**CONTRA.—CREDITOR.**

	£	s.	d.
1 acre turnips, producing 16 tons, at 7s. 6d. . . . .	6	0	0
1 acre barley, producing 6 quarters, at 30s. . . . .	9	0	0
1 acre seeds . . . . .	3	10	0
1 acre wheat, producing 5 quarters, at 50s. . . . .	12	10	0
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	£31	0	0

**ONE ACRE OF GRASS-LAND.—DEBTOR.**

	£	s.	d.
A beast that will weigh, with six months grazing, 400 lbs., or 50 stones at 4d. per lb. . . . .	6	13	4
Insurance against diseases of all sorts, at 3 per cent. upon £6 13s. 4d., or the value of stock . . . . .	0	4	0
Labour . . . . .	0	5	0
Tradesmen's account, keeping gates, fences, &c. up . . . . .	0	1	6
Commission for buying and selling . . . . .	0	11	6
Rent 30s. . . . .	1	10	0
Rates and taxes, at 2s. 8d. in the pound . . . . .	0	4	0
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Total expence . . . . .	9	9	4
£9 9s. 4d. at 5 $\frac{1}{2}$ per cent, 10s. 8 $\frac{1}{2}$ d., or the acreal profit of . . . . .	0	10	8
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	£10	0	0

**CONTRA.—CREDITOR.**

	£	s.	d.
A beast sold, weighing 400 lbs., or 50 stones, 8 lbs. to the stone, at 6d. per lb., or 4s. per stone . . . . .	10	0	0
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	£10	0	0

Now, gentlemen, in summing up this question, it will be seen by the foregoing calculations (which are founded on my experience) that the advantages to the labourer will be an increased demand in the market for his labour; because on light land six will be required where only one was required before, and seven will be required on strong land where only one was before. The advantages to the tradesman are in exactly the same proportion; the one is 10s. per acre in full, where 1s. 6d. only was before. The advantage to the landlord is, that he will receive 7 per cent. for all monies judiciously expended in improving his property; so that, although he should require to borrow the money—which he could do upon his property—at 3 $\frac{1}{2}$  per cent., by receiving 7 per cent. he will have 3 $\frac{1}{2}$  per cent. profit to himself, thereby reaping as great a benefit as the money-



lender, by increasing his rental, with an advantage to the tenant of from 10 to 16 per cent. The advantage to the tenant is the receiving an increase of 10 per cent. for his capital, increased energy and industry. The advantages to the community are in the annual circulation of an increase of 600 per cent. of money amongst labourers and tradesmen, besides  $3\frac{1}{2}$  increased interest to the landlord for his capital expended, which capital amounts to about 12 per cent. of the fee-simple of such lands, which money would also be expended amongst all parties connected with building and draining.

Mr. BEADELL: As this is a subject in which I feel great interest, I shall nevertheless be obliged to leave the meeting at an early hour this evening. I beg leave to apologise for rising to address you before other gentlemen, who may have a better claim to your attention. I have listened with much attention to Mr. Shaw's opening of the question, and I think you will all agree with him, that it is a subject, not only of great importance in itself, but one that will do much good if pressed upon the consideration of the landlords of this country (Hear, hear). I have no doubt that Mr. Shaw's elaborate calculations are very accurate, but I have some fears as to whether they are not a little too elaborate to impress the general mind. If a subject be accompanied by a great many figures for the purpose of illustration, people either do not or will not take the trouble to understand them. I think, however, that I can show that there would be a saving to this country, by breaking up the inferior grass lands, equal, at all events, to about one-third of the whole (Hear, hear). I will show the way in which I am inclined to prove it, and in doing this, it is my wish rather to understate than to overstate the matter (Hear). I say, then, that there would be one-third more profit by converting the inferior grass lands into arable land. In taking the inferior grass lands (and it is only the inferior with which we have to do in the consideration of this subject), I think you will find that the average produce is about a ton per acre; now if you reckon this at £3 the ton, four tons will give you £12, and taking 10s. per acre afterwards, you will have £2 more. I wish to put one high and the other low, in order to show that it would be to the interest of the landlord and the tenant (Hear). It is futile to expect that we shall make any progress with landlords unless we can show that it will be to their interest. Well, this would give £14 as the produce of the land for four years. From this we must deduct £1 for the making &c., reducing the sum to £13. Now, I will take the land through the four-course shift, and the produce in the four years shall be equal to £21 9s., while in grass it would be only to £13 (Hear). Surely this must be an advantage, not to the tenant only, but to the landlord also, and quite enough to show that inferior grass lands ought to be broken up (Hear, hear). I will mention a case that came within my own experience. It happened that I wanted some turnips, and I accordingly had a portion of my grass land pared for the purpose. I afterwards put some manure upon it, and found that the grass was growing as well, and that there was as perfect a sward in this place as there was in any of those

portions which had not been pared or touched. This proves that a great deal may be taken from the land without damaging it to any extent (Hear). It must be remembered also that there is a great deal of land laid down as grass land which, in point of fact, will not grow grass (Hear). The question before us is, the propriety of breaking up inferior grass lands—that is to say, such lands as are not well adapted for growing grass, although kept down for that purpose. Under the present improved system of farming, the farmer depends much more upon the production of wheat crops than he does upon grass crops; and why we should persist in an old system, on account of a prejudice that pastures give value to land, I am at a loss to conceive (Hear, hear). If the tenant had the opportunity of breaking it up and converting it into arable land, the landlord could command a much higher rent, and the tenant could better afford to pay it (Hear). It is highly necessary that the landlord should understand this; and so far as my experience goes, there is among the landlords not only no disposition to oppress the tenant, but, as far as they can, to give him what he requires (Hear, hear). It depends upon us, gentlemen, to make the landlords understand what their real interest is (Hear). But we must bear in mind that there are two sides to every question, and in discussing this subject, we must look to the rights of the landlord as well as to our own (Hear, hear). Great good will follow from showing them that we recognize the rights of others while endeavouring to obtain rights for ourselves (cheers). Suppose the case of a farm with fifty acres of pasture land upon it, and the landlord does not wish this amount of pasture to be reduced—why, although I think too much importance is attached to the matter, an easy remedy may be found; for the landlord ought to see that by breaking up these existing fifty acres of pasture which are not adapted to growing grass, and putting his pasture land elsewhere, he may benefit his tenant, and at the same time keep his favourite pasture land (Hear). I know from my own experience that I can take enough from one acre of pasture to inoculate ten acres, with scarcely any damage, and with as full, perfect, and complete a sward the year after as there was before, and that at less cost than the expense of seed if you wished to lay it down in that way. You are all aware that land which you sow with seed grows what we call a "violent crop" the first year, and a tolerably good one the second; but from the third to the twelfth or fourteenth, frequently not enough to pay the tithe (Hear, hear). In the process of inoculation I spread the grass over the ground just as I would a load of muck, and in the course of one year after this I shall have a good crop. You may take a clean fallow, and by this means you shall have a perfect and full pasture. The next year you may do what you like with it. This can be done at less expense than sowing seed (Hear).

Mr. LATTIMORE: I have listened, gentlemen, with much interest to the observations of Mr. Shaw, and also to those of the gentleman who last addressed you. I agree with the practical remarks of Mr. Beadell as to the advantage of getting rid of inferior grass lands—that is to say, such as are unprofitable from organization and texture (Hear). This is a question, however, which we

must make palatable to the landlords of this country. There is, doubtless, a very considerable degree of prejudice of attachment and old association with regard to pasture lands, especially as connected with those which lie near the dwelling-house. But I take it that it is not the object of Mr. Shaw, or of any other gentleman in this club, to recommend the breaking up of any pastures which would be useful or profitable; our great object is to discuss the question whether a portion—the inferior portion of the pasture lands of this country—might not be profitably converted into tillage (Hear). I take that to be the question, and I think it ought to be received with great caution; it should be well understood that it is not the intention of Mr. Shaw, or any other member of the club, to advise any measure which could be prejudicial to the property or interests of any landholder in this country (cheers). I regard it simply as a matter of pounds, shillings, and pence; for it comes to this after all—whether the land would be more profitable as it now is, or by conversion into tillage (Hear). If we can show that there would be one-third, one-fourth, or one-fifth more produce as a consequence of this conversion into tillage, of land that is better adapted to the growth of corn than of grass, why should there be any hesitation on the subject? (Hear, hear). I was much struck by a case which came under my own observation in reference to this question in the district in which I resided. It may be some five-and-twenty years ago that a gentleman, who was somewhat eccentric, and had a little quarrel with the tithe-owner, held some land composed of good black flinty gravel with a southern aspect, well adapted to the growth of corn and not of grass, and, in a spirit of revenge, laid it down as grass land. The first year it produced a good crop, but in two or three years it fell off, and shortly afterwards degenerated into little better than a mere sheep walk. Now that land which was equal to anything in the district for the growth of corn, and would let for 30s. an acre, was scarcely worth 15s. an acre as grass land (Hear, hear). What are the results to the labourer, of such a system? (Hear). For that, let it be borne in mind, is an important part of the question. If the labourer be not employed, he must be thrown upon the parish, which leads to great demoralization. The land to which I have just alluded was some years afterwards sold, but at a very depreciated price compared with what it would have fetched had it remained in tillage. My opinion was asked as to what should be done with it, and the advice I gave was this—"Break up every acre that is not adapted to profitable pasture." This advice was followed; and the consequence was that the whole has been made profitable, and excellent crops have been grown upon it (Hear, hear). I know an estimate has been made of what may be obtained from an acre of poor grass in different districts of the country. It is considered that it will require two acres of down land to keep three sheep throughout the winter; and two acres to keep one cow, summer and winter. I am not of course speaking of rich pasture, but of land of the description which this meeting has under its consideration. Now, if the whole country were kept in that state, it would lay the foundation for universal poverty among the people (Hear, hear.)

Upon this description of land a very small amount of labour must of necessity be employed; and why? Because there is no produce (Hear); and if there be no produce you can have little means of remunerating employment. You have neither the means nor the food for the remuneration of labour (Hear). Now only contrast this state of things with what it would be if the land were brought into a state of cultivation. In a state of cultivation it would employ four times as much labour, and yield three times the quantity of food for the community. Let us keep within bounds: let us take that only which may fairly go before the world from us as practical men; and if we do this, I think our case will be made out, as to the practicability of doing that which we are contemplating (Hear). When we hear a leading member of the House of Commons proposing that the ships of the navy should be employed to bring food for the people of this country, we may be sure that this is no trifling question, but one that may be, and ought to be, fully and fairly discussed. Suppose you take this club as a sort of normal House of Commons, and then you will feel your responsibility (Hear). The members of the House of Commons say they do not understand the practical part of the question; they look to you for advice, and I hope you are assembled here for the purpose of giving it them (Hear, hear). I believe there are something like seventeen millions of acres of grass-land in England and Wales; some portion of that has undoubtedly been broken up during late years. Suppose we take it at sixteen millions, and I think that is somewhat under the mark; now I will venture to state as an agriculturist, that one-fourth of that land might be gradually and cautiously (for I am not for doing anything hastily) broken up, to the great advantage of the landholder, the labourer, and the community at large (Hear, hear, and cheers). If we can show that one-fourth part of this grass-land could be profitably broken up—for all the stress is upon this point; and if not profitably, it had better not be done at all—but if one-fourth part, I say, of this grass-land could be profitably broken up; if we can show that this would be the case, I think we shall have a strong claim upon the landlords to give their consent to the application of the principle recommended by this meeting (Hear, hear). Now, as a proof of the advantage of breaking up grass-lands, I think I may allude to the Whitfield Farm, the property of Lord Ducie, in Gloucestershire, called "the Example Farm."

Mr. PURCHAS: Not now; it is not now called the Example Farm. It used to be so.

Mr. LATTIMORE: I have read a good deal about the Whitfield Farm, and I find that it was originally pasture land, but that now wheat is put in every alternate year. I have always thought, however, that no land could be advantageously laid down for wheat every alternate year unless of a peculiar character, or new pasture, and therefore thought it was a system which could not be applied generally. But I want to draw another moral from this; I want to show the advantage of breaking up grass lands—not lands which are not adapted for tillage, but lands which are adapted for it, as upon the Example Farm.

Mr. PURCHAS: It is not now called the Example Farm.

Mr. LATTIMORE: But does it deserve to be so called?

Mr. PURCHAS: Oh yes; I admit it deserves it (Hear).

Mr. LATTIMORE: I am always desirous of taking the opinions of more practical men than myself; and I find that Mr. John Bravender, in his prize essay, confirms my statement about the 16 millions of acres, and shows that a profit of 8s. an acre might be made by converting one-fourth of it into tillage, which would be equal to £1,600,000 in money. Now I hope this will be regarded as a sort of sugar-plum to the landlords (Hear, and a laugh), and will act as an additional inducement for their aiding us in this object. These four millions of acres would, in a state of cultivation, provide bread for a million of families; the land itself would be worth nearly three times its present value, and the four millions of acres, would, as pasture land, employ about 43,470 labourers; in arable land they would employ 174,000 (Hear, hear). These are Mr. Bravender's views. I think you will agree with me that there is weight in his arguments (Hear); and we shall not be justified in allowing this important question to rest without bringing it before the landholders of this country (Hear, hear). When we consider the deplorable state of Ireland, it surely is our duty to do all we can towards providing for the starving people that which sympathy will not give them, and that which all the money you can subscribe will only furnish to them for a temporary emergency (Hear, hear). Mr. Sharman Crawford has given notice of his intention to introduce into the House of Commons a bill for giving tenant-right to Ireland; he attributes a part of the destitution in Ireland—of course he does not attribute the failure of the potato crop to this cause—but he attributes a great portion of the destitution in that country to a want of security for capital employed in the cultivation of the land (Hear, hear); this ought to give us confidence. There are only two ways in which the community can be benefited, namely, by increasing the produce of the soil, and by obtaining a more equitable distribution of it among the people. We have met here to-night for the purpose of considering the best means of increasing that produce, and we shall be unanimous, I trust, on a future occasion as to the question of its distribution. I make these remarks in the hope that they will clear the way for the accomplishment of the great object of this club (Hear). No one, I think, will deny the advantage of increasing the produce of the soil; and I trust we have to-night introduced a subject for discussion which will prove of advantage to the whole community (cheers).

Mr. SHAW (of the Strand): Surrounded by so many practical men, and having myself but little opportunity of attending to matters of practice, I shall confine myself to offering one or two remarks upon what I have heard to-night (Hear). I feel very much obliged to my namesake (Mr. Shaw) for having introduced a subject which I hold to be of vast importance. My friend, Mr. Lattimore, whose fertile mind led him to branch out into other matters, appeared once or twice to be wandering

from the subject; yet I must confess that his arguments did really, although not always directly, bear upon the subject—(Hear)—and I could wish that I were likely to be one-tenth part as happy in producing an effect upon your mind as he was (Hear). It appears from the response to the arguments advanced your minds are tolerably well made up individually upon the importance and value of this question; and that the object you have in meeting here to-night is rather to endeavour to produce a moral effect upon the minds of those who are not sensible of the merits of the question, than with any other object; and to prove that the proposition of breaking up inferior grass lands is something like tenant-right, not so "odd a question" as some persons imagine ("Hear, hear," and laughter). It appears to me that in advancing arguments to show that it is not an "odd question"—(Hear)—it becomes important to ascertain how it is that the landlords consider it an "odd question;" and I must say that I think it originates entirely in circumstances which lie at their own door. I believe the main cause of landlords refusing to allow their tenants to break up grass lands has its origin in the vicious system which they have themselves pursued, and which prevents them from placing confidence in their tenants, fearing that if allowed to break up the land they would extract everything they could out of the soil; whereas, if they had treated their tenants with more liberality, and afforded security to their capital, they need not have entertained such fears (Hear, hear). I disclaim the intention of bringing any charge against the landlords; but such is the school in which they have been brought up—such is the education, if ignorance can be called education, which they have received (Hear). When they are prepared to give security to the tenant there need be no fear about the grass lands being broken up. The farmer having no guarantee in his occupation, going on from year to year, cannot have confidence to invest his capital; and feeling that he may be turned out at the end of six months, it is very natural that, if allowed to plough up grass land, he should endeavour to take all out of it that he can (Hear, hear). I believe this to be the reason why a large quantity of land, which might be profitably broken up, has not been broken up (Hear). The gist of the argument is that inferior grass lands, if broken up, would produce better corn crops than they now do, and beef and mutton besides. This you have had expressly stated by a gentleman whose practical knowledge is second to none (Hear). It appears to me that it is important to be enabled to determine what sort of land should be broken up, and what should not—to ascertain the character of the land, and its suitability to the purposes for which it is intended (Hear, hear). Large quantities of corn are at present grown upon second and third-rate qualities of land; if you take the most productive parts of Wiltshire, and other corn counties, we shall often find this to be the case. The great criterion, therefore, in breaking up lands, should be the natural character and adaptability of the soil to produce corn as that which would be unproductive in grass would often be highly productive in corn (Hear, hear).

Mr. HUDSON: I think this question of converting in-

ferior grass lands into arable is one of paramount importance at a time when the food of the people is at so low an ebb. With regard to what Mr. Beadell told you of the plan of inoculating grass lands instead of sowing seed, I can bear my testimony to the fact that that system has been practised on poor lands in Norfolk for many years past (Hear). Twenty-four years ago I had been converting a piece of arable land into pasture; and I inoculated one part, and sowed seed on the other. Sowing the seed cost much more than the inoculation. Lord Leicester, then Mr. Coke, asked me what I was doing there. I told him; and he said I had better take up the grass which had been sowed, for the longer it remained the worse it would be (Hear). I am myself for converting pasture into arable land. I am not only farming in Norfolk, but in Gloucestershire also. My first attempt in farming there was to break up 50 acres, and I produced upon it one of the finest crops of turnips I ever beheld (Hear); and the only horse employed was to plough-in the turnip-seed. All the rest was done by breast-ploughing (Hear). It was afterwards sowed with wheat. I have also been breaking up some fine pasture land in Norfolk. It is my own, and therefore I had not to ask the consent of my landlord; and being my own, I wish to turn it to the most profitable account (Hear, hear). I have land of this description which has produced wheat and beans for 20 years. I think it is a question whether the very best pastures ought not to be broken up in these times of dearth (Hear). I know that I can produce more in cultivation than in good grass lands that will even fatten a bullock. I have no doubt that I shall break it up, and that it will produce me more beef and mutton as arable land in two years than it would as pasture in four (cheers). This being the case, I say therefore to the landlords of England, "Break up your grass lands" (renewed cheers).

MR. TURNER (of Devonshire).—Having had some practical experience in this matter, I think I am in duty bound to offer a few remarks (Hear). It so happened that I took a farm into my possession on which there were 40 acres of bad grass-land, such as are frequently to be found in many parts of the country. I first of all had recourse to draining; then I breast-ploughed, paired, and burnt it; put it to green crops, and subsoiled it. I wish to show that this is a subject not to be taken up on private grounds, but as a national question (Hear). I have broken up land that has paid me, and amply paid me for doing so, and has produced as arable land more of the necessaries of life in three years than it had for twenty years previously as pasture (cheers). This land, from being worth only from 7s. 6d. to 10s. an acre, would be cheap now if let at from 30s. to 40s. an acre (Hear, Hear). For it has not only continued to be productive, but it has actually produced more than any other land I have had in cultivation (Hear, hear). I cannot but regard this as most important, in a national point of view, as affording employment to the industrious classes of the community. Why, look at the difference in the amount of manual labour employed, which is as 6 or 7 to 1 compared with what it was when the land was in pasture; and this is a matter of the highest importance, and one which I do

think will have its due weight in all our clubs. If it be taken only as a question of profit, I think there is no tenant who will doubt its profitability. When I was in Gloucestershire, Col. Kingscote asked me if I would go and look at his "example farm." I said—"Why no, Colonel, I don't care about seeing it; if you have a thousand acres of land to let, and will give me a lease, I will pay you a very handsome rental for it" (Hear, hear). Wherever there are inferior grass-lands, I do not doubt that, by breaking them up, the landlords would increase their rentals to the extent of one-third their present amount (Hear, hear).

MR. LOVE: This is a subject which I conceive to be of very great importance to us all. I have had experience in Scotland and Ireland, and also in England, and I never met an instance in which there was disadvantage in breaking up grass land of a second-rate quality (Hear, hear). I would go a little more at large with the advantages which would accrue to the nation from the adoption of this system. As Mr. Lattimore stated, there are about sixteen millions of acres of land in England and Wales lying in grass. If a man travels, he will observe that not half of it is fit for fattening stock. Now I would propose that eight millions in the united kingdom should be broken up; what a large increase of manual labour this would give; at an average of 30s. per acre, would be an annual increase of twelve millions of money thrown into the labour market. Mr. Shaw has shown that the average increase in the labouring account of land would be about 30s. per acre; in proof of his opinion being well founded, there are forty-six millions of acres already in cultivation, which gives employment to above 2½ millions of men, or about 5½ men per hundred acres, which at 30l. each per annum, is 160l., or 32l. per acre. (Hear). I am a great advocate for perfect drainage, which costs about 3l. 10s. per acre, for when land is once drained it is a great question whether it will ever require doing again. I have seen drainage that has been done for twenty-five years, and the water came as freely from it as ever it did. In Ireland land has been drained and let for 30s. or 40s. an acre, which previously one dare not walk upon without a guide. It is almost impossible to go into the subject of breaking up inferior grass-land in detail, but there is no doubt that the advantages of the system would extend to almost every class of the community.

MR. PURCHAS: Having, in the year 1825, visited a kind friend in Gloucestershire, at hay-making time, I found him cutting about 600 acres of meadow-land: I pressed him much to break it up. His reply was, "I cannot bear the idea of having arable land so near my house." The next summer I again visited him, and found him cutting 400 acres: I pressed him again, and he broke up 300. Since that period, the whole of it has been broken up. Now if we only take the quantity of labour which this change has given, the advantage is beyond all calculation (Hear).

A MEMBER: Having derived some advantage myself from breaking up inferior grass-land, I think it is only justice to myself, and for the information of others, that I should state the result of my experience (Hear). I had some bad land, which wanted draining, and which grew

nothing but sedge and rushes; it was a mixture of gravel and clay, and contained a good deal of water. I broke it up, and brought it into cultivation; and it is now better worth from 40s. to 50s. an acre than it before was worth 5s. (cheers.)

Mr. BROWN: The arguments which have been adduced this evening, upon the utility and importance of breaking-up inferior grass land, have been so convincing that it is quite unnecessary for me to add anything thereto. I take the term "inferior" grass land, however, to imply the existence of too much grass land on a farm. If this were not the case, there would be no "inferior" grass-land; because we all know that grass land, if well managed, will repay the occupier (Cries of "It is impossible in some cases to make them"). Well, I mean to say, that grass land can be improved as well as other land; but the reason there is so much inferior pasture is, that there is too much grass land (Hear, hear). I have had opportunities of seeing the great advantages of converting pasture into tillage, and the consequent increase of production, of which the community have had the benefit, as well from the increased production itself as from the increase of manual labour (Hear). And not one of the least causes of land of this description being brought into tillage was the Act for the Commutation of Tithes (Hear). I happened to be engaged in a parish at a very early stage of that act, in which there were 300 acres of mere "common" land, belonging to the vicar, which had not been brought into cultivation on account of the tithe—which would have been 6s. or 7s. an acre. As soon as the principle of the act had been agreed to, I said to him, "If you will allow me to break-up that land, I can improve your rental four-fold; for I have a person who will take it at 1l. per acre, and it now lets for only 5s." That arrangement was immediately carried into effect; and that very land has been producing three quarters of wheat, four quarters of barley, and other crops in proportion, ever since (Hear, hear). Some time ago, a good deal of surprise was expressed at the rates being so much higher in Wiltshire than in many other counties; but upon investigation, it was soon discovered that the reason of this was the deficiency of tillage land in the county (Hear, hear). There is Salisbury-plain, and Marlborough-downs, and a great deal of land which they call "down-land," which is all very fit for tillage. I have myself, at all our agricultural meetings, continued to urge the propriety of bringing these lands into cultivation, and the principle has been extended considerably (Hear, hear). The land which formerly kept only a few sheep, will now produce three or four quarters of barley, and a fair crop of wheat, on the four or five field system (Hear); and the labouring classes are highly benefited by it (cheers). A gentleman just now, in speaking of some of the barriers to improvements in land, alluded to the entailment of estates as an objection. Now I do not at present mean to enter into the discussion of that subject, because I think it would be foreign to the question we have under consideration; but I will refer him to some observations in the Agricultural Journal of France, as an answer to his remarks upon the entailment of property in this country.

Mr. WALLACE: From the experience I have had in some 400 acres of grass land, I can confirm what has been said of converting those of inferior quality into tillage. Of these 400 there were about 60 which would not keep more than a sheep and a half per acre as pasture; but since they have been ploughed-up they have kept four times the stock, and produced good crops of corn on the alternate years (cheers). I do not wish to take a one-sided view of the subject; but I am of opinion that the system which we are contemplating, if carried out, must benefit one side and cannot injure the other (Hear).

Mr. JAMES WOOD: I have great pleasure in assenting to the principle of the propriety of breaking-up inferior grass land; but I quite agree with Mr. Lattimore, that it is "a pounds, shillings, and pence question—a question of price of produce and expense of labour;" and where there are no circumstances which enter into the amount of that labour to prevent the owner of the soil from making a profit, I think it is a desirable thing (Hear). I am not, however, prepared to say that there may not be some extraneous matters which may affect the profits of arable land as contra-distinguished from grass land, by reason of the latter not paying the same amount into the public treasure of taxation. I believe the tithe system, until quite recently, and the system of copyhold and leasehold tenures, have kept back improvements, and prevented the great national good which would have ensued from our growing our corn instead of importing it from abroad (cheers); but for circumstances of this kind I think there would not have been the necessity of importing a single grain of corn from foreign countries. I hope that these discussions will go through the country, and I have no doubt that much good will be the result; for they will show that the circumstances to which I have alluded are the cause of famine and famine-prices being put on this kingdom.

The CHAIRMAN: I listened with great pleasure to the observations of Mr. Shaw, in his opening of this question; and although I do not agree with all that he laid down, I do think that they reflect upon him very great credit (cheers). I am not one of those who think that by breaking-up grass lands the farmer would derive all the advantages which Mr. Shaw would lead us to expect; and I do not think it should go from this club that the advantage of this conversion is to amount to such an increase of profit as he has stated; nevertheless, I am one of those who have carried the system out, and from my double position of landholder and cultivator, I know that it is profitable to do it (Hear, hear). Mr. Hudson has told you that he is breaking-up a large portion; of the small portion I have, I am breaking-up every acre, except that which is first-class land on the borders of rivers, or meadow land (Hear). I can corroborate what Mr. Beadell has told you, upon the advantages of inoculating grass land, and I would state this rather on the authority of Dr. Baker than as coming from myself: he did it with some hundreds of acres, and I have followed his example with perfect success where laying down the seed would not do—it is the best and the most economical plan (Hear). Mr.

Lattimore, in the course of his remarks, alluded to Mr. Bravender's Essay, and said he believed that four millions of acres might be broken-up; into that question I will not go, although I do not quite agree with him as to the extent; but in regard to the benefit of conversion, I perfectly coincide with him (Hear). I take it as a good omen, gentlemen, to see so many leading men among us this evening—Mr. Hudson, from Norfolk; Mr. Purchas, from Monmouth; Mr. Turner, from Devon; Mr. Umbers, from Warwick; Mr. Wallis, from Northampton; Mr. Brown, from Wilts; Mr. Mount, from Kent—all worthy and distinguished representatives of their different districts (Hear). The presence of such practical and large tenant-farmers at these meetings will do much to call the attention of the landlords to the subject (cheers). Without regard to the observations and statistics of Mr. Love, I think he will find that they require revision; for although he may be correct in his estimate of the actual number of acres of grass land in the

country, it must be remembered that there are many mountain and other districts which would not be available for the purposes of cultivation.

After some further discussion,

Mr. LATTIMORE proposed the following resolution, which, having been seconded by Mr. Shaw (of the Strand), was carried unanimously:—"That it is the opinion of this meeting that a large portion of the inferior grass land of this country might be broken-up and brought into cultivation, to the advantage of the landlords, the cultivators, and the labourers of England, by greatly increasing the employment, food, and wealth of the kingdom" (cheers).

The thanks of the club were then separately passed to Mr. Shaw (of Northamptonshire), for his kindness in bringing forward the subject, and to Mr. Fisher Hobbs, for the wise discretion and excellent temper with which he had presided in the chair; and both gentlemen having returned thanks, the meeting separated.

#### BURTON-ON-TRENT FARMERS' CLUB.

On Thursday, the 31st December, the club held its first monthly meeting of the present season. There was a good attendance of members; and Mr. Worthington, the president for the year, took the chair. After the usual business, Mr. Hollier was called on to open the discussion of the evening, which he did by reading the following paper, the subject being—"The best means of restoring land exhausted by over cropping":—

"What is the speediest and most economical mode of restoring to fertility land out of condition from over-cropping?"

Notwithstanding the impulse lately given to the progress of agriculture, it is still a reproach to the general body of farmers, that a considerable breadth of the land in the kingdom is in the condition described in the question proposed for our consideration; and though many other causes may, and do, operate to prevent its improvement—as the want of capital in some instances, the want of fair security for its investment in others, the inert force of old habits, the wilful preference of a system that diminishes the value of the land and the future profit to the farmer, because of its immediate advantage. Though these and other circumstances cause well-conditioned land to decline, and deter many from the restoration of that which has been exhausted, yet I apprehend in by far the great majority of cases farmers would keep up their land to a high point of condition if they were thoroughly convinced that when so managed it yielded higher profit, and would set about the reparation of their exhausted soils, if they knew how to accomplish it in the best manner.

You will all agree with me that this is the subject of subjects for farmers to attend to; there is a wide spread evil, a general ignorance of its remedy; and we cannot therefore be better employed than in exchanging with each other such suggestions as our experience has sanctioned, or we have gathered from intercourse with men competent to teach us, in order that our ignorance may at least grow less, if it be not altogether removed. In the remarks I venture to offer on the subject you will not, I fear, find much that is useful; I am aware that many of you are much more capable than myself of performing the task I have undertaken, but I feel sure you will pardon all the imperfections of my attempt.

Land that is out of condition from too severe cropping, is very frequently mismanaged in other respects. It may want draining, ditches will most likely want scouring; it may be over-run with weeds, may require deeper ploughing; or the soil may have natural defects as regards its staple, too sandy, or too tenacious a clay, or void of calcareous matter. These, however, are defects which do not properly come within the question we are met to consider; I will confine myself wholly to such a condition of the soil as is exclusively due to the practice of taking away too much of the produce, and of growing grain crops too frequently.

Let us suppose, then, that I enter on the occupation of 100 acres of land, half arable and half pasture, that has been farmed on a system which is but too common—two-thirds, or perhaps three-fifths of all the arable land in grain, the remainder part in dead fallow or green crop, and part in ill laid down seeds. The laid down grass is not able

more than to support itself in pasturage, the green crop available to make manure almost nothing; the dead fallow makes no manure; no cattle are fed on corn or artificial food; the straw of the grain crop is almost all which the arable land returns in manure to itself, and the deficiency is supplied by mowing the pastures, and robbing them of their just due of manure. The consequence of such a system is, that on good land the pasture will perhaps cut 15 cwt. or a ton of hay, while the plough land bears 20 bushels of wheat, 25 of barley, 30 of oats, and 20 of beans, in a fair season. Under different management the produce may be raised at least one half, and with a judicious use of extraneous manures it may be in some instances nearly doubled.

Now, how can I quickly and profitably raise such land to that pitch of fertility which is necessary to make it grow the largest amount of produce?

Manifestly there is no way but to restore to the land the stock of manure of which it has been despoiled. But, except in particular localities, common manure is not to be had, for there is no such thing as a farmer who makes more of this article than he requires; and until lately there was no remedy for such a state of things, but to treat the land so as gradually to accumulate on it a stock of manure. As land is deteriorated by growing too frequent crops of corn, and crops of cattle food too seldom, so its fertility may be increased by reversing the process—by feeding off every year a great portion of green crop, with the addition of oil cake, on the plough land, and by using corn, oil cake, grains, malt-dust, &c., to feed cattle and sheep with in the winter, and thus enriching the manure with highly fertilizing products. Now I do not mean to affirm that this last method of raising the condition of exhausted land is not in all cases ultimately profitable; anything is better than allowing land to remain in the unproductive state to which it is frequently reduced. But this method must necessarily be slow, and, as I believe, the cost will be greater than the addition of manure at once, besides that while the improvement is going on we must be only reaping the low rate of profit which poor land yields. If manure is to be had, therefore, I believe it is at once the most profitable, as it is the speediest way of restoring land to good condition.

Perhaps I may here be met with such a remark as this: If it be more profitable to restore land by extraneous manure than by the products of the farm itself, why should we not, as long as manure can be had, scourge the land with crops of corn to be carried away, and supply the waste in this manner? I will endeavour to meet this objection.

Let me ask what is it which distinguishes the new system of English farming from the old? Every body will answer that the main distinction is that we now alternate green and root crops grown for cattle feed, with our crops of corn. Now a great portion of our land is in pasture, and without any expense of cultivation we are enabled to raise from an acre of grass, on fair land, an annual growth of two and a half tons. It is at once manifest, that unless we can grow on our plough land of the same quality a much larger bulk of produce than the pasture yields, the farmer of arable land cannot compete with the grazier, because he has all the expenses of tillage to pay. I grant there are advantages in growing green crops on arable land, which do, in a considerable degree, add to the profit of growing them. First, by means of them we escape a fallow—the expense of cultivation is no greater, and we get a crop almost gratis, and the weed is as effectually killed; secondly, we are enabled to consume our manure to greater advantage, by placing it in the immediate neighbourhood of quickly growing plants—it is saved from waste both by percolation through the soil and by evaporation into the air. Yet notwithstanding these reasons for growing green crops on plough land, I think all practical men will agree with me, that it does not answer well unless you can grow large crops. The more I see of farming, the stronger is my conviction that root crops especially do not pay unless you can get a heavy crop. Neither can you, while land is in bad condition, get the indirect advantages I have pointed out, in growing green crops. Of all the ways of getting rid of weed, there is none that is so effectual as a heavy crop which occupies the soil with its roots and the air with its stems, and under whose shadow the weeds dwindle away. It is easy, with little cost, to keep high-conditioned land clean; but I will defy any man to keep exhausted land clean without such an amount of labour as shall swallow up all his profit—I might add, and his capital too.

A man farming impoverished land neatly is pretty sure to be ruined; and they who are nice about weeds, and careless about the manure-heap, will soon learn that their attention has been ill-directed. But let the land be in high condition, and in every way the growth of green crops becomes highly profitable. When you can grow on light friable land from 20 to 30 tons of turnips, and on strong land as large a bulk of vetches, you are getting from each acre as large a quantity of food for cattle as three acres of pasture land of the same quality will yield, and out of this excess of produce you can repay yourself the cost of the tillage; so that while it is undoubtedly most profitable to farm land in such a manner as to make it



provide itself with its own manure when it is once raised to a high pitch of condition, it may nevertheless be doubtful whether this be the best plan with impoverished soils. When I would endeavour to show that the growth of tillage green crops on poor soils is not profitable, I must by no means be understood as arguing against their use in the ordinary course of tillage. Unprofitable as they are, it would be still more unprofitable to grow corn instead, or to make bare fallows. I am only speaking of the comparative profit of growing them on fertile and on barren land.

There is, however, another way of repairing land, by which food for cattle is grown, and no expense of tillage incurred. We may lay land down to grass for a few years; and as this is the ordinary way of effecting the restoration, it will not be right not to examine it. It requires but few words. We are all familiar with the appearance of new grass land, where it has been laid down in bad condition. If you sow good grasses, they die for want of their proper nutriment; and after the first year the soil is filled with chance-sown varieties, which are neither nutritious nor yield a bulky crop. In the first four years the whole produce often does not amount in value to one year's crop from a good pasture. Then the reparation of the land does not depend on the time the land is at rest, but on the quantity of crop that is grown and consumed, and converted into manure upon it. But if before laying land down, you raise its condition, it will then return as much produce as an ordinary pasture, and in the first four years you will not only get this greater amount of fodder; but at the end of this time the land will be four times as full of manure when broken up again.

I think we might as well hope to reap a profit from our old grass lands, by mowing them till their yield falls off to ten cwt. per acre, as by laying arable land down in such condition as to grow no more. The two cases are precisely parallel. My opinion then is, that the best way of repairing land is to add manure at once; and though it is seldom we can procure farm-yard or similar manure, we can now, thanks to the labours of scientific men, be at no loss to find a very sufficient substitute for it. In fact, when farmers come to know how to apply artificial manures in the most judicious manner, it will become more economical to use them even when we can procure access to farm-yard manure, that is, supposing the two to remain at their present price in the market.

From me, who am but a practical farmer, you will scarcely expect any minute acquaintance with the properties of various artificial manures, and their aptitude to supply the special wants of particular soils: This a chemist alone can do. But

nevertheless, there are some plain rules which experience has sanctioned, and which are intelligible to plain people; and I may venture on a few observations on the choice of substitutes for the ordinary manure of the farm.

I suppose most farmers are aware that manure cannot become the food of plants till it is decayed, and that in the process of decay it is converted into substances precisely similar to what are usually called artificial manures. If, therefore, we know what is the composition of manure, it is easy to get a perfect substitute for it, for we may procure all the substances it contains. If we do this, no doubt we are perfectly sure of being successful; for as manure is the product of the very plants we grow, and contains all they have taken from the soil, there can be no deficiency when we return them all back. Neither is it so expensive to do this as it is to buy dung, except under very favourable circumstances.

Different plants take from the soil different substances. It is a task beyond my ability to show the exact quantities of the different kinds of substance that each plant does take from the soil; and it is not necessary that I should go very deeply into this kind of inquiry.

All I want to establish is this, that if it be ascertained that such and such materials are contained in the crop we carry off the land, and that the same materials are contained in an artificial manure, it is as proper to lay on that manure as it is to use farm-yard manure itself.

A farmer may not know exactly what articles are necessary; but if he will consult those who do know, he may easily learn what each crop requires, and he may as easily procure it. Now, if the whole of the crops have been carried from the land—all the hay, the turnips, the straw, as well as the grain—the soil will, of course, require everything returned to it which these articles contained, and which the farm-yard manure would have contained if they had been consumed on the ground.

In such a case, therefore, a farmer must add everything which farm-yard manure gives to the soil. But it seldom happens that all the crops are taken from the land; and what is usually carried away in too large quantities does not require more than three or four out of the many ingredients of manure to be returned, to repair the waste which has been occasioned.

Nobody, I suppose, understands by the term "over-cropping," the growth of too many crops of roots, cabbages, vetches, clover, or other kinds of cattle food. If these crops be grown, and the produce carried away, there is no doubt that the land will be most quickly impoverished, for they contain a much larger proportion of the mineral constituents



of plants than grain crops do. But when we speak of over-cropping, we mean the growing of grain crops too frequently; and the point I have to address myself to is—the best way of restoring land which has been so over-cropped. If all the grain and all the straw were consumed on the land, and the manure they yielded given back to it, there could be no impoverishment of the soil.

We see that where much oil-cake or corn is brought to a farm, and eaten by cattle, the land is kept in high condition, just as it is by growing more frequent root and green crops. To bring an artificial manure to the land which contains the same ingredients as the manure made by cattle feeding on grain is equally beneficial to the soil, as to bring the grain itself. In a manure made by cattle feeding on grain, the chief ingredients, and the only ones which it is of much practical importance to notice, are two: first, a substance which is called phosphate, that is, a mixture of phosphoric acid with lime, or some other earth or alkali; secondly, animal matters which in process of decay yield a great deal of ammonia to the soil. These are the ingredients which an over-cropped soil must necessarily become deficient in, by the carrying away of too much grain. It must be added too, that on farms where a judicious course of cropping is not observed, but little care is taken to preserve the manure from waste.

Though the solid dung may be kept from waste, there is usually much of the urine of cattle lost, and in the urine is found a great part of the phosphates and the ammonia which was contained in the food of the cattle. The milk of dairy cows also contains large quantities of the same materials. When we consider these facts, it is without any surprise that we learn the great increase of produce which commonly follows the application of guano or bones. These two manures have for their constituent parts exactly what the grain crops carry off, what is wasted in our manures, and what is contained in the milk of cows. Chemists also teach us that it is the phosphates which, of all the ingredients of the soil, are by nature most frequently wanting in the soil.

To add guano to a soil exhausted by too frequent growth of grain crops is therefore as efficacious a way of restoring it to fertility as to add farm-yard manure; and except in cases where the manure of the farm has been carried off, or that part of the produce which commonly yields the manure, I think it is a perfectly safe proceeding to trust to guano, for by means of it you can almost always grow luxuriant crops of green or root crops.

I cannot say that my experience of the use of

guano has been very extensive; but so far as it has gone, it has proved its efficacy as a substitute for farm-yard manure. I dressed part of a field of land four years ago with three cwt. of guano, mixed with vegetable ashes; the other part with 15 loads of farm-yard manure, for turnips. I weighed the crop in four different parts, and found from 10 to 15 per cent. in favour of guano; the turnips were consumed on the land, and the subsequent crops have been quite as good where the guano was used as on that part dressed with farm-yard dung.

The plan I would therefore recommend is to begin at once by dressing one-half of the arable land with guano or bones for green and root crops. If you do this, and more slightly dress that part which is under grain crop, you will have in the produce wherewith to make enough manure to secure abundant crops in all future seasons.

With regard to the comparative cost of a dressing of guano and farm-yard manure, a very few calculations will shew the immense advantage of choosing the former. The best Peruvian guano may be had for 11s. per cwt. This cwt. will produce as much effect on the land as 4 tons of good farm-yard manure; and as good muck can scarcely ever be bought and laid on the land at less than 10s. per ton, its cost is almost four times that of guano. If we choose to use bones, I believe the cost will be as much less than dung, or with bones and sulphuric acid, the cost will be less than with guano.

Then as to the advantage of manuring the land at once, instead of trying to restore its fertility gradually by growing green crops, let us just calculate the worth of the produce on the two different plans through the first course of cropping, on an acre of land. Suppose you begin and grow turnips, without manure, on your exhausted land. An extreme calculation would not give more than 10 tons as the probable produce. The whole account may be taken thus:—

	£	s.	d.
1st year. 10 tons turnips, at 10s. . . . .	5	0	0
2nd year. 3 quarters barley, at 36s. . . . .	5	8	0
15 cwt. straw. . . . .	0	15	0
3rd year. 1 ton seeds, at 50s. . . . .	2	10	0
Aftermath . . . . .	0	15	0
4th year 3 quarters wheat, at 50s. . . . .	7	10	0
15 cwt. straw. . . . .	0	15	0
	22	13	0

With a dressing of 4 cwt. of guano mixed with ashes, on an acre, the turnips would be increased to 18 tons; and these eaten on the ground would ensure the subsequent crops to be as much larger as I now set them down:—

	£	s.	d.
1st. year. 18 tons turnips, at 10s. ....	9	0	0
2nd year. 5 quarters barley, at 36s. ..	9	0	0
25 cwt. straw, at £1 per ton ..	1	5	0
3rd year. 30 cwt. seeds, at 50s. per ton	3	15	0
Aftermath .....	1	0	0
4th year. 4 quarters wheat, at 50s.....	10	0	0
25 cwt. straw .....	1	5	0
	35	5	0
Cost of guano .....	2	10	0
	32	15	0
Unmanured land .....	22	13	0
	£10	2	0

This will leave a net profit of £10 2s. per acre in favour of the plan I have recommended, in four years, which I think is a sufficient profit to induce all farmers to persevere in the plan I have adopted.

In the preceding remarks, I have had in view the treatment of arable land; but the same principles are equally applicable to pastures.

The common system of farming is very ruinous to grass lands, and I believe that on an average the meadow does not yield much more than one-half what it ought to do. Instead of growing cattle food on the arable land, the too frequent way is to trust almost wholly for winter provender to the hay crop. The consequence is, that the grass land is gradually robbed of its valuable materials to supply the waste caused by over-cropping the arable land. Let us suppose that it gets back its fair proportion of the manure of the farm; still, as the corn land has been for generations wasting the phosphates, the grass land from which the manure has been supplied must become deficient in them; and in dairy farms an incessant waste is caused by these substances being carried away in the milk. I have heard of instances in Cheshire, where the dairy pastures have been benefited in a most extraordinary degree by a dressing of bones. Instead, therefore, of waiting till grass land renovates itself, as it will in time if not mown, I think it preferable at once to lay on manure, and get a full crop in the first year, which, of itself, will cause its succeeding one to be abundant too. The manner in which the land has been treated, and its nature, must point out the plan to be adopted; but guano will usually insure a large increase of crop. Under my own observation the crop has been more than doubled by its application. It is, however, common to find grass land deficient in the other ingredients of plants, because the whole crop is more frequently carried away, and in such cases guano will perhaps fail. Yet, where guano does not insure a considerable increase of crop, we must

not conclude that it is wasted on the land, for when the other deficient materials have been supplied by art, or have collected in the soil by time, the good effects of it will be brought into operation.

I have judged it would be more useful in opening this subject, if I confined my attention to the principle we should follow, in restoring exhausted land, instead of going into minute detail on the mode of applying it to practice. I could not do both without trespassing on your patience at greater length than is proper, and others will, I have no doubt, supply what I have omitted.

Mr. LYON was happy to express his entire concurrence in the views of Mr. Hollier. He agreed entirely in the principle, that it was more profitable to repair exhausted land by adding manure at once, than to effect the same purpose by the slow process of keeping the land under crops to be consumed by cattle until it supplied its own manure. It was useless to talk of farmers choosing their manure, for it was seldom that they could procure farm-yard manure; and he was convinced that in a great majority of cases guano would furnish a perfect substitute. He had used guano largely, and was seldom without eight or ten tons on his premises. He had found it beneficial on every kind of crop on arable land, and on grass; but its greatest effect was produced on root crops. He used a less quantity for corn, but never less than four or five cwt. for root crops. He had repeatedly tried it in the same field, in comparison with what was accounted an equal dressing of farm-yard manure, and had uniformly got a larger bulk of produce from guano. Being asked the question by a member, Mr. Lyon said that it was his practice to draw off all his turnips, and that he had always found the barley crop as good a crop after guano as after manure.

Mr. WM. GREAVES said there could be no doubt that it was best to buy manure, and repair exhausted land; and that if guano would really supply the place of farm-yard manure, it was by far more economical; but his experience was too limited to enable him to form a judgment on that point.

Mr. RADFORD said manure should be at once furnished to the land, and pointed out the necessity of a resort to the use of artificial manures by farmers whose land lay far from a town.

Mr. J. ORDISH agreed that extraneous manure should be procured; but he doubted if guano would succeed generally, unless the root crops were eaten on the ground. In proof of what Mr. Hollier said on the reparation of land by bringing on to it manure made from grain, he quoted an experiment which he had tried. He had hurdled sheep on a piece of very bad meadow land, and fed them liberally with oil-cake. The meadow was as much improved as if it had received a dressing of manure.

Mr. LEEDAM (auctioneer) was not a farmer, and would not give an opinion on the practical question before them. It was equally to his interest whether farmers persevered in turning over their exhausted soils, or whether they improved them, as in either case their affairs would come to a sale. But, instead of deceiving themselves by working impoverished land, it was pleasanter to him to see them improve their land, and retire on their fortunes. He did not know much of the effect of guano on land; but, judging from analogy, he thought it must be a most fertilizing substance. Tom Hanson's customers found that they really could not go decently more than two days without shaving; and at last it came out that the true secret of this luxuriant growth of beard came from their cunning shaver's use of guano water in the lather.

Mr. G. GREAVES adverted to that part of Mr. Hollier's paper where he showed that unless green and root crops on arable land were much larger than would equal the produce of grass land of the same quality, the growth of such crops must be at a loss to a farmer. He thought this way of proving the inexpediency of restoring poor land by growing green crops without extraneous manure was new, and so far as he knew had originated with this club. With regard to the use of guano, he thought it important to bear in mind, that though it would produce one or two root crops, yet you could not go on with it, unless you added to the land the manure made from its own produce. Guano should be used as an addition to, and not as a substitute for, the manures made on the farm. He agreed with Mr. Hollier's remarks; but there were ways of restoring land to fertility which he had been obliged to omit—as by fallowing, liming, and more especially by burning. There was a large breadth of the clay land of the country, on which perhaps the cheapest way of restoring its fertility was to burn the surface, and thus release the saline constituents of plants which were locked up in the particles of the soil. Mr. Greaves next made some remarks on draining; but the president said he thought them too distant from the immediate question before the club, which was the restoration of over-cropped lands.

Mr. GRETTON questioned if guano would be found efficacious to the extent Mr. Hollier recommended its use. He agreed that where farm-yard manure could not be had, it was well to use something else; but Mr. Hollier gave guano a preference over it when it could be had. Mr. Hollier had also, he thought, overstated the cost of farm-yard manure. When close at hand, it would be laid on the land at much less than 10s. per ton. As farm-yard manure contained many ingredients which guano did not, its effect must be more certain and more permanent.

Mr. ORDISH remarked that he had grown better crops with bones than with any other artificial manure, and he would prefer it to guano.

Mr. DANIEL asked Mr. Hollier what he considered a heavy crop of turnips to grow with guano? and being answered, from 10 to 18 tons, said that he had grown double the weight with farm-yard manure. His turnips, sown on the 10th May, now weighed from 15 to 20 lbs. each, and he had one 29 lbs.

The PRESIDENT had grown carrots with guano, both in his garden and field, and had got better crops than with manure.

Several other members expressed opinions in concurrence with those of Mr. Hollier; and Mr. Daniel moved, and Mr. G. Greaves seconded, a vote of thanks to him for his valuable practical paper.

COMPARATIVE VALUE OF BARLEY, MALT, SUGAR, AND MOLASSES.

SIR,—I beg to hand you, subjoined, a Table of the comparative value of Barley, Malt, Sugar, and Molasses, which may be useful at the present moment.

I have neither time nor inclination to enter into a controversy upon the subject; but as brewers (*I believe*) generally say sugar will not be used in breweries, and as the sugar interests say, such is the enormous crop of sugar coming forward, that sugar must come down to 43s. to 41s. per cwt. (which is equivalent to malt at 69s. to 71s. per qr.), perhaps some of your numerous correspondents will be kind enough to enlighten me upon the subject, and say which of the two is right.

You will observe that this table is based upon the assumption that malt only yields 180lbs. of saccharine per qr., but this year, fine Suffolk and Herts malt yields considerably more, and therefore malt is so much the more valuable.

RELATIVE VALUE OF			
BARLEY.	MALT.	SUGAR.	MOLASSES.
(18 lbs. saccharine per qr.)			
Per qr.	Per qr.	Cwt.	Cwt.
s. d.	s. d.	s. d.	s. d.
33 0	60 0	37 4	26 8
35 0	62 0	38 7	27 7
37 0	64 0	39 10	28 6
39 0	66 0	41 0	29 4
41 0	68 0	42 4	30 3
43 0	70 0	43 7	31 1
45 0	72 0	44 9	32 0
47 0	74 0	46 0	32 11
49 0	76 0	47 3	33 10
51 0	78 0	48 6	34 8
53 0	80 0	49 9	35 7
55 0	82 0	51 0	36 5
57 0	84 0	52 3	37 4
59 0	86 0	53 6	38 3
61 0	88 0	54 9	39 2
63 0	90 0	56 0	40 0

Woodbridge, Feb. 5.

INQUIRER.

## CHEMICAL COMPOSITION AND USE OF MANURES.

(From a Prize Essay by M. Girardin, on Manures.)

The ordinary manure is that of healthy and stalled cattle, to whom an abundant supply of good food, partly dry, partly green, is given, and supplied with a sufficient quantity of litter, to absorb the excretions. This manure, at the time it is spread on the land, has not undergone a prolonged fermentation which would volatilize a great portion of the principles which it contains, but rather a maceration which has given it the appearance of short dung, which has softened and flattened all the straw, and has rendered the different parts homogeneous.

In its usual state of humidity, when straw has been used as litter, the dung ought to weigh from sixty to seventy pounds to the cubic foot, under the pressure which it undergoes in the waggon. This manure contains on the average three-fourths of its weight of water.

There are but few experiments on the comparative weight of dung in its different states. By experiments made in 1830 by De Voght, to ascertain the action of manures on production, this learned agriculturist found that different manures, as also a compost made of two parts of fresh dung to one of loam, green turf, and weeds, gave the following results for each cubic foot:—

Short dung of ox (about)	62 pounds.
Fresh ditto . . . .	51 „
Short horse-dung . . .	42 „
Horse-dung after eight days' fermentation . . . .	32 „
Fresh horse-dung . . .	31 „
The compost . . . .	72 „

An important question here presents itself: What is the best state in which manure can be employed—is it better to allow it to ferment, or lay it on the land at once?

To answer this question it is necessary to enter into some particulars. We may, to avoid repetitions, first state that the dung coming immediately from stables, is called *long*, or *fresh*, and this has undergone no fermentation; while we call that which has been thrown in heaps, and kept until it has undergone considerable putrefactive fermentation, by which it is converted into a kind of earth, “short dung.” Manures arrive at this state in a longer or shorter space of time, according to the season of the year, the temperature, and the amount of moisture they contain—in summer about eight or ten weeks; in winter about four or five months.

That in these two states manures possess different properties has been long known to agriculturists, and is shown by the circumstance that they are not used for the same purposes.

The long or fresh manures, which occupy much space, have a more prolonged and durable action on vegetation than the short, so that they are applied to plants which remain a longer time growing, and to strong, compact, and clayey soils, which they render lighter by their fibrous structure.

The short manures, which are heavy and compact, exercise an immediate action on plants, but this action is less durable; and hence these are applied to plants which remain only three or four months on the ground, and to light soils.

If we set aside the peculiar effects of these two kinds of manure, and consider only their relative richness in nutritive principles, it is certain that in employing them we lose a great part of the principles which the same quantity of well-prepared manure ought to yield to the plants. Indeed, the long dung is used in a state in which it is less easily brought into solution; and the short manures are in so advanced a state of decomposition as to have lost a great part of their fertilizing properties, which have escaped into the atmosphere as gases and vapours. To prove these assertions we must examine the nature or chemical composition of manure as it comes from the stable, and ascertain what are the results of its fermentation.

This manure is evidently a gross mixture of straw and other vegetable rubbish which have been used as litter, with the solid excrement and urine; consequently we ought to find in this mixture all the chemical constituents of each of them. Fresh manure, which has undergone scarcely any fermentation, contains the following substances:—

Water . . . . .	75
Soluble vegetable and animal matters . . . . .	} 5
Soluble salts . . . . .	
Insoluble vegetable and animal matters . . . . .	} 20
Insoluble salts . . . . .	
Vegetable fibre and straw	
	100

Boussingault thus represents the composition of farm-yard manure after six months, which he calls ordinary dung:—

Water . . . . .	79.3
Organic matters . . . . .	14.03 } 20.7
Salts and earths . . . . .	6.67 }
	100.0

According to Boussingault, dung reduced by a long-continued fermentation to a pasty brownish-black mass, or *black butter*, has the following composition:—

Water . . . . .	72.20
Organic soluble matters and } soluble salts . . . . . }	1.50
Insoluble salts . . . . .	10.27
Straw converted into peat . . . . .	12.40
Finely-divided peaty matter } analogous to the foregoing }	3.63
	100.00

Richardson obtained a slightly different result from the analysis of an average specimen of manure in the state in which it is spread on the land:—

Water . . . . .	64.96
Organic matters . . . . .	24.71
Mineral matters { Sand . . . . . 3.20 } { Soluble salts . . . . . 1.34 } { Insoluble salts . . . . . 5.79 }	10.33
	100.00

Fresh manure, then, contains one-fifth of its weight of insoluble matters, which can only serve for the nutrition of plants when converted into new soluble compounds, into carbonic acid, and ammonia. Now, in order to effect this change, a fermentation is required which can only take place fully when collected into a large mass. If, then, the dung be spread on the land immediately after it comes from the stable, this necessary fermentation will be imperfectly performed in the soil; so that a great part of the manure will remain inactive, and the change of the vegetable fibre into nutritive matter goes on very slowly.

But, if a slight degree of fermentation is capable of destroying the cohesion of the vegetable fibre, predisposing it to decomposition, and solution is useful to manure before spreading it on the land, a long continuance of the same action will prove injurious, as is seen in the heaps of manure of our farms. Under these circumstances the mass becomes strongly heated, numerous chemical reactions take place, the constituents are completely decomposed, an abundant disengagement of gases takes place, and a dark-coloured liquid is formed. Dung thus loses twenty-five per cent. of its original bulk, so that a hundred cartloads of fresh manure are reduced to seventy-five loads. The gas disengaged consists chiefly of carbonic acid, carburetted hydrogen, and ammonia, the useful effects of which are thus lost. Davy made a curious and convincing

experiment on this head. He filled a retort with dung, and introduced the neck among the roots of turf in the border of a garden. In less than a week its influence was visible: the grass presented a forcible contrast to the remainder of the turf, and vegetated with extraordinary rapidity.

The dissipation of the gas is not the only disadvantage of extreme fermentation; it causes also a loss of heat. This developed in the soil would have excited the germination of the seeds and facilitated the growth of the plants. It would be especially useful to wheat, to which it would yield a gentle heat during the later part of autumn and winter. Moreover, it is an axiom in chemistry that substances combine more easily at the time they are disengaged, or, as we say, in a nascent state, than when altogether free. In the fermentation which these substances undergo when buried in the soil, the gases come in contact with the roots as fast as they are generated. They are, therefore, warm at the moment when they are absorbed by the roots, and are, therefore, much more efficacious than if the manure had been allowed to putrefy before it is used.

Agricultural works are full of facts which accord with this view. The celebrated Thaër took great care not to allow the manure to accumulate in heaps, and to convey it to the land as often as the season would permit. Schmalz, in his "Observations on Rural Economy," gives his opinion of the state in which manure should be buried in the earth, in a very explicit manner:—"Very much decayed manure, compared with the same in a fresh state, loses a great portion of its bulk. It is difficult to ascertain exactly the loss, because much care is necessary to divide it and to insure its equal division. I have always been struck with the more powerful effect of less fermented manures. When, for example, eight loads of short and completely-decayed manure have been given to a field, and to another of the same size only six loads of the same weight of more fresh and scarcely-decayed manure, not only has the produce of the second been much finer, but the effect of the manure more permanent, although six loads of fresh manure would have yielded only five by a further decay. This observation has not been confined to a particular kind of soil, but it occurs on all kinds of land. The advantage, however, was generally more evident in favour of fresh manure on heavy than light lands.

"Already, for a number of years, I have spread my dung in a slightly advanced state of putrefaction, and I have obtained remarkably abundant crops. The effect of manure thus applied was more remarkable on the produce which did not immediately follow the manuring." The latter observation accords with the experiments of Hassenfratz. This chemist

manured two similar lands, one with long dung, in which the dung had only commenced to putrefy; the other with perfectly decayed manure capable of being easily cut by the spade. These two lands were cultivated and sown in the same manner: the second produced larger, stronger, and more vigorous plants the first year than the former; but the second year, when neither was manured, the former produced larger and stronger crops than the second: the third year the former still had a slight advantage over the latter.

It follows, from what has been stated above, that when manure is applied in a fresh state, the plants find in its soft and aqueous parts a prepared and sufficient nourishment for the time; while the more resisting parts, decomposing more slowly, prepare a fresh supply of nutriment for the succeeding crop. When, therefore, we desire to influence a succession of crops, we must employ, not the decayed manure, the action of which is ephemeral, but the long and fresh, which has, moreover, the advantage of giving heat to the soil, of removing acidity, of awaking and bringing into action the force of the residues of former manures which have hitherto resisted decomposition.

"An experience of more than seven years," says

*(To be continued.)*

Pictet, "has convinced me that we shall be great gainers by using manure as soon as it comes from the stables."

The principal English and Scotch agriculturists, consulted on this subject within the last twelve years by M. de Knobelsdorf, have expressed an unanimous opinion. They have all declared—it is decided alike by theory and practice—that manure applied before undergoing fermentation as it is brought from the stable enriches the soil intended for the cereals and lentils. Its immediate application prevents a loss of more than one-fifth of its weight. So all these farmers carry the manure as it is formed to the lands planted with peas, beans, and vetches, &c.; they consider this practice so beneficial that they anticipate that it will soon become general.

"For six years," says M. de Knobelsdorf, "I have followed these principles on the farm I cultivate. With the single exception of sheep's dung, all the others were conveyed to their destination, and spread even when the land was covered with snow, as soon as they were taken from the stable. It is to this circumstance that I attribute the good state, continually increasing, of my land as regards manure."

## THE LONDON FARMERS' CLUB.

MONDAY, FEB. 1.—MONTHLY MEETING OF THE COMMITTEE OF MANAGEMENT.

Present: Messrs. J. Beadel, W. R. Browne, W. Fisher Hobbs, J. Hudson, T. Knight, C. H. Lattimore, T. Mount, W. Shaw, W. Shaw, jun., Owen Wallis, and J. Wood.

W. Shaw, 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:—

R. B. Arundle, Esq., Brimpton, Newbury.  
 Horace Boys, Esq., The Downs, Northfleet, Gravesend.  
 Rev. J. Young Cooke, Semer, Hadleigh, Suffolk.  
 E. Hacker, Esq., Moreton Villas, Camden Town.  
 John Lake, Esq., 10, Lincoln's-inn.  
 E. Nicholl, Esq., Witham, Essex.  
 T. Owen, Esq., Clapton, Hungerford, Berks.  
 J. Scales, Esq., Cirencester.  
 H. Strafford, Esq., Moreton Villas, Camden Town.  
 H. Selmes, Esq., Beckley, Staplehurst, Sussex.

A Committee of the following Members was appointed to further consider and report on the subject of "Tenant Right."

E. Aitchison, Tunbridge Wells.  
 W. Anderson, Oakley, Bedford.

R. Baker, Writtle, Essex.  
 E. Ball, Burwell, Newmarket.  
 J. Beadel, Chelmsford, Essex.  
 W. Bell, 30, Bucklersbury, City.  
 W. Bennett, Lewsey, Dunstable.  
 W. R. Browne, Swindon, Wilts.  
 H. Dixon, Oxford.  
 W. Fisher Hobbs, Boxted Lodge, Colchester.  
 J. Hudson, Castleacre, Norfolk.  
 S. Jonas, Ickleton, Essex.  
 T. Knight, Edmonton.  
 C. H. Lattimore, Sandridge, St. Albans.  
 J. Oakley, Darland, Chatham.  
 W. Shaw, the Strand, London.  
 W. Shaw, Northampton.  
 R. Smith, Burley-on-the-Hill, Rutland.  
 G. Turner, Barton, Devon.  
 T. Umbers, Wappingbury, Warwick.  
 J. Wood, Cuckfield, Sussex.

T. Knight, Esq., of Edmonton, was unanimously elected Vice-Chairman of the Monthly Meetings for Discussion during the present year.

A variety of other business was transacted, and at five o'clock the meeting broke up for the monthly discussion.

TYNESIDE AGRICULTURAL SOCIETY—HEXHAM FARMERS' CLUB—TENANT-RIGHT—STALL FEEDING—MANAGEMENT OF MANURE.

The annual business meeting of the Tyneside Agricultural Society was held on Tuesday last, at one o'clock, at the house of Mr. George Bates, the White Hart inn, Hexham (John Grey, Esq., of Dilston, in the chair). On the motion of Mr. Harbottle, of Anick Grange, seconded by Mr. E. Campion, of Hexham, Mr. Marshall Stephenson, of Fourstones, was elected secretary and treasurer, in the room of Mr. Hunt, resigned. The other business was of a routine description.

At two o'clock the members and friends of the Hexham Farmers' Club celebrated the first anniversary of that institution by a dinner, in the same house. The entertainment was worthy of Hexham and the Hart, and received full justice from fifty farmers. The chair was filled by Mr. Grey, the president of the club; and the vice-chair by Mr. Harbottle, V.P. On the right of the chair sat John Errington, Esq., of High Warden—on the left, a stranger, apparently a foreigner, who excited the curiosity of the company; and no one could tell his name, save the president (who, as will be seen, revealed the secret before the proceedings came to a close).

On the removal of the cloth, after the usual loyal and other toasts were given from the chair,

The PRESIDENT rose and said, a communication had been placed in his hands by the secretary, from Mr. Shaw, who was well known to every gentleman present, as the editor of certain agricultural publications, and from his connection with the London Farmers' Club. That club had taken up the question of what was called "Tenant Right," and wished, it seemed, to learn the sentiments of provincial clubs thereupon. For his own part, if the inquiry were made with a view to an application to parliament, he would say at once that he did not think it by any means a fair subject for legislation. A tenant's rights were just those which he could establish by law. If any man were so absurd as to take no security for the money, and skill, and labour, which he laid out on another man's land, he thereby neglected to clothe himself with rights commensurate with his risks, and must take the penalty of his folly. It was his own fault if, having no rights to fall back upon, he were sent to the right-about. (Hear, hear, and laughter). The only rights, he repeated, which a tenant-farmer possessed, were those to which he could legally establish his title. He must see to it, therefore, before he expended his capital, that he had security

for the adequate reward of his enterprise. He must look to himself—not to the legislature. No legislation could embrace with sufficient nicety so delicate a subject. It was within the reach of the farmer, when engaging in an undertaking, to put down such covenants as would give him "tenant right." If the owner of the land had an objection to grant a lease for years, then the security must assume the form of compensation for unexhausted improvements. All this must be matter of individual arrangement. Legislation could not interfere with advantage. It would lead to everlasting disputes and arbitrations—arbitrations which would often be decided on the most fanciful principles. Every man must make his own covenants, and thereby enable himself to establish by law those strong claims which every tenant-farmer possessed in equity, not only for the recovery of his capital, with interest thereon, but also a fair remuneration for the intelligence and labour expended in the cultivation of the farm (applause). No law could place the relations of landlord and tenant on an equal basis. Each must see to his own rights; and no landlord, who knew his own interest—his interest in having a good tenantry—would scruple to grant them proper securities. (applause).

The officers and committee of the ensuing year were now elected by show of hands, as follows:—

Mr. Grey, of Dilston, President.

Mr. Jobling, of Newton Hall, Mr. Harbottle, of Anick Grange, Mr. John Errington, of High Warden, and Mr. Ridley, of Parkend, Vice-Presidents.

Mr. Lee, of Dilston, Secretary and Treasurer.

Mr. Marshall Stephenson, Mr. Matthew Smith, Mr. Thomas Trotter, Mr. C. Snowball, Mr. John Fewster, and Mr. John Henderson, Committee-men.

The PRESIDENT said he would now take the liberty of proposing the health of a gentleman who sat on his left hand; and he was sure the members of the club would not drink it with less warmth and cordiality because the gentleman was a foreigner and a stranger (applause). His friend, Mr. Belt, held an office under the King of Sweden, was one of the managers of the crown lands and forests in that country, and, by the permission of King Oscar, was visiting Great Britain, and, among other districts, Tyneside, in pursuit of agricultural knowledge, in the hope of

carrying back with him some hints for improvement at home. Since he (Mr. Grey) had the pleasure of making his acquaintance in the north of Scotland, Mr. Belt had been occupied in translating English works on agriculture into his native language, in furtherance of his patriotic object. He (Mr. Grey) was sure they must all rejoice in the visits of such gentlemen as Mr. Belt—fruitful, as they must be, in the promotion of general improvement, and of friendly and peaceful associations between different countries (applause). The closer intercourse of nations tended to equalize their advantages. Some, however, of the advantages enjoyed by English farmers, his friend might not be able to introduce into his own country, as, for instance, their high prices (laughter). The condition of Sweden was unlike that of England. She had great abundance and low prices. A good ox, his friend Mr. Belt informed him, might be had, after he had done his work, for £6. (Hear, hear). He rejoiced in the presence of his distinguished friend, and had been happy to learn from him that liberal measures, and free-trade principles, were making progress in Sweden (cheers). They were getting rid of antiquated barriers to commercial enterprise, and would soon enjoy the benefits derivable from a free interchange of commodities, and which, in this country, had for some time past been prevented by what he must take the liberty of calling unsalutary restrictions (cheers). He had much pleasure in proposing the health of Mr. Belt, and wishing him a safe and happy return to his own country (loud cheers); and if he should give them a speech in reply in Swedish, he had no doubt the company would be all very much enlightened (laughter and applause).

Mr. BELT briefly acknowledged (in English) the honour conferred upon him by the company, and resumed his seat amidst general applause.

Mr. MATTHEW SMITH was now called upon to introduce the subject of which he had given notice, namely, "Stall Feeding of Cattle and Economy of Manures." Such a system of agriculture, he observed, should be pursued as would bring the whole of the farm into a productive state, in place of allowing half of the farm to remain nominally in grazing, but in reality producing nothing.

"And as this," said Mr. Smith, "cannot be done without manure, and manure cannot be had without stock, the consideration naturally arises, 'How can the greatest quantity of stock be most economically maintained? and under what management can the largest quantity of manure be derived therefrom?' Four years ago I entered upon my farm at the Intacks. I then adopted the following system (which, to me, at first, appeared a very difficult one to accomplish, as the whole of the farm

was in a poor, dirty, ragged, wretched state). The first year I kept seven milk cows, four horses, and four stirks. In winter they were fed in the house in the day time, on cut tares, clover, &c. During the day, in summer, they were turned out to pasture in an old land grass field, of about six acres; and in the month of October they were housed, and kept tied up during the winter, until June. The second year I adopted the same system, but I increased my stock to nine cows; and the result of my stock feeding was that I had a stock of from fifteen to twenty tons of hay left. The third year I adopted the same system, but increased my stock to twelve cows; and the fourth year I adopted the same system, but increased my stock of cows to fifteen; and this year I have been enabled to increase my stock to nineteen milk cows and two bulls—(Hear, hear)—and have fed a quantity of fat cattle: we shall have a stack of hay left. This, then, has been the result of stall feeding, and by the economy of making the best of everything the farm produces; and I believe that I shall be able to keep a still greater number of cattle, the capabilities of the farm not being exhausted.

"The second year I erected a steam apparatus, for steaming my wheat and oat chaff, mixed with turnips and the refuse hay cut into chaff, by which I have found a very great saving in fodder, and in keeping the stock in condition, and in producing a good return in milk.

"You will perceive that in the third year I have had twelve milk cows. The first year I used for winter feed a two-acre field of grass, which had been sown two years. In June I turned out my seven milk cows in the day time into this field, and in ten days I was obliged to give them another field, as the whole had been eaten bare. This field the next year was sown with oats. The third year it was cropped in the following manner:—One half was sown with winter tares, and the other half with spring tares; and after the winter tares had been cut, I sowed that part with globe turnips. The result was that this field which only kept me seven cows about ten days by pasturing in the day time, kept me twelve cows with tares, fed in the house, eight weeks; and the turnips, after the winter tares, supplied me from three to four weeks with food for fifteen cows.

"In winter, the food of cattle ought to be given warm. If you adopt the steaming and the stall feeding, you will find, by experience, that warmth produces a saving of food; it is, indeed, an equivalent for food. Everything that cools the body of an animal causes a proportionate expenditure of food. In stall feeding, the temperature of the air of the stalls should be equally maintained, and they



should be kept clean, and the animals should be regularly fed.

"You will find that by stall-feeding your cattle you will be enabled to keep three times, if not four times, the quantity of cattle, by keeping the cattle in the house and bringing the food to them; and the manure produced by one of these cows, so fed and so bedded, would be more than that of three cows pastured in summer, and fed in winter in the ordinary way.

"Here, then, are two assertions well worthy serious attention; and if they are really founded in fact, then any who may be able to keep one cow would, by changing his plan, be enabled to keep three; and each one of these producing as much manure as three fed in the way you have hitherto been accustomed to adopt, the result would be, you would have nine times as much manure by the new system as by the old.

"The cows are only in the house during part of the winter; and whilst there, if there is any open weather, they are always to be seen ranging over the fields in search of food; so that I think you cannot but admit that, upon a calculation for the entire year round, the animal is not in the house more than eight hours in the twenty-four; and it is only the manure made during this period which can be reckoned upon. Therefore it is sufficient to show that one cow fed in the house for twenty-four hours will yield as much manure as three cows only kept in the house eight. But it is quite evident, from my experience, that if the cows kept within should be fed with turnips, hay, boiled linseed, straw, chaff, &c., and well bedded with straw, which the others are fed upon, leaving them little or no bedding whatever, then the calculation must turn decidedly in favour of the animal which is well fed and bedded. It has been proved that animals fed on oilcake, linseed, grains, &c., give manure in value double that of common stock; for abundance of nitrogen is supplied where very little is required, and consequently much is voided in dung. Various eminent chemists have investigated the amount of dung produced from a given weight of food and fodder. It appears that one ton of dry food and straw gives a quantity of farm-yard dung, which weighs, when recent, 46 to 50 cwt.; after six weeks, 40 to 44 cwt.; after eight weeks, 38 to 40 cwt.; half rotten, 30 to 35 cwt.; when nearly rotten, 20 to 25 cwt.; so that we see that when farm-yard dung is only half rotten, it loses one-half of its original weight.

"It is a question which deserves the serious attention of practical farmers, as to what time the manure ought to be applied to the land. I last year applied fresh dung to my stubble land, and ploughed it in, about November, for my turnip

crop. The result has been that the crop was equal to turnips dunged with rotten dung. In both cases, I applied, at sowing time, two cwt. of guano to the acre. I have adopted the same plan this year, by laying on all the fresh dung I had on hand. This, I consider, is a great saving of manure, and a great saving of expense, and one very important to the farmer, besides a great saving of time. I have no doubt that manure will be more generally applied in an unfermented state. In fact, as farming generally improves, so also will the mode of manuring.

"I now come to speak to you of liquid manure, of which there are various modes of application. My tank is at the back of my farm-building (with drains from the house, byers, &c.), in which I have a wood pump, and apply it to the land in a common water cart, similar to what you see watering the streets. We apply ours to our old-land grass, seeds, oats, wheat, and turnips, manure heaps, &c. Last year we covered from thirty to forty acres with liquid manure. One grass field, about four acres, which had produced us only nine pikes of hay, by the application of mixed liquid manure, produced nineteen pikes; and the quality of the hay was much improved.

"The great disappointment, in the application of urine water, arises from not having properly constructed tanks, and in not having the urine in a fit state to apply to the land.

"Now, upon the quantity of ammonia contained in farm yard manure, solid and fluid, its fertilizing powers to a very considerable extent depend. Mr. Sapringer analyzed urine in three different states:—First, when fresh; secondly, after being putrefied by itself; and thirdly, after being putrefied and previously mixed with its own bulk of water. When fresh, 100,000 parts he found contained 205 parts of ammonia; but, after putrefaction, this proportion of ammonia was increased to 457 parts, or considerably more than doubled; and when watered previously, it was then found to contain, after putrefaction, 1,622 of ammonia, or nearly eight times the quantity it did when fresh. Not only is the quality of the urine and the solid affected by age, sex, food, and difference of animal, but in cold weather the amount of ammonia, or rather the principle affording it, is less; often it is not half in winter what it is in summer. This I hold is a strong proof of the advantage of summer soiling, so that it may be reduced to some general principle, easily understood and easily remembered. These facts are scattered up and down amongst the various writers on the different quality of manures afforded by different animals, or the same animals at different times. We may, with this division,

present in a table the composition of the urine of various animals at one glance:—

	Water.	Salts.	Am.
Cattle urine, per 100lb...	92'62 ..	3'39 ..	4'00
Horse .....	94'00 ..	5'03 ..	0'70
Sheep .....	98'00 ..	12'00 ..	2'80
Hog.....	92'60 ..	1'76 ..	5'64
Human .....	95'75 ..	1'88 ..	2'36

Now, bear in mind that the last column gives the true value of the different liquids. The actual amount of ammonia in human urine and cattle dung is about the same; yet, in actual practice, the effects of urine are double those of dung. Look at the reason of this. In the first place, the principle which gives ammonia in urine runs at once by putrefaction into that state; whereas in dung the ammonia arises from a slower decay. Hence we have a quick action with the liquid, a slower one with the solid. A second cause of the better effects of the liquids, on growing crops, is, that it contains, besides the ammonia, a far greater amount of salts, and gives a more permanent effect. The amount of salts in human, cow, and horse dung, is about 1lb in every 100; whilst the urine of the same animal contains nearly 6lb. in every 100. A third cause of the great fertilizing action is found in the peculiar character of some of these salts, which are composed of soda, potash, lime, &c., united to an acid formed from urea in the animal body. Unless you understand, then, the principles of these actions, and apply them too, your labour is all vanity when you attempt to save your own or your cattle's urine. Let this be a maxim with you—"Keep what you have got, and catch what you can" (laughter). This must never be lost sight of in manure.

"In conclusion, the importance of adopting such an improvement in agriculture will be easily comprehended by the following calculation:—The extent of land under wheat in the United Kingdom is about eight millions of acres, and the average produce about 3 quarters or 24 bushels. Now, if this average could only be increased to 30 bushels, this would yield six millions of quarters. This produce, at the average price of years to come, I will not take the present price, but say 50s. per quarter, would yield the sum of fifteen millions of money. It is, therefore, on the weight of the crop, the great increase of food for stock, and the superior manure made from that stock, that the very stability of the nation is involved in this question. We are now brought into competition with all the world; and if we neglect to improve our lands by every means in our power, to supply our own increasing population with food, the fault will lie with ourselves" (applause).

When Mr. Smith had come to a conclusion, a short, animated discussion, in which Messrs. Grey, Harbottle, Lee, Campion, and others took part, ensued. In reply to questions put to him, Mr. Smith stated:—1. That tanks not unfrequently proved useless, because not properly constructed. All the virtue of the liquid was allowed to escape into the air, and no benefit was derived from what remained. 2. The expense of his steam-apparatus was £5 altogether. 3. Two waggons of small coal served him the whole year. 4. While increasing his stock he had not increased the extent of the farm to which the experiments applied. 5. He kept the same number of horses the whole time. 6. The manure was laid on the surface and ploughed in—not in drills. The land was on a declivity, and he found it better to pursue this plan.

The PRESIDENT offered a few remarks as to the application of raw and old manure. The effect to be produced, he said, must always be taken into consideration, before deciding what kind of manure to apply. If a quick action, extending over a short period of time, were required, or if they desired a slower and more permanent effect, they must manure accordingly. Mr. Grey related a case in point. Sir Humphrey Davy found by analysis that raw manure contained more virtue than rotten. He therefore fell into the error which men of theory, ignorant of practice, were apt to commit: he came to the conclusion that raw manure, as a general rule, was preferable to rotten. The enterprising farmers of Berwickshire acted upon the philosopher's deduction: they placed raw manure in their turnip drills. The consequence was, as a rapid action was required, that the crops were light; while those of neighbouring farmers—men of the old school—were heavy; and the laugh went against the spirited and improving tenantry of Berwickshire. If guano and foldyard manure were used, it was better to apply them together than separately. The one acted as a quickener—the other exerted a slower but more permanent influence; and thus a double advantage was gained when the two were used together, and heavier turnips would be produced.

Mr. SMITH said it was certainly necessary that the manure should be suffered to ferment before application, or be ploughed in, and left to ferment underground. There was another thing to be taken into consideration; and that was, the nature of the subsoil. He would not have manured as he had done, had his subsoil been gravel instead of clay. Being clay it held the manure. The turnips were a heavy crop. The women told him they had taken off their garters (laughter), to measure some of the turnips, and they found them of greater circumference than their own waists (great laughter).

A vote of thanks was passed by acclamation to Mr. Smith, for his excellent paper.

Mr. SMITH returned thanks. He had seen, he said, many farm-yards, in which a lamentable disregard of economy was visible. An immensity of manure was wasted. The liquids were suffered to run from the homesteads unheeded. The solids lay reeking in heaps, with their virtues escaping into the atmosphere. When this wasteful action had gone on for a time, the farmer turned over his heap, and renewed the improvident process. Then, when the mass was rendered worthless—when nothing but straw and rubbish was left—it was

applied to the land, and disappointment was the result. If great crops were wanted, the manure-heap must be the farmer's great care. (A cry of, "How do you keep your manure?"). The heap should be composed of manure and soil in alternate layers. The soil fixed the ammonia. It was also desirable to throw all refuse animal substances into the heap, which was thereby greatly enriched.

Mr. HARBOTTLE gave "The health of the President," which was drunk with loud and general cheers; and when other toasts had been drunk, the company broke up.

PROBUS FARMERS' CLUB.

The annual meeting of this club was held at the Hawkins's Arms, Probus, where about thirty persons sat down to a good dinner provided by Mr. Weekes. The chair was taken on the occasion by Mr. Tresawna, with Mr. R. Doble acting as vice. Various tabular statements were suspended at the end of the room, containing analyses of soils and manures, and the results of experiments instituted with different manures by J. H. Tremayne, Esq., Heligan; J. D. Gilbert, Esq., Trelissick; at Trewithen, the residence of C. H. T. Hawkins, Esq., the experiments being made by Mr. Trethewy; at Treverbyn, Probus, by Mr. Kendall; and also by Mr. Charles Parks, Newlyn. A lecture, founded on these experiments, was delivered in the course of the evening by Mr. Karkeek, and to the full report of it which we have given we invite the attention of our agricultural readers, as it lays before them many important results from the use of different artificial manures.

After the usual loyal and complimentary toasts were given and responded to,

Mr. KARKEEK read a paper founded on experiments made and attested by members of the club, on the use and application of certain artificial manures for the turnip crop. Mr. Karkeek said he felt honoured in being, by request, the humble expositor of the practical experience of members of the club; and he would beg to suggest for their guidance, in the course of the inquiry, that when the produce obtained by the application of two unlike manures in the same experiment does not differ more than a ton or a ton and a half per acre, the effect of the two manures should be considered as practically equal, since the amount of difference may have arisen from the unlike qualities of the soil to which the manures were respectively applied. Among the many experiments intrusted to his revising, there were none that he could find so de-

serving of their attention as those made with bones and sulphuric acid. The use of bone dust had been so general and so extensive as a manure for turnips for so many years, that it may be imagined that scarcely anything new could be adduced respecting it; but the experiments before him made with bones dissolved in sulphuric acid, commonly called oil of vitriol, showed that they had much more to learn in the economy of this valuable manure. The first experiment to which he would direct their attention, with this new fertilizer, was made by J. H. Tremayne, Esq., of Heligan. Three acres of strong loamy clay slate soil were appropriated for the experiment. The seed was Skirvinge's variety, sown in the latter part of May, 1845, in drills of twenty-seven inches apart. Each of the manures was mixed with fourteen bushels of wood and coal ashes per acre, which was drilled in with the seed. The following statement shows the different manures applied, the cost per acre, and the profits per acre:—

No.	Manure per Acre.	Cost.	Produce per Acre.
1.	24 bushels bone dust .	72s.	30½ tons.
2.	8 bushels of bone dust and 100 lbs. sulphuric acid }	36s.	28 "
3.	20 cart loads of good farm yard manure }	60s.	28 "

The Swedes grown by the vitriolized bones were the earliest in leaf, and fitted to hoe sooner than the other plants. Ultimately there was no great difference in the weight of bulbs, but the difference in the expense per acre was very considerable, the bone dust and dung costing more than the amount stated, as the extra expenses of carting and spreading the dung were not taken into the account. Mr. Karkeek said it should be observed that the crops in this experiment, compared with those afterwards mentioned, might appear large; but it should be remembered that the turnip crop of 1845 was one

of the largest, and the one of 1846, perhaps, one of the smallest, since the general introduction of artificial manure into the county. In this and the other experiments he had purposely omitted the odd hundred-weights when they had not amounted to the fourth part of a ton. The proportion of bones and acid used per acre upon Mr. Tremayne's experiment is unusually large; the quantity now recommended is four bushels of fine bone dust, weighing about 180lbs. to 80lbs. of concentrated sulphuric acid, the common oil of vitriol of the shops not being sufficiently strong for the purpose. Mr. Karkeek then stated the method of manufacturing the vitriolized bones, now commonly known as super-phosphate of lime; there were, however, he said, several difficulties in the way of farmers making the preparation for themselves, and to obviate these difficulties the super-phosphate is prepared in a dry powder ready for use, and sold at as cheap, if not cheaper rate, than a farmer could make it himself. Philip Pusey, Esq., chairman of the Journal Committee of the Royal Agricultural Society, was the first to direct the attention of farmers to the value of dry super-phosphate, in an experiment made with bones in three different ways. The trial ground was three acres. On one part a mixture of bones and acid was drilled at the rate of four bushels and a half of bones to the acre; in another part, bone dust at the rate of twenty bushels per acre; and on the third part the dry super-phosphate at the rate of two cwt. per acre. The result was that the dry super-phosphate surpassed the bones as well as the vitriolized bones which he had manufactured himself. The bones produced  $44\frac{3}{4}$  cwt. of turnip bulbs on the fifth of an acre, at an expense of 55s. per acre; the mixture of bones and sulphuric acid produced  $49\frac{1}{2}$  cwt., at a cost of 22s. per acre; and the dry super-phosphate produced 53 cwt. of turnips on the same space, at an expense only of 17s. per acre. Many of the experiments intrusted to his care confirmed Mr. Pusey's statement, as to the economy of using superphosphate of lime for a manure. The following experiment was made on Treverbyn estate, in Probus, by Mr. J. Kendall, on a barley arish, the soil of a light loamy character, resting on brown arinaceous slate, and valued at 25s. per acre:

No.	Manure per Acre.	Cost.	Produce per Acre.
1.	12 bushels of bone dust and 2 cwt. of sulphuric acid	60s.	20 tons.
2.	20 bushels of bone dust and one cart load of wood ashes	68s.	18½ "
3.	Dry super-phosphate	64s.	20 "
4.	3 cart loads of wood ashes and 3 cart loads of field ashes	33s.	8 "

The object Mr. Kendall had in view in making the experiment was to test bones in three different

ways at about the same expense. The super-phosphate took the lead at the commencement, and continued it throughout. The rapidity of growth is seen in every experiment made with super-phosphate, which is of essential importance; for the turnip is a plant which exposes a large surface of leaf to the atmosphere, and on this depends its power of obtaining organic matters from the atmosphere. Mr. Kendall's experiment is not a favourable one as far as the super-phosphate is concerned, there being no saving of expense, and the produce in each case being nearly equal. The next experiment is a trial of Ichaboe guano against the dry super-phosphate, by Mr. Charles Parks, at Newlyn, on a wheaten arish, the soil of a deep loamy character, resting on arinaceous slate, and valued at 25s. per acre. The extent of land was five acres.

No.	Manure per Acre.	Cost.	Produce per Acre without Tops.
1.	2½ cwt. of Ichaboe guano	22s. 6d.	13¼ tons.
2.	2½ cwt. of super- phosphate	22s. 6d.	16½ "

He had several experiments of this character before him, and in every instance the super-phosphate proved to be an exceedingly cheap manure, and rapid in its fertilizing properties. J. S. Enys, Esq., of Enys, tried the super-phosphate on a piece of sparry soil, resting on coarse argillaceous slate, near Carclew downs, valued at 10s. 6d. per acre. On 27 rows, measuring 29,403 square feet, manured with two cwt. of Ichaboe guano, the weight of turnips without tops was eight tons per acre; whilst on 22 rows, measuring 24,948 square feet, manured with two cwt. of super-phosphate, the weight of bulbs averaged eleven tons per acre. The Rev. T. Phillpotts, of Feock, instituted some very extensive experiments with different manures for turnips, and the result confirms the experiments previously mentioned, as he obtained as heavy a crop with four cwt. of super-phosphate and a half cwt. of Potter's artificial guano mixed, at an expense of 46s. per acre, as with thirty-two bushels of bone dust, at a cost of 96s., or with thirty-two bushels of bone dust and a half cwt. of Potter's guano, at a cost of 102s., or with twenty-eight loads of rich butchers' dung, at a cost of 168s. per acre. The next experiment was instituted at Trewithen, the seat of C. H. T. Hawkins, Esq., by Mr. Trethewy, with four different kinds of manures for turnips, on an old ley pasture of a loamy character, resting on arinaceous slate, valued at 30s. per acre:—

No.	Manure per Acre.	Cost.	Produce per Acre.
1.	Ichaboe guano	36s.	23½ tons.
2.	Liebig's patent manure	35s.	24 "
3.	Dry super-phosphate	45s.	23½ "
4.	Bone dust	72s.	20¼ "

The most interesting part of this experiment is the effect of "Liebig's turnip manure," which produced the largest crop at the smallest expense. This manure pushed the turnip plant more rapidly forward than either of the others, but it will be seen that the same effect does not always attend its operations, for in the very next experiment made by the same party, on Carnwinick estate, and in a different kind of soil, it had quite a contrary effect. This was on a plot of ground of six acres, purposely reclaimed from the wastes adjoining Trelyon common, by stubbing, beating, and burning, as is usually practised in cultivating the gorse wastes in this county. The soil is of a coarse character resting on argillaceous slate:—

No.	Manure per Acre.	Cost per Acre.	Produce per Acre.
1.	Liebig's turnip manure	35s.	12½ tons.
2.	Saldanha Bay guano, No. 1.	26s.	27 "
3.	Super-phosphate of lime	45s.	20½ "
4.	Bone dust	72s.	26¾ "
5.	Ichaboe guano	38s.	20½ "
6.	Saldanha Bay guano, No. 2.	38s.	26½ "

In remarking upon this experiment, Mr. Karkeek said, the first thing that attracts the attention is the small produce from Liebig's manure, compared with its effect in the former experiment, for in this case it appeared to have acted the worst of the lot. He then proceeded to account for the contrary action of this manure on the two soils by stating that the meadow at Trewithen having been highly manured for the last seven years with farm-yard dung, might be considered as fairly rich in carbonized and nitrogenized matter, besides a tolerable amount of alkaline phosphates and silicates; but the Carnwinick soil could not afford much of these matters, for excepting the ashes left from the burning of the furze roots, &c., there was, probably, very little else, saving the inorganic or mineral elements which the soil itself afforded. He then remarked upon the mineral wealth of the soil of this county in an agricultural point of view, which was but seldom considered, and afterwards gave the analysis of Carnwinick soil (by Mr. Hunt), stating his belief that the failure of Liebig's manure on that soil was owing to the absence of a sufficient quantity of the phosphates, and, perhaps, of azotized matter also. He knew nothing of the composition of Professor Liebig's manure; he believed it to be entirely a mineral one; but the next experiment would perhaps throw some light on the subject of its failure at Carnwinick. This was made on a very extensive scale by J. D. Gilbert, Esq., Trelissick, on a wheaten arish of ten acres, lying on coarse argillaceous slate, abounding in quartz (provincially spar stones,) the soil of which was extremely poor, having been very considerably injured by bad farming previous to its coming into Mr. Gilbert's possession. It was

valued at 12s. per acre, and in preparing the land for a turnip crop of "Scotch yellows," it was ploughed seven inches deep, and the seed and manure drilled in twenty-seven inches apart.

No.	Manure per Acre.	Cost per Acre.	Produce per Acre.
1.	Bone dust	72s.	10 tons.
2.	*Fish refuse (one load of fish offal mixed with 11 loads of earth)		11½ "
3.	Farm-yard dung	100s.	10½ "
4.	3 cwt. Liebig's patent manure	35s.	6 "
5.	3 cwt. Liebig's patent manure, with 200 lbs. of Ichaboe guano	59s.	11½ "
6.	400 lbs. of Ichaboe guano	32s.	15 "
7.	24 bushels of bone dust and 190 lbs. of nitrate of soda	91s.	20½ "
8.	24 bushels of bones and 100 lbs. of nitrate of potash	98s.	20¾ "

The produce in each case, excepting the two last, was exceedingly light, but the experiment is an interesting one, as testing the effect of eight different manures on a poor exhausted soil. In this instance Liebig's manure, compared with the guano, No. 6, at about the same cost per acre, yielded only two-fifths of the weight of turnips; and in the trial No. 5, where 200lbs. of Ichaboe guano were added to Liebig's manure, the weight of turnips, compared with No. 4, was exactly doubled. The guano in this instance contained, according to analysis, 30 per cent. of phosphate of lime, with magnesia, oxalate of lime, and 25 per cent. of ammoniacal salts. From this he was led to believe that the inactivity of Liebig's manure on Carnwinick, was owing to a deficiency of azotized matters in the soil, as well as the want of a sufficient quantity of phosphate, for when both were added in the guano used in Mr. Gilbert's experiment, the crop was equal to that produced by twenty-five loads of good farm-yard manure, and superior to that produced by twenty-four bushels of bone dust. In Nos. 7 and 8, in the last mentioned experiment, they had a striking proof of the utility of combining nitrogenized substances with the phosphates when absent in the soil; for the addition of 100lbs. of nitrate of soda in one case, and the same weight of nitrate of potash in another case, produced an increase over No. 1, when the bone dust was used without these salts, of double the produce. Both these salts furnish nitrogen to the plant as well as an alkali, and hence their value in addition to the bone manure, on a

\* The recent fish refuse, according to a note in the last edition of Sir H. Davy's work on Agricultural Chemistry, contains about four per cent. of nitrogen, besides the phosphates.

soil previously exhausted of these materials— 100lbs. of each furnishing about 19lbs. of nitrogen. The nearly equal effect of these two salts was rather opposed to his preconceived notion; he expected to find the nitrate of potash produce the largest crop, and must ascribe the effect of this manure to the nitrogen only, or to the principle that both potash and soda are capable of replacing each other in the living vegetable, without materially affecting its growth. It was likewise observed that the plants of Nos. 7 and 8 grew more rapidly at the commencement than any of the others, which might reasonably be expected, as the soil required a nitrogenized substance to support the leaf and stem of the plant. The turnip crop can be cultivated, perhaps, with a smaller supply of nitrogenized substances than almost any other, particularly when compared with wheat, barley, beans, &c. Science now taught them that the atmosphere yields its portion to the growth of plants, as well as the soil. Hence the larger the vegetable surfaces they could present to the atmosphere in the shape of luxuriant stem and foliage, the more they should absorb from it; and this was partly effected by the organic matters in the soil, whether supplied in the shape of manure, or from accumulated vegetable and animal matter in a state of decay. Therefore, if the farmer does not possess these materials in the land, he must carry them in the cheapest way he can. Good farm-yard manure, in a recent state, not too much decayed, will afford him an abundant supply; and unless these matters are supplied to the soil, the inorganic or mineral elements, such as the alkaline phosphates and silicates, will not be of much avail to the growth of the crop. Mr. KARKEEK then adverted to the doctrine recently introduced by Professor Liebig, which under-estimated the influence of organic manures in the soil, and attached the more importance to the inorganic constituents of plants, by keeping a supply of which in the soil he is of opinion that the carbon and nitrogen, which are necessary for the growth of the plant, will be supplied through the atmosphere. This is a theory altogether opposed to the experiments which he (Mr. Karkeek) had placed before them that day, and it was also opposed to Liebig's previous teaching. They might rely upon it that the inorganic elements were of very little use in a soil as food for plants without a corresponding supply of the organic; indeed, he was of opinion that the roots of plants have neither the power of assimilating the inorganic substances in the soil, or the organic substance from the atmosphere, in such a degree as to enable the farmer to grow twenty tons of turnips per acre, unless they are supplied with a fair proportion of carbonaceous and azotized substances in the soil. The reason that guano answered so well was because it

contained (like farm-yard dung) all the elements which plants require; and putting either into the earth restored those substances which the plants abstract from it, and which are necessary to their growth. For the turnip crop next season he would recommend them to use a mixture of super-phosphate of lime and guano, in preference to either of those manures singly, which he had every reason to believe would be found to be a useful and economical manure, not only for turnips, but for grain crops generally. Another advantage derived from the mixing of these manures was, that the super-phosphate fixes the volatile parts of the guano, and prevents its dissipation into the atmosphere, which loss must otherwise ensue when so small a quantity as two cwt. or three cwt. is distributed over an acre of ground as a top dressing for corn or grass, particularly in dry weather. Some of the guanos are more evaporable in the atmosphere at common temperatures than others. The South American is less volatile than that from Ichaboe and other African localities, which, under circumstances of exposure, should be either mixed with a substance that would lessen its volatility, or be quickly covered up in the soil. When the last is done, he believed he might safely say that it produced as good an effect on the crop for which it is applied as the Peruvian. But the deposit at Ichaboe had been long since exhausted, and they would be obliged to have recourse to other kinds. Mr. Karkeek concluded by stating that he had confined himself strictly to an explanation of the experiments before him, and the theories he had advanced were open to fair and legitimate discussion.

Mr. W. CARDELL inquired whether super-phosphate would be of strength to remain in the land so long as bone dust. It appeared that the latter had remained on Carnwinick estate for ten years.

Mr. KARKEEK said his object was to recommend a manure that would produce at a cheap and rapid rate. The super-phosphate being a soluble substance, they could not expect it to remain so long in the soil as the bone dust. He did not for a moment compare the two manures together in point of stability. The experiments of Mr. Trethewy on Carnwinick were a sufficient proof of this, showing as they did the permanency of bone dust as a fertilizer.

Mr. TRETHERWY, adverting to the last experiments on Carnwinick estate, said they confirmed Mr. Karkeek's views as to the rapidity of growth after applying super-phosphate. At the first start of the turnips, the portion manured with super-phosphate went considerably a head of the rest, but afterwards it fell back. At Trewithen, the value of land being 30s. per acre, the produce from three quarters of bone dust was twenty tons per acre;

while at Carnwinick, where the land was worth only 5s. per acre, the produce from the same quantity of bone dust was upwards of twenty-six tons per acre. This showed the action of bone dust on certain soils; he had found it answer exceedingly well on newly reclaimed land.

Mr. KARKEEK said it had been frequently seen in practice that three-quarters of bone dust, each bushel weighing about 48lbs., would produce better crops of Swede turnips on waste lands than on old pastures. In consequence of that, he was led to believe that a great deal of the wastes of this county might be cultivated, and bone dust should therefore be considered as one of the very best manures ever introduced for this purpose. It was the quantity of potash contained in this description of soil, and having never been made use of, that enabled the turnip crop to come forward as it did on the Cornish wastes.

Mr. GILL observed that a general principle was, to keep the land sweet. Now, wherever there was grass on the waste lands referred to, an acid generated by the plants would be washed off by the dews and showers, by which the land became soured. They must therefore add an alkali to correct this acidity, and then he doubted not they would have flourishing crops wherever the component materials for those crops were found in the soil. If they added bones or phosphate of lime to the soil, the acid, having an affinity for the lime, would evolve carbonic acid gas, and the effect would be that if turnip seed were sown in that land it would spring up very rapidly in its early stages, which they knew was desirable. Mr. Gill next made some remarks upon the uncertainty of experiments made by agriculturists. He would recommend them, as a club, to take, say two fields; have the soil of each accurately analyzed; then set out portions for the trial of each manure, mark the results, and afterwards have their own fields analyzed; for unless they knew the nature of the soil in which manures had been tried, and also the nature of their own soils, they were quite in the dark. He next recommended the throwing silicate of potash into the streams flowing through watered meadows, which he considered would be of much benefit, as it would spread over the surface, and was a necessary element in the composition of grasses, seeds, and rushes.

The conversation proceeded in a desultory manner for some time longer.

Mr. KARKEEK recommended the using a large quantity of wood ashes with bone dust and guano, and advised them to save all the wood ashes they could.

Mr. TRETHERY wanted to know why the straw was so deficient in this county, if the soil contained such an abundance of silica, which was the very

requisite for straw. Above Exeter there was better straw than in this county.

Mr. KARKEEK also propounded the question why wheat lodged more on the granite than on the slate soils, although granite contained eight per cent. of potash and seventy-three per cent. of silica, white clay slate contained only forty-nine per cent. of silica and one per cent. of potash.

Mr. WHITLEY spoke of some land between Truro and Redruth, just by Whitehall, which produced capital grass, and very good turnips and potatoes, but grain crops in all cases invariably failed. The plant of the corn was very healthy; but when the stalk began to put forth the ear, it failed. In this land silica was most abundant; but he believed that those substances which were required to render it soluble were not to be found in the soil.

Mr. GILL remarked that on granite the attraction of cohesion had much influence, while the silicate in slate was more easily acted upon.

Mr. WHITLEY observed, in reference to the lodging of wheat upon granite, that the granite soils were more exposed than the killas.

Mr. TRETHERY spoke of the sending portions of Carnwinick soil to Mr. Hunt to be analyzed, and Mr. Hunt finding phosphates in that part of the soil where bone dust had been applied ten years before. He then pointed out to Mr. Gill, who had recommended the analysis of land before trying manures upon it, that the club had thus ascertained the analysis of land at Carnwinick; and the result of experiments, as alluded to in Mr. Karkeek's lecture, was, that guano would answer upon any soil; that Liebig's manure was best upon a rich soil; and that bone dust answered better than other manure upon a barren soil.

The health of the chairman was then given, and received with loud applause; after which several other toasts were drunk, and the evening passed most pleasantly.

## THE POTATO DISEASE.—IMPORTANT COMMUNICATION.

TO THE EDITOR OF THE MARK LANE EXPRESS.

SIR,—The following fact, about the potato plant, may not be unimportant at this time of the year. I last year received, direct from the Brazils, two barrels of *genuine wild* potatoes, small, but very healthy, having been grown in a district where no potato blight has been known. They were planted, about the end of February, in land that had remained in pasture more than twenty years. The situation and soil were favourable; the latter a little stiffish. *No dung* was used in setting them, but a few decayed leaves and a little sand. Under

these circumstances, then, it might be well expected that if potatoes can escape disease, these would have had a fair chance—wild Brazilian potatoes, planted in England for the *first* time, in a favourable situation, and in virgin soil. Yet in the autumn the disease failed not to appear, and even carried off a third of the finest and most vigorous looking crop ever seen.

The above must, then, contradict many of the theories which have been advanced as to the cause or origin of the disease. It cannot be owing to any *degeneration* in

the plant itself, or to any corruption or exhaustion of the land, or from over dunging, as some imagine.

If you think this letter worthy of insertion, as throwing any light (if it be only of a negative character) upon the question of the potato disease, either by settling disputed theories, or by preventing farmers from taking useless precautions and making vain experiments, it is at your service for insertion. I inclose my card and address, and am, Sir, yours obediently,

R. P. G.

Manchester, Feb. 5.

### PLYMPTON ST. MARY FARMERS' CLUB.

At a meeting of the Plympton Union Farmers' Club, held at the Yealmpton Inn, Yealmpton, on Wednesday, the 27th January, the subject of farm leases, named for discussion, was introduced by Mr. H. Symons, of Whifferton, as follows—Mr. Pitts in the Chair :—

The question of farm leases being in itself of vital importance to landlords, tenants, and the community, is now being regarded by intelligent men of all classes in its true light ; it therefore becomes me to approach it with very faltering steps, and to apologise to the club for having presumed to introduce it here for discussion. But I take courage, from the consideration that although many of the wise and prudent are now very zealous for a reformation in those important documents, there still remains a large majority of the men who are not only directly interested in, but actually parties to, such documents, without knowing scarcely a covenant therein ; thus I am led to hope that the most humble remarks may, perchance, induce further inquiry among this class of persons.

It will, I think, be readily admitted by all present, that few, very few, farm leases are anything like what should exist between landlord and tenant ; and, where such documents are executed, it is frequently the declared feeling of both parties that the covenants of cultivation and tillage are only intended as a protection to the land against bad tenants ; thus they are laid on the shelf, and no further regarded, until some serious breach has been committed, and the seeds of litigation sown, which frequently ripen and choke all further friendly intercourse between two parties whose interests are so closely interwoven, and in whose mutual prosperity the whole community is interested. Surely you will all admit that mutual security in this important matter is much to be desired. The security of a tenant has been much discussed throughout the country under the head of "tenant-right," which being first suggested and considered by the London Farmers' Club, has recommended itself extensively to local clubs. I have some doubt as to the wisdom of the choice of this title ; for be it remembered that in discussing tenant-right, whether by an assemblage of tenantry or of a mixed interest, it is idle to exclude from consideration the landlord's right ; for although the tenant must necessarily make a large investment in the soil before he can receive back its produce, he at the

same time possesses great facilities of seriously infringing the rights of his landlord.

But very many of the leases existing in this county not only do not properly protect either party, but contain such covenants of cultivation as would, if strictly adhered to, prove detrimental to both, and, above all, to the community, in loss of food. Instance the three successive corn crops required to be taken in each course of tillage, and the fifty or sixty bushels of lime, be the land what it may. Again, we find covenants precluding the sale of various descriptions of produce, whatever be the price or the facilities of sale, or of reimbursing the land by a return of manure. Surely it matters not to the landlord what becomes of the produce, nor from whence the manure is derived, provided the land is properly manured ; but such manurance is of such vital importance as should make it imperative on the tenant to furnish proof when required, the absence of which proof should be deemed a breach of covenant. Thus the very variable question of cropping and manurance would be much simplified, and the tenant be at liberty to adopt such improvements as may from time to time be developed, and from which so many are now precluded.

The more immediate object in the frequent discussion of tenant-right appears to be to provide remuneration for permanent improvements and unexpended manurance and tillage. These are certainly valuable considerations which cry aloud for protection, seeing that in the absence of it the land is frequently damaged by an off-going tenant to an extent which requires several years of great expenditure and careful nursing to recover ; hence the immense loss between the two tenants, and also to the community. But here again be it observed, that in providing protection and remuneration for the tenant for what he may leave in the land, it is fair, also, to provide a remuneration for the landlord for any damage his land or premises may sustain by bad treatment ; to accomplish which it is necessary that frequent investigations should be made as to the culture of the land, either by a statement of the cropping and manurance, returned and certified by the tenant from time to time, or by an inspection on the part of the landlord ; and in order to determine, after such certified return or view, whether or not the land is being fairly treated, a standard of manurance should be set up, presenting a given quantity of



lime, dung, bonedust, or an equivalent in other acknowledged effective manure for and in lieu of each corn crop, and that no two corn crops be taken in succession; and that manure carried for green crops should not be deemed a manurance for corn unless the produce thereof be consumed on the land where grown. Thus the farmer would be at liberty to crop as fast as he finds profitable, and to change his rotation of crops as increased science may suggest, with the exception of alternating green with corn crops; and I am of opinion that however fast the land may be cropped, it cannot be injured, provided the tillage be in accordance with good husbandry. And with respect to what part of the produce may be sold off the land, so as an equivalent is returned in manure, this as well as the cropping should, as far as consistent with the due protection of the soil, be discretionary with the farmer; indeed, without considerable latitude in these respects, it will be impossible that the improvements which may from time to time develop themselves can be made generally available. It may, however, be urged, as I am aware that it has already frequently been, that such returns or investigations of the farmer's proceedings are inquisitorial, and improperly interfering with his business. This objection I most boldly treat as very deficient in principle, seeing that wherein the land is honestly treated there need be no fear of investigation; indeed, it seems reasonable that a fair and honest farmer would prefer that his landlord should from year to year possess himself of such information as would prove the character of his tenant; and I incline to the opinion that where there exists a contrary feeling, there cannot be that emulation for agricultural improvement so loudly professed.

It should, I think, be clearly seen that when a landlord lets a farm under a covenant for a given amount of rent and certain covenants of culture, he is as much entitled to satisfy himself that his land is fairly treated as he is to count the bank-notes paid him as rent; nor can I see that the landlord is performing his duty who does not satisfy himself on those points, for he is remembered that no man has a moral right to allow his land to be abused; the community will fairly call him to account for the talent committed to his care, seeing that the people's bread is dependent upon it.

With reference to the permanent improvements, of which this locality stands so much in need, such as improved buildings, draining, pulling down useless fences, &c., these are landlord's duties, and will, I trust, receive their attention; but it is only common honesty to say that when such improvements are made after the terms of a tenancy are agreed on, and form no part of the consideration, the landlord is fairly entitled to interest for his money in increased rent; but such improvements should be made with the consent of the tenant, or no interest be claimed for the outlay. And here I dare not fail to remark that in many cases where such improvements have been made, and at great expense, it has frequently happened, through neglect on the part of the tenant that drains have become choked and useless, and buildings gone into dilapidation, for want of an inexpensive stitch in time, which the tenant may generally apply. This is one of the unhappy results of that want of union between landlord and tenant. I may instance a case which has very recently presented itself to my notice. A new building of considerable importance had been erected by the landlord, but in the finish it had been neglected to clear out a

proper drain at the back to keep the wall dry, the consequence of which was that the accumulations of water were from time to time actually driven into the barn floor and the cattle stalls, rotting the timber, and doing serious injury to both landlord and tenant, all of which might have been prevented by the tenant expending about 4s. or 5s. in labour to clean the drain; but no—he said the landlord left it so, and it was his duty to clear it. Surely no reasonable man, as a tenant farmer, can find excuse for thus allowing a waste of his landlord's property, which he can with so little difficulty or cost prevent; rather let every faithful tenant consider it his duty to protect the property he holds from every kind of waste and damage; thus, and thus alone, will he establish a fair claim to the favourable consideration of his landlord for such protection and encouragement as it is the duty, and, I trust under such circumstances, would be the pleasure of every landlord to afford a good tenant.

It will be in the recollection of many of us, that early in the existence of this club a very interesting and instructive paper was read to the members by Mr. H. Woollcombe on this subject, the result of which was the appointment of a committee to prepare a form of lease, such as might be considered applicable to this district, but unfortunately nothing further was done, the subject was allowed to drop for the time. I now presume to attempt its revival, and trust it may not be an abortive attempt, but that the club will regard it as deserving its most serious attention, and that we shall at once proceed to a free but temperate discussion, nothing doubting that by a steady and consistent perseverance, duly considering the rights of both parties to farm-leases, we shall ultimately succeed in doing a little of the great good which may reasonably be expected from thus assembling ourselves together. In conclusion I would venture to suggest that no lease should be for a less number of years than will admit of three courses of cropping.

After rather a lengthened discussion by the members present, the following resolution was agreed to:—"That the views expressed by Mr. Symons in the introduction of the subject are generally approved by the club, and that the principles of alternate white and green crops are worthy of promotion, giving in all cases the utmost discretionary power to the tenant in his cropping, so far as is consistent with the due security of the landlord."

WEALD OF KENT FARMERS' CLUB.—On Wednesday evening, January 20, the monthly meeting of this club took place at the George Inn, Cranbrook. Mr. Walker was unavoidably prevented attending, and consequently his second lecture on agricultural chemistry was postponed till the next meeting. The club accordingly proceeded to discuss the subject which stood over from the last meeting—"Tenant Rights." Mr. Barnes took the chair, and there were about sixty members present. An animated discussion ensued, in which a large number of the members present took part. The disposition was strikingly manifested to entertain the question in an enlarged and liberal spirit. It was strenuously maintained that a just and fitting relation between landlord and tenant must be equally as beneficial to the former as the latter, and that this was the true light in which the question of tenant-right ought to be viewed. The subject again stands over for another meeting. We shall present our readers with the whole of the resolutions when the discussion is finished. After electing Messrs. George and William Crampton, of Cranbrook, members of the club, the proceedings terminated.

## AGRICULTURAL TENANT-RIGHT.

## A BILL FOR THE IMPROVEMENT OF AGRICULTURAL TENANT-RIGHT IN ENGLAND AND WALES.

(Prepared and brought in by Mr. Pusey, Mr. Evelyn Denison, and Mr. Acland.)

WHEREAS it is expedient for the better security of Farmers in the Improvement of Land, and for the consequent increase of Produce therefrom, as well as of Employment for Farm Labourers, to enlarge and extend the custom of Agricultural Tenant Right in accordance with the modern advance of Husbandry: BE IT THEREFORE ENACTED, by The Queen's most excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, That every tenant under any holding commencing either before or after the passing of this Act\*, shall, on the determination of his occupancy of any farm, by effluxion of time, notice, death, bankruptcy or insolvency, be entitled to receive from the incoming tenant on behalf of the landlord, or from the landlord (subject as after provided) compensation for any outlay effectually and properly incurred by the said tenant from and after the passing of this Act in the temporary improvement of the said farm, by the purchase or preparation of artificial manures, or the purchase of food for cattle, or in the durable improvement thereof by draining, marling, or otherwise amending the soil of the same, or the permanent improvement of the same, by raising or constructing new fences, roads, or suitable and necessary buildings thereon; the said compensation to be estimated as follows: first, by ascertaining the cost of such improvements, then by determining the several terms within which every such kind of amelioration may be expected to reimburse a tenant for such outlay, and distributing the costs equally over such periods respectively, and then ascertaining what is due to the tenant (if anything) by deducting from such terms the time during which the tenant shall have had the benefit of such improvements: Provided always, That the expenses incurred in the ordinary course of good and clean husbandry, or in pursuance of any special contract made before the passing of this Act with the landlord, or of which the landlord and tenant shall have agreed to share the expense, shall not be reckoned as improvements for which the tenant is to be compensated under the provisions of this Act.

And be it enacted, That no tenant for a term of years having less than five years to run of his holding, shall be entitled to claim compensation under this Act for any work of draining or irrigation, except under any special contract already existing or hereafter to be made, unless he shall furnish beforehand to his landlord a statement

in writing of the plan and estimated cost of such work, and the said landlord shall agree in writing to the said plan; nor shall any tenant whatsoever be entitled to any compensation for any work of building, fencing, or road-making, without such plan and estimate furnished and agreed to as aforesaid, nor for any work of durable improvement whatever executed after he shall have given or received lawful notice to quit, or in the last year of a holding for years: Provided nevertheless, That if any tenant shall have erected any buildings without the consent of the landlord, and on the determination of his tenancy as aforesaid the landlord shall decline to make compensation for them in the same manner as the tenant would have been entitled to be compensated if they had been erected with consent, the tenant shall be at liberty to remove the said buildings at the determination of his tenancy, or within three calendar months from the time, and for that purpose shall have for himself and others a right of entry on the farm; but nothing herein contained shall authorize any tenant to injure or suffer to go to waste any buildings erected on the farm held by him.

And be it enacted, That no tenant shall be entitled to any compensation in respect of any permanent improvement when the same shall not be in good and sufficient repair or condition at the time of the determination of his tenancy, unless the said valuers shall think fit to allow the same, and then the cost of putting the same in repair shall be taken into account; and any building erected and in respect of which it is intended to claim compensation must have been proved to have been insured from loss by fire in its full value from the time of erection.

And be it enacted, That any tenant claiming compensation under this Act for any outlay, shall, three calendar months before the determination of his tenancy, if the nature of the case shall admit, and if otherwise immediately after the same, deliver to his landlord the amount and nature of his claim, and an account of all disbursements in respect of such improvements as aforesaid, together with necessary vouchers to support the same; and that if within three calendar months from the delivery of the same the said amount of the said claim shall not be paid, then it shall be referred to valuers to ascertain and determine if any compensation is due to the tenant, and the amount thereof; and the tenant shall appoint one valuer, the landlord another, and the two valuers shall appoint a third (each valuer to be appointed in writing, and the landlord or tenant to appoint a valuer within fourteen days after he shall

\* The words printed in *Italics* are proposed to be inserted in the Committee.

have been required by the other party ; and the two valuers to appoint the third valuer in writing within *seven days* after either landlord or tenant shall require them so to do), and the award in writing of any two of the said valuers shall be binding on all parties ; and if either party should refuse to appoint a valuer, or the said valuers should refuse to appoint a third, or if the said valuers, or two of them, should, within *one calendar month* from the appointment of a third valuer, refuse or omit, or be incapable of making an award, or if by any reason whatever such valuers, or any of them, should not be appointed, then either the landlord or tenant, or the representatives of either, may apply to the Inclosure Commissioners, who shall on such application appoint a person as a valuer, who shall proceed in the said valuation, and whose award in writing shall be binding on all parties, and the costs of such valuation shall be paid as the said valuers shall direct, and any monies directed to be paid to any tenant or his representatives, including any costs, may be recovered by such tenant or his representatives at any time after *one calendar month* from the date of any such award, by distress as for rent in arrear from time to time on all or any part of the land which he had so occupied, so as no such distress be made after the expiration of *two years* from the time at which it might first have been made ; but no such award shall give any personal or other remedy for the recovery of the sum awarded against the landlord, but the same shall only be a charge on the land to be recovered as aforesaid.

And be it enacted, That any owner of a farm, either absolutely entitled, or entitled in tail, or for life, or for a term of years whereof not less than *twenty* shall be unexpired, and whether subject to any rent or otherwise, may, if he shall so think fit, and he is hereby empowered to contract and agree with his tenant beforehand as to the number of years which shall be taken as the full term of compensation under any or each head of claim respectively, and also as to the allowance in money to be made for the same, which agreement shall be binding upon the before-mentioned valuers, and also on the persons for the time being entitled to the farm : Provided nevertheless, That if any such special agreement shall, in the opinion of the valuers, be manifestly contrary to or illusory of the intent of this Act, such agreement shall be null and void.

Provided also, and be it Enacted, That no owner of a farm having a limited interest therein shall consent to such farm being charged in respect of improvements under this Act for any term exceeding *twenty-two* years, nor for the purposes of building with any sum exceeding at any one time *one year's* rent of the same, except in the case of a farm which in the opinion of the valuers shall, at the time of such outlay for building having been incurred, have consisted mainly of waste and unimproved land.

And be it enacted, That if any incoming occupier, whether as tenant or otherwise, shall pay to the outgoing occupier the amount of compensation due to the same under this Act the sum so advanced by the said incoming occupier, or any part thereof, shall, in the ab-

sence of any special agreement to the contrary, be recoverable under the provisions of this Act, as if the said incoming occupier had himself effected the improvements in respect of which such compensation had been paid, due allowance being made in manner hereinbefore provided for the period during which such incoming occupier shall have had the benefit of such improvements.

Provided nevertheless, and be it enacted, That nothing in this Act contained shall alter or affect the rights of landlords or of outgoing or incoming tenants, under any existing custom or under any agreement or provision, unless as hereinbefore provided, or unless any such agreement shall be contrary to the provisions of this Act.

And be it enacted, That the word " farm " shall include all land used for the purpose of husbandry, and all buildings thereon or held therewith, with their appurtenances ; and that the word " landlord " shall mean the party entitled to the land immediately expectant on the determination of the interest of the tenant ; and that the word " tenant " shall mean any person in possession of land, as tenant under any lease or agreement, or as tenant from year to year, or as holding over on the terms of any lease or agreement ; and the singular number shall extend to the plural, and the masculine to the feminine, where before used, unless contrary to the meaning of this Act.

And be it Enacted, That this Act may be amended or repealed by any Act to be passed in this Session of Parliament.

AGRICULTURAL IMPROVEMENT IN AYRSHIRE.—We have had no law affecting Scotland, for many a day, that promises so much practical benefit to the agriculture of the country as the drainage act, of which we rejoice to see many of our landowners are prudent enough to take advantage. Government supplies the money at 6½ per cent., on payment of which for 22 years the original debt is extinguished ; in other words, money is reckoned worth 22 years' purchase at 6½ per cent. We to-day advertise applications for no less an aggregate than £34,938, to be expended in Ayrshire. This is cheering, when we reflect how much home labour this will afford, and how the expenditure will improve the soil in appearance and fertility. As yet, we suspect a great many of our landlords have not turned their attention to the advantageous nature of the offer, otherwise applications would have been quadrupled. Hitherto, if the landlord expended the money, the tenant usually paid 5 per cent., but the outlay was lost for ever. Now, under the drainage act, only 1½ per cent. more is required for 16 years, and the debt is paid. However rich, the landlord can never lay out his capital to tell in this way. There is another great advantage in the circumstance, that it is to be presumed the work will be well executed ; neglect of which point has hitherto caused a vast and utter waste of money. We can scarcely doubt that ere long the applications will stretch over almost the entire map of Ayrshire.—Ayr Advertiser.

## GREAT OAKLEY FARMERS' CLUB.

(SIXTH REPORT.)

First Meeting, 8th December, 1845.

Subject:—"ON WATER-FURROWING."

A member, after pointing out the ill effects of stagnant water, stated the effect of water-furrowing was to prevent it, and remove all surface water as quickly as possible: to effect this on flat land, every advantage must be taken, and the quantity of water-furrows must be regulated by circumstances; in form they should be wider at the top than at the bottom, and the depth should be some inches deeper than the stetch-furrow. On hilly land he thought it best to allow each furrow to carry its own water to the bottom of the field into a water-furrow; care must be taken to have sufficient eyes out of this furrow to carry off the water quick enough; about one eye to the acre would in general be found sufficient for all lands not more than 50 rods long.

A second member said he had found on this plan the accumulation of sand at the bottom of each furrow was greater than he liked, and to avoid it he introduced a latch-furrow; but the best assistance to water-furrows were tiles laid in, deep and close.

A third member said he liked the plan of a latch-furrow, as he thought the bottom of a long field was not so wet as where the water was allowed to run down all the way of the water-furrows.

A fourth member thought, when latch-furrows were used, the herring-bone-shaped furrow was the best, as the furrow on this plan did not carry so much water, and it sooner reached the ditch.

A fifth member liked the plan of allowing the water to run to the bottom of each furrow; the evil of latch-furrows was that in a hasty heavy shower the water would often break over a latch-furrow, and sometimes carry away half a stetch.

The first member said the evil complained of by the second member, that the earth accumulated at the bottom of each furrow, was because there was not sufficient force of water in each furrow to wash it away, which in a latch-furrow it was sure to do, as the mouth of each furrow would prove.

A sixth member stated many objected to leads, but he much preferred them to deep outlets at each furrow at the side of the field.

The majority of the meeting approved the plan recommended by the first member.

Second Meeting, 12th January, 1846.

At the meeting this evening the Rev. G. WIL-

KINS gave his Lecture—"ON THOROUGH DRAINING."

The reverend gentleman, addressing the meeting, said, of all the arts and sciences, the cultivation of the earth, though it appeared the most easy, was the most difficult to be brought to any thing like perfection. A professional man, or a manufacturer, might try twenty experiments in a single day, whilst a farmer could not accomplish so much in as many years; and this he thought was an insurmountable obstacle to any rapid improvement to be made in the all-useful, noble, and honourable occupation in which they were engaged; but still, though they did not even hope to bring agriculture to complete perfection, and though there would always be something to be learnt, some occult cause to be investigated, something in it that would ever baffle the skill and wisdom of the wisest men to understand, still it was their duty to advance—ever to be learning, though they might never arrive at the real truth.

But, before he went further into the subject, he would, with their permission, and he hoped for their amusement, if not instruction, take a cursory view of the mode of cultivating the earth practised by a few of the ancient nations of the world. He did this in order to prove that as in architecture, sculpture, and literature the moderns had made but little or no discoveries beyond what those ancient nations understood, so it was with the science of cultivating the land, and producing from it the requisite food for man—no great advancements had been made.

For example, the volatile alkali, called ammonia, and which was the basis of all guanos and dung-hills, received its name from, and was known to be, the pabulum of plants, and was used as such by some of the first inhabitants of the earth soon after the Flood.

We read in ancient writers that 1,800 years before the Christian era, or upwards of 3,600 years from the present time, this alkali obtained its name of ammonia from the name of the place at which it was first collected, and applied by the ingenuity of man for the production of human food. In a part of Africa, called Libya, bordering upon Egypt, and about nine days' journey from the more modern city of Alexandria, the descendents of Ham, soon after the deluge, erected to Jupiter Ammon, a heathen deity, a temple, which for magnitude and

splendour might be classed among the wonders of the world. To this temple pilgrims, by tens of thousands, with their families and cattle, annually resorted; and we read in one of the best of ancient historians, that inns were built in the vicinity of the temple, where the pilgrims who came to worship were accustomed to lodge. The same historian informs us that the proprietors of those inns had some contrivance also in their stables to preserve and concentrate all the urine and dung which came from the cattle of the pilgrims; and that it was in part sublimed into the salt called sal ammoniac, and the remainder was applied to the purposes of agriculture, something after the manner, he presumed, of their friend's farm-yard at Tiptree Hall.

When, therefore, they heard the word ammonia, they must remember that it was a term used, and the matter of it understood, 3,600 years from the present time, nearly or quite as well as it was at this day, and applied to the same purposes it now was. Nor was it assuming too much to suppose that during the seven years of abundance of corn in the time of Joseph, 1,700 years before Christ, the land was manured and fertilized by the Egyptians by manure brought from the temple of Jupiter Ammon; for although that most extraordinary abundance was prophetically foretold, yet they were nowhere informed but that it was produced in the usual way, and was the result of the industry and agricultural skill of the wonderful people among whom it took place; and he was the more inclined to think that such was the case, since there was no improvement of moment in agriculture, that he knew of, which that learned and scientific people did not understand and practise nearly as well as we did at the present day. They drained, ploughed, and manured; they sank wells, and by machinery raised water to irrigate the surface of their lands, and with a machine, nearly like, if not exactly of the same kind, to the one used in our gaols for the punishment of the prisoners there; and, if his memory did not fail him, he had read of another machine by which they thrashed out their corn. But from Egypt he would turn their attention to the Holy Land, and there, as they might recollect, they found the most beautiful, interesting, and instructive picture of the operation of the cultivation of the earth that was ever drawn by the pen of man for the instruction and example of mankind. In the 19th chapter of the First Book of Kings, they found Elisha ploughing in his field with twelve yoke of oxen before him, and himself with the 12th, when the Prophet Elijah passed by him and cast his mantle upon him; and they would remark that the man who was thought worthy to succeed Elijah, the true Prophet of the Lord, was a farmer like

themselves; and that he, in those days of primitive simplicity, was ploughing with his twelve yoke of oxen, and all before him, that he might see that every one of his servants did his work as well as himself. And that his countrymen in after ages were excellent ploughmen we learn from the highest authority, for our Lord himself informed us that when a man had once put his hand to the plough he did not look back, lest, he presumed, he should disgrace his profession by making an unsightly and crooked furrow.

But he would pass on to countries somewhat nearer our own, though he could not avoid stopping for a moment or two to inform them that in ancient Persia, a festival was annually held in honour of agriculture in the month of April, and that at it the Persian kings were accustomed to address their subjects in words something like these:—"I am one of you; my subsistence and that of my people rest on the labours of your hands; the succession of the race of men depends upon the plough, and without you we cannot exist." The Grecians, too, the most learned and polished people in the heathen world, paid the greatest attention to the practice and science of agriculture. The Roman poet, Virgil, who wrote so eloquently on all subjects connected with agriculture, imitated and even copied the Greek writer Theocritus, who flourished nearly 300 years before his time. We learnt also from Dr. Whitaker, one of the most learned antiquaries this country has produced, that it was through the medium of the Greek colony settled at Massilia, the modern Marseilles, and not by the Romans, as was generally supposed, that agriculture was first taught to the inhabitants of the southern part of Britain about the same time that Theocritus wrote, or 300 years before Christ. But the ancient Romans as well as the Greeks applied themselves to the study and practice of husbandry; and with reference to good and scientific ploughing, and to their skill and industry in the collecting of, and preparing and economising of manures, they have not been surpassed by any people, ancient or modern; and he fearlessly asserted that in attention to circumstances and exactness of execution, British farmers might extensively profit by a diligent study of the practice of those of ancient Rome. For examples; several of their historians, Columella, Palladius, Virgil, and Pliny, inform them how careful the Roman husbandman were in ploughing their lands, and not to plough them when they were wet; which they all knew were good practices. And Pliny assigned the following as the cause why there was such a plenty of corn in ancient Rome:—"What," says he, "was the cause of this fruitfulness? was it because in those times the lands were cultivated even by the hands of generals; the earth,

as it is natural to suppose, delighting to be ploughed with a share adorned with laurels, and by a ploughman who had been honoured by a triumph? Or was it because those men ploughed their fields with the same diligence that they pitched their camps, and secured their corn with the same care that they formed their armies to battle?"

And that this glowing and beautiful picture was strictly correct every one must acknowledge who is acquainted with the history of that people; for about 460 years before the Christian era, when their country was in danger, Cincinnatus, a Roman farmer, was twice chosen by his countrymen to be the general of their armies, and on both occasions he met and conquered the enemy; and, having done this, he refused every offer of reward pressed on him by his grateful countrymen, but resigned his office when his duty was done, and returned again to his plough and private life.

The reverend gentleman said he had intruded this epitome of the practice of agriculture of ancient nations on them, in order to shew how highly the occupation they were engaged in had been honoured by the best, wisest, and most polished men and nations that the world had produced. He had shewn them that one of the divines of the Prophets of the Lord was chosen by Elijah to be his successor whilst he was holding the plough; he had shewn them that the greatest and best of generals were also skilful and practical farmers; and he had done this in order to stimulate the younger members of this society to think highly of their profession, and by diligent study and persevering industry to endeavour, by every possible means, to bring the first and most useful, though, as he had said, the most difficult, of sciences to the highest possible attainable perfection.

This had been his motive for carrying them thus mentally through those ancient countries; and now he would return to the subject more particularly which he had in view, namely, to the deep and thorough drainage of their lands, which he considered to be the basis of all the improvements they could possibly make; and without it they could never rival those excellent models he had endeavoured to hold up to them.

Deep and thorough draining! What was this but to free their lands from an enemy which must mar all their labours? Not that he meant to insinuate that scientific draining alone would act as a talisman and supersede all other agricultural operations; by no means: but he maintained, without fear of refutation, that cold and stagnant water in their lands was the greatest enemy to their labours and destroyer of their hopes. Wherever this element existed in undue quantities, there healthy vegetation could not go on. Trees, shrubs, corn

of all kinds, and most vegetables, like land animals, including man, required warm feet, and without this they would never flourish and arrive at perfection. They might witness this in fruit trees, whose roots descended into cold water, the branches at the summit being rotten, dry, or withered; they might see it in an undrained field of growing wheat, after a continuance of too much rain the flags being yellow and of a sickly hue; they might see it too in cattle in cold and wet pastures, as they required more food than in other dry and comfortable quarters, and did not fatten half so fast, and they might see it in man, for he cannot long exist in good health with wet feet, but cold and consumption seize upon him, and he quickly sickens and dies. Formerly Essex was notorious for ague amongst its inhabitants, and mildew on its corn; but now both these diseases, which sprang from the same cause, are gradually and imperceptibly dying away. Water, in some shape or other, is the agent which produces both: a better cultivation of the soil, a better drainage, a removal of many useless hedges, and a thinning of others, had greatly mitigated this scourge in man and disease in corn; and when true and scientific drainage shall become general, ague and mildew, except in a few unfavourable places, will no longer exist. Humbly, therefore, and earnestly he called upon the farmers, for the benefit of themselves and their fellow beings, and their cattle, and their corn, to thoroughly drain their lands, if they had but the means. When this was done, the earth, the best of mothers, would never cease to reward their labours—"their garners would be full and plenteous with all manner of store; their sheep would bring forth thousands and ten thousands in their streets; their oxen would be strong to labour; and there would be no decay, and no complaining in their streets."

Not, as he had said, that draining alone would accomplish this happy and prosperous state, but it was the only road that could lead to it; and when this was done they might farm when and how they pleased; wet would not hurt them: they might open the earth with their ploughs to any required depth: they might effect immense saving by sowing less seed, as every grain would grow and come to perfection, none would rot in the ground; and as they would plough deeper, they would destroy the roots of weeds, and consequently let their lands grow nothing but what they would plant in them, but what would reward their skill and labour; and finally, they would require less manure. He refrained from saying how deep in every case the drains should be made, or how wide from each other, or whether pipes or tiles were the best instruments to be used. But they must drain *down* to, not *above*, the water. Shallow drains were

nearly useless; the operations of nature rendered them, in most cases, completely inoperative, and to make such would be merely money thrown away. The deeper you make them, the better they will work, and the more effectually will they warm the earth for the roots of the plants to descend into; always remembering that the object of draining land is to take away the water which rises from below, and not the top water only.

As to the distance from drain to drain, much would depend on circumstances, as he thought a single drain scientifically made would produce wonders, and effect all that was required; but it must be commenced *at*, and continued *to*, the proper place, and it must in all cases cross the strata of the earth, and not go along with them, as he would cross the lines in the leaf of a book by drawing a pen from the top to the bottom of it. A single shaft in a mine would sometimes drain all the wells dry around it, and a cutting in a railroad frequently drained all the surrounding lands.

In conclusion, he stated his object was to draw the attention, especially of the younger portion, of the members to a subject which he hoped, for their own benefit as well as that of the country in general, they would pursue and carry further than he had the means or ability to do. He strongly pressed on them to study the manner in which nature herself had acted, and always to ASSIST and not thwart her laws. By these means the cultivation of the earth would daily become more delightful to them, and they would pursue all their operations with pleasure, and he trusted also with certain profit.

At the conclusion of the lecture, the President, Mr. Barker, moved a vote of thanks to the Rev. Mr. Wilkins for his lecture, which was seconded and carried unanimously.

Afterwards Mr. Barker asked permission to have the lecture printed, which was immediately consented to by the lecturer.

Third Meeting, 9th February, 1846.

Subject:—"ON HORSE-HOEING."

The subject was in some degree postponed, as it was thought desirable to wait until the instrument introduced by Mr. Garrett, and highly spoken of, could be seen at work.

A member introduced the subject deferred last meeting, on harrowing and rolling; and after alluding to the difficulty of exciting a discussion on a point so generally understood, said that he had been led the last few years to attach more importance to harrowing, or moving the land by some such instrument, than formerly, and had been induced to apply more frequent harrowings and less

ploughings than was at one time considered necessary by him.

He should commence with beans as the first crop, and for this he thought good harrowing highly essential; it facilitated the hoeing by having the surface well pulverized, and at the same time added *solidity to the land*—both great essentials for the success of the crop. For barley, peas, and oats it was by all admitted that too much labour in pulverizing the surface could scarcely be employed; and harrowing the growing crops of wheat and beans he thought beneficial on most lands, when there could be time spared for these operations. In the process of fallowing, repeated harrowings tended not only to benefit the land by destroying the small annual weeds, but by encouraging the seeds of such plants to vegetate when they could be eradicated with little trouble and no injury. With regard to autumn work, the same rule might be applied as in spring—that after the roll had been well applied on the lands prepared for wheat, their being well harrowed was not only beneficial in securing a good seed bed, but in giving solidity to the soil.

The meeting, after fully discussing the various points alluded to by the first member, agreed on the principles laid down by him.

Fourth Meeting, 9th March, 1846.

Subject:—"ON KEEPING HOGGETS."

A member said the first point was to select a good lamb, and that they ought to be put to turnips at Michaelmas, or immediately afterwards, and that the turnips should be cut for them into troughs at Christmas at latest; that they would consume many more turnips cut than when they were not cut—at least one sixth more; and that they would make one-third more meat in the same time: the expense of cutting was about 1s. 6d. per score; on this plan hoggets would be fit to kill on May-day, or with 28 weeks' keep at turnips.

The points alluded to were discussed, and, when sheep were fed on the land, were generally agreed to. Several members pointed out the advantage of feeding hoggets in small inclosed yards, surrounded with temporary sheds made of hurdles and fold stakes.

A second member said on this plan he had made very fat hoggets in 21 weeks, fed solely on cut Swedes; and he believed, when the land did not require treading, that it would well re-pay, from the economy of food and the increased quantity of meat produced, to cart the turnips to a fold-yard made on an earth bottom in the turnip field. The manure would also be less injured than when made on the field subject to the heavy rains of winter.

Fifth Meeting, 6th April, 1846.

Subject:—"ON THRESHING AND THE APPLICATION OF CAVING."

A member was requested to introduce the subject in the absence of the gentleman who was to have brought it forward. He remarked that but little was now to be said on threshing, as the machine had nearly superseded the use of the flail for everything except beans; and as to caving, he must confess, with the exception of bean-caving for the horses, he had not made much application of it; he should leave that part of the subject to another member, who had used it extensively.

A second member said since he had used linseed boiled he had found his caving of all descriptions extremely useful, as with it and linseed boiled he was enabled to keep a large quantity of stock with a limited quantity of roots. His plan was to have it all preserved and cut into chaff, to two bushels of which he added a pail of boiling water, with a pound, more or less, of linseed boiled in it; of this all neat stock and horses were extremely fond when warm, and he found it enabled him to rear young stock to a much larger extent than he could otherwise do, at a reasonable expense, as the addition only of a very limited quantity of roots was required; according to their size, he gave from two to four pecks of roots, and as much chaff as they would eat, wetted and well mixed with water in which linseed had been boiled. To fatten stock of 50 stone, for the first eight weeks he gave two bushels of turnips and two bushels of caving-chaff, mixed with a pail of water in which a pound of linseed had been boiled; after this time he did not increase his quantity of roots, but added to the chaff some corn and a little more linseed to the water; and the chaff thus given, although possessing no fattening quality, had a tendency to correct the effects of the vegetable food, and to keep the stomach in good order; and they did as well or better than when a large amount of roots was given.

Another member remarked that since the introduction of the whole drum to the machine, barley could be threshed as well with the machine as with the flail; indeed he thought it was to be preferred.

Sixth Meeting, 11th May, 1846.

Subject:—"ON HORSE-HOEING."

Some further discussion took place this evening on Horse-Hoeing. Mr. Garrett's implement was inspected by the members present; but as there was not a piece of beans or peas drilled near the village, no trial took place.

A member said that hoeing wheat on heavy lands he considered advantageous, but on some of his mixed soils he never hoed unless compelled.

A second member said on some soils he had seen much injury done by the use of the horse-hoe, the wheat becoming root-fallen in consequence of it.

A third member said he had tried it, and at present the wheat was looking equally well as that hoed by hand, and if any difference it was cleaner after the horse-hoe.

A fourth member said he had been over Mr. Mechi's farm, and had seen the horse-hoe at work, and, in his estimation, it did the work to perfection; but Mr. Mechi had added a press to the hoes, which he thought on stiff land a decided improvement.

The members admired the simplicity of the hoe, and the mode by which it was so easily adapted to the rows, and believed that for beans, peas, and roots in particular, it must be a valuable addition and assistance to the hand-hoe.

A member then stated what were the effects he had witnessed of Mr. Mechi's deep draining, which excited much interest and discussion.

Seventh Meeting, 8th June, 1846.

Subject:—"ON PLOUGHING."

In the absence of the member who was to have brought forward the subject, but was prevented from indisposition.

A member introduced it by saying that he was not aware he could recommend any other plan than that generally adopted in the neighbourhood; he was aware that there were many advocates for deep ploughing, but except on certain soils he should doubt if the plan was desirable.

A second member, from his experience, recommended deep ploughing; he had been ploughing as deep as eleven inches, with the best results, both as to corn and roots. He then read certain extracts from *The Principles of Agriculture*, by Albert D. Thaër, translated by W. Shaw, Esq., and C. W. Johnson, Esq., shewing on the various soils the benefit of deep cultivation. Thaër says "A deep soil contains a larger portion of vegetable earth, and of that succulency so necessary to the nutrition of vegetables; and even if this excess of vegetable mould should not be useful to all plants, it agreed with some of them, even when the whole depth of the soil is not turned up; and, besides this thickness of the superior layer of his land enables a skilful husbandman to draw at will upon the riches which it contains, and occasionally, or about once in six or seven years, to turn it all up, and profit by the stores of succulency and nutrition which the under part of it will yield. The roots of all plants sown in a soil of this nature, even those of the tribe of cereals, penetrate in a right line, and seek that nutriment at a greater



depth, which they would otherwise have had to extend themselves laterally in order to obtain; and they may therefore be sown much thicker without causing any detriment to the crop. A deep soil will therefore yield much larger crops than a shallow one, provided its nature is similar, and that it is equal in all other respects. Some persons assert that the roots of corn are never more than six inches in length; but I have seen them exceed twelve inches when the soil was deep enough. The roots of vegetables and clover penetrate much deeper in a right line; land therefore in which the layer of vegetable mould is very thick, is peculiarly favourable to the cultivation of these crops. Besides, such land evidently possesses one great advantage, namely, that of suffering less from humidity and drought. The water which falls upon it has more room to penetrate before it encounters the understratum: argillaceous land, which is tolerably deep, can only be properly drained by subterranean trenches. But as a deep soil can absorb and contain more water in its pores, it can also retain it longer, and return it to the surface from its subterraneous reservoirs when it is required. These soils are peculiarly characterized by their resistance of humidity and drought. Cereals growing in a deep soil are less liable to be laid or lodged, even when the ears are very large. On shallow land exactly the contrary effect takes place. We have already supposed six inches to be the average depth which a soil ought to possess, and we are quite convinced that every inch added to the depth of land increases its value eight per cent.; so that a soil where the vegetable layer is twelve inches thick is worth half as much more as that in which it is only six. We are not prepared to say that the value increases in equal proportions when the depth is yet further increased, and become so great as to render it scarcely possible to reach it by simple ploughings; but as it cannot fail to be beneficial to plants, we shall not hesitate to affirm that every additional inch of depth beyond twelve adds five per cent. to the value of the soil. On the other hand, the same proportion should be observed in decreasing the value according as the upper stratum of earth diminishes below six inches, which we consider to be the average."

A third member spoke of the advantages of opening clover and other furrows, and spreading it prior to ploughing on the stetch. He alluded to a framework to be attached to a double tom for this purpose, which he had been using with good effect; the spreading it by hand cost about 1s. 8d. per acre.

A fourth member spoke of the implement alluded to for levelling the furrows when opened, and praised it much; he also alluded to a plan of dou-

ble ploughing, which had been adopted by a friend of his for the last ten years on one field, with highly beneficial results; the plan was to lay a wide and flat top, and then follow in the same furrows with a deep furrow, to be thrown on the top of the fleet ones; the next furrow falling into this deep furrow was to be covered up in the same way; on this plan the land received two ploughings, at the same time bringing the bottom soil at top and removing the soil at least twelve inches.

He had tried the plan this year for the first time; the land was planted with beet, and the effect was strikingly visible at present in the regularity and strength of the plants.

Eighth Meeting, 6th July, 1846.

Subject:—"ON THE FORMATION OF STACKS."

A member said, in filling the stack-yard, regard should be had to the convenience of taking in the stacks as they were required for market. As barley was generally disposed of first, the stacks should stand near the barn, except those intended for seed. Wheat, except in fine seasons, was seldom firm enough to be taken to market before spring, and on that account might be placed outside. Oats were wanted at all times, and should therefore be always at hand. The great object in building stacks was to keep out the wet, and having accomplished that, it matters but little about the shape; the form must depend on the taste of the particular county in which they were built, and if done in a masterly manner, they were sure to please. He should say beans were better in a long stack, but for any other grain he should prefer a round one, according to the size of the occupation. He need not say the stud must project far enough to keep the water from running down the ends of the sheaves. Round stacks required to have their middles well filled up all the way, especially when the stud was finished, and the roof about to be begun: it was of importance that the middle should be filled so as to resemble a roof, and then set the outside courses for the formation of the roof, which would seldom take any harm from wet, either before or after thatching.

A second member thought there was a saving of 2s. 6d. in the thatching of 20 loads on a round stack instead of a long one; that a seven-yard-bottom would contain about 16 or 17 loads, and would require a roof of about 18 feet. Hay and stover should be made in long stacks, and placed north and south, and should be begun at the north end; much injury by sun and weather is by this plan avoided; the same observation applied to corn stacks when cut in pieces. In answer to a question, he said he thought there was not only greater security against weather and economy in thatching com-

pared with a long stack, but in constructing it four men at a round stack would keep four men at work in a field until quite high in the roof. The size of a round stack was nearly uniform, while that of a long one increased in size so much as it approached the top. A respectable miller, well known to the meeting, said he was convinced that if corn was in equal condition when stacked, he should be able to tell that which came off a round stack and a long one, as the condition of the former would be so much superior.

A third member said he had last year, for the first time, tried round stacks, and was so satisfied with them in all respects that he should continue to do so. His thatcher complained because it reduced the amount of thatching.

Ninth Meeting, 7th September, 1846.

Mr. H. GORE, of Colchester, delivered a lecture  
"ON THE CHEMISTRY OF VEGETABLE LIFE."

As the lecture was obliged to be much compressed, in order to bring the various important topics connected with the subject before the members, Mr. Gore took a brief survey of the various solid elements which enter into the organism of plants, and the cultivation most suitable for their assimilation. He then proceeded to point out the nature and condition of the gases composing the atmosphere and water. Their peculiarities were illustrated by a variety of experiments, in which the properties of carbonic acid gas were especially noticed, and its importance shown, in affording a most material element in the food of plants, namely, carbon. Mr. Gore then explained the operation of lime in soils containing an excess of vegetable matter, and pointed out the importance of such matter being thoroughly decomposed in order to become a useful ingredient in the soil. In the course of the lecture a variety of pleasing and instructive experiments were introduced, tending to prove the value of a knowledge of chemistry in promoting the improvement of the art of agriculture.

Tenth Meeting, 5th October, 1846.

Subject:—"ON THE BEST DISTANCE BETWEEN THE ROWS OF CORN AND ROOTS."

A member said he was induced, three or four years since, to try, on a small scale, the plan of drilling nine rows instead of twelve, and he was so pleased with the growth and appearance of the crop that he extended the trial, and was now convinced it was far preferable; another advantage was the saving of seed, and the facility it afforded of cleaning the crop.

A second member remarked that thin rows and thin sowing required more cleaning than twelve

rows and thick sowing, as the weeds obtaining more air and space were encouraged to grow more.

The first member said that in the plan of nine rows the furrows should be about sixteen inches wide, and the rows eight inches apart. For barley he preferred sowing and drilling, sowing six pecks per acre and drilling six pecks. For oats the same, sowing two bushels and drilling two bushels. For beans he preferred seven rows on a stretch, and from ten to twelve inches apart, putting it from ten pecks to thirteen pecks per acre.

Much conversation took place on drilling turnips, as to the proper distance.

A third member said he preferred four rows on a stretch: great facility was given for the use of the horse-hoe, less labour in setting them out was required, and he thought a greater weight per acre could be obtained on this plan than when thicker.

Much conversation took place as to the proper width of the furrow on corn and root lands. But the opinion of the meeting generally was that this must depend on the quality and dryness of the soil; on good and dry soils they could hardly be too narrow.

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## THE TOTAL REPEAL MALT-TAX ASSOCIATION.

Committee Rooms,  
York Hotel, Bridge-street, Blackfriars.

MEETING OF THE COMMITTEE, Wednesday,  
February 3rd.

Present: Messrs. — Neame, J. Smith, Hilder, Edmonds, Purchas, Elvy, Cheetham, Lattimore, W. P. Lambe, Locke, Horton, Whittaker, Pix, Myers, Crowdy, &c., &c. S. Cheetham, Esq., of Oakham, in the chair.

The minutes of the last committee meeting were read and confirmed. The minutes of the adjourned general meeting were also read.

Mr. SMITH, as one of the Treasurers of the Association, read a statement of the subscriptions received and expences incurred, from which it appeared that the Committee continued to receive that assistance the Association required.

A great number of letters were read from different quarters, all in favour of the object of the Association, and promising to co-operate in obtaining it.

Several subscriptions from districts, parishes, and individuals were also announced; and the following gentlemen elected Members of the Committee:—

J. Hall Nalder, Esq., Alvercott, Lechlade.  
W. Elliott, Esq., near Ross, Herefordshire.  
W. Price, Esq., Ben Hall, Ross, Herefordshire.  
G. Wilshire, Esq., Kimpton, Herts.  
G. Clark, Esq., Hyde Hall, Sandon, Herts.

Arrangements were made for continuing the agitation of the question, and impressing its importance upon all classes of society.

## INTRODUCTORY LECTURE ON THE CONSTITUENTS OF SOILS.

BY J. C. NESBIT, ESQ., F.G.S., M.C.S.L., &amp;C.

AT MESSRS. NESBIT'S SCIENTIFIC ACADEMY AND AGRICULTURAL TRAINING SCHOOL,  
KENNINGTON, NEAR LONDON.

In the last course of lectures which I gave you on agriculture, I described, you will recollect, the organic elements of plants—those elements which are driven off from plants subjected to a red heat; and these elements were carbon, hydrogen, oxygen, and nitrogen. We illustrated their properties in a variety of ways; we spoke of the forms in which they were assimilated by vegetables; and we told you that the result of the destruction of all vegetable matter by heat, or by natural decomposition, was, that the carbon was returned to the atmosphere as carbonic acid, the hydrogen as water, and the nitrogen as ammonia. We are now about to take a view of the nature of the earth itself, and of the different earthy or inorganic substances which compose its crust; but we shall more particularly direct your attention to those ten or twelve elementary bodies which are so generally spread out as to constitute the vast bulk of the earth itself, and which are found in soils in all parts of the world.

We have nature putting on very different appearances in different parts. In some places we see the most bleak and barren mountains, wholly incapable of supporting verdure, so that scarcely a shrub of any kind, or even a lichen, will grow upon them. We see other parts of the earth's surface which furnish the most luxuriant vegetation, and are clothed with verdure. We have every diversity in the mineral appearance and in the physical geography of countries. Whilst some countries are merely plains, composed of sand or gravel, others consist chiefly of mountains, composed of granite and the other primary rocks. There is every variety of appearance that it is possible to conceive; and the mind of the dreamer never yet dreamed of things more curious or more wonderful than we find in the aspects which nature presents in the minerals which we see, and in the diversified forms which they assume. But all these appearances are produced by the combination of a very small number, comparatively speaking, of elementary bodies. When the art of the chemist is applied to the solution of the problem, "Of what consists the crust of the earth?—what are the various component parts of it?" he finds that all his skill cannot prove the existence of more than fifty or sixty elementary bodies; that is, bodies which differ from each other. Of course, if two bodies perfectly agree in

their properties, in whatever locality they may have been found, they are the same. If iron found in England possess the same properties as a similar substance found in America, the term "iron" is applied to both. You are aware that of these sixty elementary bodies a great number are metals: between forty and fifty of the number come under that name. There are gold, silver, iron, copper, lead, tin, manganese, and a great many others. You are well acquainted with the names of the other elementary bodies. There are amongst the non-metallic bodies sulphur, phosphorus and carbon, hydrogen and oxygen, chlorine, iodine, bromine, fluorine, and others. But these substances are not all disseminated alike over the earth's surface. If I pick up a piece of earth in one spot, and analyze it, I do not find it identical with a piece picked up in another spot. A stone or rock which comes from one locality does not necessarily contain the same properties as a stone or rock obtained from another; in other words, these sixty elementary bodies are not equally distributed; they do not exist in the same quantity and amount throughout the whole crust of the earth: quite the contrary; some of these bodies are excessively scarce, being found only in one or two very rare minerals; and, in consequence of their rarity, though not applied to any very useful purpose, they are worth more than gold. Gold is rare; it is only found in certain localities, in general near mountain ranges. Silver is not a very common metal; we do not find it in the same quantities that we find sand; and gold is not picked up as iron is. The majority, therefore, of these elementary bodies are not of abundant occurrence; they occur only in particular localities. You do not find mines of quicksilver spread in very many places over the world; you know that there are only three or four. Tin mines are not very plentiful; we only know of a few which are capable of being worked, as those of Cornwall, Bohemia, Siam, and Malacca. There has been an attempt to work mines in France, but the metal was not found there in sufficient quantities to make the enterprise a paying one.

Well, then, on examining these sixty elementary bodies, and on examining the earth, we find perhaps only a dozen such bodies (generally in combination with oxygen) which are largely disseminated,

and found in almost all parts, under almost all circumstances. These may be very easily mentioned. The constituents of soils and of rocks in general, as found disseminated in the largest quantities over the whole earth, are shown in the following table:—

SIMPLE OR ULTIMATE ELEMENTS OF ROCKS  
AND SOILS.

Metals.	Non-Metallic.
Potassium	Silicon
Sodium	Sulphur
Calcium	Phosphorus
Magnesium	Chlorine
Iron	Fluorine.
Aluminum	
Manganese	

These substances do not exist in an uncombined state in the earth's crust. Iron, indeed, is found sometimes in the metallic state, but only in those singular masses of meteoric iron which have fallen from the heavens at various periods. In general, the metallic bodies occur in union with oxygen or with chlorine. The non-metallic bodies likewise exist in combination. These various combinations unite with one another, and, though compounds, act in every respect as if they were simple bodies: they are, therefore, often called *proximate elements*; while the real elements are sometimes called the *ultimate* or *last* elements. The ultimate elements cannot be decomposed; the proximate can by certain means be decomposed, but in the general operation of nature they never are. We may, consequently, in our views of their unions and disunions with one another, look upon them as though they were not compounds; for, as we have just said, they are not decomposed in the common processes of nature.

The following table will show the proximate elements, derived from the various combinations of the ultimate elements previously mentioned:—

PROXIMATE ELEMENTS OF SOILS.

Metallic Oxides.	Composed of—
Potash.....	Potassium and oxygen
Soda .....	Sodium and oxygen
Lime .....	Calcium and oxygen
Magnesia .....	Magnesium and oxygen
Oxide of iron.....	Iron and oxygen
Alumina .....	Aluminum and oxygen
Oxide of manganese....	Manganese and oxygen

Non-Metallic Oxides.	Composed of—
Silica (pure sand) .....	Silicon and oxygen
Sulphuric acid, or oil of vitriol.....	Sulphur and oxygen
Phosphoric acid.....	Phosphorus and oxygen

Chlorine and Fluorine are generally found in combination with the metals—chlorine existing most abundantly in combination with sodium, forming common salt, and fluorine with calcium, forming fluor spar.

The proximate elements above enumerated have also the power to combine one with another—the non-metallic oxides uniting with the metallic oxides, and forming salts and other combinations of great durability. Sulphuric acid, for example, combines with lime, forming sulphate of lime, or gypsum. Silica and alumina combine, forming silicate of alumina, found in all clays.

It will much assist us in obtaining correct notions of the nature of the substances contained in the soil, if we briefly mention the localities in which they are found in nature, the more ordinary combinations in which they exist, and the names by which they are known as articles of commerce.

Potash and soda are found, in nature, in union with silica, in the felspar and granite rocks. Soda is likewise found in common salt. More particular allusion will be made hereafter to the combinations of silica with potash, and soda, as they play an important part in the economy of the soil.

Lime also exists in large quantities in the form of limestone, or carbonate of lime, or chalk. It exists, too, in the beautiful marble which bears so fine a polish; and it is found in the stalactite which has been left by water containing lime percolating through limestone rocks, and dripping down into the hollow caverns, and leaving, as each drop fell, a portion of lime behind it. It is found also in the form of Iceland spar, some specimens of which are, you know, perfectly transparent; and it is found in combination with sand, as silicate of lime. All shells contain limestone; many limestones are full of fossils. Here you have a piece of limestone formed of corals, and the remains of moluscous animals; and the corals of the present time are chiefly composed of carbonate of lime.

Magnesia is also widely disseminated. We have silicate of magnesia in the form of asbestos, serpentine, and soap stone. It is found also in large quantities, as a carbonate of magnesia, in what is called the magnesian limestone, which is a combination of the carbonates of lime and magnesia. The magnesian limestone is very largely developed about Sunderland and in Derbyshire.

Iron is found, you know, in immense quantities combined with oxygen and often with sulphur. It is found too in all situations: you cannot mention a soil in the world which does not contain iron.

Alumina is one of the most widely developed of these oxides. It is discovered in the state of silicate; scarcely ever is it found pure. The base of almost all our clay-fields is alumina; all the clays for making bricks and pipe-clay contain alumina, united with silica, as their base; and it also exists very largely in the granite rocks.

Oxide of manganese is often found in the pure state; and there are scarcely any soils in

which it cannot be detected; it exists even in the white and beautiful chalk.

The silicic acid, or pure sand, exists in great abundance, and forms many beautiful jewels. You know the amethyst is nearly pure silica. Here (pointing to a specimen) is the crystallized quartz rock, which exists in such abundance near granite formations; it is nearly pure silica. Rock crystal is silica nearly pure. Silica is found in the state of sand lying on the sea-shores, and in the state of sand-rocks, where the particles of sand are slightly glutinated together.

We have then phosphoric acid, the base of bones. It is a combination of phosphorus and oxygen; while silicic acid is a combination of silica and oxygen. Phosphoric acid is found widely disseminated, but not in large quantities. In Spain it is found as a phosphate of lime, and in some localities it is found as a phosphate of alumina. Though widely spread, it is, I repeat, generally found only in minute portions. It exists in granite, and in almost all organic fossil remains, but not in large quantities. You know that the bones of extinct animals contain certain quantities of phosphoric acid, in the same way as do the bones of existing races of animals.

Sulphuric acid is better known as oil of vitriol; united with lime it forms gypsum; which is found in large masses. Sulphur is also found near volcanos almost in a pure state.

Chlorine, which is the base of muriatic acid, is also widely disseminated. The salt rock, which is found in Cheshire and in other parts, is composed of chlorine and of sodium, the base of soda.

Fluorine is not generally found in great quantities in one spot, like chlorine; but a little of it is found in a great number of rocks, and I believe, when looked for, in the ashes of all vegetables. I found it myself in two specimens of the ashes of the hop, the only specimens which I examined.

I have thus given you a kind of general idea of the nature of these different bodies; and you are all pretty well aware, I dare say, by this time, of what they consist.

Now you know that potash comes into commerce in the form of pearlash, which is made by burning the ashes of land plants, and washing the potash out with water. Saltpetre is nitrate of potash. Soda comes into commerce in the form of common salt, which is a chloride of sodium; or in the form of the ashes of sea-plants, which contain carbonate of soda. You all know the form in which lime enters into commerce, and its uses for mortar and other purposes. Magnesia is, as you are aware, the base of Epsom salts. You also know in what form calcined magnesia and carbonate of magnesia appear. Iron comes into com-

merce in the shape of cold steel, as well as in that of pig-iron. Alumina is seen in commerce in the shape of the ruby and the topaz, or as pottery, bricks, and so on. Oxide of manganese is well known for making chlorine for bleaching. The silica, or sand, is also well known: you all know what flint and sand are, and that they are nearly pure silica. Phosphoric acid is also pretty well known as the base of bones. Phosphorus also enters commerce in the shape of lucifer-matches; and whenever you are setting a match on fire, you must remember that you are forming phosphoric acid. The phosphorus in burning takes oxygen from the air, and produces phosphoric acid. You all know that sulphuric acid makes its appearance in the shape of oil of vitriol, and you are also aware that sulphuric acid is made from sulphur. Chlorine appears in the shape of muriatic acid, and in combination with sodium in common salt. Fluoric acid, is not used much in commerce, except in the form of the beautiful vases which come from Derbyshire and Germany, and which are made of the blue John or fluorspar.

Now I think we pretty well understand the nature of the bodies which are expressed by these names. Unless, however, we do understand what is meant by potash, soda, lime, and so on—unless there are definite ideas in our minds connected with the words, it must be impossible for us to understand any arguments or statements which may be made on the subject.

Such being the bodies most widely diffused over the face of the earth, we will now begin to consider whether these substances remain in a state of quiescence, whether they act on one another, or whether there are other agents acting on them, in such a manner that a constant and incessant change is taking place. Now, if we look around us, my boys, everything at first sight appears to be standing still; if we look, however, at nature a little deeper, we shall see nothing that is not in a state of progress. The acorn is put into the ground; it springs up in a little time, grows and grows, aggrandizing to itself year after year substances which had previously existed in another form. But eventually there is a stop put to its aggrandisement, and it begins to follow a downward course; and at last the monarch of the forest is gone, and his place knows him no more for ever. There is a change. Again, the waters of the rivers stay not in their place: they are constantly in an onward progress, flowing into the sea, and the vacancy created is daily and hourly supplied by fresh waters which take their place. We have not always sunshine; it is alternated with rain, with wind, with tempests, with storms, and then we have the calm again. Man does not live for ever: one generation springs

up, exists for a little time, and then gives way to another. Throughout the whole earth everything is in a state of incessant change. The "eternal hills" themselves are not exempt. There is not a hill or a mountain, a field or a plain, a rock or a prominence, of any kind, which exists as it did a thousand years ago, or even twelve months since. The incessant action of the elements produces incessant changes upon their surface: we have the winds blowing, the rains descending; we have the action of substances which to ordinary perception are invisible; the effect, indeed, is seen, but not the cause.

Now we will try to seek out the cause of this action by finding what substances there are in the atmosphere to act upon the surface of the soil, and what substances there are in the soil capable of being acted upon by the atmosphere. You know that the substance in the atmosphere which acts chiefly on all vegetable matter is oxygen, and that, sooner or later, by the action of this substance all vegetable matter is destroyed. If you put vegetable matter into a fire-place, and create sufficient heat to cause it to begin uniting with the oxygen, the process of union will go on until the whole of the vegetable matter is destroyed, and the mineral matter only will be left in the grate. If you have a slower action of oxygen, say in the forming of manure, you have the bulk of the manure diminished in consequence of a portion being acted upon by the oxygen of the atmosphere; it is constantly changing its form, diminishing, and going into the air. On the contrary, oxygen does not act upon the mineral substances in a general way. It acts upon some, but not upon all.

But there is another substance which acts upon the constituents of the soil, a substance which is contained in the air, and which results from the decomposition of vegetable matter. What is that? (Several voices—"Carbonic acid"). Carbonic acid is formed by the union of the oxygen of the air with carbon, or pure charcoal; this gas exists in the air in minute quantities; this substance acts, though slowly, yet surely, on the mineral matters of the globe. That it has acted largely we may know from the results of its combination. Look at the limestones: limestones are compounds of lime with carbonic acid; they constitute at least one-seventh of the crust of the earth: the carbonates we find everywhere. Look at the chalk, and the limestones in Derbyshire and other parts of England; poor is the place where you cannot find limestone.

But we must consider the action of this carbonic acid not only on lime, but on all other substances of which we have spoken. Now take the action of carbonic acid upon those substances which are

formed from the union of silicic acid with potash, soda, lime, magnesia, iron, or alumina. These compounds occur in various parts of the world. I will point out to you where some of them are found. You are aware that granite is the foundation rock of the world, that it forms the highest mountains, and descends down beneath the other strata; they all rest upon granite as the foundation rock. We have every reason to suppose that it has been from the action of the atmosphere on granite and other similar primary rocks—such as the serpentines, the porphyries, and the basalts—that all the other soils of the world have been formed. Now we will look at the composition of granite. You know that granite is composed of three different substances, mica, quartz, and feldspar. Quartz is nearly—nearly pure what? (Several voices, "Pure silica"). Silica in the state of quartz, rock, or sand, is one of the most difficult things in nature to be acted upon. The idea of sand and insolubility go together; it is one of the most insoluble of substances. We make use of sand with other substances to form our glass, because of all substances it is the least easily attacked.

I am not, however, going to speak of quartz at present, but of mica and feldspar, both of which contain silica in combination with other substances. Mica is that portion of granite which has generally a shining or silvery appearance, and which easily separates in thin transparent plates or laminae. In Russia it is found in large plates often more than a yard square, and there and in other places it has been used instead of glass. In England we sometimes see it in the front of closed stoves, which seems as if glazed with glass. The following table will show the composition of various specimens of this substance:—

COMPOSITION OF MICA.

	Siberia Black Mica.	Siberia Mica.	Zinwald Mica.	Kimito Mica.
Silica . . . . .	42·5	42·5	47·00	46·36
Alumina . . . .	11·5	16·05	20·00	36·80
Potash . . . . .	10·0	7·55	14·50	9·22
Magnesia . . . .	9·0	25·97	0·0	0·00
Oxide of iron . .	22·0	4·93	15·5	4·53
Oxide of man- ganese . . . . .	2·0	0·0	1·75	0·00
Fluorine . . . .	0·0	0·0	0·0	1·81

If we refer to the composition of the micas from Siberia we find a combination of silica with alumina, potash, magnesia, and oxide of iron, and a trace of manganese. They are, therefore, compounds of the silicate of alumina, the silicate of potash, the silicate of magnesia, and the silicate of iron. There are some micas, those from Zinwald and Kimito, as the mica here [pointing

to a specimen] which do not contain magnesia, but it is made up by the larger quantity of alumina and iron.

Now we have felspar as another ingredient of the granite. Large crystals of common felspar may be seen on the footpaths of London and Waterloo bridges. Well, felspars are contained largely in granite and other primary rocks.

There are several kinds of felspar ; the two principal are common felspar and albit.

From the annexed table of the composition of felspathic minerals, it will be seen that common felspar is composed of silicate of potash and silicate of alumina ; and that in albit the potash is merely replaced by soda. Albit is a silicate of soda, united with a silicate of alumina. The Labrador felspar contains lime, and the anorthite magnesia and lime.

*Composition of Felspathic Minerals.*

	Common Felspar.		Labrador Feldspar.	
	Albit.	Albit.	Anorthite.	Anorthite.
Silica . . .	65·9	69·8	55·8	44·5
Alumina . .	17·8	18·8	26·5	34·5
Potash . . .	16·3	—	—	—
Soda . . . .	—	11·4	4·0	—
Lime . . . .	—	—	11·0	15·7
Magnesia . .	—	—	—	5·2
Protoxide of iron . . .	—	—	1·3	0·7

The chief magnesian silicates are hornblende and serpentine rocks, very largely developed, talc and stealite, and arbestos or soap stone. Serpentine is chiefly silicate of magnesia, with a small amount of silicate of lime, alumina, and iron. Hornblende contains silica, lime, magnesia, alumina, and iron ; it is therefore a silicate of lime, a silicate of alumina, a silicate of magnesia, and a silicate of iron.

Augite is another mineral substance widely diffused. It contains silica, lime, magnesia, and iron ; it is therefore a compound of silicate of lime, magnesia, and iron.

Now, carbonic acid, as you are well aware, unites with potash, and forms carbonate of potash ; it unites with soda, and forms carbonate of soda, both of which are soluble in water ; it unites with lime, and forms carbonate of lime or chalk ; it unites with magnesia, and forms carbonate of magnesia. One compound of carbonic acid and lime, and another of carbonic acid and magnesia, are insoluble in water ; but if you have an excess of carbonic acid, they are both soluble.

Let us now try to trace the action of carbonic acid on those minerals which contain substances, as lime, soda, &c., capable of being acted upon by carbonic acid.

What is the action of the carbonic acid of the air upon mica ? Not an action which is very perceptible for a small period of time, but such an action

as would be perceptible in the course of ages, from the continual dropping of water impregnated with carbonic acid upon micaceous rocks. Carbonic acid does not form a combination with the alumina of the mica, and therefore it would not be prone to attack that, but carbonic acid does form a combination with potash. Well, now, you can imagine that these compounds of silicate of potash, silicate of magnesia, and silicate of iron, exposed to the action of the air for a length of time, exposed at the surface of an immense rock, which sent up its pinnacle to the cloud, would in the course of time undergo a change. The continuous, increasing, unwearièd action of the wind and of the rain being brought to bear on this rock, the carbonic acid and the air would, little by little, attack the potash contained in the mica ; carbonate of potash would be formed, and being soluble, would be washed away. The carbonic acid, you see, would take the potash from the silica little by little ; the magnesia would be attacked ; carbonate of magnesia would be formed. Iron forms no permanent compound with carbonic acid ; it is attacked by it, but as soon as the carbonic unites with it, the compound is again destroyed by the oxygen of the air. Well, then, little by little, we should have carbonates of potash, lime, and magnesia formed there, taken away from the rock, and silicate of alumina and oxide of iron, with some lime and magnesia, would remain behind. Now, though silica is generally very insoluble, it is remarkable that when separated from any of its combinations, either with potash or soda, a portion of it becomes soluble. If you were to take an ounce of sand and four ounces of carbonate of potash, and melt them together, you would get a kind of glass, and if you were to take that glass and put it into water, it would all dissolve, silica included. If you were to separate the silica from the alkali by means of an acid, the silica would form a kind of jelly, and you could wash it away. If you used a large quantity of water to dissolve the glass, the acid would not even precipitate the silica at all. It is in this way that a portion of silica becomes soluble, though the greater portion continues insoluble. Now, how would the mica be acted upon ? As the action was going on, little particles of mica unacted upon would be washed away with the disintegrated materials of the rock.

We have spoken of the potash and a portion of the magnesia being rendered soluble ; but what would become of the silica and alumina ? They would be washed away from the rock, and form a powder, together with portions of the rock itself ; they would be washed away, and would deposit themselves in the nearest place where the waters would allow them to settle. Well, now, what would be the state of affairs

with respect to felspar? You remember common felspar is composed of silica, alumina, and potash. We should have carbonic acid acting on the potash to form carbonate of potash, which would dissolve in water and go away, and there would be a little silica also going away; but the major part of that which would be washed away from the rock would be silicate of alumina; it would not remain on the rock, but would be washed away from it, and deposit itself in the places where the water would allow it to settle; it would be washed away with small quantities of undecomposed felspar itself in little pieces.

And what would become of the quartz? It would be carried away, and run off, and would again be deposited much sooner than the finer particles of silicate of alumina. You may mix clay and water together, and the water will not become clear for some time; but if you mix sand and water, how soon the sand will settle! Well, then, in like manner the particles of sand from the quartz rock would be deposited much sooner, and would not be washed to the same distance. In a substance containing lime, the same as the Labrador felspar, which differs from these in containing lime as well as soda, you would have the carbonate of lime washed away; a portion of it in solution in water would be carried into the sea, and the insoluble portion would be deposited by itself, or it would be found mixed in small quantities with the other insoluble matter derived from the rock. Well, now, do we find in any localities strata which bear any relation to what would be the result, if this were the action on granite rocks? Do we find any layers of matter that have those properties which would result from such a decomposition and washing away of rocks? We do. If you look at the composition of the porcelain clay obtained from Morle, near Halle, in Germany, you will have an example. Most granites contain lime; and if you look you will see that this is nothing else than the felspar and mica of the granite decomposed, and insoluble portions left behind, together with a small portion of the original rock stone undecomposed.

*Porcelain Clay of Morle, near Halle, Germany.*

Silica . . . .	71.42
Alumina . . . .	26.07
Peroxide of iron . . . .	1.93
Lime . . . .	0.13
Potash . . . .	0.45

The chief thing in the porcelain clay is silicate of alumina; you have a peroxide of iron, but very little, not more than might be left by small particles of undecomposed mica. The lime and the potash are both derived from small fragments of the felspar, &c., still undecomposed, which have been covered by the silicate of alumina from the action of the air; so that these little pieces of felspar tell

the origin of the rock; they are tell-tales; you can pick out fragments of the rock from whose decomposition the clay has proceeded.

Well, now, this is not a mere tale, because we find granite, which we are apt to consider one of the most permanent of rocks, in many parts in a notable state of decomposition, in almost every stage between porcelain clay and hard rock. I have here on the table a piece of granite rock, and if I hold it up you will see the mica resplendent and shining. It is so tender, however, that I could easily break it; if I were to drop it on the floor, it would of itself break into fifty pieces; it has been thoroughly acted upon, and it would require but little more aqueous action to wash the finer particles away to form a porcelain clay, and leaving the sandy particles behind. The clay would still contain fragments of felspar and mica, by which we should know that it came from granite, even if we had not ocular demonstration of it. Now, in the same way, if we turn to basalts, the basalt of Mount Etna is composed chiefly of the minerals called zeolite and augite. The augite is chiefly a silicate of lime, iron, and magnesia; the zeolite may be considered as composed of the silicates of alumina, lime, and soda. Well, I am sure that knowing which of these compounds are soluble, you can tell which would be left from the decomposition of the augite. Would the silica be left? (A voice, "Yes"). Lime? (A voice, "No"). The greater part would be washed away. Some of the protoxide of iron would be converted into peroxide, because when acted upon by the carbonic acid it would be converted into carbonate of protoxide of iron, but the oxygen afterwards would drive off the carbonic acid, and leave peroxide of iron.

The alumina would be left as silicate of alumina; therefore, we should have silica of alumina, with a considerable portion of free silica left behind insoluble. The decomposition of most other rocks of a similar character by the carbonic acid of the atmosphere proceeds in the same manner.

*Composition of Zeolite.*

Silica . . . .	38.83
Alumina . . . .	28.77
Lime . . . .	10.45
Soda . . . .	13.81
Potash . . . .	1.42
Water . . . .	6.72

*Composition of Augite.*

Silica . . . .	52.00
Lime . . . .	13.20
Peroxide of iron . . . .	14.66
Magnesia . . . .	10.00
Alumina . . . .	3.34
Manganese . . . .	2.00

The action of carbonic acid on limestone rocks is very extensive likewise. The water containing



carbonic acid, acting on the surface of limestone rocks, and percolating through them, dissolves a small portion of the carbonate of lime. You find no waters deficient of lime; almost all spring waters contain it in abundance. Well, now, what becomes of the soluble parts of rocks which are washed away? What becomes of the potash, and soda, and lime, and magnesia? These soluble portions of the earth's surface are washed to where the water goes, into the great receptacle of all the water of the world, and of all the soluble matters of the globe. If you refer to the composition of sea water, you will find that it consists of soda, potash, lime, and magnesia, these bodies having been derived by the action of water on the mass of the earth itself; and according to this, you know, the sea must every day get salter, because it has every day more of this soluble matter in it.

*Composition of Sea Water.*

1,000 parts of sea water contain	
Chloride of sodium (com. salt)	26'66
Sulphate of soda	4'66
Chloride of potassium	1'23
Sulphate of lime	1'50
Chloride of magnesium	5'15
	<hr/>
	39'20

*Marcel.*

We have instances in which rivers have flowed for a long time into inland seas, having no communication with the great ocean itself, and yet these seas have become salter even than the ocean. Such a sea is the Dead Sea, into which the river Jordan has flowed for thousands of years, and the evaporation from that sea is quite sufficient to take off all the waters which the river brings into it. As with every flow of water soluble matters are being brought into this sea, and as the waters which are brought into it are evaporated—for the evaporation of every day is just sufficient to make up for the flow of water—the soluble matters brought down are left in the sea, which becomes every day salter, and it is at present far salter than the sea itself. There are other similar instances of inland lakes.

*Composition of the Waters of the Dead Sea.*

100 parts contain	
Chloride of sodium	103'60
Chloride of magnesium	102'46
Chloride of calcium	39'20
Sulphate of lime	0'54
	<hr/>
	245'80

*Marcel.*

Well, then, the constant action which has gone on for hundreds and thousands of years upon the granite rocks goes on at the present moment upon all rocks, not upon the granite alone but upon every other rock which contains any of the sub-

stances that are capable of being acted upon by the carbonic acid of the air. This clay (pointing to a specimen) still contains substances which are capable of being acted upon by carbonic acid, and it may be taken as a fair representation of the general soils throughout the world. It contains a portion of the original rock from which it was derived, which has escaped decomposition; there is still lime and potash there, and almost all soils still contain phosphate of lime and other substances.

Now potash and soda, lime and magnesia constitute the soluble matters, which are the most important mineral substances for vegetables; and as the vegetables cannot take them up in an insoluble state, we see how wonderfully all things have been adapted by the wisdom of the Almighty, one to another, in this world of ours, nothing being out of its place, but everything being adapted with the most admirable ingenuity and wisdom. The carbonic acid exists in the atmosphere in large quantities, compared with the whole bulk of the atmosphere, in very large quantities, millions of pounds weight; every change in the wind and every fall of water brings it into contact with these substances; its action is to render soluble the silica, potash, soda, lime, magnesia, and the phosphates, so that the vegetables may be able to take them up.

The vegetables growing on the soil immediately seize these things as they are rendered soluble, and appropriate them to their own use; and where these things are absent from the soil, you have a type of the greatest sterility which it is possible to conceive. If you have a soil which, through ploughing and exposure to the air, will not yield any soluble thing, you have there one of the most barren soils in the world. Now when you consider that there is some of this silica, some of this potash, soda, lime, or magnesia, in nearly all soils which are not perfectly barren, and will not grow anything, you see at once the use of ploughing, and the effect of fallowing, and you get some idea of what manures ought to be put on the land to replace anything that has been taken away.

Now on this part of the subject I want just to say a word or two, and I hope you will not go to sleep. There are two agents at work on all cultivated fields to diminish their fertility. Let us talk of what the atmosphere is doing. The fertility of a field consists in the ease, generally speaking, with which you can supply these bodies; at least that is one of the greatest elements of its fertility. The constant action of the atmosphere is to make these bodies soluble, and the water which falls upon the field dissolves them, and takes them away, so that each year the field will become less rich in these substances. The farmer who grows a crop upon his field—a crop of any kind, say a crop of clover—

when he cuts his clover, takes away with it potash, silica, magnesia, lime, &c. ; so that you see the field is losing both by every crop obtained from it, and by every rain that falls upon and percolates through it. It is constantly losing both by the action of nature and by the work of the farmer. It must then be replenished, if its fertility is to be retained. It is inevitable that if left to itself it will become poorer and poorer ; and, on the other hand, we know that if exposed to fallow, it will become richer for the farmer's crop. How is that ? I will show you. If you have the land exposed to the air, and well ploughed up, there will be a certain number of disintegrated substances : a quantity of substances will be brought into a nearly soluble state, so that the plants can take them up. There is a certain atmospheric action every year, and if it act on the land to a certain degree, so as to render soluble all that is wanted, you can grow crops from the soil without difficulty. It is for this reason that you can grow large crops on some lands and not on others. The land must be capable of furnishing the crops with what they require. Now, supposing the land not to have furnished enough for a crop—supposing that sufficient lime and soda and potash and bone-dust had not been rendered soluble in one year to supply the crops for one year—(the farmer used always to fallow ; he used to take two years' action of the air for one crop : he would plough, harrow, and expose a great surface constantly to the air, and he would have the action of the air, carbonic acid, and water on the soil for two years, and would only grow one crop within that period)—the consequence would be that the land would apparently be benefited ; yet the more the amount of silicas, &c., in the soil is diminished, the more you expose them—the more you plough and harrow, the more do you diminish the riches of the field, because you are rendering these substances soluble, and they are taken away in that state ; but, however, this must be done, because you do not want to lock up the riches of the field, and to make no use of them. This would be acting like the miser, who has got £10,000 in a great strong chest, and will never make use of any of it for fear he should come to the bottom. This is not the way in which the farmer should act with regard to the soil. He must resort to proper means to render soluble the insoluble riches of the soil, but he must also take care occasionally to supply them again. If he wants to keep his field in a proper state of fertility, he must let these substances return to the soil. The real art of manuring is to put back on the land whatever substances the farmer has taken out of it ; we cannot prevent nature from taking some portion. Although we admit the advantage of thorough draining, and are aware how much it helps the growth of

plants, by clearing the soil when you let the air get down, still we know that large quantities of soluble matters are always taken away by rain ; it dissolves to some extent, but not to the great extent which some people suppose. If we suppose a pint of water to dissolve a grain in passing through a field, that would give, in a year, 850 lbs. per acre. Now, 850 lbs. of soluble matter is a very large amount. But the farmer cannot get over this loss ; he must still continue to turn up his land, only taking care that the soluble matter does not pass out too quickly, and for this deep draining is better than shallow draining. All the substances, then, being taken off the field by the farmer, he must return to it again, and, if necessary, he must put his lime, potash, soda, magnesia, bone-dust, or any other substances which have been removed either by crops or by atmospheric action, again on the land, if he wishes to retain it in a proper state of fertility.

Now, is it immaterial to a man whether he has a fallow of two years to get enough for a crop, or whether he puts the things required at once on the soil ? One man will lose a year's rent, and everything else, to fallow ; another will buy his potash, soda, lime, ammonia, &c., put them on the land, and thus save his rent. The one gets one crop in two years ; the other obtains two crops, each of which will perhaps leave him a handsome profit. Now, which has acted most wisely ? Why the man who has himself put on the ground that which two years' fallow would put on it ; he has put the substances in a soluble state, and thus he secures his crops. Now, it is not always desirable to put these soluble substances in the land all at once ; it is rather advisable to put them on at three or four times, to prevent them from being washed away. It is quite certain that if, when guano has been put on the land, heavy rains fall for a lengthened period, a considerable portion of it will be washed away without the roots of the plants being able to act upon it.

Well, now, gentlemen, I hope I have given you a little insight into the general nature of atmospheric action. It is almost impossible to seize on all the salient points of a subject in a lecture, extended, as this has been, over such an immense variety of subjects. We have considered no less a thing than the earth itself, together with the various influences that act upon the earth. I think, however, that you will have heard enough to perceive that chemistry is of immense importance, in order that we may have a proper view of the nature of the operations which are going on throughout the whole earth, and, consequently, on our own farms. You must perceive, too, that it will give us a vast deal of power over the whole of our operations on the farm, because we shall know what becomes of everything

that we have on the farm. We know which of the ingredients of the soil are soluble, and which are insoluble; we know those plants which want, and those which do not want particular elements; we know which substances are liable to be washed away, and consequently can guard against this result, and we know those that are not washed away; we know all these things by our study of chemistry—by the investigation of these elementary bodies in our laboratories, and by watching the action of the air upon them in the wide field of nature. But in order to understand the matter thoroughly, we must look at these bodies—potash, lime, magnesia, and all the other ingredients of the soil—individually; and next Tuesday evening it will be my honourable duty to proceed with the consideration of potash

and soda. I shall afterwards take, one by one, the whole of these bodies; I shall speak of their general chemical properties, their actions in nature, and the localities where they are found; and by the time we shall have gone through the whole of this subject with attention, I think we shall have a much better insight into the general nature of the actions of which we have been speaking than we have at present. We shall then, too, be able to take a more extended view of that which has been the subject of our lecture this evening. I am very much obliged to you for the attention which, with only one or two exceptions, has been granted to me while discoursing on what might be considered rather a dry subject by those who are unwilling to study for themselves.

PROCEEDINGS OF THE AGRICULTURAL CHEMISTRY ASSOCIATION.

COMPOSITION OF LIMESTONES FROM ARGYLSHIRE, BERWICKSHIRE, AND SUTHERLAND.

*Limestones from Argyleshire.*

(a.) *From Ardgour, upon Loch Eil.*—Among the so-called gneiss or oldest slate rocks of Inverness and Argyre, there occur, among the highly-inclined strata, beds of limestone more or less crystalline, many of which are of sufficient thickness to be worked, and in localities in which the use of lime would be a prelude to much agricultural improvement.

A bed of this kind runs along the face of the hills on the Ardgour side of Loch Eil, in a northerly direction, from the Corran ferry to an unknown distance. It is in the form of a bed, of eight or ten feet, and sometimes considerably more, in thickness, and lies at a very high angle. Some of it is almost pure white, and semi-crystalline. It is mixed with a variable proportion of fragments of quartz, which form distinct prominences on the surface of the rock, where it has been exposed to the action of the weather. I have found this quartz, upon analysis, to vary from 6 to as much as 80 per cent. of the whole. The more siliceous portions, however, are not difficult to distinguish, and in quarrying could easily be rejected.

During a late visit to the spot, I collected specimens from two different localities upwards of a mile apart, and upon analysis they have been found to possess the following composition—

	No. 1.	No. 2.
Carbonate of lime . . . . .	90·14	89·15
Carbonate of magnesia . . . . .	0·31	2·56
Alumina and oxide of iron . . . .	0·51	0·51
Insoluble siliceous matter . . . . .	9·08	7·48
	100·04	99·70

They are both very good limestones, therefore, and might be employed for agricultural purposes in the district with much advantage. One of the localities is situated near a waterfall, where ample power could be obtained for crushing it. The neighbourhood of the island of Lismore, however, which abounds in lime, and of Loch Leven, on the northern shores of which thick beds of limestone form cliffs along the road, will probably prevent this Ardgour lime from ever being extensively worked.

In the higher or more inland part of the country, to which transport is difficult, it may be found profitable to work it for local consumption.

(b.) *Limestones from Cantyre.*—The district of Cantyre is a very interesting one, both agriculturally and geologically. The low oolite flat called the Laggan, stretching across from Campbelton to the Western Sea, rich in coal below, and capable of great agricultural improvement on the surface—the spirited and thriving race of farmers who have lately settled in the country, and now hold a large portion of its surface—the gradual change for the better now going on, both in the husbandry of the district and in the condition and habits of the people—all these circumstances render this district very interesting to those who are occupied with agricultural pursuits.

It is fortunate for this district that it is rich in lime. Besides the deposits of limestone marked on our geological maps, as lying on the north side of Campbelton bay, others exist in large quantities to the south and west, at the distance of four or five miles from Campbelton. I had not an opportunity of examining accurately the geological position of the thick bed, which is most extensively

worked ; but, from its appearance at a distance, I judged it to be one of the highly-inclined beds of the slate rocks. The comparative proximity of the oolite and old red sandstone rocks, however, renders this point worthy of further investigation.

The limestone is of a yellowish colour, and has the following composition :—

Carbonate of lime . . . . .	98'05
Carbonate of magnesia . . . .	0'44
Alumina and oxide of iron . .	0'29
Insoluble matter . . . . .	1'27
	100'05

It will yield, therefore, a very good agricultural lime.

On the west coast, a mile or two above Bar—a district in which great agricultural improvement is attainable—I met with a vein of black crystallised limestone, of a few feet in thickness, *crossing* the slate rocks, and which had the following composition :—

Carbonate of lime . . . . .	90'96
Carbonate of magnesia . . . .	0'62
Alumina and oxide of iron . .	1'81
Insoluble matter . . . . .	6'40
	99'79

This is also a very good limestone for agricultural purposes ; but the vein is too thin to admit either of profitable or extensive working. Towards the interior of the country, thicker beds of limestone may probably be discovered, which may hereafter be made available when passable roads shall have been constructed across the peninsula.

On the south-east coast, near the mouth of Glenharvie, I found upon the shore a thin vein of very

hard pale-yellow crystalline limestone, traversing the old red sandstone beds, too trifling to be turned to any agricultural use, but which, for other reasons, I have thought it interesting to subject to analysis. It was found to consist of—

Carbonate of lime . . . . .	46'33
Carbonate of magnesia . . . .	29'68
Alumina and oxide of iron . .	11'64
Insoluble siliceous matter . .	11'95
	99'60

It appears thus to be very rich in magnesia, a circumstance not unimportant when taken in connexion with the composition of the limestone beds, found among those of the old red sandstone in Berwickshire, of which the analysis is given below.

2. *Limestones from Berwickshire.*

In the higher part of Berwickshire, which stretches from Duns towards Greenlaw, there crop out, in the bottoms of the burns and on the sides of the hills, numerous thin beds of limestone among the shales, red marls, and sandstones of the old red rocks of the district. These have occasionally been quarried and burned for lime. Having lately visited several of the localities where this limestone occurred, I thought it of some interest to determine their composition, not only in reference to their agricultural value, but also with the view of determining how far their geological position might affect the proportion of magnesia they contained.

For this purpose, Lord Breadalbane was kind enough to send me four specimens for analysis, collected on various parts of his property of Langton, near Duns. These specimens were found to have the following composition :—

	No 1. From washing pool, Langton Park.	No. 2. From the part of Langton wood where some of the stone had been burned.	No. 3. From an old quarry, supposed the same where a stone was got which was burned for lime.	No. 4. From Greuellydikes, on the east of the Langton estate.
Carbonate of lime . . . . .	43.85	47.00	39.01	43.81
Carbonate of magnesia . . . . .	33.34	38.04	30.25	39.50
Alumina and oxide of iron . . . . .	1.59	1.99	1.39	3.57
Insoluble siliceous matter . . . . .	21.41	12.97	29.27	13.09
	100.19	100.00	99.91	99.97

The limestones are all remarkable for the large quantity of magnesia they contain. Should they even be quarried extensively for burning, they will make an excellent building, but an inferior agricultural lime, and must be laid sparingly upon the land.

The limestones from the slate and gneiss rocks, of which the analyses are given above, and of which many others have been analysed in the laboratory of the Association, are all comparatively pure, con-

tain at least little magnesia. Those from the old red sandstone, on the other hand, abound in magnesia. Are these universal characteristics of these rocks, or are they merely local phenomena? I should be obliged to any of the members of the Association for specimens of limestones from the old red sandstone of other counties, the analysis of which might throw further light upon this interesting point.

3. *Limestones of Sutherland.*

The composition of a marl from Assynt, in Sutherland, has probably some connexion with the above question.

In the district of Assynt, towards the western coast of Sutherland, there occur rocks or beds of limestone of considerable extent, though not marked on our geological maps. A marl found in considerable quantity at the foot of a limestone rock in one of the glens of Assynt, was lately sent to the laboratory for examination. Upon analysis, it was found to consist of—

Alkaline salts.....	0.20
Gypsum.....	0.27
Carbonate of lime.....	49.92
Carbonate of magnesia.....	36.23
Oxide of iron and alumina.....	4.70
Insoluble siliceous matter.....	7.90
	99.24

When examined under the microscope, it appeared to be made up in great part of minute rhomboidal crystals, and was probably, therefore, derived from a crystalline limestone, crumbled by the action of the weather.

This district in our geological maps is included in the gneiss country. If the above limestone, therefore, be in this geological position, it settles the question as to the universal freedom from any large admixture of magnesia in the limestones which occur among the gneiss rocks of Scotland; for the proportion of magnesia, as the analysis shows, was very large. It was about equal to what was found in the limestones of the old red sandstone of Berwickshire.

But we know that metamorphic or changed rocks, like those of the Scotch gneiss, may be of any age. In the wide area occupied by this class of rocks in Scotland, we may have many subdivisions, some of which may be characterised by pure, and others by dolomitic or magnesian limestones. Chemical analysis, therefore, may aid the geological observer, as well as the agriculturist, by indicating to the one where rocks of a particular age may be looked for, and to the other where limestones of this or that agricultural value are to be expected.

It is possible that the proximity of the old red sandstone rocks, which skirt so much of the west coast of Scotland, may be connected with the large proportion of magnesia in the limestone of Assynt.

COMPOSITION OF THE SLUDGE OF THE RIVER URR IN KIRKCUDBRIGHT.

The tide of the Solway Frith makes its way for many miles up the river Urr, in Kirkcudbright, and, as it ebbs, leaves deep banks of mud or sludge on either side of its channel. This mud is, of

course, chiefly derived from the debris of the rocks and soils of the upper country from which the waters of the river come—and which, when dammed back by the tide, they quietly deposit.

When the river passes the house of Mr. Maxwell, of Munches, it leaves such a deposit; and as a considerable tract of reclaimed moss land lies near its banks, it occurred to Mr. Maxwell that the sludge of the river might form a useful application to its surface. But as he had hills of gravelly soil also which were equally accessible, and had already been employed to a considerable extent for this purpose, he was desirous of ascertaining which of the two would be likely to produce the better effect. He sent therefore to the laboratory two samples of the sludge, one taken recently from the river, and another which had lain some time on its banks, and along with them a portion of the gravelly soil, with a view to a comparative analysis of the two being made. They were accordingly subjected to analysis, and the following results obtained:—

	1st. <i>By Washing.</i>		
	Gravelly soil.	Sludge, No. 1.	Sludge, No. 2.
Clay, fine sand, and organic matter.....	28.80	19.60	26.00
Coarser sand.....	71.20	80.40	74.00
	100.00	100.00	100.00
2nd. <i>By Analysis.</i>			
Organic matter.....	1.91	2.78	2.92
Alkaline salts (soluble in water and acids)	0.76	0.26	0.80
Gypsum (sulphate of lime).....	trace	0.37	0.32
Alumina (soluble in acids).....	3.42	2.09	1.65
Oxide of iron.....	4.75	3.78	3.43
Carbonate of lime.....	0.60	7.17	6.86
Carbonate of magnesia.....	2.59	0.56	1.82
Insoluble siliceous matter.....	83.76	83.18	81.68
	99.79	100.19	99.48

The sample of gravelly soil contained 66 per cent. of large stones, varying from the size of a walnut to that of a pea. These consisted chiefly of pieces of granite, felspar, and trap. These stones were taken out, and only the fine part of the soil was analyzed and found to have the composition above given.

From these analyses it appears that a marked difference between the two exists in regard to the

proportion of lime they severally contain. The seven per cent. of carbonate of lime present in the mud of the river, as well as the minute division of its particles, gives it a decided preference over the other material as an application to moss land—upon which lime is almost a necessary of healthy and luxuriant vegetable life.

It is probable that there are many other places on the banks of the same river, and of the other rivers of the south of Scotland, to which it might be profitable to apply this tidal mud.

A question we are much inclined to ask is, Where does all the lime this mud contains come from? The slate country through which the river Urr chiefly flows is not known to be rich in limestone; and yet the composition of the mud seems to indicate that deposits of limestone of considerable extent somewhere prevail. They may be too poor or impure to be profitably worked for agricultural purposes, and yet it might be of consequence to some of the proprietors in the upper country to institute a search for them, and ascertain their quality.

#### OF THE COMPOSITION OF PIGEON'S DUNG.

A novel article of import having recently appeared in the English manure market under the name of pigeon's dung, from Egypt, a sample of it was sent to the laboratory for analysis, with the view of determining its value, compared with Peruvian and the better varieties of Ichaboe guano. When subjected to analysis, it was found to consist of 23.9 per cent. of soluble, and 76.1 per cent. of insoluble matter. Its more detailed composition was as follows:

Water	6.65
Organic matter, containing 3.27 per cent. of nitrogen, equal to 3.96 of ammonia	59.68
Ammonia	1.50
Alkaline salts	0.42
Phosphates of lime and magnesia	7.96
Carbonate of lime	2.37
Insoluble siliceous matter	21.42

100.00

It will be seen above, that the sample submitted to examination contained upwards of one-fifth of its weight of sand, a mixture scarcely, perhaps, to be avoided in a country like Egypt. Had it been free from sand, its composition would have been—

Water	8.46
Organic matter, containing 4.16 per cent. of nitrogen, equal to 5.04 of ammonia	75.94
Ammonia	1.92
Alkaline salts	0.53
Phosphates of lime and magnesia	10.13
Carbonate of lime	3.02

100.00

As a manure, this pigeon's dung will be very

valuable to the farmer, and if more free from sand, may prove even a profitable article of commerce. It is as rich in ammonia and ammoniacal matter as some of the best Ichaboe guanos. It is only half as rich, however, in bone earth; but this deficiency, if considered of importance in any particular locality, might be made up by an admixture of bone-dust, or of the waste bone-charcoal of the sugar-refiners.

#### COMPOSITION OF THE REFUSE OF THE GLUE MANUFACTORY.

Mr. Girdwood, Corstorphine, one of our members, having been offered a quantity of the refuse of a glue manufactory for use as a manure upon his farm, brought a sample of it to the laboratory to be analyzed, with the view of determining its composition, and the price he might safely pay for it. It was, therefore, submitted to analysis, and was found to consist of

Water	45.86
Hair	1.10
Fatty matter	22.34
Cellular tissue, and a little ammonia	4.43
Phosphates of lime and magnesia, and a trace of iron	2.30
Carbonate of lime	20.06
Sand	3.03

99.12

The substance, therefore, was very valuable as a manure. With the exception of the water, which formed almost half its weight, nearly everything it contained was of value in fertilizing the land. The skin, the hair, the fat, and the phosphates alone, independent of the carbonate of lime, were found, upon calculation, to be worth twice as much as the price asked for the whole by the manufacturer. The consequence was, that a large purchase of the refuse was made.

#### OF THE COMPOSITION OF BREWERS' DRAFF, OR GRAINS, AND ITS VALUE AS A FOOD FOR MILK-COWS.

A difference of opinion having arisen between the buyers and sellers of brewers' draff in Edinburgh regarding its value, and the price that ought to be paid for it, Mr. Girdwood thought that some light might be thrown upon this question by a chemical analysis. He caused some of it, therefore, to be sent to the laboratory, where it was submitted to both an organic and an inorganic analysis, with the following results:—

1st. <i>Organic Analysis</i> .—A hundred pounds of the fresh draff were found to contain—	
Water	75.85
Gum	1.06
Other organic matter (chiefly husk)	21.28
Organic matter, containing nitrogen (protein compounds)	0.62
Inorganic matter or ash	1.19

100.00

From the above analysis we see that, during the digestion of the malt in the mash-tub, the protein compounds—those which contain nitrogen, and are necessary to the production of muscle in the body and curd in the milk—are nearly all dissolved out.

2nd. *Inorganic Analysis.*—The ash left on burning the draff was found to consist of—

	Per cent. of ash.	In 1,000 parts of wet draff.	In 1,000 parts of dry draff.
Alkaline salts (chlorides, with a small quantity of sulphates) and alkali	7.60	0.90	3.72
Phosphoric acid in combination with the alkali	2.11	0.25	1.04
Earthy phosphates	48.00	5.81	24.06
Silica.	41.51	4.94	20.46
	99.22	11.90	49.28

An examination of the above numbers suggests the following remarks in regard to the value of draff in comparison with other kinds of food.

(a). The quantity of water present in it is 76 per cent.; in this respect it approaches very near to potatoes, and some other varieties of green food. It contains, however, considerably less than the turnip or the cabbage.

(b). The greater part of the solid matter, as we should suppose, consists of husk. This is not wholly insoluble in the stomach of the cow, nor without considerable nutritive power. It is impossible, from theoretical considerations, to assign any definite value to this husk; but the experience of the cow-feeder seems to show that it is not by any means worthless in the feeding of milk cows. In the grains of the brewers it is generally understood that the proportion of nutritive matter left is much less than in those of the distiller.

(c). One important result is the small proportion of protein compounds, amounting only to two-and-a-half per cent. in the dry grains. No doubt this proportion will vary in different samples. It is probably attached to the husk in the form of coagulated albumen, which, however, is dissolved and appropriated in the stomach of the animal.

The draff weighs about 46lbs. to the bushel, and costs 3d. to 3½d. for this weight. One hundred and sixty pounds of draff contain one of albumen, and this weight costs 1s. Five pounds of oil-cake contain one of albumen or other protein compounds, and costs 5d. This ingredient of the food, therefore, is cheaper in the form of oil-cake than in that of brewers' draff.

(d). Again, the quantity of ash left by the dry draff is about five per cent. One hundred pounds in the wet state contain 0.6 lb. of phosphates; or

160lbs., costing 1s., contain 1lb. of phosphates. But 33lbs. of oilcake contain 1lb. of phosphates, at a cost of nearly 3s.; thus the phosphates are cheaper in the form of draff.

Hence a mixture of other food, such as oilcake or beans, along with it, is recommended where the draff is to be used most economically and with least waste.

(e). A part of the feeding value found in the draff by past experience is probably to be ascribed to the steeping it has undergone, rendering the otherwise innutritive or slowly nutritious matter soluble in the stomach, and thus admitting of less waste.

Turnips are the kind of food most usually given with brewers' grains. The following letter from Mr. Caird, Baldoon, near Wigton, shows the profit of feeding milk cows upon draff and turnips, compared with beans and turnips, according to his experience:—

“I have fed for the last two winters a large dairy stock in the following manner, for between six and seven months, or 200 days:—

	£	s.	d.
Each cow half a bushel of draff (23lbs.) per day, for 200 days, 100 bushels at 3d.		1	5 0
Each cow (22lbs. per day), 2 tons of turnips, at 10s.		1	0 0
	£2	5	0

“And the dairyman to whom my cows are let prefers this feeding to the following, which is the usual allowance in this district to a dairy stock:—

	£	s.	d.
Each cow 4 tons of turnips, at 10s.		2	0 0
Each cow 2 bushels of beans ground, at 4s. 6d.		0	9 0
	£2	9	0

In both cases the same fodder is given.

“On the draff and turnips the cows give fully more milk and butter, both of which are well-tasted, and they keep themselves in better condition than when fed on turnips alone. With this feeding, they are a very healthy stock.

“On the turnips and beans, the butter and milk are always strong-tasted, and the cows are not kept in such high condition as on the draff and turnips.

“If cows get an unlimited supply of turnips, they may yield more milk than on the quantity of draff and turnips mentioned above. They do not eat beyond a certain quantity of draff, while it is difficult to satisfy their appetite for turnips.

“The question as to which of the two is the cheapest food depends altogether on the respective money values of draff and turnips in any given locality.”

COMPOSITION OF THE ASH OF THE ARUNDO PHRAGMITES, OR COMMON REED.

During one of my recent visits to the Carse of Gowrie, my attention was again drawn to the length of straw which prevails in new alluvial soils, and especially in such as are reclaimed, by warping or otherwise, from the sea or from rivers. The inconvenience of this is, that it is often too weak to bear the weight of the grain, and the corn crop is apt to be laid in rainy weather. It has been said, but hitherto without proof from actual analysis, that this weakness of the straw is owing to a deficiency of silica, and that the application of manures containing silicates would strengthen it and support the ear.

In reference to this point, it occurred to Sir John Richardson that probably the common reed (*arundo phragmites*), which grows so abundantly on the margin of the Tay in some parts of the Carse, might, if burned, leave an ash so rich in silica as to admit of its being applied with advantage to the young corn. At all events, if it was so, it would afford the opportunity of making a trial with a substance not difficult to be procured. The suggestion appeared to me a valuable one.

He accordingly sent a quantity of reeds to the laboratory to be burned and analyzed, which was accordingly done with the following results:—

(a). The dry reed left 1.62 per cwt. of ash—a very small proportion from a plant so nearly allied to the grasses—though two or three times as much as would be left by an equal weight of wood.

(b). The ash, on being analyzed was found to consist of—

Potash .....	}	4.80
Soda .....		
Lime .....		6.06
Magnesia .....		0.24
Oxide of iron .....		0.93
Phosphoric acid, .....		3.19
Sulphuric acid .....		5.49
Chlorine .....		0.17
Silica .....		78.91
		99.79

It thus appears that the ash of this plant is very rich in silica, containing nearly four-fifths of its weight of this substance, and, besides, about 6 per cent. of phosphate of lime, and 10 per cent. of the sulphates of potash, soda, and lime.

It is not quite certain that the whole of the silica in the ash could readily be taken up by the roots of growing plants; but, for the purpose of a trial, I recommended that, instead of being burned to an ash, the reed should be charred, or burned in a smothered fire only. The black dust thus obtained may be dibbled in with the corn, or applied in still weather as a top-dressing; or, where guano is used,

may be advantageously mixed with this manure before it is applied to the soil.

It is doubtful, however, whether the tall straw of the Carse lands be really deficient in silica—in fact, the average proportion of silica contained in a strong glazy wheat straw is not yet known. I propose, therefore, to investigate this point during the present autumn, and shall be obliged to any members of the Association who will forward to me at the close of the present season a pound or two of any ripe wheat straw, which appears remarkable in any way.

OF THE COMPOSITION OF THE CARROT BEAN.

The carob bean, the fruit of the carob-tree, or *Ceratonia siliqua*, is thus spoken of by Professor Lindley in his "Vegetable Kingdom," pp. 549, 550.

"Under the name of the carob-tree, or algaroba bean, it is consumed in the south of Spain by horses, and has been imported into this country, it is said with profit, as a substitute for oil-cake. The dry pulp in which the seeds are buried is very nutritious, and is supposed to have been the food of St. John in the wilderness, wherefore it is called locust-tree, and St. John's bread. Singers are said to chew this fruit for the purpose of improving their voice.—*Pharm. Journ.*, 3-79. The seeds of the carob-tree are said to have been the original carat weights of the jewellers."

Mr. Thomson, of Leith, one of the members of the Association, having lately received a considerable consignment of these beans, brought a sample of them to the laboratory to be analyzed, with the view of testing their real theoretical value. They have therefore been examined with care, and their composition was found to be as follows:—

Impure sugar .....	46.76
Gum, and a little colouring matter ....	4.46
Gluten, and coagulated albumen .....	3.32
Fat .....	0.34
Woody fibre and starch .....	22.51
Water .....	22.38
	99.77

This bean, as appears from the above analysis, is remarkable for the large quantity of sugar it contains—about 47 per cent. of its whole weight. The protein compounds—gluten and albumen—are in comparatively small proportion. It ought to be given therefore, along with common beans or oil-cake to growing stock. A little of it may make a good addition to the ordinary food where animals are intended to lay-on fat. Cattle are said at first to eat the carob bean unwillingly, but pigs devour it greedily. It would be desirable to have some accurate experiments made upon its practical feeding value, compared with other varieties of common food.



For milk cows or fattening cattle it may be expected to answer well.

It is the pod, and not the bean or seed, properly so-called, that forms the nutritive part of this food. The seeds are small, dark brown, and almost stone-hard, and form about one-tenth part of the whole weight of the article as it comes to this country.

COMPOSITION OF THE ASH OF YOUNG FURZE.

In a previous part of these proceedings, I inserted a copy of the analysis of the ash of young furze, made by Sprengel, with a view of affording to our members the best information we then possessed in regard to a plant to which the attention of practical farmers has lately been very much directed.

I have thought it of consequence, however, to have new analyses made of this ash, and accordingly put it into the hands of two of my assistants. Young shoots of furze were collected in the neighbourhood of Durham, and upon Arthur's seat, respectively. They were dried, burned, and the ash analyzed.

The recent shoots consist of—

	Undried.	Dried.
Water .....	77.40	
Organic matter .....	21.23	93.94
Ash .....	1.37	6.06
	<hr/>	<hr/>
	100.00	100.00

The ash left by two samples collected on Arthur's Seat at different times, and analyzed separately, were found to consist of—

	Furlonge.	M'Calmont.	Mean.
Potash .....	20.13	16.49	18.31
Soda .....	6.75	8.33	7.54
Chloride of sodium ...	12.39	12.06	12.23
Lime .....	16.80	15.25	16.02
Magnesia .....	5.27	8.31	6.79
Phosphates of lime and } magnesia, and a little } phosphate of iron .. }	27.15	26.34	26.74
Sulphuric acid .....	6.07	7.50	6.79
Silica .....	5.44	5.72	5.58
	<hr/>	<hr/>	<hr/>
	100.00	100.00	100.00

Per centage of ash in dry furze, 6.06.

These analyses differ slightly from each other, but not more so than the ash of two portions of a plant collected at the same time, on the same spot, might be expected to vary. The ash of the furze collected in the neighbourhood of Durham contained more magnesia, and less lime and phosphoric acid; but the results are altogether so different from the above that I delay the publication of them till an opportunity occurs of collecting a fresh supply, and of having the analysis repeated.

The above table, however, shows that the plant is very rich in phosphate of lime—every hundred pounds of the dry plant containing upwards of two pounds of the earth of bones. This is, no doubt, one source of the nutritive qualities of the young furze. I am about to have the proportion of protein compounds contained in the fresh shoots determined also, for the purpose of ascertaining if they are as well adapted to the production of muscle as they are to the production of bone.—Transactions of the Highland Society.

PLANTATIONS ON THE SEA-COAST.

In returning to the subject of "tree-planting," I have been gratified by the perusal of an essay which describes the formation and progress of a series of plantation, so striking as to induce me to avail myself of its most interesting details. No one can travel along the high roads of Britain without being struck with the wretched condition of young trees that appear to be little else than mere skeleton abortions, and that too in situations and upon soils which ought to produce luxuriance. The fact is notorious; and it long ago attracted the notice of writers upon tree-culture. As to the coast, and trees growing thereon, there is, and has been, but one opinion; but now they who peruse and attach credence to the few particulars which this condensed article will contain, must arrive at the conclusion that nothing is impossible. Those, on the contrary, who doubt, may readily satisfy them-

selves of the truth or incorrectness of the report of the state of "Several Plantations formed by the late Sir Thomas Fowell Buxton, Bart.," in the extremity of Norfolk, close to the German Ocean.

In my preliminary observations upon "Tree-planting," I insisted upon the deep and thorough preparation of the land by trenching, and draining if required: repudiating altogether the miserable blunder of the "hole-digging" system, which was sure to be productive of debility.

As March and part of April present the only remaining opportunity of planting trees—evergreens in particular—I embrace this occasion to adduce proof of what may be done, even in ground so bad that few would think of turning it to any purpose of cultivation whatever; but to do justice to the subject of coast-planting, it will be needful to appeal to the positive evidence which is offered in the

accredited report of Sir T. F. Buxton's operations. That gentleman, it appears, was an enthusiast in the work which his fervent zeal enabled him to carry through with success during the short period of four years—namely, between 1840 and 1844. In a general point of view, the land was so wretched as to merit the character given by the reporter in the following lines:—"A tract for thousands of years unmarked by any feature of fertility;" not an acre of which was "worth renting for any agricultural purposes, for the farmer who had one of the best pieces said, 'he should not put his plough into it again.'"

The terms "moor-band" and "iron sandstone pan" are expressive of a subsoil deposit so intractable as to present (if unremoved) an effectual obstacle to every operation. We shall soon, however, perceive what can be effected by patience and assiduity.

"Labor improbus omnia vincit." So Virgil taught, and experience has triumphantly established the truth of his axiom.

The whole extent planted was 117 acres, all of which was trenched, excepting about three acres left with a view to ascertain what progress trees would make in unprepared land of a quality so uncongenial. These acres were divided into 22 plantations, some of which it is necessary to describe rather minutely, after quoting a few lines which indicate the qualities of the several strata that the high cliffs of the coast present to view. The lowest stratum reached in the district occupied by the plantations of Trimmingham and Rupton, is called the "cart or iron sandstone." Over this are layers of red chalk, then chalk marl, over which another of hard chalk. In this the jaws and teeth of a large saurian animal were found; next a thin layer of ferruginous gravel, containing wrecks of a forest—trunks and branches, fir cones, leaves, and seeds; also tusks, teeth, and bones of the elephant, ox, and horse. Over this a marine formation, here called "crag," containing shells and other ocean deposits; next a stratum of blue clay; and above the clay a bed of gravel, varying from 15 to 30 inches in depth, of the poorest description, consisting chiefly of small, water-worn pebbles, cemented together by oxide of iron, and of extreme hardness, particularly on the surface, and constitute the pan or crust. This gravel forms the subsoil, on which the trees have to rely for a great part of their support. Those persons who are familiar only with the loams and other fertile lands of the interior, and witness the failures that therein occur, must, to a certainty, be startled at the somewhat discouraging prospect which was presented by the *ingrata terra* above described. However, to come to particulars.

#### PLANTATION No. 1.

"The Burning Mountain," 4 acres; situated 290 above the sea, 2 furlongs from it; trenched 18 inches deep in 1840; planted with 2 years' seedling fir, larch, oak, chesnut, alder, birch, and hazel, from Scotland, 2½ to 3 feet high. The space between the plants was hoed for three years, and then the plants were left to themselves. The larches and birches are now six feet high. The oak, hazel, alder, and Spanish chesnut are remarkably healthy, and the general character of the plantation is almost as thriving as if it was inland and well sheltered.

#### No. 2.

"Long's Hill" contains from 9 to 12 acres. The report of this portion comprises all that *could* be deemed objectionable, and may be cited as the climax: "Stands 300 feet above the level of the sea. Naturally the surface soil to the depth of four inches was composed of peat and gravel, resting on a solid bed of the latter, from which materials for mending the roads have been taken. The trenching to the depth of 18 inches has mixed the soil, so that the surface now presents the usual appearance of the poorest description of land. From 2 acres of the worst of it, 200 loads of large stones were removed. This hill was planted in 1844 with a mixture of Scotch pine, larch, and hardwood trees. A part, containing about 1½ acres, was sown with white Belgian carrots, and the produce was 820 bushels. The trees and shrubs already distinguishing themselves by their healthy appearance are the mountain ash, Scotch pine, the snow-berry, and the *berberis aquifolium*."

It is my object to invite the arboriculturist to study the whole original article. It recites miracles, and being written by a nurseryman and land improver (Mr. James Grigor, of Norwich), to whom the gold medal of the Great Parent Society has been awarded, it may claim confidence in the ability of the writer. I therefore do not intend to trespass on his manor further than to cite a few examples of success with plants, which, according to previous notions, could not by possibility have been expected to live, much less to thrive in a situation and on ground so exposed and miserable.

#### No. 3.

1842.—3 inches only of peat over a thick sandstone pan; abounds with sycamores; and as underwood, is covered thickly with the holly-leaved barberry, which abounds with berries that are eaten by partridges and pheasants.

#### No. 4.

1840.—2 furlongs from the sea; a poor sand lying on a hungry gravel; displays the perfect success of the alder (a water-tree; many have been

already cut as hurdle-wood); and of the oak, a tree supposed to affect strong land exclusively.

## No. 6.

"Boreas," 8 yards from the cliff, which is washed by the German Ocean; "the boldest trial," so considered by Mr. Grigor; it is 250 feet high. Soil on the surface, a mixture of sand and peat, over a mass of clay supposed to be 100 feet deep: trenched as before, and planted in the spring of 1842. The trees are the pinaster, the *pinus maritima*, *P. Austriaca*, *P. mugh.*; also the sallow, osier, elder, alder, ash, and sycamore, in abundance. Some of the pines have made shoots in the present year (1846) 15 inches long; the ash-tree, however, which is esteemed ill fitted for a marine exposure, has proved itself here to be one of the hardwood trees, peculiarly applicable to its present situation. In Rome plantation "the alder is again taking the lead; and this tree, which is generally consigned to wet and boggy lands, prospers remarkably well on poor sand and peat on the most exposed places." I pass over many of the numbers, as the result of the trenching are coincident; and some of them possess a superiority of staple; marl and other earths being occasionally present.

## No. 17.

"Earlham," planted in 1844; the *Araucaria imbricata* and *pinus excelsa* are profusely intermixed with other trees, and are looking well.

## Nos. 19, 20, and 21.

Herein the osier, sallow, and alder are placed as nurses to the hardwood trees throughout. Finally,

## No. 22.

"Davis' Hill," 300 feet above the level of the sea, and lying nearly half a mile from it. The soil is various, much of it pure sand. It was made in March, 1841, and, "by way of experiment, the trees on several acres were planted in untrenched soil. The result was that two-thirds of the plants died."

The writer insists chiefly upon the trenching. "Without this preliminary step, the land had better remain as it is; for a plant which cannot readily establish itself underneath, cannot stand the buffeting of the tempestuous and keen winds from off the ocean.

Spring planting of young, *small* trees, two or three years old, planted very closely, is considered important, because the roots start immediately, and the little trees have thus the advantage of a full season's growth, and a better hold of the land.

Having thus adduced the leading facts connected with a situation of peculiar exposure, and which bear chiefly upon the growth of timber trees, I cannot further enlarge here. Much remains upon the decorative part of the work, and this will stand over to another month, when I hope to show that shrubs the most interesting and beautiful can be still planted in the ensuing spring, and with every promise of a success equal to that which crowned the exertions of the late Sir Thomas Fowell Buxton.

JOHN TOWERS.

February 12.

## TENANT-RIGHT.—HEXHAM FARMERS' CLUB.

The usual monthly discussion of the Hexham Farmers' Club took place on Tuesday, Feb. 9, John Grey, Esq., in the chair. The subject, "tenant-right," was introduced by Mr. John Harle, of Mill Hills, who said: Before entering into this day's discussion, I beg you will allow me to state, that had I anticipated the subject to have been so complicated, I certainly should have left it to some one more able than myself to elucidate; but as it was voluntarily undertaken on my own part, I trust your criticism will not be too severe should I fail in illustrating those rights according to your expectation. But though this short exposition of mine may be of small importance, we know much valuable information is often elicited by provoking after discussion among the various members; should that be the case in the present instance, my object will be attained. I think it must be conceded that any tenant who has a fixed tenure for a term of years secured to him by lease, neither has, nor can have, any rights but what the law will amply secure to him under that agreement. If he makes a good bargain, so much the better for himself; if he makes a bad

one, which, no doubt, has been too often, unfortunately, the case, he must, like men in all situations of life who invest capital in any undertaking, submit to his lot; therefore, with regard to tenants who are secured by leases, it is not my intention to dilate further. But we are all well aware that a very large portion of the land in this kingdom, especially in the more southern counties, is held by no such security; nay, so much is the reverse the case, that I believe leases are the exception and not the rule. I believe it will not require a very scrutinizing eye to detect, on riding along the road, without inquiry, whether a man has security of tenure for his farm or not. We know there are many honourable attachments, where families have remained for two or three successive generations under the same proprietors; but I could almost make bold to state that even in such a case the land would not be cultivated according to the spirit of the age. I read not long ago a paragraph in the newspapers of a proprietor putting the question to his tenantry—if they wished to have leases? and the answer they made—they would rather remain as they were; it

struck me forcibly at the time, had any experienced person examined the estate, he very probably would have said they had remained as they were for fifty years. What can have been the particular cause, but leases, which have given such an extraordinary impulse to the best modes of management which you see in Berwickshire, the Lothians, and many places in this county, and which have enabled them to meet seasons of difficulty, and overcome distress, when their brethren in the south, in a more favoured clime, were clamorous for parliamentary committees? Would ever such large sums of private capital have been laid out on other persons' estates, which made them, as it were, into garden ground, had they not had security for their skill and capital? It is my firm opinion the soil in this country will never be brought to bear the weight of produce which it is capable without a general system be followed of letting farms for that length of term in which a tenant may reasonably be entitled to look for a fair return for his stock in trade—namely, skill, labour, and money which he has expended upon it. I shall now proceed to give you an authority corroborative of these views, and a name of no less weight than the late Mr. Curwen, of Workington, a practical man in every sense, as being both a large proprietor and also a large cultivator. In his reports, he says: "Upon a review of the causes which have given to Northumberland, Durham, and Scotland, the superiority in agriculture, they may, I conceive, be fairly traced to have principally originated from the granting of long leases. As agriculture advances to a state of perfection, the necessity for the same length of lease does not exist to encourage enterprising men in districts that require improvements to embark their capital; a tolerable length of lease is absolutely necessary, with a greater share of liberality of covenants than is usually to be found. Example and improvement in agriculture are of little consequence to the farmer without a lease. He is precluded from adopting them; whatever advances the value of his farm beyond the state in which he took it, renders his tenure more insecure. If he wishes to keep his farm, it must not appear to be above the scale of moderate advantage. If his exertions shew it to be capable of improvement, he hazards the loss of it." With regard to the form of a lease his opinion was—"That most of them were too complex; that the lease ought to guard the property of the landlord from injury, leaving the tenant the greatest possible liberty with regard to cropping. Alternate white and green crops renders it impossible for the tenant to injure the land without equal loss and injury to himself." These are the opinions of one I take to be of some little weight on this matter. But there is another party who has the principal share in carrying these measures into effect betwixt landlord and tenant—I mean the agent; and every person who has had any experience in farming knows what value is attached to an able and efficient agent. There are many duties belonging to him requiring great knowledge and experience with regard to the management of land, independent of collecting receipts. It is not an uncommon thing to see farms advertised to be let by members of the legal profession. Now we cannot expect that men who have

studied law all their lives can have much knowledge, less regard, to the management of an estate; it must be the practical eye of men who are perfectly acquainted with what is best suited to different soils and situations, who alone can discriminate between an enterprising and a slothful tenant, or to encourage the one and to quicken the other; therefore, next to a lease, I think in importance to the welfare of a tenant is an able and efficient agent. There are many minor points in connection with this subject which it would be too tedious to enter into detail; there is one, however, which I think is too important to be omitted—that is, what assistance a tenant is entitled to receive from his landlord with respect to permanent improvements, including draining, fencing, &c. But I believe it is now generally adopted upon what I think a very equitable principle, for the landlord to advance the money and the tenant to pay a reasonable per centage upon the outlay; none has now the plea of poverty to plead, for by proper application money may be had for the purpose. Now, gentlemen, I think if these views which I have taken were generally adopted, I can see no right but what we would be in possession of, and none but what any man with sufficient ability, added to industry and capital, would make his way in the world. It would have the effect, also, of putting an end to that constant source of dispute (seeking compensation for improvements so very common in some places) under a tenant-at-will occupancy; for a person under that tenure may remain so long, that I think it would be extremely difficult to know what compensation he was entitled to. Where leases are granted, I think it would be beneficial to both parties to have leases renewed some time before they fall out, not less than eighteen months; it would be attended with mutual advantages, and would weaken any motive of a selfish tenant to rob—or, at any rate, not doing the same justice to his farm near the expiration of his lease. It would also give a tenant, who may be possessed of a large family and an extensive stock, more time and opportunity to look before him, should he unfortunately have to leave his farm. We have seen many instances where farmers, under such circumstances, have had to enter the market when an undue competition was going on for land, and outbidding even their better judgment, and ultimately placing themselves in difficulties, where, if more opportunity had been given, different results would have followed. I am fully persuaded that however the interest of the proprietor and occupier may appear at variance to the eye of superficial observers, they are so intimately bound up that it is impossible for the one to suffer without injury to the other. And that, as tenants, we think we are making rapid advances in improvement, still we are very short of making the earth produce what it is capable of doing: it is, therefore, our duty, as it is assuredly our interest, to study by every means in our power to promote and increase the productions which are so necessary to mankind—trusting we shall meet with every compensation from those (I mean the landed interest) who cannot, or ought not, be otherwise than solicitous for our welfare.

After a very long and animated discussion, the follow-

ing resolution was passed:—"That the practice which prevails to a considerable extent in this country of letting land from year to year, and withholding leases, is proved to be highly detrimental to the progress of agriculture, and that every means ought to be adopted to abolish

the same; but that legal enactments for securing compensation to tenants for unexhausted improvements, can only be made to operate satisfactorily in cases where leases are not granted."

## REVIEWS.

THE FOOT OF THE HORSE; its Structure and Functions; with the means of preserving its Action and remedying Diseases, by a new method of Shoeing.

By THOMAS CLARENDON.

Dublin: Hodges and Smith. London: Longman and Co. 1847.

It is well known that one of the many serious evils to which "horse flesh" is exposed to, arises from a vicious mode of shoeing. This is particularly felt in the case where corns are produced by the iron shoe at present used, giving an excessive share of labour to the horny crust from the sole and frog. The author says—

"But the *corn*, by whatever means produced, is greatly aggravated by the iron shoe, when so nailed on as to prohibit the relief that the corn, in an unshod foot, would derive from the expansion of the quarters. An inherent evil, therefore, of the iron shoe, is its undue pressure on the crust. Hence the great severity of road-work as compared with riding on soft ground. In the former, the crust has to bear nearly the whole burden; in the latter, the soft surface, rising in the hollow of the foot, distributes the pressure over the sole and frog."

To obviate the evils of this system of shoeing, he puts forward his own views, which are well worth attentive perusal. The peculiarity of the invention consists in the provision made for action *behind*, by having the hinder nail holes widened in the direction of the elastic action to resemble the size of the *neck* of the nail.

"The nails inserted in these slits or apertures are termed 'slide nails,' and their heads take hold of the shoe at each side of these apertures respectively, in counter-sinkings, where they work to and fro, with the alternate expansion and contraction of the hoof in which they are fixed, and at the same time hold the shoe tight to the foot. In this way, at every step of the animal, the natural action takes place; and although the extent through which it ranges in any case is very small, not exceeding the sixth or eighth of an inch at either side, yet the beneficial effects of avoiding an interference with the provisions of nature, even to that slight extent, are most striking and indubitable.

"To guard against the effects of gravel or road-stuff lodging in the apertures, an opening is made on the exterior face of the shoe, through which the action of the nail (carried in and out by the motion of the hoof in which it is fixed) expels any foreign substance that may happen to be taken up."

The work is illustrated with engravings of the several parts of the foot of the horse and of the different sections of the shoe, and the testimonials of the efficacy of the slide-nail shoe are from most respectable physicians and persons connected with agricultural pursuits.

SELECT WRITINGS OF ROBERT CHAMBERS.  
ESSAYS, &c. Vol. I.

Edinburgh: Chambers. London: Orr.

The works of Robert Chambers (now twenty-five years before the public as an author), and which

have met with such success as few authors ever had the good fortune to attain for their works, hardly require our notice. To blame we cannot, for there is not an essay that does not contain a moral lesson or useful hint to some class of society; and although the modesty of the author only claims to be "an essayist of the middle class," if the aristocracy are fond of "thoughts, lovely and of good report," they will not, they cannot, deny but that virtue must be promoted and intelligence gained by a perusal of this interesting volume. One of the many interesting papers which this volume contains—"Distant Ages connected by Individuals"—has the following introduction:—

"It was only on the 16th of May last that the newspapers announced the death of the Earl of Powis. Many would suppose this to be an ordinary nobleman, and his name would with them pass unregarded. But Lord Powis was no common person. He was the son of the very Robert Clive who established the British power in India—that 'heaven-born general,' as he was called by Chatham, who, going out as a clerk to India, illiterate, proud, poor, and irritable, nevertheless in a very few years rose to high military command, and performed such exploits as caused civilized nations to gaze at him in wonder across intervening oceans. It was the father of this newly deceased earl who, so far back as 1744, when ordered to ask pardon of a secretary whom he had unjustly offended, and when afterwards, in a forgiving spirit, invited by that person to an entertainment, said, 'No, sir; the governor did not command me to *dine* with you.' It was the father of this newly deceased earl who, in 1758, with 900 European soldiers, and 2,300 native troops, fought and overthrew, at Plassey, a native army of 50,000 foot, 18,000 horse, and fifty pieces of cannon, thereby laying the foundation of that mighty empire which has since been the source of such enormous wealth to Britain."

CORN TO CAVALRY HORSES.—In consequence of the present extraordinary high price of oats, occasioned by the general scarcity of all descriptions of grain, an order has just been issued from the Horse Guards to the colonels of all the cavalry regiments in her Majesty's service, for a considerable reduction to be made in the supply of corn to the troop horses. Heretofore the regulation was for each horse to have 10lb. of oats per day, generally averaging, from the excellent quality of the corn contracted to be supplied for cavalry horses, about two gallons. According to the new regulation ordered to be carried into effect by the Commander-in-Chief, the quantity is to be reduced from 10lb. to 7lb. per day, making a diminution in the consumption of nearly one-third. In a cavalry regiment of 800 horses, under the new arrangement, the enormous saving of upwards of 50 bushels of oats will be the daily average, and nearly 18,000 bushels in the twelvemonth.

METEOROLOGICAL DIARY.

BAROMETER.			THERMOMETER.			WIND AND STATE.		ATMOSPHERE.			
Day.	8 a. m.	10p.m.	Min.	Max.	10p.m.	Direction.	Force.	8 a. m.	2 p. m.	10 p. m.	
Jan.	21	29.90	29.86	29	35	35	East	calm	cloudy	cloudy	cloudy
	22	29.80	29.71	34	37	34	East	gentle	cloudy	cloudy	cloudy
	23	29.64	29.63	31	40	39	E. by South	gentle	cloudy	cloudy	cloudy
	24	29.40	29.37	35	47	36	S. to West	brisk	cloudy	cloudy	cloudy
	25	29.27	29.32	37	47	39	S. West	brisk	cloudy	cloudy	cloudy
	26	29.34	29.35	37	47	45	S. West	brisk	fine	sun	fine
	27	29.36	29.24	36	46	45	S. West	gentle	fine	cloudy	cloudy
	28	29.00	29.28	36	48	34	West	brisk	cloudy	cloudy	fine
	29	29.28	29.38	31	45	30	W. by North	gentle	fine	sun	fine
	30	29.49	29.52	28	44	35	N. West	gentle	fine	cloudy	fine
	31	29.57	29.61	34	40	30	North	gentle	fine	sun	fine
Feb.	1	29.60	29.75	29	39	32	North	gentle	cloudy	cloudy	cloudy
	2	29.80	29.80	34	42	33	North	variable	cloudy	cloudy	cloudy
	3	29.80	30.00	33	34	32	N. East	lively	cloudy	cloudy	cloudy
	4	30.06	30.15	29	37	30	N. West	gentle	fine	sun	fine
	5	30.15	29.98	28	42	37	Westerly	lively	cloudy	sun	cloudy
	6	29.70	29.50	35	50	40	W. by North	brisk	cloudy	cloudy	fine
	7	29.55	29.49	33	40	25	North	variable	cloudy	cloudy	fine
	8	29.62	29.36	20	30	27	West, Easterly	variable	cloudy	cloudy	fine
	9	29.37	29.37	21	30	25	W. N. W.	lively	fine	sun	fine
	10	29.40	29.50	24	35	28	W. N. W.	brisk	fine	sun	fine
	11	29.64	29.80	29	38	23	N. by West	gentle	fine	sun	fine
12	29.80	29.80	12	35	27	Westerly	gentle	fine	sun	cloudy	
13	29.97	29.98	18	33	27	N. W., West	variable	haze	sun	cloudy	
14	29.66	29.64	26	43	43	West	lively	cloudy	cloudy	cloudy	
15	29.54	29.54	41	53	43	W. by & by N.	strong	cloudy	cloudy	fine	
16	29.80	29.64	38	46	45	W., W. by S.	brisk	cloudy	cloudy	cloudy	
17	29.86	29.89	43	55	50	W. by South	brisk	fine	sun	cloudy	
18	29.90	29.77	49	49	47	S. W.	strong	cloudy	cloudy	cloudy	
19	29.86	30.16	43	49	42	W. N. by W.	brisk	fine	sun	fine	
20	30.22	30.22	36	45	43	W., S. W.	variable	fine	cloudy	cloudy	

ESTIMATED AVERAGES FOR FEBRUARY.

Barometer.		Thermometer.		
High.	Low.	High.	Low.	Mean.
30.82	29.170	53	21	38.

REAL AVERAGE TEMPERATURE OF THE PERIOD.

Lowest.	Highest.	Mean.
31.9	41.	36.44

WEATHER AND PHENOMENA.

Jan. 21.—Snow thawing; rain, fog. 22, fog and gloom. 23, cloudy, and a thaw. 24, rainy forenoon; finer, changeable. 25, wind and rain last night; lunar halo. 26, changeable. 27, changeable after a stormy night. 28, cloudy; wind, then rain. 29, fine and frosty; hot sun. 30, hoar frost, then cloudy. 31, generally fine and clear.

LUNATIONS.—First quarter, 23rd day, 4h. 18m. morning. Full, 31st day, 8h. 29m. morning.

Feb. 1.—Frost; day thaw; gloom. 2, some snow at times. 3, snow last night; thawing. 4, thaw all day. 5, changeable. 6, snow melting till 4 p.m., then frosty. 7, snow, then keen frost. 8, fine morning; cloudy, and a heavy fall of snow; clear frost after 8 p.m. 9, clear day, and keen frost, but hot sun.

10, the same; snow melts a show. 11, fine, hot sun; keen night. 12, lowest temperature; fine day. 13, haze, and great rime; tends to change. 14, frost abated: thaw; some rain and wind. 15, rainy forenoon; gusts of wind. 16, *idem*; variable wind. 17, fine; thaw confirmed; beautiful spring day. 18, wind; became fine, lovely air; cloudy, and drizzling rain. 19, tempestuous wind all night; wind veered, and the morning was beautiful. 20, fine noon; rain clouds, and a shower; lunar faint halo.

LUNATIONS.—Last quarter, 8th day, 1h. 39m. afternoon. New moon, 15th day, 11h. 26m. morn.

REMARKS REFERRING TO AGRICULTURE.

The whole period has been cool—no advance in vegetation. February has brought an increase of frost and snow; and the great fall of the 8th buried every crop under its heavy mantle; whence, by a ground thaw, the young wheat emerged just as it had been in December. Grass, however, is everywhere green, and there is none of the parched brown seen, which was so noted in 1845. If the genial temperature be lasting, nature will soon prove that spring has already come in, to proceed with double vigour, and thus no time will have been lost.

Maidenhead Thicket.

J. TOWERS.

## CALENDAR OF HORTICULTURE.—MARCH.

February 18th I date as the commencement of this article; when—after the severest frost of the winter, and beyond all comparison the deepest fall of snow—a change of weather and temperature, equally remarkable, has established the correctness of an opinion often expressed, that “*spring commences in February*,” so far as nature is concerned, for vegetation is in a state of rapid advance. The cold weather commenced with the 27th of November; December was severe; January consistently cool, below the estimated average mean; and February still cooler. On Monday the 8th, after a fine sunrise and brisk frost, a close fall of snow commenced, which covered herbage to the depth of seven inches. The frost at night equalled eleven degrees; and as the three following days were bright and sunny, it became requisite to shake all the evergreens, in order to prevent that scalding which a hot sun upon snow ever occasions. On the 12th morning the thermometers marked 20° of frost (12 Fahr.)—and here it will be proper to notice the extreme discrepancy of local registers; for, while in East Berkshire, we quote 12°, 18°, and 20°, as our lowest depressions, we observe 4°, 5°, 6°, Fahr. in the table of the *Gardener's Chronicle*, and a difference of nearly ten degrees upon the same dates in that of the east of London. Previous to the 9th, that beautiful evergreen, Pitto's *porum tobira*, had escaped injury, though fully exposed; and as to vegetables nothing had materially suffered, not even lettuces, though protected solely by a few fronds of fern; and now—or rather so soon had the snow disappeared, which it did by a strong ground thaw—on Sunday the 14th, snow drops were observed in flower; the buds of apples and pears were rapidly swelling, and all vegetable nature prepared to awake from the torpor of the long-protracted winter. The late rains, after so heavy a snow, have, however, barred the operations of the spade; and thus, the duties of the busy month of March will be multiplied. In future it is proposed to exchange the editorial “*we*” for the more familiar first and third persons, as tending to excite greater confidence in the practical experience of the writer. If March be fine, and the ground friable, the OPERATIONS IN THE VEGETABLE GARDEN are—

In the *First Week*, above all things, to set about the preparation of land for new asparagus beds or single rows, in good earnest. Autumn—or rather the middle of November, just before the horticultural winter commences—is the best season, be-

cause the deep trenching and manuring of the whole plot demand time to permit of a proper settling of the earth; and again, that season would afford the additional advantage of ridging the surface for the winter. Early in March, however, the work would succeed, because the young two-year-old plants, or seeds if preferred, could be safely introduced even in the middle of April. Sow, early as possible, Scotch kail, savoy, Brussels sprout, and dwarf summer-cabbage. Sow second early peas, Windsor beans, the latter in the strongest ground; radish in light but rich soil; lettuce, spinage, and the sweet basil, and marjoram; carrots, first the early horn, and beet in light or sandy ground, deep, and free from stones; parsnips in deep, stronger soil. *Salt*: Sprinkle the asparagus rows over the surface prior to forking, and also the ground between the rows of sea-kail. As to quantity, it is difficult to decide; some say an inch layer would not do injury. I have ventured to scatter 17lbs. over a plot of asparagus of about forty-two square feet.

*Second Week*: Stir the earth between and about growing crops, and draw some when quite friable to the stems of peas and beans. Sow round spinage; take gatherings of the prickly sort for the table. Sow more peas and beans whenever those last sown are fairly above ground; long carrots; onions for pickling, and for large bulbs soot is useful.

*Third Week*: Sow a little broccoli, and repeat all the other sowings as before. The carrots were devoured in 1846; perhaps they may escape it by the late frost and snow—molluscous vermin has been thinned: a good preventive would be lime and soot, alternated with surface sprinklings of salt. Cinder-ashes, fine as dust, are said to be a good dress between the drills of any crop. Gently fork the asparagus beds, and lay a covering of dung over the moved earth, and upon that three or four inches of decayed leaves; then scatter salt over the whole.

*Fourth Week*: Continue to sow for succession crops, and attend to earthing up; sticking peas; dressing artichoke-beds, after removal of all the dead leaves. If potatoes are contemplated, be sure to salt and soot the ground liberally a week before planting, and set only the earliest sorts. If the autumnal plantings vegetate, try a pound of salt to every six yards, between the rows, but not within six inches of the plants; fork the spaces, and when the vegetation shall have advanced, scatter more

lime and soot over the entire surface. We know not when we may expect the first movements, therefore should be on the alert. I still lean to the opinion that the disease has been of atmospheric origin.

#### FRUIT DEPARTMENT.

Prune all the wall trees before the buds expand, and protect the blossoms by glazed sashes if at liberty. In 1846, peaches and nectarines were early in flower, and the night of March 21 destroyed hundreds of blooms, even those of the pear-trees, causing *in them* a secondary crop of blossoms, and even fruit, which, though small, ripened fairly. Now (Feb. 20), buds swell so as to yield promise of fruit, but we shall not be precociously early. Old flags made of bunting sheet are durable, and protect wall-fruit, while they admit air and light; but sashes warped sloping, like a steep roof, and secured by ropes or holdfasts at top, are better than anything.

*Grafting* should be begun about the middle of the month, observing the particular period when each tree swells its buds. Now, turn the soil an inch or two deep in the gooseberry, currant, and raspberry beds, so as to raise the weeds and expose their roots; then sprinkle some salt over the reversed slices. If pear-trees run to wood and show little bloom, it will not be amiss to open the soil, and prune away a considerable number of the secondary roots as a check.

#### FRUIT GARDEN AND SHRUBBERY.

The earlier herbaceous plants can now be divided, and the best-rooted portions transferred to other spots. Apply fresh loamy soil to the old plants, and scatter light friable loam, mixed with one-sixth of decayed cow or sheep manure, over the whole surface, and fork it in; this dress will confer strength and colour to flowering plants. Sow the best annuals in pots, to be placed in a frame for a time. Look over the stock of geraniums, petunias, verbenas, and other species for "bedding-out." Remove decayed leaves, and give air and water as required.

Sweep and roll lawns and walks, plant or remove box-edgings, prune holly-plants for hedges, and evergreens which have rambling, disorderly shoots.

#### FORCING FRUIT DEPARTMENT.

Pines never disroot, keep the succession plants in full growth, and, if possible, adopt the mode of growing in beds, not pots: the soil, peat and turfy loam, and no fermenting manures. The atmospheric heat about 70° by day, heat of the bed 80°, or little more.

Earliest vinery has now been once thinned of its berries, and should be again looked over. Let the

clusters be always free and open, to allow of the utmost enlargement of the berries: abate steam and moisture when colouring commences, but keep strong sun temperature, and give plenty of front or back air, but admit no currents.

Figs are very particular; they cannot bear heat, and yet must be scrupulously attended to. A whole crop falls off, if the temperature be in excess: 55° as the average may be safe.

Peaches, before stoning, are equally delicate, the Noblessé is the best and safest forcer, and with air and regular syringing, its fruit will advance safely at 50° through the critical period.

Cucumbers and melons must always be kept at 70° to 80° to 90° with sun, and then air will do no injury. Succession plants must be constantly provided.

Strawberries in pots, or beds within frames or pits, require great attention in the supply of water and air—heat 55° to 60°.

Kidney-beans in the forcing house will bear the highest degree of stove-heat; but air and sprinkings will be useful, the latter particularly, as the plants are the peculiar prey of a certain species of acarus (red spider).

#### FLORAL HOUSES.

*Conservatory and Greenhouses*: At no period of the year is more cautious prudence required than in the "many weathers" month of March. Water must be given, and freely too, when a hot sun and a parching atmosphere are of such frequent occurrence; and these dry the soil, perhaps, twice a day. The *Gardener's Chronicle* once observed "that as fierce, drying winds are proverbial, yet by no means to be desired in hothouses, &c., &c., the best plan is to keep down fire heat at the lowest possible pitch all the morning; and where forcing is going on, to have a lively fire for a couple of hours in the afternoon, from three o'clock until five. By these means the necessity of giving much air will be obviated."

The *Plant Stove* should never, by day, be much lower than 62° without sun; by night, than 56°. As air, however, must be allowed, front swing sashes, with regulating irons and pins, are safe; but a still safer plan for airing a house, I inspected the other day, and will report it if I find the action to correspond with the clever design of its projector. The furnace is built at an angle of the back and end walls, toward the north-east point; it is furnished with an air-tight ash-pit, flanged door; the flue runs thence, and passes on four courses in the centre of the house, forming a capital pit, and leaving a walk round its four sides; this pit is covered, and produces a hot-air chamber, which air is propelled by a current from without, led through the end wall by a six-inch earthen pipe; and thus, warm air pervades the house: while another set of pipes, of like dimensions, is led from the floor through the brickwork at the south-east corner, and conducts its colder air into the ash-pit, thus exciting the fire from below the bars.



AGRICULTURAL REPORTS.

GENERAL AGRICULTURAL REPORT FOR FEBRUARY.

During the greater portion of the month the weather has been extremely cold, though not to say unfavourable to the crops. The heavy falls of snow which took place on the 7th and 8th have tended much to shelter the young wheat plants from the easterly and north-easterly winds. On the whole, the accounts which have reached us respecting the appearance of the wheats are cheering, though in some districts they are represented as sickly, and by no means regular in their growth.

The lambing season, in most quarters, has gone on tolerably well, the fall having been nearly an average; but we regret to state that, in some instances, the long-complained-of epidemic has made its appearance amongst them, and not a few of which have ended fatally.

The fears which were entertained a month or two since on the subject of the turnip crop are being realized. In some parts very few turnips now remain, and those few are seriously affected with disease; so much so, indeed, that the cattle refuse to eat them. Their saccharine and other fattening properties appear to be wholly lost; and the consequence is, that not a few of our large graziers are now compelled to give immense quantities of hay to their stock, of which, fortunately, the supply is very extensive.

Our advices as to the potato are of a most disastrous character. In some localities, scarcely any portion of last year's crop remains; and it is a matter of great uncertainty with many persons whether adequate quantities will be preserved for seed. However much we could have desired extensive autumn planting of that esculent, we fear that that process was undertaken by comparatively few farmers; and we have every reason to believe, from the great losses which many of the growers have sustained during the last two seasons, that the usual breadth of land will not be planted this year.

Comparative steadiness has prevailed in the demand for most kinds of meat, and prices have been tolerably well supported. The hay markets have continued in a very dull state, owing to the large quantities brought forward; and the quotations have undergone no material change. Most of the other markets have ruled dull, at drooping figures.

Throughout Ireland and Scotland a very extensive business has been doing in grain and flour, at

high prices, owing to the great pressure and want on the part of the poorer classes. It is quite evident that the whole of the foreign arrivals will be thus required for some time hence.

REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

Since the date of our last review, the metropolitan, as well as most of the provincial markets, have been seasonably well supplied with both beasts and sheep. Still, however, as the weather has been cold, and as consumption has been large, a full average amount of business has been transacted. In the value of beef, we have to report a decline of from 2d. to 4d. per slbs.; but that of most other kinds of stock has ruled about stationary. Notwithstanding the prevalence of the epidemic in Norfolk and others of our large grazing districts, the number of beasts on most farms is represented as about an average; but that of sheep is unusually small. Prospectively speaking, therefore, we see little reason to expect any material improvement in the quotations of beef; but it is placed almost beyond a doubt that those of mutton will rule steady for some time to come. As to the lambing season, this has gone on tolerably well, even though great losses have been sustained by some of the flock-masters during the late inclement weather.

For the time of year, the imports of live stock from abroad into London have been large, or as follows:—

From whence.	Beasts.	Sheep.	Calves.
Nieu Diep . . . . .	145	1,006	10
Nordwycke . . . . .	35	33	—
Boulogne . . . . .	—	15	—
Harlingen . . . . .	535	346	3
Rotterdam . . . . .	245	464	38
Flushing . . . . .	—	70	—
Total . . . . .	960	1,934	51

It is necessary for us to state that the above returns are derived from official sources, because we perceive that some publications of the day issue statements—for what purpose does not exactly appear—directly at variance with the truth. At the outports, 1,260 head of beasts, sheep, and calves

have been landed—mostly in good saleable condition—from Holland.

Annexed is a comparative statement of the supplies of stock exhibited in Smithfield during the month of February, 1845, 1846, and 1847.

	1845.	1846.	1847.
Beasts.....	13,879	13,140	15,101
Cows .....	527	590	601
Sheep .....	119,950	78,270	84,830
Calves .....	659	640	844
Pigs ... ..	2,159	2,031	2,285

The comparison of prices stands thus:—

Per lbs., to sink the offal.		Feb., 1845.		Feb., 1846.		Feb., 1847.	
s.	d.	s.	d.	s.	d.	s.	d.
Beef.	2 6 to 4 2	2 6 to 4 2	2 6 to 4 2	2 10 to 4 4			
Mutton.	2 8 4 4	3 6 5 6	3 6 5 0	3 6 5 0			
Veal.	4 0 5 4	4 2 5 4	4 2 5 4	4 2 5 4			
Pork	3 0 4 4	3 10 5 2	3 6 5 0				

The bullock supplies have been derived as under:—

	Head.
Northern districts . . . . .	3,100
Eastern ditto. . . . .	5,000
Western ditto . . . . .	2,800
Other parts of England . . . . .	2,200
Scotland . . . . .	220

The remainder of the supplies have been principally derived from the neighbourhood of London.

Newgate and Leadenhall markets have been very heavily supplied with meat from Scotland and the north of England; the arrivals in the course of the month having amounted to about *fifty thousand carcasses* of beef, mutton, and pork. These immense supplies have had a depressing influence upon the trade, and prices have ruled somewhat lower. Beef has sold at from 2s. 6d. to 3s. 8d.; mutton, 3s. 4d. to 4s. 4d.; veal, 4s. to 5s. 2d.; and pork, 3s. 4d. to 5s. per lbs. by the carcass.

AGRICULTURAL QUERIES.

TO THE EDITOR OF THE MARK-LANE EXPRESS.

SIR,—I should like to have the opinion of some of your numerous correspondents as to the probable result, upon the next crop, where the snow is now being ploughed in. The farmers hereabout, in order to be in the usual time for putting in the seed, are daily occupied in ploughing the land, and the snow being two or three inches deep, lies under the furrow slice, and I apprehend will make it raw and ungenial for the seed. Perhaps this may draw the attention of some of your numerous readers if you will favour me with a corner in the *Express* next week.

Yours, &c.,

New Uppingham: Feb. 5. ENQUIRER.

A subscriber wishes to know who is liable to the tithes upon land taken for a railway. The tenant has a lease for a term of years, and the landlord has sold, and taken compensation for the land taken, allowing the tenant a reduction in rent. Is it the railway company, the land-

lord, or the tenant, who is subject to the tithe; or are railways titheable at all?

The railway has been two years in progress, and now completed; who should pay tithes during those two years? The land was in the possession of the railway company all the time.

“A Subscriber” enquires if it is possible to bring up rearing calves without milk? If it can be done, what is the best food for them?

“A Subscriber in the west of Yorkshire,” enquires the best and cheapest way of keeping farming horses! If it is requisite that they should have corn all the year, or only in the fallowing and seed time? What sort of corn is best, and if it should be ground or given whole?

“A Constant Subscriber” enquires what quantity of parsnip seed an acre of land requires? If broadcast or the drill mode of sowing, which is preferable? whether cattle will improve upon them as well as hogs? and what is the best mode of preserving them?

“Roderick” asks what land is most adapted to flax? what quantity should be sown per acre? when sown? in what way applied? and any other particulars relative to it.

ANSWERS TO AGRICULTURAL QUERIES.

SOOT, SALT, AND ASHES.

TO THE EDITOR OF THE MARK LANE EXPRESS.

“Juvenis Agricola,” in your paper of January 25, inquires whether any danger would result to a crop of oats by drilling in with them “soot, salt, and sod ashes.” Evidently no danger would result to the crop by the admixture; but would he not find it judicious to increase the quantity of salt to the proportion of weight for weight of soot? The advantage of increasing the quantity of salt would be to fix more the ammonia of the soot, and thereby cause a less energetic but a more lengthened action of the preparation to the growing plant. The refuse of rock salt, if properly pulverized, will be as effective as the common salt.

I am, Mr. Editor,

Near Boston, Feb. 2. AN OLD SUBSCRIBER.

SIR,—A correspondent signing himself “A. B.,” wishes to know if it would be advisable to mix a heap of lime and soil with manure.

I humbly beg to inform him that the lime will expel all the ammonia from it, depriving it of one of its most valuable properties; but that sulphate of lime or gypsum will, on the contrary, detain the ammonia, and greatly add to the strength of the manure.

I believe the best application would be bone-dust and sulphuric acid, especially if it is intended to be a rich manure for turnip land, which would effectually detain the ammonia, besides adding its own invaluable properties.

POOR PRICE.

## POTASS MANURING.

SIR,—In reply to your correspondent's inquiry of the best and cheapest means of supplying his soil with potass, the readiest and most active potass manure is vegetable ashes, where obtainable; or, as all vegetable matters contain potass, vegetable compost will do, and feed the land more, though not quite so prompt in action. It may be made, as most farmers know, with hedge clippings, dead leaves, weeds and roots, sods, &c., rotted with lime. The ashes of sea-weed answer where the price allows; and it would be well if rough-wood ashes were admitted for manure, duty free, from Canada and other forest countries, as they contain other fertilizing ingredients beside the potass.

For a cheaper and more durable supply, though less immediately active, a compost of crushed granite with lime may be used, of which I hope to send the details for next week's *Express*. I am, &c.

J. P.

## TO PREPARE GAS LIME.

SIR,—Your correspondent, "A Norfolk Farmer," will find it safer to form a compost with the refuse lime from gas works than to apply it direct to the land. When applied direct it is often found too powerful, and has proved itself decidedly injurious, particularly to very young vegetation. One-fourth part of the refuse lime with three-fourth parts of vegetable mould, well stirred together, will make a good fertilizing compost.

Yours, Mr. Editor,

Jan. 30.

A FARMER.

## GAS TAR.

SIR,—In reply to your correspondent, "Agricola," I would observe, that from experiments made by Mr. Bowley on his land, the effect of gas tar appears very powerful as a manure; in fact, so powerful, that it cauterised vegetation, and destroyed seeds when applied direct; but the after effects were exceedingly beneficial. In the course of a few months grass recovered itself and became more luxuriant than in other portions of the field where no tar had been used. The following year's wheat crop, on the portions of the field where the tar had been used, was so conspicuously flourishing over the other part where no tar had been employed, as to attract the attention of the most casual observer; and although a heavy crop (whilst the rest of the field was light), it was ready for the sickle from seven to ten days earlier than the rest. The nature of the soil was cold and sandy. Mr. Bowley states that he has long used the refuse of the gas house as a manure. His usual practice is to form out a compost heap with long dung, about three feet thick, and to pour the coal-tar regularly over it; and then to put on another layer of dung or turf, and to throw lime on the top; after which it is allowed to remain two or three months before it is turned. The lime, he says, should not be under the tar in the first instance, as the tar will find its way through the dung and unite with the lime into a hard cement.

I am, Mr. Editor, yours truly,

Feb. 2.

AGRARIUS.

SIR,—In reply to "Enquirer," I should unhesitatingly say that the neighbours he alludes to would have much better studied their own interest by keeping their teams at rest in the stable, than ploughing in the snow upon the land, as he says, intended for their lent corn. Yours, "MIRUM."

SIR,—In reply to "Enquirer," respecting the result of ploughing in snow, I should fancy the farmers he alludes to must be all young men, or if not, have never before tried the experiment, as when snow is ploughed in, the crop is materially injured by it; and as there is some ploughed, it will be seen to a furrow which was ploughed in the snow, by an extra quantity of weeds, and the crop of corn will not prove so productive.

Yours, &amp;c.,

A GLOUCESTERSHIRE FARMER.

SIR,—In answer to an inquiry in your paper of the 1st inst., I beg to say that calves may be reared without milk after a few days from their birth. Linseed porridge, made by boiling a quart of seed in eight or ten gallons of water, and further thickened by three pints or two quarts of flour: oats are perhaps best; but flour made of the large broad bean, or even the common field bean or barley, will do. This should be given new-milk-warm. I am, sir, your obedient servant,

A STOCK FARMER.

## GAS LIME REFUSE.

The refuse lime from the gas purifiers may be regarded, practically, as a mixture of sulphuret of lime with caustic lime and pretty much water. By exposure to the air it loses water, and absorbs oxygen and carbonic acid, by which it is converted into gypsum and mild lime. This change may be forwarded by mixing it with two or three times as much earth, to increase the exposed surface; and if the weather is dry, by the addition of one-eighth its weight of salt to keep it moist. It should not be turned under until the bad smell and dark colour have disappeared. It is especially good for lucerne, sainfoin, clover; also for peas and vetches; and perhaps beans, although they are said not to like quick lime. It varies considerably in proportions, but as an average, each single horse cart-load (from the gas works) may be reckoned for three to four acres.

J. P.

SIR,—Your correspondent's query about payment of tithe, as respects the liability of lessor, lessee, and occupier (in the absence of any agreement to the contrary between the parties) is plainly decided by the provisions of the Tithe Commutation Acts of 1836, 1837, 1838, and 1839, whereby the railroad directors he mentions as occupiers would be liable to the payment of the tithe.

W. F.

## REVIEW OF THE CORN TRADE DURING THE MONTH OF FEBRUARY.

We are now approaching a period of the year when the weather has more influence on the Corn trade than any other circumstance; and the future range of prices will so greatly depend on atmospheric changes that it would be rash to venture on any very definite opinion. This is however pretty certain, that the wants of Ireland will rather increase than diminish, and that to supply upwards of three millions of people, who usually subsist on potatoes, with a different kind of food, must have a tendency to keep up the prices of grain in all parts of the United Kingdom. It is yet too early to form any judgment of the effects which may have been produced by the severe weather on the crops in the ground. The aspect of the wheat plant is not favourably spoken of, particularly along the eastern coast, where it has been more exposed than in the west. The heavy fall of snow with which the western parts of the island were visited on the 7th and 8th inst., came in a south-west direction; and in Lincolnshire, Cambridgeshire, and Norfolk, scarcely sufficient snow fell to cover the ground. We are, therefore, by no means surprised that the appearance of the fields should have suffered; at the same time, we attach little importance to the rumours on this subject, knowing from experience that so long as the vitality of the root has remained uninjured, the apparent damage to the blade is of no great consequence. Since the breaking up of the frost, on the 14th inst., the weather has been as auspicious as could possibly be desired; and we trust shortly to be enabled to report a marked improvement in the aspect of the face of the country. A bad, or even an indifferent harvest, would indeed, under existing circumstances, be an awful calamity; for there can be no doubt, in our opinion, that stocks of grain are smaller than is at all usual at the corresponding period of the year; and we much fear that, however large the imports from abroad may prove, there will be no great surplus on hand at harvest time.

The trade in wheat has continued in an unsettled and excited state. In the early part of the month there was some appearance of prices giving way; indeed, a decline of about 5s. per qr. did occur; but this did not last long, and before the middle, quotations were again as high as they had been at any former period. A more clear account of the actual fluctuations will, however, be given hereafter in our notice of the transactions which

have taken place at Mark-lane. The most important point to be kept in view, when the probable future range of prices is under consideration, is the position of Ireland; and what quantity of food she may still require from this side of the channel between this and harvest. If the estimates lately laid before Parliament be anything like correct, the money value of the deficiency in the crops of Ireland last year amounted to £15,000,000; and it can therefore be scarcely supposed that any cessation in the Irish demand will take place during the summer months. It is at the same time an undoubted fact that the consumption of grain in England has for months past been, and is likely to continue, on an unusually large scale, owing to the dearth and wretchedly bad quality of potatoes. No stronger proof can be given that such has been the case, than the present state of the granaries at the leading maritime ports. The enormous importation of three millions of wheat and flour, besides large quantities of other articles, which took place when the new Corn-laws came into force, have been nearly used up, besides the arrivals that have at different times since come forward, and stocks of foreign corn are now reduced into a very narrow compass. Meanwhile, our own farmers have not held back supplies; indeed, the deliveries from the growers have throughout been on so liberal a scale as to afford reason to come to the conclusion that they hold less at present than in ordinary years in April or May. Whether this be really so or not, it is quite certain that for some time to come farmers will be unable to bring much grain to market, as for several weeks they will have to give their undivided attention to the preparation of the land, and the committing of the spring seed to the soil. Taking all these matters into consideration, we can scarcely imagine that a fall from present rates is at all probable; and we should certainly not be surprised if the upward tendency were to continue. Most of the markets in the agricultural districts have throughout the month been well supplied with wheat; but the quantity brought forward has not been more than sufficient to meet the demand, and, as already remarked, a gradual and steady rise has taken place in the value of the article. At the shipping ports in Lincolnshire the best parcels of red wheat have lately realized 75s. per qr. free on board, being nearly as high a price as that current at the period

of the greatest excitement. A large proportion of the supply has been bought to go to northern markets, leaving less than usual for Mark-lane, and the total arrival coastwise into London has been moderate. Neither has the quantity exhibited in the metropolitan market by land carriage samples from the home countries, been by any means abundant. Business, nevertheless, commenced very languidly, and under the influence of a temporary cessation of the Irish demand, and the mild weather prevailing about that time, a fall of from 4s. to 5s. per qr. took place on Monday, the 1st inst. For about eight days the trade remained in this state; but the return of frost caused the wheat to come to hand in improved condition on the 8th, when the above-named decline was partly recovered, prices being then quoted 2s. per qr. higher than in the commencement of the month. From that time up to the 22nd, a further rise of 3s. to 5s. per qr. was established; but here the upward movement was again checked, and a reaction to the extent of 2s. to 3s. per qr. having since occurred, quotations leave off much the same as they were at the end of January.

There has been less variation in the value of foreign than in that of English wheat: the fall which took place in the latter, in the first instance, produced very little effect on prices of the former, nor was the subsequent rise participated in to the full extent. A fair extent of business has, on the whole, been done in foreign; as, in addition to what has been taken by the local millers, purchases have, from time to time, been made for Ireland; and latterly, some quantity has besides been taken by buyers from the west of England. The deliveries from the granaries have consequently been on rather an extensive scale, and the quantity remaining at this port is very small. At one period of the month Polish Odessa wheat brought 70s. to 72s. per qr., but it has since been sold 1s. to 2s. per qr. lower. The fluctuation in the value of the finer sorts has also been unimportant, and in comparing present rates with the prices current at the time of our last monthly notice, we find that the advance established at one period has again been lost, quotations being now precisely the same as they were then. We have had no importations of consequence from abroad, the northern ports of Europe having been closed by ice. France having taken nearly all the Black Sea and Mediterranean supply, and what has reached Great Britain from America having gone principally to Liverpool and other ports on the west coast.

Though the metropolitan millers have manufactured less flour than usual (owing to many of our large steam-mills having been partially employed grinding low qualities of wheat into

meal for Ireland), still considerable difficulty has been experienced in inducing the bakers to purchase more than they have required for immediate use. The nominal top price of the best town marks has remained stationary at 65s. per sack. Ship samples have fallen and risen in proportion to wheat: at one time Norfolk households were obtainable at 52s. to 53s., afterwards they rose to 55s. per sack, but this rate can now scarcely be realized. American flour appears to have rather gone out of favour with our bakers, and very little speculation having taken place in the article, the operations have been on a restricted scale. The very finest brands of western canal could at present be readily purchased at 41s. per burl., and at one time there were sellers at 38s. to 39s. The quantity in warehouse is still rather large, and further supplies being reckoned on from the other side of the Atlantic, no material rise can be expected unless a fresh impetus be given to the wheat trade.

Though the arrivals of barley into London have been decidedly small, and the markets in those counties where this grain is most extensively grown have also been poorly supplied, there has been less animation in the demand than might have been expected; this has, no doubt, been caused by the recent alteration in the distillation laws, by which sugar has been permitted to be used. During the first half of the month, fair malting barley was sold at 55s. to 57s., and the best at 60s. per qr.; afterwards a rise of 2s. to 3s. per qr. on these rates was established, which has, however, been since lost, leaving the value nearly the same as previously. The alteration in prices of distilling and grinding sorts has scarcely been so great, and all kinds now stand in much the same position as at the close of January. A good many purchases of this grain were made during the winter, in the Baltic, for shipment at first open water, on British account, mostly at high prices; some of these cargoes may be looked for in the course of next month, or early in April; and the knowledge that a foreign supply is likely to reach us so soon has caused the maltsters and distillers to act with the utmost caution. We feel tolerably well satisfied that the extent of the arrival has been exaggerated, and that the effect likely to be produced on prices has been more than anticipated.

The operations in malt have been on a scale in accordance with the transactions in barley; and though the large brewers are believed to hold very small stocks, they have certainly manifested no anxiety to add to the same. In quotations of the article scarcely any change has occurred, the top price being now 84s. to 85s. per qr.; and other sorts being obtainable at corresponding rates. The agitation for a repeal of the malt-tax continues to be carried

on; but, in the present position of the revenue, there is not much prospect of the government giving up so large an item of income.

The oat trade has been very dull throughout the month, and with supplies about one-half short of the quantity usually consumed in the metropolis and its suburbs, prices have gradually receded. This is so singular a position of affairs that many of the most experienced practical men have been completely at fault. The only way to account for so apparent an anomaly, is the presumption that substitutes have been employed in feeding horses to an extent almost unprecedented. The usual consumption of the metropolis, at the time of the sitting of Parliament, is estimated at fully 20,000 qrs. per week; whilst the receipts have, since the commencement of the present month, scarcely averaged 10,000 qrs. per week. The dealers' stocks must consequently have been largely drawn upon; notwithstanding which they have all along shown a decided aversion to take off more than just sufficient for their immediate and pressing wants. The fall from the extreme rates realized in January cannot be estimated at less than 5s. per qr.; good Irish, which were then worth 38s. to 40s., being now freely offered at 33s. to 35s. per qr. We have no doubt that the large yield and fine quality of last year's hay crop has caused that article to be very extensively used; carrots have also been largely employed for keep, which, with other substitutes must have displaced a considerable quantity of oats. It is not easy to foresee how the value of this article may range during the summer, but we cannot help thinking that the very great falling off in the supplies from Ireland will be severely felt, and that though arrivals from abroad may for a time cause a depression, it appears to us hardly possible that oats can be cheap at any period between this and next harvest.

Notwithstanding the admitted deficiency in the last crop of beans, we have hitherto experienced no scarcity of the article, proving that there must have been good stocks on hand when the new crop was gathered. Whilst oats rose in value beans also advanced, but latterly they have become difficult of disposal, and a fall from the highest point of 3s. to 4s. per qr. has taken place.

Peas have come sparingly to hand, and small quantities having from time to time been taken for shipment to Scotland and Ireland, the previous value of the article has been pretty well supported: fine white boilers have not been sold below 60s., nor good maples under 53s. to 54s. per qr.

In Indian corn far more business has been done at Liverpool than in the London market, but the contracts closed have been at high rates. The purchases of this article have been almost exclusively for

Irish account, and buyers have directed their attention principally to cargoes on passage, having a clause in the charter ordering the vessels to call at Falmouth or Cork to receive instructions regarding the port of discharge. For fine heavy Galatz corn 72s. per 480 lbs. has been readily realized, and other sorts have brought corresponding rates.

In our notice of the state of the grain trade abroad, we shall in the first instance direct attention to America, that being the quarter to which we shall have to look for the greater part of our foreign supply of bread stuffs. It appears, by the most recent accounts from the other side of the Atlantic, that the continued rise in prices of wheat, &c., in Europe, had caused great excitement at the principal markets in the United States. Holders of flour and grain having come to the conclusion that England would require very large supplies from America, had raised their pretensions considerably. A letter from New York, dated 4th February, states that the best brands of Genessee flour had risen to 6'87½ to 7 dollars per barrel. About the end of January a good deal of speculation had taken place; but after the prices had attained the height named, the disposition to buy had fallen off, and for some days the operations had been comparatively trifling. The shipments of flour and corn from New York during January had been very large, not much less than 108,610 barrels of the former article having been despatched, besides 137,282 bushels wheat, 372,596 bushels Indian corn, 21,222 bushels oats, and 531,109 bushels barley. The quantity likely to be exported from the United States was variously estimated; but the opinion of one of the very first mercantile houses at New York is, that the total quantity of all kinds of grain and flour likely to be shipped to Great Britain during the ten months ending 30th June next, would not exceed two millions of quarters. We are of course unable to say how far this estimate may prove correct, but there can be no doubt that exaggerated notions of the capabilities of the United States are entertained in this country. The inland navigation was still closed at the date of the last advices, and no important arrivals from the interior were expected till April. Meanwhile, the stocks at the ports on the Atlantic had become reduced, and it was therefore the prevailing opinion that, even if the foreign demand should fall off, no immediate reaction in prices would follow. At New Orleans, flour was still obtainable on the 25th January, at 4'50 to 5 dollars, and Indian corn at from 70 to 75 cents per bushel. One of the greatest difficulties likely to stand in the way of our obtaining adequate supplies from the other side of the Atlantic will be the scarcity of ships, and the consequent enormously high rates of freight. At New York, 7s. per barrel had actually been paid to load

flour to Liverpool, and 8s. to London, and for other ports equally high freights had been asked.

The indifferent yield of the last harvest, in many of the continental states of Europe, will prevent us obtaining anything like the extent of assistance from the Baltic that has been afforded in former years. Russia is probably the only country in Europe where large stocks of old corn are at present held. The wheat to be derived from thence will mostly have to come by the way of Odessa; and hitherto we have had to compete at that port with buyers from France, Italy, &c.; indeed, only a comparatively small proportion of that contracted for during the winter for spring delivery has been taken on British account; and so long as Marseilles, Leghorn, Genoa, &c., offer more remunerating prices than London, we can scarcely calculate on large supplies from countries lying east of the straits of Gibraltar. At the leading ports in the Baltic, less business has been done this winter than might have been expected, which may be partly attributed to the smallness of the stocks of fine wheat in that quarter. By the most recent advices from Danzig we learn that very few bargains had been closed, and that prices had not undergone much change. Fine high mixed qualities were, on the 15th inst., quoted at 66s. per qr. free on board, and other descriptions were obtainable at corresponding rates. The trade is described as having remained in a quiet state for several weeks consecutively.

At Rostock and Stettin the transactions in wheat appear also to have been on a restricted scale, and at neither of these places had prices fluctuated much, 63s. to 65s. per qr. free on board having been about the current value of the article. In France, Holland, and Belgium, wheat and most other sorts of grain are much too scarce to allow us to calculate with any degree of certainty on assistance from thence; indeed, as far as regards the first-named country, the chances are that we shall continue to export; and in conclusion we may state that a purchase of 3000 qrs. of Lincolnshire wheat, to be shipped from Boston, has been made on French account less than a fortnight since.

CURRENCY PER IMPERIAL MEASURE.

FEBRUARY 22.

WHEAT, Essex & Kent, red ..	70	74	White ....	73	82
Do. new ..	73	76	Do., new ..	78	83
Norfolk and Suffolk ..	68	72	White ....	73	78
RYE, new ..			.....		58
INDIAN CORN ..	54	60	Extra ....	65	67
BARLEY, Chevalier, new ..	56	60	Malting ..	53	56
Distilling ..	55	57	Grinding ..	43	46
Scotch ..	43	53	Irish ..	—	—
MALT, Brown ..	69	71	Pale Suffolk		
			& Norfolk ..	74	77
Ware pale ..	77	79	Chevalier ..	78	88
OATS, English, feed ..	31	36	Potato, &c. 37	41	
Irish, feed ..	32	35	New ..	36	37
Do., Potato ..	36	38	New ..	36	36
Scotch, feed ..	34	39	Potato ..	37	49

BEANS, Tick..	45	49	Narrow..	46	47	Pigeon	50	54
Long Pods	44	51	Windsors	66	76			
PEAS, Essex and Kent, white boilers, new ..								54
Maple, new ..	52	54	Blue ..					75
Grey or Hog ..	51	53	Do. non-boilers..					—
FLOUR, Town-made and first country marks, per sack ..								60
Norfolk and Suffolk ..								50
Stockton and Yorkshire ..								55

FOREIGN.

WHEAT, Danzig and Königsberg, finest high mixed ..	71	79			
Do. mixed ..	69	72			
Silesian and Stettin ..	69	72			
Pomeranian ..	70	74			
Polish Odessa ..	64	69			
RYE ..					
BARLEY, Hamburg, Königsberg, Danzig, and Russian malting ..	48	52			
Do. distilling and grinding ..	46	48			
OATS, Dutch and Friesland, Brew or Poland ..	34	39			
Danish or Swedish ..	33	36			
Russian and Mecklenburg ..	33	36			
BEANS, Small or Pigeon ..	49	54			
Egyptian ..	45	47			
PEAS, white boiling ..	none	Grey or hog ..	none		
FLOUR, Danzig, per brl. of 196 lbs.					
American ..	40	41	Canadian ..	39	40

IMPERIAL AVERAGES.

Week ending	Wheat.	Barley.	Oats.	Rye.	Beans.	Peas.
Jan. 9th ..	66	10	46	5	27	10
16th ..	70	3	50	0	29	6
23rd ..	73	3	54	6	31	2
30th ..	74	11	55	11	32	2
Feb. 6th ..	73	10	53	5	33	0
13th ..	71	7	51	10	32	8
Aggregate average of the six weeks which regulates the duty.	71	10	52	0	31	1
Comparative Average.						
Same time last year	55	3	31	4	21	10

PRICES OF SEEDS.

FEBRUARY 22.

Rapeseed, 22l. 25l.	Irish, —l. —l.
Linseed, Baltic, 44 48	Odessa, 45 48
Mustard, per bush., white 3	10 brown, 9 10
Caraway, 41 43 new, 42 44	Coriander, 10 13
Hempseed, 35 38 per qr.	Trefoil, 17 19
Canary, 70 73 fine, 75 80	Tares, winter, 6s. 0d.
Linseed Cakes, English 13l. 13l. 10s. per 1000	
Linseed, English, sowing 50 60	crushing 44 48 per cwt.

HOP MARKET.

BOROUGH, MONDAY, Feb. 22.

Our market remains inactive, but holders are firm. We can notice no alteration in prices. Weald of Kent pockets, 86s. to 96s.; Mid. and East Kents, 92s. to 130s.; S. Essex, 78s. to 86s.

POTATO MARKET.

SOUTHWARK WATERSIDE, Feb 22.

This market has been exceedingly heavy during the past week, and the sales have been very limited even for the best lots, and the small samples of York and Lincolnshire Regents were a complete drug, as the asking prices are too high for the trade, and the farmers are afraid to risk planting at such high prices. The weather this morning is warm and favourable for the spring crops, and the same lifelessness pervades the market, and there is but little doing at any price. Several of the following quotations may be considered nominal.

Yorkshire Regents..	180	to 220	Lincoln and Cam-bridgshire Kidneys	160	to 170
Ditto Reds ..	180	to 220	French Whites, ..	180	to —
Lincoln and Cam-bridgshire Regents	180	to 200			

WOOL MARKETS.

BRITISH.

LEEDS, FEB. 19.—The demand for wool this week has been limited; the spinners and manufacturers buy sparingly and cautiously. There is not any variation of moment in the prices quoted; but the sales which have been made have been at rather lower rates.

WAKEFIELD, FEB. 18.—We cannot report any relief to that extreme dullness that has prevailed in the trade for the last month: sales are limited, and prices are again a turn in favour of the buyer.

LIVERPOOL, FEB. 20.

SCOTCH.—There has not been so much doing in laid Highland Wool this week: still, holders are pretty firm, at late rates. For white Highland the demand is still dull. There is still a fair demand from the trade for the better class of Cheviots and crossed Wool, at the quotations. Inferior of both kinds are still neglected.

Laid Highland Wool, per 24lbs	7	0	to	8	0
White Highland do	10	6	to	11	0
Laid Crossed do	9	0	to	10	6
Do. unwashed	9	0	to	10	6
Do. washed	10	0	to	11	6
Do. Cheviot	9	6	to	12	0
Do. unwashed	9	6	to	12	0
Do. washed	12	0	to	15	6
White do.	22	0	to	24	0

FOREIGN.—The public sales of Wool are now progressing in London. There is little doing here by private contract this week.

FOREIGN.

The public sales of Wool commenced on Thursday, and have been in progress daily since. They will, probably, include about 12,000 bales; but the quantity is as yet uncertain, because more may arrive. They are proceeding much the same as the last; fully as well we believe, and with a fair attendance of buyers. The following have been the order of the sales:—

Messrs. Marsh and Edenborough offered on Thursday 1,058 bales: viz., 581 of Australian, which sold at 1s. 2½d. to 1s. 11½d. for clean sheep's, at 1s. 2d. to 1s. 3d. for handwashed, at 11½d. to 1s. 3½d. for skin, at 7d. to 1s. 2d. for locks, and at 1s. 2½d. to 1s. 4½d. for lambs'. 235 bales Port Phillip went at 1s. 2d. to 1s. 8d. for clean sheep's, at 1s. 2½d. for handwashed, at 1s. 2½d. to 1s. 3½d. for lambs', and at 1s. 3d. to 1s. 6½d. for scoured. Cape, 214 bales went at 7½d. to 1s. 4½d. for sheep's, at 11½d. to 1s. 2d. for handwashed, at 6½d. to 1s. 1d. for greasy, and at 1s. for lambs'. A few bales Van Dieman's Land went at 1s. 4½d. to 1s. 6d. for lambs', and at 1s. 1½d. for do. locks. Some Rio brought 8½d. to 1s. 3½d. for washed sheep's, and 5d. to 3½d. for greasy; and East India 3½d. to 5d. per lb.

On Friday Messrs. Simes and Co. put up 1,191 bales: 777 bales were Australian, and sold at 1s. 1½d. to 1s. 11d. and 2s. 2d. for washed sheep's, 1s. 2d. to 1s. 5d. and 2s. for lambs', 8d. to 1s. 2½d. for greasy, and 1s. 10½d. to 2s. 2½d. for scoured. Port Phillip lambs' went at 1s. 5½d. to 1s. 6½d., sheep's at 1s. 2d. to 1s. 4½d., and skin at 1s. 2d. to 1s. 3d. Cape sold at 1s. to 1s. 5d. for clean samples, and at 6½d. to 10½d. for greasy.

Mr. William Hall followed with 590 bales of foreign. Spanish sold at 11d. to 1s. 9d., and Odessa at 6½d. up to 1s. 7½d.; some Wool from Kersch going at 1s. 2d. to 1s. 11½d. per lb.

On Saturday Messrs. Southey had a large sale of Australian, &c., which went off well at about corresponding rates to the above.

THE WOOL TRADE IN GERMANY.—BERLIN, Feb. 8th, 1847.—Our market continues to wear an animated aspect. During last week a rather considerable quantity of wool was disposed of; partly to buyers from the Netherlands, and partly to dealers and manufacturers in this town and neighbourhood. The combers, also, are still active, and have now extended the sphere of their purchases to wools of fine, and of the finest qualities, having already taken the sorted electorals from one or two establishments here. Several of the spinning houses have raised the prices of their yarns four *ilber groschen* (or five-pence English) per pound.—*Leeds Mercury*.

HIDE AND SKIN MARKETS.

		s.	d.	s.	d.	per lb.
Market Hides, 56 to 64lbs	.....	0	2½	to	0	3
Do. 64 72lbs	.....	0	3	to	0	3½
Do. 72 80lbs	.....	0	2½	to	0	3½
Do. 80 88lbs	.....	0	3½	to	0	4
Do. 88 96lbs	.....	0	4½	to	0	5
Do. 96 104lbs	.....	0	5½	to	0	6
Calf Skins	.....	4	6	to	6	6 each.
Horse Hides	.....	13	0	to	0	0
Polled sheep	.....	4	8	to	5	8
Kent and Half-breeds	.....	4	4	to	5	2
Downs	.....	3	6	to	4	6

BARK.

	Per load of 45 cwt.
English, Tree	£13 0 0 to £13 10 0
Coppice	13 0 0 to 14 10 0

LIVERPOOL.—About 80 hds. Philadelphia, of a very old import, sold by auction at 13s. 6d. to 14s. 6d., and some small lots of the newest arrivals at 15s. per cwt. 30 tons cork tree bark are reported at 6l. 17s. 6d. per ton.

PRICES OF MANURES.

Subjoined are the present prices of several sorts of Manure:—

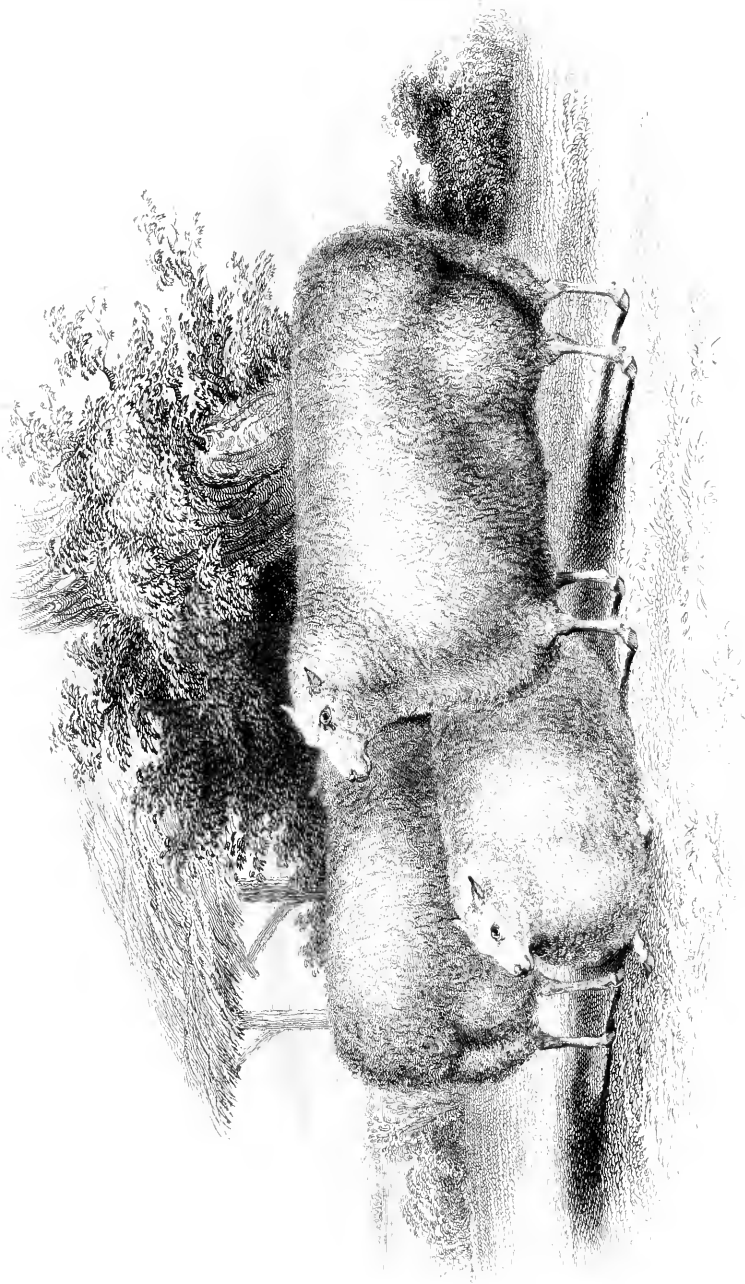
Agricultural Salt, 32s. per ton	Muriate of Ammonia, 20s. to 24s. per cwt.
Alkalies, 28s. and 42s. per cwt.	Muriate of Lime, 6s. per cwt.
Boast and Co.'s (Bow) Inorganic Manures, from 6s. to 11s. per cwt., according to crop	New Bristol Manure, 8s. per cwt.
Boast's Guano, 9l. 9s. per ton	Nitrate of Soda, 16s. per cwt.
Carbon, 12s. per qr.	Nitrate Potash (saltpetre), 25s to 26s. per cwt.
Chie fou, 21s. per cwt	Patent Disinfected Manure 13s. 6d. per qr.
Chloride Lime, 28s. per cwt.	Petre Salt, 4l. 10s. per ton
Clarke's Compost, 5l. 12s. 6d. per hhd., sufficient for three acres	Potter's Guano, 10s. per ton.
Fothergill's Gypsum, 35s. per ton.	Preparation for Turnip Fly 10s. 6d. per pakt., sufficient for three acres
Fothergill's Phosphate of Lime, 14s. per cwt.	Rags, 4l. to 4l. 10s. per ton
Graves, 6l. 10s. per ton	Rape Cake, 6l. per ton
Guano, Peruvian, 10l. 10s.; Bolivian, 9l.; African, 6l. 6s. to 7l. 10s. per ton, according to analysis	Rape Dust, 6l. 6s. per ton
Gypsum, at the waterside, 35s. per ton	Soap Ashes, 10s. per ton
Highly Concentrated Manure, 30s. per qr.	Soda Ash, 14s. to 16s. per cwt.
Humus, 14s. per qr.	Sulphate Soda, 6s. per cwt.
Hunt's Bone-dust, —s. per qr.	Sulphur for Destroying Weem on Turnips, 12s. per cwt.
Hunt's Half-inch Bone, —s. per qr.	Sulphuric Acid, 1½d. per lb.
Hunt's Stuff Graves, 3s. 6d. cwt.	Superphosphate of Lime, 8s. per cwt.
Hunt's new Fertilizer, 13s. 4d. per qr.	The Liverpool Abattoir Company's Animalized Manuring Powder, 2l. 10s. per ton
J. T. Hunt's Artificial Guano, 9l. per ton	The Urate of the London Manure Company, 4l. 4s. per ton
Manure Powder, 16s. per qr.	Willey Dust, 4l. 4s. per ton
	Wolverhampton Compost (Alexander's), 12s. per qr., subject to carriage to London, or forwarded from Wolverhampton











# THE FARMER'S MAGAZINE.

APRIL, 1847.

No. 4.—Vol. XV.]

[SECOND SERIES.

## PLATE I.

### EXQUISITE; A SHORT-HORNED BULL, SIXTEEN MONTHS OLD.

“Exquisite” (8048), roan, calved August 7, 1845, bred by Earl Spencer, the property of Mr. J. Booth, Killerby; Mr. R. Booth, Warlaby; and Mr. W. Torr, Riby: got by Humber (7102), d. (Vanity) by Ranunculus (2478), g. d. (Ornament) by Roman (2561), gr. g. d. (Welcome) by Firby (1040), gr. gr. g. d. (No. 19) by St. Albans (1412), gr. gr. gr. g. d. by Cato (119), gr. gr. gr. gr. g. d. by Jupiter (342), gr. gr. gr. gr. g. d. by Sir Oliver (605), gr. gr. gr. gr. g. d. (Raspberry) by Trunnell (659), gr. gr. gr. gr. g. d. (Strawberry) by Favourite (252), gr. gr. gr. gr. g. d. (Lily) by Favourite (252), gr. gr. gr. gr. g. d. (Miss Lax) by Dalton Duke (188), gr. gr. gr. gr. g. d. (Lady Maynard) by Mr. R. Alcock’s bull (19), gr. gr. gr. gr. g. d. by Mr. J. Smith’s bull (608), gr. gr. gr. gr. g. d. by Mr. Jolly’s bull (337).

“Humber” (7102), got by Orontes (4623), d. (No. 57) by Monarch (2324), g. d. (No. 13) by St. Albans (1412), gr. g. d. by Jupiter (342), — by Sir Oliver (605), — (Raspberry) by Trunnell (659), &c., &c.—Vide “Coates’s Herd Book,” vol. vi., p. 92.: vol. vii., p. 69.

On referring to the foregoing pedigrees, we think the most fastidious admirer of pure blood will be gratified. It will be seen that this splendid young animal is descended from the very first of the improved short-horns, combining the best of the Chilton and Wiseton blood, being from the two celebrated cows, Nos. 13 and 19, purchased at the Chilton sale in 1829, and afterwards crossed by Firby, Roman, &c. We have quoted rather freely from the *Herd Book*; but our readers would, by further reference to it, observe that this bull is from the same herds as the celebrated bulls Orator, Orontes, Hecatomb, Helicon, Hermes, and Homer. Although we have not as yet to record him as a prize animal (not having been exhibited), still we feel pretty certain that his pretensions to such a position are of no ordinary character. Most of our readers will be aware that this bull was purchased at the Wiseton sale, in September, 1846 (beng then 13 months old), for 370 gs., and was one of the last bulls bred by the late most esteemed Earl Spencer, and bequeathed by his Lordship to Mr. Hall. The sum realized, is, we believe, the highest on record for an animal of the same age sold by public auction. His colour is a rich roan, with plenty of hair and substance; quality of flesh good, and may be classed as a first-rate animal, deserving the name of “Exquisite”.

## PLATE II.

### THREE LEICESTER WETHERS.

The subject of our second plate, Three New Leicester Wethers, 21 months old, bred by Mr. J. Painter, of Burley, near Oakham, Rutland, from rams hired of Mr. R. Smith, of Burley. The fact that this pen of sheep obtained three principal prizes in the long-wooled classes at Smithfield last Christmas, must be very flattering to Mr. Painter, who has since the year 1832, been most successful as a breeder and exhibitor of Leicester sheep, having from time to time obtained fourteen silver and gold medals at various agri-

cultural exhibitions. The prizes which he obtained for this pen at Smithfield were, the 1st prize of £20, the silver medal as breeder, and the gold medal as the best pen in the long woolled classes. Mr. Painter obtained the first prize of £10 for the same animals at the Rutland Agricultural Society's Show, in December. He was also the successful competitor at Smithfield Show in 1845, carrying off the first prize in this class and the gold medal for the same description of sheep fed on vegetable food.

The various points of the new Leicester sheep have been thus correctly described:—"The head should be hornless, long, small, tapering towards the muzzle, and projecting horizontally forwards; the eyes prominent, but with a quiet expression; the ears thin, rather long, and directed backwards; the neck full and broad at its base, where it proceeds from the chest, but gradually tapering towards the head, and being particularly fine at the junction of the head and neck; the neck seeming to project straight from the chest, so that there is, with the slightest possible deviation, one continued horizontal line from the rump to the poll; the breast broad and full; the shoulders also broad and round, and no uneven or angular formation where the shoulders join either the neck or the back, particularly no rising of the withers, or hollow behind the situation of these bones; the arm fleshy through its whole extent, and even down to the knee; the bones of the legs small, standing wide apart, no looseness of skin about them, and comparatively bare of wool; the chest and barrel at once deep and round; the ribs forming a considerable arch from the spine, so as in some cases, and especially when the animal is in good condition, to make the apparent width of the chest even greater than the depth; the barrel ribbed well home, no irregularity of line on the back or the belly, but on the sides, the carcass very gradually diminishing in width towards the rump; the quarters long and full, and, as with the fore-legs, the muscles extending down to the hock; the thighs also wide and full; the legs of a moderate length; the pelt also moderately thin, but soft and elastic, and covered with a good quantity of white wool, not so long as in some breeds, but considerably finer." The complaint against the new Leicesters has been, that they become too fine and delicate for general use, this defect has been in a great measure remedied by increasing the size, and improving the constitution; and in which Mr. R. Smith, of Burley, and Mr. Painter have been very successful.

## ON THE CULTIVATION OF CARROTS, PARSNIPS, AND MANGEL-WURZEL.

BY THOMAS SULLIVAN.

The preparation of the soil for, and the general culture of, the above-named plants being in many respects similar, their properties, cultivation, and management may, without impropriety, be adverted to in the same article. As no dependence can at present, or indeed for some years to come, be placed on the potato as a general field or garden crop, it is admitted on all hands that carrots, parsnips, and mangel-wurzel (or beet, as it is also denominated) must be grown to a much greater extent, and with greater attention, than they have hitherto been. These, with the turnip, are the most valuable roots with which we are acquainted, and by judicious culture they can be raised on a great variety of soils. Heretofore, indeed, such crops have been considered by the majority of agriculturists as suitable only for garden culture, and not for the rough husbandry of the farm, from an apprehension of their being too delicate and hazardous; but field-culture is annually approximating more and more to that of the garden, whereby the soil is rendered suitable for the production of many plants with which the horticulturist alone was, at no re-

note period, acquainted. The potato disease, too, has materially contributed, especially in Ireland, to extend the culture of those roots, as they are acknowledged by all competent authorities to constitute the most eligible substitutes (among green crops) for the lost potato. The following cursory observations shall have reference chiefly to the culture of those crops on the farm, and where it may be advisable to grow them to some considerable extent. We begin with

*The Carrot.*—This valuable and nutritious root requires for its growth and development to the maximum size which it is capable of attaining, a deep, dry, open, and fertile soil. Deep loams and rich sandy soils are peculiarly adapted to its production; but by drainage, deep cultivation, and adequate manuring, the lighter class of clay lands may also be rendered suitable. Excellent crops have been grown on peaty soils that have been thoroughly drained.

The land intended for carrots, parsnips, mangel-wurzel, and indeed for all other green crops, should be deeply ploughed or subsoiled in autumn, in

order that the soil, and particularly any portion of the substratum that may be brought up, may be pulverized and mellowed by the action of the atmospheric alternations occurring during the winter and early spring months. The utility of having the soil deeply tilled and pulverized for these crops must be manifest from the construction of the roots themselves, as well as from their peculiar habit of growth.

A second deep ploughing should be given early in spring, with the two-fold object of further loosening the soil, and preventing the growth of weeds; and a third ploughing may be given, crossing the former, shortly before the period of sowing. The harrow is to be unsparingly employed to reduce the furrow slices; and the grubber, or scarifier, and roller, will also, in most cases, require to be put in requisition. As nothing is more essential and conducive to the production of heavy crops than a fine *tillth* for the seed, the pulverization of the soil should be assiduously persevered in till effectually accomplished. The eradication of couch grass (*Triticum repens*), and all other root-weeds, should also at this stage be attended to.

The seeds of carrots, parsnips, and mangel-wurzel may be sown in various ways. It is hoped that no argument is now necessary to prove the superiority of low or drill culture over the old, but not yet abandoned, broadcast system. One of the great advantages accruing from the judicious cultivation of green crops is the excellent condition in which the land is left for the production of grain; but it is obvious, that when the broadcast method of sowing is adopted, neither the soil nor the crop itself can be much benefited by any after-culture that can be given during the summer months. The soil not being sufficiently loosened, the roots of the plants are unable to penetrate in search of nourishment so far as it is desirable they should; and the use of the horse-hoe being inadmissible, the growth of root-weeds cannot be completely or effectually restrained, much less eradicated.

But even when the row or drill system is adopted, the cultivator has a choice as to the particular mode of sowing. The seeds may be deposited in parallel rows on the flat surface, by means of the dibble or the hand; or they may be sown or dibbled in raised drills or ridglets: again, the rows on the summit of each ridglet may be single or double. There exists some diversity of opinion among cultivators of green crops, in reference to the comparative merits of these varieties or modifications of drill culture; but, in the opinion of the writer, the propriety or the impropriety of either can be judged of only in connexion with the quality and condition of the soil on which it is adopted. In the case of perfectly dry land, on which rain-water is not

expected to stagnate or operate injuriously, the rows may be formed on the flat surface, in the same manner as drilled corn; but where the soil is liable, from its texture or insufficient drainage, to become saturated with heavy rains, there can be no question as to the superiority of the raised drills; besides, when the latter method is adopted the young plants are much less liable to injury in horse-hoeing than in the other. The practice of forming two rows on the summit of a raised ridglet appears highly judicious, especially in the case of land not thoroughly dry. The distance between the rows may be from 18 inches to 2 feet when sown on the flat, but the ridglets should be from 2 to 3 feet apart.

The proper period for sowing carrots is from the beginning to the middle of April; but they are frequently sown at the end of April.

The choice of the best varieties must be regulated in a great degree by the nature of the soil and the object in view. The Altringham and the Surrey seem to be among the most esteemed of the red varieties; and certainly the former, at least, has long been deservedly held in high estimation. The Belgian or white carrot is most productive on light dry lands, but not so well adapted to clay soils as the Altringham. However, the former is generally, and I believe justly, preferred for field culture. It produces a heavy crop, and possesses excellent nutritive properties.

The manure for carrots, parsnips, and mangel-wurzel may be farm-yard dung, or dung in conjunction with guano or some other of the numerous extraneous fertilizers now obtainable in the manure market. A commendable practice pursued in some districts is to plough-in in autumn, the whole or a portion of the dung intended for the crop. It is thus well incorporated with the soil by the preparatory tillage; and at seed time a further allowance of farm-yard manure, or an equivalent in guano is applied. It is of the first importance that the dung thus applied at the period of sowing should be well decomposed, as it is most desirable to obtain, by all means, a vigorous *braird* of young plants. A strong and plentiful braird is, in fact, generally an unerring index to an abundant crop, and *vice versa*. The quantity of manure which it may be necessary or expedient to apply is obviously dependent, in a great degree, on the condition of the land, and on the quality of the manure itself.

The proper allowance of carrot-seed is from 2½ to 3½ lbs. per acre, according to the particular mode of sowing adopted.

The *Parsnip*, though not so extensively cultivated as the carrot, is nevertheless a most valuable and nutritious root as food for either man or the animals of the farm. For feeding live stock pars-

nips are equal to nearly double their weight of turnips; and as human food, in lieu of potatoes, they are decidedly superior to any other root in cultivation. The parsnip, like the carrot, prefers the lighter class of soils; but complete drainage and deep tillage will enable most kinds of land to grow remunerative crops of this valuable root. The preparatory tillage is the same as that recommended for the carrot. Deep and early ploughing is evidently of paramount importance.

Parsnips should be sown early in February, and the method of sowing recommended is in rows or drills from 2 to 2½ feet apart. The seeds may be dibbled in at intervals of 6 inches or so in the rows. The quantity of seed required is from 2½ to 3½ lbs. per acre, according to the mode of sowing. The variety of parsnip most generally esteemed for field culture is the hollow-crowned Jersey, but there are several other good sorts.

*Mangel-wurzel.*—This is certainly among the most valuable of our root-crops, and is perhaps unequalled by any other, so far as the feeding of live stock is concerned. It is peculiarly adapted for the food of milch cows, promoting as it does the secretion of milk, without imparting to the milk or butter the strong, disagreeable flavor produced by the use of turnips. Not only are the roots useful for this purpose, but the leaves also are excellent for milch cows. *Mangel-wurzel* is also much esteemed for feeding pigs, and latterly it has been successfully tried for a much more important purpose—namely, as human food. Several parties have manufactured and brought under public notice a species of bread, into the composition of which *mangel-wurzel* enters as a principal constituent.

In the preparation of the land for this crop deep tillage is peculiarly important, as the roots will not attain their maximum size unless the soil has been loosened to a considerable depth. This is to be effected either by deep ploughing or by trenching with the spade, which latter operation, I may observe, is eminently suited for the complete destruction of weeds, as well as for the due pulverization and preparation of the soil. For reasons already adduced, the earlier before winter that the land intended for this and other green crops can be dug or ploughed, the more easy will it be to accomplish the preparatory tillage in spring.

The proper period for sowing the seed is from the middle to the latter end of April.

The seeds, encased in their capsules, may be sown in rows or drills from 26 to 30 inches apart. They are sometimes sown thinly in a rut formed along the summit of raised drills, and covered with the earth to the depth of about an inch, and occasionally also by a drill-machine, in the same

manner as turnip-seeds. Many successful growers of the crop, however, prefer dibbling the seeds in holes one inch deep, at one-half the distance asunder in the rows at which it is intended the plants shall ultimately stand; two or three seeds are deposited in each hole.

The quantity of seed required is from 1½ to 2½ lbs., according to the mode of sowing adopted.

There are two principal varieties of *mangel-wurzel*—namely, the long fusiform kind, and the globe. The red and yellow globes are allowed to be most profitable on all except very rich and well-cultivated soils, and on these the long kinds may be most productive.

The after-culture of these crops is nearly similar when the same mode of sowing has been adopted. When the seed has been sown in parallel rows, the horse-hoe is to be introduced at an early stage, for the purpose of loosening and pulverizing the soil in the intervals, and of checking the growth of weeds. Carrots should be thinned out by the hand to the distance of from 5 to 8 inches in the rows, according to the quality of the land; the thinnings are of course to be used for feeding cattle, or for domestic purposes; and in order that the supernumerary plants may be available in this way, the thinning may be deferred until the young plants have attained some size. The operation should not, however, be delayed too long, otherwise the plants will become long and spindly, and will never turn out a heavy or remunerative crop.

Parsnips are to be treated in a similar manner. The horse-hoe is to be frequently employed in stirring and pulverizing the soil between the rows, and the plants are to be thinned out to the distance of 8 inches or thereabouts in the rows. The thinnings will be very useful for various purposes; but this consideration should not induce the farmer to defer the operation of thinning beyond a certain period in the growth of the plants, lest the result referred to in the case of carrots be the consequence of allowing the plants to remain too long unthinned.

The after-culture of *mangel-wurzel*, when grown, as it ought almost invariably to be, in parallel rows or drills, is precisely similar to that of the carrot and parsnip just adverted to, and consists in the necessary horse-hoeings and thinnings. It is of great importance in the culture of this crop to have the soil in the intervals between the rows well and frequently loosened by the horse-hoe during the summer months. The plants are to be thinned out so as to stand at intervals of from 12 to 16 inches in the rows, according to the condition of the soil. Before the roots have attained maturity and become ready for use, the leaves of the plants may be turned to account in feeding milch cows



and young stock, care being taken to remove only the lowermost leaves from each plant, and not to break or injure the others.

These crops—namely, carrots, parsnips, and mangel-wurzel—commonly attain their full growth about the middle of November, at which period they may be taken up and stored. There exists some apprehension in the minds of many agriculturists in reference to the practicability of preserving these roots during the winter; but I am enabled to state, from considerable experience, that they may be stored for several months with perfect safety and propriety. The weather selected for the taking up and storing should, however, be dry and mild. In divesting the roots of their fibres and leaves, great care must be taken not to wound or cut them, as the exudation of the juices from the incisions would endanger the putrefaction of the whole. The roots should be piled together in narrow, oblong heaps, and carefully covered with straw, fastened on by ropes manufactured of the same material. The pile may be of any height and length which may be most convenient; the site selected for the heap should be perfectly dry, firm, and situated not far distant from the farm-steading.

The produce of these crops depends in a very great degree on the quality of the land, the manure applied, and the care bestowed in their cultivation. From 20 to 30 tons of carrots or parsnips per acre may be considered a fair crop, though much heavier returns are not unfrequently produced. Under favourable circumstances, from 25 to 35 or even 40 tons of mangel-wurzel per statute acre may be expected. A successful cultivator of the latter crop says: "I find that about 9½ tons of clean roots, with 1½ tons of good hay, will generally increase the value of a bullock, stall-feeding, from £12 or £13 to £22 in five months, and sometimes a great deal more. For feeding milch cows, ewes, and pigs, mangel-wurzel is superior to Swedish turnips; and, as far as promoting a secretion of milk, they are superior to carrots or parsnips, but will not produce so much butter. The leaves of mangel-wurzel form an excellent food for milch cows and young stock; but no leaves should be pulled until they get a little yellow, and in getting these off the greatest care must be taken not to break the leaves which remain."

March 10, 1847.

ON THE ADULTERATION OF MANURES.

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

At a period of the year, when the farmers are, in so many districts, about to procure a supply of artificial dressings for their land, it may not be unattended with benefit if I address myself to the consideration of the subject of the adulteration of manures. It is a subject which can hardly be too often and too generally regarded, since the fraud thus committed by the dealer is not only injurious to, nay, a robbery committed upon the purchaser, but it produces still more generally injurious effects, since it leads to erroneous conclusions and deceptive results. For if the farmer tries an experiment, for instance, with what he purchased as, and believes to be, cubic petre (nitrate of soda), when in reality the salts he has purchased, are three-fourths composed of Glauber salt (sulphate of soda), he has not only been robbed by the fraudulent dealer of his money, but he has been still more deeply injured by the failure of his trial leading him out of the true path of knowledge, and thus depriving him of a permanent advantage to which he was justly entitled, from a well considered and sagacious course of reasoning. Deceived in his chemical agents, he is convinced of the correctness of his own merely, in fact, intended experiment. Of what

use, indeed, are all those careful considerations, as to the possibility of profitably supplying to a barren or a poor soil the constituents of plants in the way so well and so practically adopted by the Rev. A. Huxtable, if its possessor cannot safely obtain the unadulterated manures in which those ingredients abound? Take, for example, the manure super-phosphate of lime, and remark the adulteration, recorded to have been only recently detected, and publicly announced by Mr. Pusey (*Mark Lane Express*, March 1, p. 2). In this instance, some super-phosphate of lime, sold to the public at a high price, as genuine super-phosphate of lime, upon being analyzed, was found to contain in 100 parts,

Super-phosphate of lime . . . . .	14
Sulphate of lime (gypsum), being worth about 30s. a ton . . . . .	64
Water . . . . .	20
Residue . . . . .	2

From the same authority we learn that this manure ought to contain per cent., when genuine,  
 Phosphate and bi-phosphate of lime 35 to 40  
 Sulphate of lime . . . . . 20 to 25  
 Animal matter . . . . . 20  
 Water . . . . . 20

Let the farmer, then, beware of these frauds : let him avoid, as he would an infected animal, all manure-dealers, of whose respectability he is not well assured ; and if he is not able to deal with any such, let him procure the materials, and make his own super-phosphate of lime. The sulphuric acid and the bones are all the ingredients he needs ; and in case he cannot procure the sulphuric acid, or has not the necessary vessel in which to dissolve the bones, then let him consider what Mr. Pusey has in another place remarked on the same subject (*Jour. Roy. Ag. So.*, vol. 6, p. 327) : "Mr. Brooks, of Hatford," he tells us, "has for many years assured me that he could make four bushels of bones go as far as twenty bushels, by mixing them first with peat-ashes. It occurred to me that since many peat-ashes contain sulphate of lime, this practice might be a self-taught form of the recent scientific discovery. Following his instructions, I mixed eight bushels of crushed bones with sixteen bushels of our brick-coloured peat-ashes, and the mixture was thrown upon a heap ; in a few days they began to heat violently, and the heat lasted for about ten days ; at the end of which time, on opening the heap, scarcely a particle of bone could be detected. The whole was reduced to a fine reddish grey powder. The fragments of bone which still shewed themselves were exactly like those which sulphuric acid has acted on. On trying this compost by the side of super-phosphate of lime, with a crop of turnips, the effect was precisely the same." (It may be useful to remind the young farmer that super-phosphate of lime is prepared by mixing the sulphuric acid with bones, and that the sulphuric acid, by taking a portion of the lime from the phosphoric acid of the phosphate of lime, leaves only the remaining lime in combination with the phosphoric acid ; thus the phosphoric acid being in excess, forms quite a new salt, called by chemists, *super-phosphate of lime*. The portion of lime which combines with the sulphuric acid, forms *sulphate of lime*, and hence in the super-phosphate of lime of commerce there is always a portion of this salt).

Glauber salt (*sulphate of soda*) is, from its cheapness (6s. per cwt.), the saline substance very often employed by the fraudulent dealer, for the adulteration of the more valuable salts used as fertilizers. The boldness of the size of the crystals of Glauber salt, materially facilitates this process of adulteration (and they are readily reduced in size, according to the requirement of the contemplated fraud. And when the farmer reflects that sulphate of ammonia is worth about 17s. per cwt., carbonate of ammonia 56s., muriate of ammonia (*sal ammoniac*) 20s., nitrate of soda (cubic petre) about 19s., saltpetre (nitrate of potash) about 27s., he will see how great is the temptation for the fraudu-

lent dealer to partially substitute for these a salt like sulphate of soda, which is procurable in abundance for about 6s. per cwt.—an adulteration, too, which only a chemical analysis can detect. I had a curious instance of this adulteration communicated to me only a few days since, in which the buyer of some sulphate of ammonia purchased it in two lots, one of a house who deservedly ranks at the head of the manure trade, and the other of a small profligate dealer, who did not charge so much by several shillings per cwt. as the others did. The purchaser suspecting some foul play, fortunately succeeded, after much trouble, in tracing both lots of sulphate of ammonia to the *same chemical manufacturer*, who, upon being applied to, had the courage to explain to the merchant the difference in the price. "The sulphate of ammonia you procured, Sir, of Messrs. ——— was sure to be sulphate of ammonia, for they do not adulterate, and they could not sell it to you for less than they did ; but that which you bought of Mr. ——— was made by us on purpose for you, by his order mixed with one-fourth of impure Glauber salt."

And again, in the case of guano, the frauds which are perpetrated are very great. The public has heard pretty accurate details of the earth which resembles guano procured by the fraudulent London dealers from Epping Forest and other places, and of the mixture of the inferior African guano with that of Peru. There is only one safe way for the farmer in this respect—he must carefully avoid all inferior cheap specimens and little dealers in this valuable manure. If he wishes for a less powerful or less concentrated fertilizer, let him procure the best guano, and *lower it himself*, on his own farm, by mixing it with finely-sifted peat-ashes or mould. He will then not only save in the carriage of his purchase, but be certain that he has a certain amount of valuable manure in his possession.

On the third of March (see *Mark Lane Express*, March 8) Mr. W. C. Spooner, of Southampton, with his usual readiness to advance the cause of the farmer, and of fair dealing, communicated to the council of the Royal Agricultural Society of England the result of an analysis of a specimen of Saldanha Bay guano placed in his hands as a genuine article, but which he found to be composed of one-half *chalk*, and to contain only *two per cent.* of phosphoric acid, the only valuable ingredient in that variety of guano ; and yet, he adds, "the sample had all the external characters in colour and odour of the genuine article." And I learn from Mr. Purser, the excellent manager of the London Manure Company, that the fraudulent dealers are now adulterating Ichaboe, or African guano, with the refuse of the fellmongers, called scutch (worth about 20s. per ton), and that they are so similar in

appearance, that it is very difficult to distinguish by the eye one substance from the other. He added, that the adulteration of crushed bones by means of broken oyster shells and the refuse lime of the soap makers, is proceeding as generally as ever; and that they are now vending some refuse sulphate of lime, the refuse of some manufactories, that so abounds with water, as to be of very inferior value as a manure.

If any manure might be considered safe from the operation of the fraudulent dealer, it might be supposed that soot, from its cheapness (7½d. to 9d. per bushel), might escape; and yet every London scavenger can testify that there is a very considerable demand for the *very finely sifted* cinder-ashes of the metropolis. These, when passed through a fine sieve, are well adapted for the purpose; and thus the farmer, when he intends to purchase a really valuable fertilizer, abounding in the salts of ammonia and in gypsum, is supplied with a mixture only of soot and ashes, whose chief constituent is finely powdered flint.

The true composition of soot is not generally understood. Mr. Solly has given its analysis (*Farmers' Almanac*, vol. iii., p. 97.); he found in 1000 parts—

Combustible matter . . . . .	371	parts.
Salts of ammonia . . . . .	426	„
Salts of potash and soda . . . . .	24	„
Oxide of iron . . . . .	50	„
Silica . . . . .	65	„
Alumina . . . . .	31	„
Sulphate of lime (gypsum) . . . . .	31	„
Carbonate of magnesia . . . . .	2	„

Such, then, are only a few of the scandalous frauds practised by the small manure-dealers now to be found lurking in most districts of the kingdom. Again I warn the farmer to beware of such as these; let him rest fully assured that in all such transactions—dealings in which his skill is of necessity so inferior to that of the dealer—he will ever find the greatest houses the cheapest, and the only safe persons to deal with, since they have not only a character to maintain, but they can well afford to be honest.

I have already alluded to the successful trials of Mr. Huxtable, on the possibility of supplying a naturally barren soil, by artificial means, with the ingredients necessary for the profitable production of a crop. Let the farmer read the following refreshing statement, and ask himself what would have been the result of these valuable efforts, if he who instituted them had, unfortunately for the progress of agricultural knowledge, been supplied with adulterated, and consequently useless fertilizers? He tells us (*Journal of the Royal Agricultural Society*, vol. vi, p. 366.)

“The portion of ground chosen for the testing of the principle here implied is situated in the parish of Sutton Waldron, in Cranbourn Chase, very steep, exposed to the south, but sheltered in some degree by the hills of which it forms a part, almost covered with white rubble, forming a portion of the ‘upper chalk.’ This precise spot, consisting of five acres, was selected because it appeared the most barren and ‘unlikely’ of any in the immediate neighbourhood. In truth, the endeavour to grow Swedes on such land appeared to all observers an *experimentum crucis*. So long as it lay in down scarcely any herbage whatever covered this hill-side. On the failure of the hay crop, in 1844, a party of poor men, from Shaftsbury, came to me soliciting employment. They were set to dig this piece of land, but the soil proved too thin and stubborn for the spade; they therefore, in their own phrase, knocked it over with the pickaxe. Twice in the season afterwards it was sown with rape, but the produce was nothing. A soil of this constitution seemed a fair field for the experiment on a pretty large scale, and in a popular way. I say in a popular way, because, to satisfy the requirements of rigid science, a strict analysis both of the soil and manure would be asked for, before any inference would be permitted to be drawn from the result. Yet, for practical purposes, it may seem enough to show that on land growing nothing, a large crop can be raised by adding certain ingredients which the chemist tells us are necessary for the fruitful cultivation of that crop. Accordingly, in the latter part of April, 1845, I determined on this hill, as above described, to see whether it were possible to produce a crop of Swedes weighing twenty tons per acre. To effect this object, chemical analysis, as given in Professor Johnston’s lectures, acquaints us that there would be required for the bulbs and tops of a return (*i. e.* for 20 tons of bulbs and 5½ tons of tops), inorganic matter weighing more than 500 lbs.; consisting of about 146 lbs. of potash, 76 lbs. of soda, 69 lbs. of sulphuric acid, 30 lbs. of phosphoric acid, 103 lbs. of lime, 22 lbs. of magnesia, 23 lbs. of chlorine, 23 lbs. of silica, as well as a certain proportion of organic matters in the form of ammonia and carbonic acid. It was expected that if these were sufficiently supplied to the plant in its early stages, the remainder of the carbonic acid and ammonia necessary to the perfect Swede would be furnished, whether, as Mulder affirms, from the decaying matter in the soil (especially the sawdust mentioned afterwards), or from the ammonia brought down by the rains, according to Liebig. The quantities of inorganic substances above enumerated are not constant, but vary, as is well known, within certain limits, according to the soil: they must be con-

sidered as only an approximation to the quantities and proportions required. The issue of this experiment has exceeded my most sanguine expectations. Forty perches of the best part of the crop yielded, of *clean* roots, after the rate of  $23\frac{3}{4}$  tons per acre, whilst forty perches of the poorest gave 19 tons. On comparing the relative quantities of the heaviest and lightest produce, competent persons have estimated the crop at 21 tons per acre of clean roots, the samples of which were weighed in dry weather. Some of these, when topped and tailed, weighed 14 lbs., several measuring 29 and 30 inches—many hundreds of them exceeded 10 lbs. in weight. One remarkable circumstance presented itself to the observer. Between Swedes of 8 lbs. and 9 lbs. weight would be seen, every now and then, a starveling plant, in bulb not bigger than a marble. This arose from the carelessness of the children employed, who occasionally dropped the seed at a distance from its appointed food. But the accident served to prove, beyond all doubt, at once the efficiency of the manure, and the intrinsic poverty of the ground."

Then as to the fertilizers employed, and the cost per acre? The following account furnishes us with an answer to both these essential considerations:—

30 bushels of wood-ashes, at 6d. . . . .	£0 15 0
2 cwt. of Ichaboe guano, at 7s. 6d. . . . .	0 15 0
50 lbs. of burnt bones, 22 lbs. of sulphuric acid . . . . .	0 7 0
30 bushels of sawdust . . . . .	0 2 6
Labour account, hoeing and drill-dropping seed . . . . .	0 19 6
10lbs. of sulphuric acid over ashes. . . . .	0 1 3
Rent 5s., rates, &c., 2s. . . . .	0 7 0
Seed . . . . .	0 3 6
A pair of horses hauling the artificial manure . . . . .	0 7 6
	3 17 9

Such, then, are the true objects to be successfully attained by the farmer in the addition to the soil of those ingredients in which barren or poor soils are naturally or partially deficient, and such are the difficulties to be successfully and easily overcome. The means I have endeavoured to point out are such as need only the employment of caution and good sense. If these were more generally used, I feel quite certain that the excellent farmers of my country would very rarely have occasion to lament the *apparent* failure of the experiments suggested by the chemical philosopher from the result of laborious researches, which are certain, under proper management, to be productive of advantage to the cultivator of the soil.

### THOUGHTS ON BREEDING SHEEP.

The flocks of the United Kingdom of England, Scotland, and Ireland, forming, as they do, a very prominent article in the provision, as well as furnishing a staple article in the clothing market, it becomes a matter of just and anxious inquiry how an increasing supply of mutton and wool may be produced in part or wholly equal to the increasing demand; and as the conversion of vegetable into animal substance may be considered as the readiest and also the most effectual way to arrive at the end proposed, the present inquiry will chiefly have that object in view.

In giving expression, therefore, to thoughts on the above subject, it is not intended so much to settle the question as to invite discussion, so as to elicit opinions which may serve to show how the *principles of breeding* can be made to subserve this important subject.

The principles of breeding may be considered as chiefly confined to the preservation of distinct classes (the only variation being that of crossing or mixing two or more classes for the purpose of producing an improved animal), and must not be confounded with the general practice.

These principles are chiefly valuable in order to keep a superior family in a particular class up to its present, or to increase its future, excellence. In almost all classes there will be found a particular family which has stood out from the general mass for a length of time in a variety of points, such as wool, form, quality of flesh, &c., which distinguish them from other flocks: this is a fact open to the most common observer. Why it is so, is the point to which attention is now particularly invited. It cannot be supposed that these peculiarities are the result of indiscriminate breeding: to suppose so would be contrary to all sound reason and experience; for, if the allowed axiom hold good, that "like produces like," it will naturally follow that great care has been taken in selecting the best males of the class alluded to, instead of using them at haphazard, and that the selector had a sound and steady judgment, which extended over a long period of time, or the peculiarities and family likeness of the whole flock would not be so particularly marked as to constitute a superior race.

Again, the males must have been chosen from the same *blood*, or a various appearance would re-

sult, instead of a family likeness being maintained; so that a long line of ancestry has been required to insure a true descent.

If a flock bred indiscriminately be examined with care, it will be often found to possess one animal very superior in character to the general flock, another of a decidedly bad one, together with every grade and shade of character between the two. Should this flock pass into the hands of a person of sound judgment as a breeder, the whole flock will be brought, in process of time, without any extraneous aid, up to the mark of the first noticed; but should it, on the other hand, remain with a breeder of unsound judgment, it is likely to remain at the best unimproved, and may degenerate down to the level of the worst.

This principle will be found to hold good if the inquiry be extended to other animals. Why, for instance, is a long line of ancestry required to give confidence in a horse? or why is a herd-book found useful, if it be not to ascertain the descent of bulls, and thus give confidence to the breeder of cattle? A reference might also be made to the breeder of hounds or any other domestic animal, which, if left to nature, would produce variety, and all distinction would be lost. There would be neither nag nor cart-horse, neither spaniel, pointer, nor hound, terrier nor bull-dog; but all would be a heterogeneous mixture.

Should the above reasons for the science of breeding be considered worthy of attention, it will be necessary to keep them in mind when the *variation* of principle—viz., crossing—is under consideration.

Crossing, in the sense in which it is generally understood, is the opposite to breeding from one family, and is supposed to be necessary for the continuance of a good stock, under the idea that the adherence to one family will cause a diminution of good qualities, if not a failure of them altogether. It is, in fact, the opposite to breeding *in and in*. If, however, an example of the *in-and-in* practice will give weight to the argument in its favour, and an example be taken from the human race, the nation of the Jews might well furnish an unexceptionable one, who were by the laws of Moses compelled to marry in their own tribe, and actually continued to do so for a period of nearly two thousand years without impairing their constitutional character. Crossing is, however, recommended by many as a means whereby the supposed general defect of one class is to be remedied in their produce by the application of a male of another, possessing in an eminent degree that particular point in the form or other quality which is considered to be deficient in the class to be crossed. This mode of improvement is met on the threshold by the fear that,

should the male be faulty in some other point (and a peculiar eminence in one point is generally indicative of inferiority in another), the produce of the two may be a propagation of both defects, in the place of an amalgamation of the good qualities. In all flocks that have been long subjected to indiscriminate breeding, and more particularly to crossing, there will be found to remain for several generations a *stain* of each variety with which the crossing has been effected, whether for good or for evil. Indeed, the system is encompassed with difficulties, and entails upon the follower of it a necessity of continuing to cross to the end of the chapter.

If two animals could be found of perfect form, male and female (and perfect form implies and assures aptitude to fatten), they would, according to the law of nature, propagate a perfect race, and the feeders or graziers could be supplied with perfect animals as fast as they could be had from the fountain-head.

But perfection of form is not as yet determined, but remains, and is still likely to remain, altogether *ideal*. If the fact of its being so is doubted, let application be made to the chief breeders of four classes, namely, Leicesters, Oxfords, Kents, and Downs (these will be sufficient to refer to as representatives of every diversity), and it will be found that just that number of perfect animals will be presented, all differing in form, wool, and fattening propensities; proving that perfection of form is too indefinite to be taken for anything but the fancy or educational judgment of the breeders of the various classes before mentioned, or any other variety of them. This undefined notion of perfection may be further illustrated by a reference to show-yards.

Let the awards of the judges of show-yards be examined (not for the purpose of impugning their decisions, for it is readily allowed that they are all gentlemen highly honourable, as well as eminent for judgment and discrimination, or they would not be selected and appointed by the committees), and the assertion will be justified by their decisions; for they vary as much in their judgment of symmetry and other requisite qualities as the counties from which they come. Nay, even were the judges taken from the same locality, the same discrepancy would be found; which is to be accounted for, not by their want of judgment, but by the various ideas they possess as to the best form and other properties of the animals exhibited. If, then, the view above taken of these things be consistent with experience, the question that naturally arises is, how are breeders in general to be guided in their choice of males, in order to approach with the best hope of success the desired end? This is undoubtedly

a difficult question; for if the males be chosen from a mixed race, the chance of success must be limited to a hope, and cannot be sustained by an assurance: for, should a cross-bred animal possess good points, the derivation of them has probably arisen from some chance medley, which may never happen again; whereas, had it been a quality derived from a long line of ancestry, it would give a confidence to the breeder which would not be often disappointed.

The gentlemen engaged as breeders with the most numerous classes of sheep—viz., Leicesters, Oxfords, and their varieties—appear to have formed a theory of their own as to form, and cannot easily tolerate the least deviation therefrom.

Thus the Kent sheep are considered by most of them as very imperfect in this respect. Although allowed to possess superior wool to any long-woolled breed, and though possessing a quality of flesh superior to most and exceeded by none, yet their form is not so desirable in the estimation of these gentlemen as that of the Leicesters, whose straightness of back and evenness of handle are supposed to indicate a greater aptness to fatten; and a cross with the latter, it is supposed, would therefore greatly improve them. The Leicester breed—or rather the New Leicester, such as are here referred to—are of recent date, and had not been a distinguished race till the days of the late Mr. Bakewell, who may be considered the author of them, having first brought them into public notice; but since the decease of that gentleman, the Leicester sheep have not made much advance, either in form or tendency to fatten: probably the diversity of opinion, as to some peculiar points, may account for this. Fifty years ago, it was strongly insisted upon by various breeders, that the neck (snag) and tail should be very small, so as to indicate very light offal, and consequently a larger proportion of dead, when compared with the living weight: this must be considered a deviation from Mr. Bakewell. Whether this idea has been discerned to be wrong, is not said; yet few breeders of Leicesters, in the present day, are anxious to obtain this peculiarity, but rather appear to prefer a greater substance in those points: all which facts tend to confirm the necessity proposed of a line of ancestry, and a fixed principle, which would prevent these mistakes.

Unfortunately, that fixed principle cannot be had, till all breeders of sheep arrive at the same conclusion; which is not likely to happen, as scarcely two can be found to look through the same medium: neither is it likely to be taught, for we are indebted for improvement in the breed of sheep, not to any fixed principle, but to gentlemen of *innate ideas*, and therefore not easily communi-

cated, each having a form in his own mind, which he follows as the best.

Had Mr. Bakewell been successful in *communicating his ideas* practically to those who succeeded him, the Leicester sheep might have continued at the head of all flocks, as to symmetry of form, size, and aptitude to fatten; but failing in this, other classes have succeeded in rivalling their excellencies at least, if they have not surpassed them. Mr. Bakewell, however, is fully entitled to the first place among breeders, for to his judgment and perseverance we are indebted, not only for a very valuable improvement, but also for the stimulus by him given to other breeders; which has been instrumental in producing an improving spirit, and is discernible in almost every class in the kingdom.

But may not the desire for straightness and fullness be carried to an extreme? Suppose a gentle fall from the rump to the shoulder to be characteristic of the best of the Kent breed, will the attempt to improve that peculiarity, by imparting the straight and level back of the Leicesters, convey that property only? Will there be no danger of reducing the muscle, or risk of substituting a layer of fat on the shoulder, for a good leg of mutton? It was said by a breeder of Staffordshire, in answer to an enquirer into the reason of the sheep in that county having black faces, that they had been crossed with Downs. Upon being further questioned as to the reason for doing so, the answer was, that "the Leicester sheep were too fat;" a plain indication that their deficiency of muscle was felt and acknowledged, which ought to operate as a caution to all breeders, lest they fall into a similar mistake.

It is possible, then, to err in an over anxiety for straight and level handlers; a just proportion of muscle being a requisite never to be lost sight of, in a due desire to improve the form, especially so when that form has no deficiency of fattening propensity. The notice taken of the Leicester sheep will apply in a proportionate degree to the new modification of that class *the Oxfords*, which have sprung up since the Leicesters ceased to progress, little being known of them thirty years ago. It is, however, readily allowed, that in this particular breed, some extraordinary instances of size and fatness have been produced, exceeding *most*, if not *all*, hitherto recorded. But their qualifications for marsh grazing have not as yet received a full trial; it will be sufficient to say of them, that they appear to answer in their own locality. Yet a partial trial has been made in a few instances, without sufficient success to warrant a continuance of it. This may have arisen from bad selection, but it may also have arisen from uncongeniality: be this as it may, it will be further tried, and the Oxfords

may possibly supersede all others; indeed, if they are a better sort, they ought to do so; but this is no reason why a *cross* should be adopted, for either one or the other will prove itself to be the best, and a cross of a worse sort with a better can never, in these enlightened days, be considered an improvement. Let one or the other establish its superiority, and let the worst be put away.

If, however, this mode should be thought to involve a difficulty, in that it would create a greater demand for the superior sort; or should that difficulty arise from the process which a change of sorts would occasion to an individual, and the inconvenience, as well as expense, that would thus be entailed upon the owner of the inferior sort, by inducing him to sell his own at a depreciated value, and purchase the other at an increased one; and if a cross, therefore, should be deemed a better plan, it should not be forgotten that the form of the one, or of the other, has not yet been proved to be the cause of success; for until a fair trial of feeding has been made, and the powers of each sort, in changing a given quantity of vegetable into animal substance, has been satisfactorily made out, the bias in the mind of the breeder in favour of either of the three sorts of long-woolled sheep may greatly mislead him.

Suppose a trial to be made upon the feeding plan (the trial here suggested ought to be tested by the market price of the carcass and wool, the animal producing the largest sum over the cost price at market value to be declared the winner), and suppose the sort least esteemed for form should beat the other two, it would not be contended that the disapproved form was the cause of success; nor, on the contrary, should the sort possessing the most esteemed form have the advantage, could it be justly attributed to its form. It is true, indeed, that its success would be less surprising in the latter than in the former instance; but every breeder is supposed to be sufficiently practical to have witnessed in his own flock, that the most perfect animal in form is not always the most profitable. There is frequently to be found a very beautiful form that cannot be forced into a continued improvement: they are often brought to their size and ripeness (being naturally diminutive) at an early period, but cannot *go on*; whereas another of the same blood, less formed at first, will continue to improve as long as you choose to feed him.

A book appeared thirty years ago, from the pen of Mr. Clive, Surgeon, in which was set forth a new theory of breeding. The principle he there attempted to establish was this—"That no perfectly formed animal could be expected from any female, unless the size of that animal was smaller

in frame than the female producing it;" supposing, at the same time, both the parents to have arrived at their full growth. If this theory was as much followed by the then celebrated breeders of Leicesters, as the principle was admired by some of them, it will appear sufficient to account for the diminished size of their produce; and had that principle been acted upon to the present time, it would be difficult to estimate the diminution of size which would have resulted from thirty years' practice. It is by no means to be inferred from what has been advanced, that form is to be disregarded; far from it! *form is to be regarded*. But it does not follow that the precise form of either of the two classes already noticed, is the best before all others for the purpose.

The Kents have a form peculiar to themselves, which is as much admired by the breeders of them, and perhaps is as worthy of admiration, as the Leicesters and Oxfords; for what is it that ought to call for applause but those marks which indicate good qualities? and the Kent sheep possess them in quite as many instances as any long-woolled sheep—the wool, aptitude to fatten, size, and quality of flesh being among the number. But that form, or, rather, that the peculiar form contended for by the breeders of Leicesters and Oxfords, is not necessary to constitute excellence, is proved by the fact that Downs, which are as much sought after as any class whatever, are the opposite to them both in form and character, or nearly so; and yet, who will say that the breeders of Downs are mistaken as to form? when it is also known that some of the successors of Mr. Bakewell have carried their views to such an extreme, that it is now thought necessary to call in the aid of Downs to rectify them—that is to say, to give them a greater portion of muscle, which an over-anxiety for form had lost, producing little else than fat; so that if a *feeder* of sheep, in those counties that have no particular breed attached to them, is asked what he considers the best sort for his purpose, in most instances it will be answered that a cross between a Down and a Leicester are the most to be desired. But how is that cross to be maintained, if not by keeping the two races pure, in order to produce the cross so much sought after? for, be it remembered, the cross here alluded to is not followed out by breeding from the mixed race, but is confined to the first produce. The Kents, however, possess in themselves those very attributes so much sought after in the cross—viz., aptitude to fatten, size, and strength of muscle—more than any other class, Downs excepted.

Here, then, is evidence that the form of the Kent sheep, so far from being an objection, is a real indication of merit; and let the breeders of Kent

sheep beware how they sacrifice a *real* excellence, which they already possess, for the *fancied* one, which some having sought after, have erred to the degree already noticed.

The Kent sheep are also capable of sustaining a winter in the open marshes, where they are exposed to the severest trials of weather, in such bleak places as the Isle of Sheppey, Romney Marsh, &c., which the hardiest of any other kind seldom have to contend with; they are, notwithstanding all these trials, seldom injured so far as to prevent a good crop of lambs. This is, doubtless, to be attributed to their muscular character; which being wanted in other long-wooled sheep, renders them, from their *thinness of flesh*, incapable of much endurance, and also less prolific; as it is well understood by breeders that the greater the portion of muscle in any breed of sheep, the more they may be trusted in to produce a crop of lambs. This is particularly exemplified in the Downs: for they, being allowedly the most muscular of any class, are also the most prolific.

The Down sheep having been already alluded to, and some of their peculiarities noticed in the former part of this paper, it will not be necessary to go much into detail respecting their merits; they are too generally known, and are spreading too far over the kingdom, to leave a doubt upon the mind of any person of their good qualities. They may, however, be noticed chiefly as affording the strongest contrast to Leicesters and Oxfords; so that it can scarcely be questioned that as the *Downs advance* in favour, so their opposites *suffer* in the estimation of the public. They are also peculiar as having the best hind quarter. The leg of mutton of a Down affords perhaps a larger portion of weight, when compared with that of the whole carcass, than any other sheep; whereas the Leicester and Oxford afford the least, being more remarkable for the fore than the hind quarter.

An eminent breeder of Leicester sheep (who has also given his views of breeding to the public), forty years ago gave as his opinion that "a true formed sheep should be like an egg, with the large end forward." This idea is nearly that which is now followed, although it may be allowed that the breeders of Leicesters have discovered this to be so far an error as to cause greater attention to the hind quarter than their predecessors did; still they are far from approaching the Downs in this respect, the breeders of the latter having doubtless in view that it is part of the science of breeding to produce a preponderance (if any such preponderance be allowable) of that part which constitutes the greatest value.

It cannot, however, be said of the Downs that

they are quick fatters. That they make the best stall of meat in a butcher's shop is not to be doubted; the *market-price of Downs* generally reaches to one penny per pound over that of Leicesters and Oxfords, and perhaps to half that amount over Kents, which will be sufficient to establish the fact. It becomes, therefore, a matter of calculation in the feeder whether or not it will answer to select the Down, or either of the other sorts.

Perhaps it will be near to the truth (taking the opinions of those who are more engaged in feeding than in breeding sheep, and who have already been noticed as preferring a mixture) if we allow the difference, in a feeding point of view, to be considerably diminished under the circumstances noticed above; viz., that the muscular Down is worth more money per pound than any other, but requires a greater degree of force to obtain the weight; and that the Leicester or Oxford will return a greater weight of animal for vegetable food, but is far less valuable per pound when obtained. Taking this view of the subject, may it not be said that the Kents participate in both good qualities (as respects fattening propensity, and making a good stall of meat), but excel both in wool?

Taking into consideration all the particular points noticed, it will be for the breeder to determine for himself with reference especially to his own circumstances, and to the nature of the food to be consumed; whether his land be arable, pasture, or marsh; whether the flock is to be fed on roots or grazed in exposed situations: these various items must all enter into the calculation before a wise determination is come to in the choice of sorts.

The requirement of the feeder will have its due weight with the breeder, whose object is to furnish that article in the largest proportion that obtains the greatest demand. The *principle of breeding* will assist under every view. Whether it be thought necessary to adopt any particular breed, or whether the first cross between two be more desirable, it will naturally follow that neither can be so well obtained without purity of blood in the first instance; for indiscriminate mixture (though frequently practised by those who consider "all breed to lie in the mouth") will always be found in the rear when exposed to a fair trial.

Having now noticed some of the leading topics of controversy, and having endeavoured to draw from the opinions of some and the practice of others, it will only be necessary, in conclusion, to make a few remarks upon breeding which have been omitted in the earlier part of this paper.

That some particular breeder in each of the four classes of sheep brought under view possesses a peculiar talent, which enables him to discover the



true points of excellence, cannot be doubted. It is not intended either to excite or gratify a curiosity on this head, by giving names; but those who are distinguished in either class will easily be guessed by their fellow breeders. This talent is a peculiar privilege or gift, which cannot be communicated to another; and it is this which enables its possessor to arrive at the head of his profession, and by which means he is able to select from that class over which Providence has placed him, that peculiar animal which will produce the best of his kind; and by a continued application of this gift, he at length establishes a family superior to all others of that class. But as this breeder is subject to mortality, when the time arrives for him to pass away, that discriminating talent dies with him. He may be followed by one or more who have been instructed by him, or who have by some chance entertained practically similar views; but the spirit is gone! a new set of ideas are brought into operation. It is not, therefore, extraordinary if the character of the flock should change in proportion to the change of views entertained by the successor; and this will

account for the failure of many who have apparently followed in the steps of their predecessors. Names will doubtless arise in the mind, and be applied to those gentlemen who once excelled, but whose flocks are now brought down to the level of the mass; and such flocks may be expected gradually to recede towards the common point, till some master-mind arise to bring them again into notice. A continual change is thus brought about in flocks once highly valued, now no longer distinguishable. The only thing that is likely to delay their lapsed state, is the fact of their having been bred under the same mind for a long succession of years, which will have so completely indented them with each other (if such an expression may be allowed), that it will require a proportionate time again to reduce them.

Whether this state of things will continue, or whether science can step in, in time to prevent the evil, and fix the principles of breeding upon an established basis, is not clearly discerned by

A BREEDER OF KENT SHEEP.

## BEEF-ROOT AND MANGOLD.

BY MR. TOWERS, MEMBER R.A.S., H.S.L., ETC.

It is a singular circumstance that at this period of increased and increasing knowledge, there should exist a good deal of perplexing uncertainty as respects the botanical character of these valuable plants. We know that the true beets belong to the natural order *Chenopodæ* (goosefoots), among which this genus is distinguished by having (with one or two exceptions) large succulent roots, and a calyx adhering to a single kidney-shaped nut, thus forming a husky seed, which is of a rude figure; but of the species or varieties there are different opinions, and also manifest contradictions in respect to the plant which was employed in France during the war for the manufacture of sugar, and hence called the *sugar* beet. In fact, from all that I can learn, the cultivators of England know little or nothing of this beet, either theoretically or practically. This doubt is, perhaps, of minor consequence, since it has been decided that little, if any, economy is exercised by the preparation of beet-bread; and that, after all, true farmer's grist, or "one-way flour"—which contains all the fine pollard, and rejects only the coarse brans—produces the most wholesome and cheapest loaf that a family can consume: it being also understood that the coarse bran itself, though removed from the flour, be still employed in preparing the water with which

the dough is to be made up. This digression may be permitted, in order at once to set at rest the inquiry concerning various adjuncts (of which beet was one) to flour on the score of economy.

The late Mr. Loudon mentions five species of beet in the "Encyclopædia of Plants;" two of which refer to the subject of this paper. First, *Beta vulgaris* (the garden-beet), *Betterave* of the French; and second, *Beta cycla* or *sicula* (the chard, the white beet), to which is attached the following specific description: "Leaves with very thick ribs; flowers three together; root scarcely any." Yet, in the historical note appended, we read that it is the "mangold" of Kraut, the *Biettolà* of the Italians—employed as a spinage in horticulture, and for being used as chard or asparagus; and in foreign agriculture for the production of sugar!

In the "Encyclopædia of Gardening," the same author, speaking of the common red beet, says that "from one variety, having a red skin but white flesh, sugar is prepared, in some parts of France and the Netherlands; but this manufacture, introduced under Buonaparte's reign, is now almost entirely given up."

The article *Beta*, of the "Penny Cyclopædia," species 3, *Cycla*, has the following passage:—"It

is cultivated like the common beet; but the leaves only are used in soups, or their ribs are cut out, and stewed like sea-kail. They have, however, an earthy taste, which it is not in the power of cookery wholly to remove; on which account they are little esteemed." But the same article introduces species 2, "*Beta altissima* (mangel wurzel), a much larger and coarser plant than the common beet. Independently of their use for cattle, mangel wurzel roots have been, and are still extensively employed in France in the manufacture of sugar." Again:—"But the French have preferred a perfectly white kind, which is said to exceed the former in nutritive properties, in the proportion of two to one."

From all these utterly discordant passages, it is evident that we in England know nothing of the true sugar beet; and if, as I infer, *that* species or variety is identical with "the white kind" last mentioned, we ought to obtain the seed, were it only for the nutrimental quality which is so predominant.

I have cultivated two kinds of red beet. The one which is to be preferred as a table vegetable (either boiled and hot, or, when cold, sliced, salted, and covered with vinegar) is of a full and rich purple in the foliage as well as the roots; and the red-rooted, with green leaves, the ribs and veins of which are of a purplish red—this variety is of a larger and coarser habit than the former; both, however, are distinct from the true mangold, which is said to have been introduced from Germany by the late Dr. Lettsom about sixty years since. The varieties seen by me have very long spindles, rising high above the soil; some, yellow in tint; others of a dirty red outside, the flesh within whitish, mottled, and streaked with red: the leaves of both are green; the midribs and veins either purple or yellowish, according to the variety.

The common white (*sicula* or *cycla*) I have also grown, and can attest that it has no useful roots whatever, and can in no respect be identified with the true saccharine beet.

To finish the question of species and their qualities, I find, by very recent articles, that some persons mention the turnip-rooted as an early beet, the large red and the yellow-rooted for bulk, and for flavour the dwarf red and yellow<sup>6</sup> "Castelnaudary"—of French origin, we may infer from its specific title—also the white silician beet.

#### CULTURE OF THE GARDEN BEETS.

*Soil.*—All authors agree on this point. It should be a free, sandy, workable loam, with few stones, naturally rich—by which term is implied, replete with decayed fibrous matter, and with silicate of potassa—deeply trenched, manured at the bottom,

and if above that, with some perfectly reduced dung (as humus) thoroughly incorporated with the earth. I believe, however (as is the case with the carrot), that a pure, maiden, light loam, manured only at the bottom of each trench (eighteen inches deep), is the safest and most desirable staple. However, experience instructs that beet will succeed in any good land; for not only have I grown mine for sixteen years in loams of different texture, but two years since I had occasion to witness a large plantation of mangold, the ground for which was raised two and three spits deep, having been meadow land, stiff and clodding, especially at the bottom spit, that lay over a heavy, marly chalk, which spit was raised to the surface, while the grass turf was thrown to the bottom of each trench as the work proceeded. By the way, I may remark in passing, that this turfy substance, two inches thick, reversed and abundantly salted, produces a fundamental manuring of admirable quality.

*Preparation.*—It is always advantageous to trench ground in gardens during autumn; to mix cinder-ashes with it, if stiff and binding; for these meliorate the temperament, and add gypsum and silice: common gritty sand does not improve the labourable texture of a clayey soil. The surface should be finished by setting it up in high ridges. If naturally friable and sandy, ridge-trenching is not required: the addition of a good loam would be a great improvement.

*Sowing.*—March is a proper season. The precise point of time is to be determined by the states of the weather and ground: the former should be dry, the latter free and loose, so as to be readily pulverized by the fork and rake. The seed may be mixed with three times its bulk of sandy earth, holding just water sufficient to moisten the seed and hasten its germination. In the mean time the ridges of the plot are to be levelled by the fork, the earth moved to the depth of sixteen inches, and the surface made quite level by the rake.

I have this day (March 9) sown seed of the deep purple beet, so prepared; the radicle having begun to make its curve. The ground also being in fine condition, the line was strained, and the earth made rather firm by treading along its course. The distance of line from line was one foot; and each drill was made by carefully pressing the back of a long rake along the course of the line, which gave greater firmness to the ground, and increased the level depth of the drill. The seed and sandy earth were trickled along the groove; and the work finished off by the feet first, and then by raking to a fine surface.

I may here mention that having moistened the sandy earth too freely, the germination had become active, and, in one night afterward, not only the

radicle, but the plumules of some seeds were developed; so that I added fresh seeds to each drill, to secure a sufficient crop.

I thus mention an actual experiment, as a guide and caution; and, moreover, to enable me to state another previous operation and its results. Last year I sowed much later, and rains fell copiously in April and May. Nevertheless, so sudden and violent was the access of dry, hot weather, that scarcely a seed germinated; or, if it did, the plants were so destroyed either by heat or vermin that I was obliged to sow a second time. Hence I had no hopes of a single beet till after the rains of July, and then several ran off to seed.

Early sowing, made before drought sets in, in drills covered fully one inch with fine earth, warrants the expectation of a good crop.

The subsequent culture of small purple beet consists, first, in making the surface pretty firm by a light roller; then, when the plants are seen, and become a little firm, to thin them out to distances of a few inches, and to Dutch-hoe the spaces; and finally, to thin a second time when three inches high, so that the plants remain from nine to twelve inches asunder.

Weeds must always be kept under by timely hoeings, which also tend to feed the plants, by enabling the moved surface of the ground to attract and retain that moisture which the atmosphere is sure to supply even in the dryest seasons.

*Mangold, or Mangel-wurzel.*—This plant I have occasionally cultivated as food for a milch cow. The routine of management was much the same in principle as that detailed for beet. All my land was trenched two or three spits deep; but in some places the loam was more close, with binding grit, than in others, and it was in such land the mangold was grown, and greater spaces were allowed than those allotted to the red beet. In our neighbourhood farmers pay little attention to the plant, and I have not seen a plantation of any extent for years, though I am certain it could be produced to a full remuneration. I, therefore, shall at once refer to the experiment before alluded to, which fairly determined what might be done in land that had previously borne no other crop.

In 1845, some time in April, a large piece of a grass meadow was trenched by spade and fork from two to three spits deep, and the turf was laid at the bottom of each trench, the lowest soil being brought to the top. This earth was a pale, ochrous yellow, abounding with flints, owing to the contiguity of the chalk, which subsoil rests upon gravel. The middle spit was a sound brick-earth,

free enough to the tools; the upper spit, which was turned over the turves, consisted of a lighter and better soil, enriched by the fibrous matter of grass-roots.

Every labourer objected to this inversion of the strata, saying that nothing would prosper in the bad loam thus brought to the surface. However, the occupier chose to proceed, and merely added some spit-dung to that surface, and had it worked in by the tools. The seed was then sown in drills about eighteen inches asunder and two inches deep. I believe they were only trodden in, and then raked over, to level the plot and remove the exposed stones.

The plants rose very well, and were thinned by degrees to distances of eighteen inches: they turned out to be the two varieties—the pale red and yellow-rooted. Here and there insects caused a blank, but in the main they prospered exceedingly. The hoe was frequently employed, and no weeds suffered to exist. The plants attained a very large growth, standing many inches above the surface. Nothing more was done, and the crop was stored in a sort of stack in the open air, and thatched over, whence it was taken as required for cows.

Authors differ in their treatment of this root; distances vary, and results are never alike. Some recommend, in *field culture*, to steep the seeds in *urine and lime*—a very unchemical application, tending to decompose any existing ammoniacal salt. If lime is to be used, it should be applied with a steep of weak brine. The drill-machine for sowing, and the horse-hoe and scuffle for cleaning the spaces, are recommended; they also act on the soil itself by rousing the power, which all newly-disturbed soil possesses, of attracting water.

Of course the field treatment must be on a more bold scale than that of the garden; still, the processes are one in principle. If the lower leaves of *full-grown* plants are to be used as food (as those were in the experiment described), they should be twisted off, not cut by knife; and this also should be observed in storing, as the wounds so inflicted do not cause the discharge of juice. I cannot enlarge, and therefore close this article by referring to a paper at p. 335, of this magazine, on the comparison of the potato with the mangold, carrot, turnip, &c., by Professor Johnston. Like all the other writings of this truly practical chemist, we perceive no trace of that flare and “dandyism” of chemical science which but too frequently are met with, to the great perplexity of those who cannot appreciate the modern cabalistic symbols. Mr. Johnston is a plain and evidently lucid investigator, whose object it is to explain and improve.

## AGRICULTURE IN SCOTLAND.

TO THE EDITOR OF THE WESTERN TIMES.

SIR,—A few weeks since I troubled you with an account of the method adopted in the southern counties of Scotland, of paying farm labourers, &c.; therefore have again taken the liberty of trespassing on your valuable columns, by giving your agricultural readers some idea of the manner in which farming operations are conducted in the Lothians of Scotland or counties of Haddington, Edinburgh, and Linlithgow. I shall not enter minutely into details: those who wish to be more fully acquainted with Scotch farming should visit the country; and whether they do so on a tour of profit or amusement, they will be most amply repaid.

The Lothian farms consist each of from 200 to 500 Scotch acres, the Scotch acre being one-fourth larger than the English statute acre, therefore I shall limit my remarks to the current acre of the Lothians. A farm of 300 to 500 acres is by common consent the utmost which one farmer is thought capable of managing. The farm buildings are small, compact, and situated near the centre of the farm, and have always a steam engine of six to eight horse power for threshing, and other purposes. At the entrance of the farm-yard is the dwelling of the grieve, or bailiff; for every farmer keeps a bailiff, who superintends everything on the farm, and is cognisant of everything that goes in or out of the farm-buildings. I found the grieves universally clever, acute, and sensible, and their minds open to what was passing in the world beyond the limits of their own immediate neighbourhood: this speaks well of what education has done for the peasantry of this part of Scotland. The farmers themselves are men of much superior education, manners, and style of living to the possibly equally wealthy ones of the farming counties of England: they are all of most hospitable habits. Few of them are without a handsome phaeton for the use of the female members of their family. One feature throughout the Lothian farms may be remarked—a great uniformity in the quality of the crops. Not, as elsewhere, here a good farmer and there a bad one, here a failing crop and there a middling one, and here again a finer one, but nearly all the same; showing that farming is there reduced to a science, leaving nothing uncertain but the seasons. The farms are divided into fields of from 20 to 50 acres each, the hedges are clipped low and thin, and the ditches covered in, so as to occupy as little space as possible. There are no trees in the hedges, and few furrows in the land; and thus, between one thing and another, the entire area of the farm is made productive, and the expense of fences and gates is reduced to a minimum. Another thing worth noting is, that permanent grass, either as meadow or pasture, is unknown, or nearly so: the only hay or pasture is derived from artificial grass sown in the regular rotation of crops. The rent of the Lothian farms is from £3 10s. to £7 per acre, and these high rents the farmers not only pay but thrive upon. They are enabled to pay these rents and thrive, partly by the heavy crops arising from

skilful cultivation, and partly by economy of management in every department. Actual wages, however, are as high as in England, viz.—10s. to 11s. a week for a common labourer, 12s. for a ploughman, and 9d. a day for women—ten hours to the day. As to the great amount of produce, it must be remembered that *all the land is under the plough*. Five quarters of wheat, ten of oats, seven of barley, and from thirty to thirty-five tons of turnips, are reckoned a good average to the acre.

Economy of management is shown in the division of employment confining the attention of the farmer to as few points as possible, in a due rotation of crops, so as to have no land lying idle or unproductive, and in the use of machines and horses instead of manual labour, whenever circumstances admit of it.

All the Lothian farms are held on 19 years' leases, and the rents wholly or partly corn rents, rising and falling with the yearly fluctuations of the price of corn. Without a long lease, the farmers would not lay out their capital in the free manner they now do, and with a long lease they feel independent of their landlords, more as if they were the actual proprietors. In consequence of this independence and part ownership, as it were, of their farms, men of much superior rank, education, and capital engage in the business of farming than is the case in England, or, indeed, *than ever will be the case* in England under existing circumstances.

The foundation of all improvements in the Scotch farming is the system of *thorough draining*; and so essential is this considered, that most of the land is deemed unworthy of being farmed at all until it has undergone this operation. The drains are made at regular distances, from 15 to 30 feet or more apart, according to the nature of the soil, and from 24 to 30 inches deep. The general course of cropping in the Lothians is—wheat after summer fallow; turnip, barley, seeds down for one, two, or three years as circumstances vary; oats. When the land is very stiff, a crop of beans and peas is taken.

I have thus endeavoured to give, in a somewhat unconnected way, the results of my observations on the Lothian farming, where high rents, high profits, and a well paid and contented peasantry are all seen combined in a pleasing union. It is an interesting question, but one I am not going to enter upon, how this improved system of cultivation can be introduced into England? I am inclined to think the superior and more practical education of the Scotch has been at the bottom of the improved state of things. Education has given the knowledge which has enabled them to apply their capital with success, and to extract from the landowner the long lease, which enables them to invest their capital with safety as well as success. Trusting these few remarks will be found worthy a place in your paper,

Believe me, yours truly,

R. S. HEWS.

Broadcliff, February 17th, 1847.

## ASSIGNATION OF LEASES IN SCOTLAND.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

SIR,—I beg to address you in your capacity of editor, and in the fewest words in which I can make myself intelligible, on a subject which, in the ordinary course of business, has repeatedly and strongly recommended itself to my attention. I address myself to you on this important subject—important to Scotland—knowing well the effective aid you are always disposed to give to every rational proposal which promises in any way to advantage that country, and remove any injudicious restriction on agriculture and agricultural property, and from the high respect I entertain for your opinion on general questions; and, besides, it is unnecessary for me to conceal how much it weighs with me, that I have the best reasons for believing that any suggestion, coming with the sanction of your approval, will certainly meet with due attention in the desired quarters.

I now take the liberty of bringing under your consideration a proposal for such an alteration in the law as would render an assignation of leases in Scotland available as securities; and for the easy and expeditious transmission of such leases; and the constitution, transmission, and extinction of securities for debt thereon.

The establishment of a separate record for leases and sub-leases, and assignations thereof, would necessarily form the basis of this arrangement; and any assignation therein duly registered should be held to form a good and effectual security in all questions between the assignees and the other creditors of the tenant, and other parties deriving right from him; leaving to the law, as it at present stands, the completion of the right of the assignees as regards the landlord or sub-tenant in cases where there has been a sub-lease.

This cannot be condemned, at all events, as any new idea; as, from obscure hints dropped here and there in their writings, a comprehensive plan of this nature would appear to have occupied the attention of distinguished jurists of the last century not to talk of any later notice of the subject as regards attempts at legislation, or lucid exposition like Mr. Hunter's, whose remarks nearly coincide with what follows.

In the existing state of agricultural industry, and from the no small difficulty often found to procure the safe investment of capital, it would be highly advantageous to fall upon any effective means of rendering leases available as securities. Her

Majesty has just been pleased to appoint a body of commissioners in England for inquiring whether the burdens on land in that country can be diminished, and the establishment of an effective system for the registration of deeds and the simplification of the forms of conveyance. As regards landed property, we in Scotland, you are aware, enjoy the benefits of registration, and our forms of conveyance have also been somewhat simplified, and there is a great outcry about farther simplification and cheapening of conveyance. But we want the benefits of registration extended to *leases* in some such manner as the following, and for the reasons I shall presently state:—

In agricultural leases of ordinary duration, even granted at reasonable rents, there must be often a large and comparatively permanent outlay, the profits of which the tenant cannot hope to derive until the duration shall have far advanced, and frequently not until near the expiration of the tack.

In leases of large manufactories and other subjects the first outlay is often immense: so also in leases of minerals.

It cannot be doubted that it would, in many cases, be of great importance to the lessee in this age of manufacturing activity and commercial enterprise, to procure a loan larger and more permanent than can be obtained on any species of personal security, could he convert his invested capital and prospective profits into an available source of credit. Could he obtain this much coveted advantage, and enjoy it under the security of a statute, a man of enterprise, by spirited improvements in machinery, and by calling in the aid of science, might be induced to extend, while he rendered more productive, his future operations. The economist and statesman will no doubt here bear in mind that improvements in machinery, and the consequent simplification, coupled with increased rapidity in the various processes of manufacture, never fail to produce cheapness of fabric. In this advantage the public is ultimately the chief participator.

The landlord would reap benefit from the more *certain* payment of the rent, and the subject matter of the hypothec would be augmented by the new investments and increasing resources of the tenant.

The accumulated, and ever accumulating, hoards of the capitalist would find a beneficial outlet; and opportunity for remunerative investment at fair rates would speedily be opened up.

As a proof of the necessity for legislation, I may mention that, notwithstanding all practical difficulties, I am well aware of many instances, as Mr. Hunter states, where attempts have been made in the manufacturing districts of Scotland to create, in transactions with copartnerships, securities not only over leases of manufacturing subjects, but over apparatus and utensils, and this in some cases for absolute loans, in others to cover floating advances on bills, &c.; the borrower assigning his lease and the apparatus and machinery, per inventory, to the lender; the latter intimating the assignation; the borrower thereupon changing the firm, executing and communicating a new contract of copartnership to the lender, and taking a sub-lease of the premises and apparatus, &c., from him; the rent in such sub-lease being stated at a sum sufficient to cover the tack duty, the interest of the sum lent, and occasionally including a compensation for tear and wear. Although no rent is actually paid, a fixed rent is introduced, to enable the creditor to sequester in case of insolvency. But as none of these transactions, that I have heard of, have as yet been subjected to judicial inquiry and decision, it would be presumptuous to venture an opinion as to their validity or otherwise. They have been, in practice, generally intended as temporary securities in emergencies. It is abundantly clear, however, that prudent legislation would, under these circumstances, be both acceptable and salutary.

I would especially venture to press this subject, so far as regards agricultural leases, upon you, and through you upon the minister, at the present moment; and this I am emboldened to do from two considerations. It would be extremely popular with the agricultural interest, and, upon their own principles, could not fail to have the sanction of the commercial and manufacturing interests.

In the first place, it will be confessedly necessary for the tenantry of this country to make redoubled exertions in contemplation of the anticipated consequences of the withdrawal of protection. Improvements in culture must involve additional outlay; and improvements in culture will, it is generally allowed, be necessary to enable the British farmer to cope with foreign and colonial competition. This would appear, then, to be the happy moment for the legislature to step forward, and, by its judicious and well-timed sanction, to enable the industrious and enterprising tenant to make his lease available by assignation, as a security on which to obtain the necessary funds to empower him successfully to cope with foreign and colonial competition.

In the second place. Busied as the legislature is at present with agricultural legislation for Ireland,

is it too much to ask the consideration of this rational and valuable boon for Scotland; seeing that it is to be productive of unmingled good to landlord and tenant and capitalist, that it is attainable at little cost, and that it can entail no supposable inconvenience or derangement, legal or social.

I would venture, with previous well-disposed legislators, and Mr. Hunter, to propose generally—That a separate register of leases, sub-leases, assignations, and extinctions of the same, and other writings relating to the constitution, transmission, and extinction of securities, be kept; in which it shall be competent to register all leases, sub-leases, and assignations and extinctions of the same, and other relative writings of subjects situated in the district; and that, after such registration, the principal copy, with certificate of registration indorsed thereon, or an extracted copy of the same, will become available for the purposes of assignation. The duties may be performed by the present district-keepers of the particular registers of sasines; or Scotland may be divided into districts containing several contiguous counties—as post-office facilities are now so great—and one keeper appointed to each district so constituted.

That a general register be kept at Edinburgh, with a separate keeper, in which may be recorded the various meetings, &c., specified above, from any part of Scotland.

That all such leases, sub-leases, assignation, &c., &c., shall be preferable in competition according to the priority of their respective registrations, and to the extent that shall appear on the register.

That nothing in any new act contained shall prejudice the landlord's right of hypothec; but the assignation in security should, on registration, have a preference over all other creditors: the assignee not to be responsible for the rent, unless he accept of a conditional option of paying the rent, and taking an assignation to the hypothec.

All the details about the machinery and office-bearers I need not trouble you with at present.

It is the deliberate opinion that such a measure as I have above shadowed forth would be attended with very considerable practical benefit, and would be generally, if not universally, acceptable in Scotland. It would be regarded as a boon by both manufacturer and agriculturist. It would be extremely politic if at this moment Government were to come forward with such a measure for the benefit of the agricultural interest; for the conferring of such a substantial benefit would go far to heal up those festering wounds which a great proportion of that party insist will be inflicted on them by the withdrawal of protection. No benefit, that I know

of, could be bestowed on the agricultural interest, which could for one moment stand a comparison with what I have ventured to recommend.

I am, Sir, your very obdt. servant,

OBITER DICTUM.

P.S.—I think, with fixity of tenure, a modification of this proposal would be valuable in Ireland. If fixity of tenure were conceded in Ireland, there are many, very many, willing and able to improve their native country. If valuable improving leases, on a proper system, were granted them, containing judicious clauses, there would be no want of capital to back up and second their endeavours, if they were only allowed to assign such valuable leases as temporary securities for advances for improvements. Extensive and judicious ameliorations would thus be carried on, which could not fail to result in the general improvement of the country and the people, while at the same time they would ultimately prove abundantly profitable to both borrower and lender.

Edinburgh, February 23.

O. D.

## VALUE OF SEWER WATER.

(From the *Liverpool Health of Towns Advocate*.)

If we take the population of Liverpool at 300,000, their annual produce of sewer water would, according to Mr. Smith's (of Deanston) data, be 7,140,185,676 gallons; and *if use could be found for all of it*, at the yearly rate of 17,920 gallons per acre, it would fertilise 398,460 acres. So that, allowing about one-half of the saving to go to the farmer, there would still, on Mr. Smith's data, be a revenue of above 270,000*l.* a year to the town. And be it remembered that this estimate rests on the assumption of the *present sewer water* being used, without taking into account the improved drainage, by which the *whole soil* of the town (that to a very great extent is now otherwise disposed of) will be suspended in the water of the sewers, and increase vastly its value as a fertilising agent.

By an experiment made lately in Lancashire, it was proved that eight tons of sewer water were superior in efficacy to fifteen of farm-yard manure, or three cwt. of guano.

We need hardly say that, if even a small part of this be true, the authorities of Liverpool may have at their command, whenever they choose, a fund amply sufficient to defray every necessary expense in improving the sanitary condition of the town. The Rev. Mr. Clay, in his report on Preston, has given a calculation in which he shows that, to place that town in as perfect a sanitary condition as external means well could, a sum of money would be required, the *annual interest* of which, to be raised by a rate, would be 8,959*l.* 9s. 8d. For this sum the whole town would be cleansed, every room in it ventilated, every house would have a water-closet and drain, the needful main and secondary sewers would be laid down, and half of the town supplied with water.

To meet this expenditure, he estimates the annual value of sewer manure at 25,000*l.*, and the whole annual saving from improved sanitary condition, a lower rate of insurance, &c., at 22,815*l.* more. In other words, the whole *weekly* expenditure per head of the population, for every improvement, would be about *three farthings*, while the whole weekly saving per head would be 4½d. This may be thought somewhat extravagant by those who have not paid attention to the subject; but let us see what the Towns' Improvement Company actually offers to do, and what it is about to do for Leicester, and, not improbably, for Manchester also. The proposal for Manchester is—to lay on pipes to every cottage, with a constant available supply of water to the extent of 100 gallons per diem to each house, for a penny a week for houses under 5*l.* rent. To provide every cottage of the same class with a sink, washhand-basin, and self-acting water-closet, for another penny a week; and, for an additional halfpenny a week, to keep the foot pavement and roadway clean by the sweeping-machine and washing with the jet. And lastly, “to effect street sewerage and pavement on terms of contract, and to seek its profit from an undeveloped source of revenue—the application of the refuse of the town for the purposes of agriculture.” The company expects an income of twelve per cent. on the outlay from these sources, but offers to pay over one-half of all dividends above eight per cent. to the Town Council as an improvement fund. The Towns' Improvement Company has in connexion with it many individuals who are the most competent to form a judgment on the subject; and their proposals shew the commercial value attached to sewer water as a source of revenue. Captain Vetch, R.E., one of their engineers, says in his evidence: “If the three objects of supplying water to the town, extinguishing fires, and of sewerage and draining, were skilfully combined into one system, and if each town secured the benefits of such a combination to the inhabitants at large, their comforts and conveniences might be met either very cheaply, or even *be entirely defrayed* by a proper application of the manure.”

The objection to the use of sewer water for agriculture, on the ground of malaria, is very simply answered by the fact stated by competent parties, that, while a top-dressing of stable-dung gives off gases for six days, a dressing with sewer-water ceases to do so in *one day*.

BROMLEY.—FARMERS' CLUB.—On Tuesday evening week, a preliminary meeting of the agriculturists of this district was held, to consider the propriety of forming a farmers' club. It was unanimously resolved—“That it is expedient to form an association to be denominated the Bromley and West Kent Farmers' Club.” It was also resolved—“That George Warde Norman, Esq., be requested to take the presidency of the proposed institution.” Mr. Norman accepted the office for the first year. Mr. G. Colgate was appointed secretary, *pro tem*. Under the gentlemen we have mentioned, there can be no doubt that this club will carry forward successfully the useful objects contemplated.

## THE LONDON FARMERS' CLUB.—MONTHLY DISCUSSION.

SUBJECT:—"THE COMPARATIVE MERITS OF WAGGONS AND ONE-HORSE CARTS FOR THE PURPOSES OF AGRICULTURE."

The monthly meeting of the Farmers' Club was held at the Club House, Bridge Street, Blackfriars, on Monday evening, March 1. W. F. Hobbs, Esq., in the chair. The subject appointed for discussion was, "The comparative merits of waggons and one-horse carts, for the purposes of agriculture."

The secretary read a list of new members who had been elected that day.

The CHAIRMAN said, Gentlemen,—It is gratifying to me, as it must be to yourselves, to find that this club is increasing so much in numbers; and I believe I may add that it is increasing equally fast in usefulness. I always anticipated that it would be the focus of all the Farmers' Clubs in the country; and the importance which appears now to be attached by the public to our discussions, and the interest which is felt in our proceedings by influential parties, convince me that I was right in the view which I entertained. We have of late had our attention drawn to various important subjects relating to agriculture; and to-day the committee have been engaged for several hours with Mr. Chadwick, the Secretary of the Poor Law Commissioners, upon the important question of "Poor Law Settlement." I can only say that so long as we are making ourselves useful, I for one shall be most happy to afford my humble services in advancing the interests of this club. Gentlemen, the subject for discussion this evening, is one of a practical nature, which my friend, Mr. Baker, has consented to bring before you. It is one of considerable importance at all times, as it has relation to the economy of labour. Since the Royal Agricultural Society has, by its proceedings, brought the application of the science of mechanics to bear more especially upon agriculture, it behoves us, as practical farmers, to use our utmost endeavours to select those instruments and machines which will be best adapted to the various purposes of agriculture. And although we have, throughout the country, promoted the use of various new implements, still I think that as regards one portion of our implements, namely, the vehicles used for the conveyance of produce, but little improvement has been generally made (Hear, hear). I, for one, have long been a convert to carts as preferable to waggons; but I think there are many who still believe that waggons are the best. I feel persuaded, from my own practical experience, that the opinion which has been frequently stated, that a saving of one-fifth may be made by using carts instead of waggons, is not exaggerated; and I do believe that the more the question is brought before the public, and the more an improved kind of carts is introduced into the various districts of the kingdom, the more will carts be used in preference to waggons (Hear, hear). I will say no more on the subject at present,

but will at once call upon Mr. Baker to introduce the question for discussion. Before I sit down, I wish to state that in the interview which we had to-day with Mr. Chadwick, that gentleman appeared not in his capacity of Secretary to the Poor Law Commissioners, but in his private capacity as seeking information before he delivers his evidence in the House of Lords.

MR. BAKER.—Gentlemen, having proposed the subject which is placed on the card in connexion with my name, I feel bound to confess on this occasion my inability to do it that justice which such a subject requires. The use of carts has been introduced as yet to a very limited extent, and carts have been used by myself individually in a very limited degree; but a comparison of the statements of others, and the observations which I have made myself, have quite convinced me of their usefulness. During the last harvest, I had an opportunity of inspecting some carts of this description (pointing to a model on the table) at work, on some farms in Bedfordshire; never having seen any in operation before, I confess I was astonished at the quantity of corn carried by them. Although I saw the fields myself, witnessed the process, and beheld the stubble, I felt some hesitation afterwards in stating the number of acres which had been cleared within a certain time; and until gentlemen came to my house, and repeated in my presence what they too had seen, I did not do so with satisfaction to myself. In the particular instance to which I allude, the wheat was of very good strength, that is, it was above the ordinary strength. Thirty-five acres were carted in one day by two men, one man pitching and the other loading. I venture to say that, under ordinary circumstances, no men in mine own district would have carted much more than half that quantity. Twenty acres is quite as much as we could have calculated upon with our waggons, under ordinary circumstances. Assuming that the wheat shall produce from one to two waggon loads of sheaves per acre, the custom with us is to carry what is termed four layings round, above the sides of the waggons, and the quantity usually carted is from 30 to 35 loads per day. I believe every one in our district would consider that a full day's work. I can speak with confidence on that point, because for many years I assisted on the farms which my father occupied: I pitched half the wheat on the farms for several years in succession. We used to estimate the work in this way—six loads to be pitched before breakfast, between breakfast and dinner twelve loads, then six from dinner to the afternoon meal, and six more afterwards. That was considered a full day's work. Now, when I inquired as to the cost of carting wheat in Bedfordshire, I found that it was 15d. an acre; we paid from 2s. to 2s. 6d. The difference was therefore about



half. The following day, I saw the men at work with carts again, and the cause of the difference which I have mentioned as regarded expense then became pretty evident. You must be aware that in the case of an ordinary waggon, the height of the lowest side is from six to seven feet; that is, therefore, the lowest point to which the sheaves would require to be lifted; whilst, in the case of a cart, seven or eight feet is about the highest point at which any of the sheaves would have to be placed. Therefore a man using a waggon is obliged to exert himself by taking the wheat on the fork, balancing it properly, and then raising it to the necessary height. Now, with a cart, no such effort is necessary; the sheaves are taken on the fork, and lifted without much effort or any time being lost. In the case of the waggon an increased time will be wasted in putting on the sheaves. At every shock of wheat the horses are brought to a stand-still, and the shock is put on from each side of the waggon. Other shocks are put on until they get to the end of the field, where some three or four minutes are occupied in turning. Thus there is great difficulty in the operation, and much loss of time. In the case of the carts to which I have referred, it was one *continuous* progression forward. A boy came with the cart, the man being already inside, the sheaves were put in motion, and the boy continued leading the horse without stopping. That load was no sooner finished than another empty cart was ready at its tail; the same proceeding went on with a third, and so throughout the day. On a comparison I clearly saw where the difference laid, that it laid principally in the distance to which the wheat had to be raised in the first instance, and secondly, in the difficulty of moving cumbersome waggons, and the time that is required to get them bound with ropes before starting homewards; thus far I have only stated what I have myself observed, and so far as my own practice is concerned I can say but very little (Hear, hear). I am quite of opinion that the introduction of light carts would be beneficial, not only at harvest time, but at all periods of the year. We in Essex have resorted to various modes of constructing carts in order to secure that they shall do the least possible injury to the land. In some cases broad wheels are used, in others narrow ones, but in all some peculiar construction of the cart is adopted, in order to prevent, what is called, cutting up the land by carting on it manure. Now, if men had reasoned on the matter, they must have seen, while reflecting on the necessity of preventing injury to the land, that more injury would be produced by three horses than would be effected by carting with a lighter cart and one horse. The system, however, has prevailed in many districts of carrying on the land large quantities of manure—say a ton and a half at a time—when the same amount might have been conveyed upon it, by three operations with one horse, with far less injury to the land. I think it requires no reasoning to prove what I am now pointing out. Greater facilities in many other respects are connected with the use of one-horse carts than with waggons. They are lighter and can be more easily turned, more easily managed; they may be entrusted in the hands of lads, and in this respect they

have a great advantage over high tumbrel carts with three horses. Although I am advocating the use of these carts, I must still confess that there are particular descriptions of work for which very large carts would be necessary; but for ordinary purposes these small carts would be attended with great benefit, and I believe that the only reason why they have not made way to a greater extent than they have is to be found in the expense which attends the changing of the implements on a farm, most farmers being already provided with implements, though they are perhaps becoming less and less suitable. Since our roads have been so much improved, we have seen the necessity of introducing a lighter description of implements than were formerly used. In some districts the roads have been so much improved that, instead of two horses, one horse will suffice to carry a load of the same description; the load is lessened to the horses one in four, and consequently the waggon which was made to resist a certain power on the part of the horses needs not to be so strong. We have, in fact, from time to time been getting waggons and tumbrel carts of a lighter description than those which we used formerly; but carts of this description (pointing to the model) have not been used yet to any considerable extent. I am now introducing them myself on my own farm. I have had cast-iron naves from Mr. Stratton, of Bristol, which possess a considerable advantage over the common wood naves. In the case of wood naves there is considerable difficulty in keeping the earth from working in between the wheels and axletree, and obstructing their free movement; but, with cast iron naves of this description, a part works under the cart, giving facilities for preserving that part of the wheel clear from all obstruction, preventing the intervention of dirt or any other substance which can operate against the wheel. I think as regards this portion of the cart I have introduced an improvement. I find by inquiry of those employed in making carts of this description, that, whatever the size of the cart may be, it takes just the same time to form the standards for a cart of this description. I have ascertained that if the sides are cut from one to two inches in thickness, and three-quarter-inch bolts are placed through the side, and made to serve underneath, the mortices are got rid of, while the cart works quite as well as when managed with these standards; there are also the advantages that the expense is a great deal lessened, and that there is not the same liability to get out of order. I have had some carts made on that principle for seven or eight years, and they have proved better and stronger than the carts made on the other system. If it happens to be dry weather, and the sides have got a little loosened, they are brought down to a perfect bearing by the screws, and made almost as strong as they were in the first instance. As there are many gentlemen here who are quite competent to speak to you on the merits of carts of this description I shall not trespass upon your time any longer. As I said before, I came here unprepared to deliver anything worth your hearing upon "the comparative merits of waggons and one-horse carts." In what I have said as to the use of carts I have given you the result of the slight attention which I have paid to the manufacture of

them; having always, in effect, used waggons myself, I have rather given my attention to the *manufacture* of carts than used them. I may now leave the matter to other gentlemen who are present. There is one gentleman who has written a very elaborate and useful article in the Royal Agricultural Society's *Journal*—I allude to Mr. Hannam. My friend Mr. Mechi has done more in this way in Essex than any other man. He has cast a shade over the waggons. They are spirits rather too weighty for him entirely to lay within a short period, but I do not doubt that he will ultimately succeed. I now leave the subject which it has been my task to introduce, thanking you for the attention which you have paid to me.

The CHAIRMAN: Gentlemen, I have to apologise to you for not having before introduced to you Mr. Hannam. That gentleman is well known as having written a most able article, in the *Journal of the Royal Agricultural Society*, in 1811, on the subject of the advantages of carts as compared with waggons. The cart which he introduced to the notice of the public at that time is one which, I think, deserves particular attention; I am sorry that we have not a model of it here this evening, but it is well known to many of you, and I can confidently recommend those who do not know it to make a trial of it. I myself have tried it for two or three years, and a neighbour of mine has done so for four or five; it is quite superseding all the waggons that we have in this country, and, being firmly persuaded that Mr. Hannam has done good service to the cause of agriculture, I beg now to introduce him to the meeting.

Mr. HANNAM said: Although I am much obliged to the Chairman for the compliment which he has paid me, I feel that it is not in my power to do justice to the subject under discussion. Still I am willing to give any information which may tend to its elucidation. Mr. Baker has stated one or two leading principles in consequence of what he has seen in operation. With regard to one leading principle which he has brought before us, I have had my attention directed to it for some years—I refer to the advantage gained by the height or the lowness of this kind of vehicle. I may justly state that, on observing one-horse carts with simply a rail round them, I saw that they would not carry what one horse could draw in the shape of light materials. I therefore cast about to see if I could discover something that would carry the largest quantity of light material which one horse could draw. I looked first at the larger rails which are fitted on to dung-carts of considerable dimensions; that plan I rejected, because you could not carry the requisite sized loads. The load would be very unstable and apt to slip off, and there would be a difficulty in loading with a double set of men. I then looked at the Middlesex cart, which we see coming into London from different quarters, and which I was at first inclined to adopt. At last I thought of the French method of carrying corn. I had seen the French harvesting: they carried their corn upon what appeared to be two long parallel poles, and I saw that they had only to lengthen to any extent they pleased; they used no other method than that which I afterwards adopted, putting a platform upon the top. By that means I ob-

tained the same superficial area as that of a waggon. I endeavoured to make the thing as simple and as light as possible; and Mr. Stratton, I believe, in some degree imitated the plan which I adopted. No matter what the method is, if you gain the object of obtaining the superficial area which will carry the largest load of the lightest material that one horse can draw. Lowness is, of course, most desirable. We all know what Mr. Baker has mentioned, the difference in this respect between waggons and carts. We all know that, mechanically speaking, twice as much labour is required to raise a weight two feet as to raise it one foot; and, therefore, we can easily understand how it is that these carts can gain upon waggons. Waggons must be something like six feet high, while carts are three. The sheaf, therefore, has to be raised a yard higher in the case of the waggon than in that of the cart; and if the waggon be two yards high when the first sheaf is raised, and if the sheaves are put two yards high, the sheaves will have to be raised nine feet on the average. There is, then, a difference of one-third in the positive labour required to raise the sheaves; and under such circumstances it is easy to see that a greater quantity of land could be cleared by carts than by waggons within a given time. It has been objected, however, that although there may be a gain in the loading at the field, yet it is lost at the stack. Until the stack gets up to the point at which the waggon-load commences this argument will not apply, as the wheat will only have to be thrown down again; but at nine feet waggons may have some advantage. Well, the simple remedy is, as the sheaves are brought home quicker, to apply a little more strength to raise them to the proper place, and the work will then go on well enough. With regard to general economy, of course there is a saving of horses; but, as I am speaking of harvest work, the principal thing to be considered is time. By which ever way you can get home corn the quickest, that is of course the best, even if you are put to a little more expense. The fact is, that the work is done by carts with the least strength. The fewest number of horses that could be used in carrying by waggons, even a near distance, would perhaps be five. Three waggons must be used and three carts, and therefore there will be a saving of four horses by using carts. Whatever distance you have to carry the corn, there will be a saving of horses; the further you get, of course the saving is proportionately less. I suppose that in drawing the corn home a mile four waggons might be required; of course where any particular number, either of waggons or carts, was insufficient, you must add to it. One great object to be kept in view is economy of horses. I do not know whether it is one object of this evening's discussion to enter into the general question of saving by horses.

The CHAIRMAN: The discussion is upon "the comparative merits of waggons and one-horse carts."

Mr. HANNAM: I would simply say that it is, in the first place, a point of economy to use a one-horse cart. I have endeavoured to carry out this principle, and to economize my horses to the utmost extent; and whenever I conceived that horse-labour could be saved or lessened, I have endeavoured to effect that object. When once

that object is set about in earnest, I am convinced that the number of horses will be very considerably reduced. Farmers in general look to a saving in manual labour, and to immediate payments on Saturday night, and the horses are expected to do what labourers leave undone. If equal attention be directed to the saving of horse-labour, I am persuaded that horses may be reduced one-half. In the paper which I sent to the *Journal*, and to which reference has been made on this occasion, I stated that I had reduced my horses from about fourteen or fifteen to eight. Since that time I have further reduced them to six. When the reduction is effected, it ceases to be a matter of choice whether you will use a cart or a waggon. A cart is then a matter of necessity; for you cannot horse waggons. Perhaps I have obtained this reduction partly by indirect means, employing manual labour in some cases instead of horse labour. That of course raises another question—namely, how far manual labour may be made to supersede horse labour. I have brought one or two calculations with me. I do not know whether or not it will assist the object of the discussion. I should mention, before I proceed, that my cart has been a little misnamed in being called a skeleton cart. It has, certainly, no body; but still I think it would be more properly called a platform cart. Now, four waggons and seven horses would be required to bring home corn at one mile distance. In that case five carts and five horses would be necessary, the saving being nearly one-third. Where half a mile was the distance, three waggons and five horses would be required, against which we must set four carts and four horses. In the case of a quarter of a mile, there would be three waggons and five horses, as opposed to three carts and three horses. With regard to the loading of the two, I believe that it would come to about the same. I will suppose the load of a one-horse cart to be sixteen shocks. The waggon would carry, with two horses, only twenty-four shocks, because the weight of the waggon must be taken into account. The weight of the shocks I suppose to be one cwt. each, and this being added to the  $6\frac{1}{2}$  cwt., which is the weight of my cart, would make  $22\frac{1}{2}$  cwt. The 24 shocks in the waggon, and the weight of the waggon itself, would make 41 cwt., which would be 22 cwt. to each horse. Again, I have made some little calculation as to the time that would be gained by carts. I do not know, however, that I need enter into that part of the question. The simple view which Mr. Baker took of the question of height in relation to the low carts was sufficient to show that time must be gained, independent of the additional saving in moving backwards and forwards, and going in and out of the barn, whenever the cart is employed. If any further opinion is required, I shall be happy to give it, so far as my experience extends—I mean with regard to the comparison between carts and waggons. I feel bound, before I conclude, to make one more observation. It has been generally stated that a single horse, being near to the vehicle, has an advantage over the fore-horse in a team. In an experiment which I tried a little while ago, I found that there was not so great a difference in that respect as there might appear to be.

I found, in fact, that the difference in point of drawing between the first horse and the fourth was very little more than the difference between the weight of the traces (Hear, hear).

The CHAIRMAN: I beg to introduce to you Mr. Stratton, who is a maker of agricultural implements. Having invited him to attend on this occasion, I hope you will allow him to give his opinion.

Mr. STRATTON (of Bristol) said: Many years ago our firm turned their attention to the improvement of waggons, and we effected certain alterations. That there is a mechanical advantage in the use of carts is clear. Every one allows that in a moderately high wheel there is a much more economical application of power than in a low one, and that a horse can draw more when such a wheel is used. It has sometimes been urged as an objection to the use of carts, that the weight on the horse's back tends to hamper him and to interfere with his proper working. That is a subject which was treated in a very able and interesting manner by Mr. Hannam, in the article which has already been referred to. On directing our attention to the subject, we saw at once the advantage of using the harvest-cart. In this paper Mr. Hannam suggested one idea which we had previously acted upon with regard to carts used for the conveyance of goods—namely, the use of crank axles. The centre wheel being on a level with the centre of gravity, there is no difficulty whatever in the working, putting an equal amount above and below the axle.

The CHAIRMAN: Has there not been some great improvement made with regard to the blocking of the wheel for the purpose of regulating the bearing of the cart?

Mr. HANNAM: When you use a crank-axle you are quite independent of the man who has charge of the cart; it regulates itself. The expense of the crank-axle above the common one is about £1. There are a great many used for general purposes.

The CHAIRMAN: Do you know any farmers who use the harvest carts for common purposes, and who also use the Scotch carts for carting manure?

Mr. HANNAM: I do not use them myself; I use for carrying dung a cart which measures exactly a cubic yard. I only use my own cart for light purposes.

Mr. STRATTON: The advantage of this cart (pointing to the model) is that you may use the same cart for nearly all purposes on moderate-sized farms.

Mr. HANNAM: Yes. But on large farms it is desirable to have carts for carrying the largest possible loads.

The CHAIRMAN: Will you, Mr. Stratton, tell us the price of this cart?

Mr. STRATTON: Fifteen guineas. In our neighbourhood many who profess to use one-horse carts very often use two.

Mr. MECH: Mr. Chairman and Gentlemen—It may seem rather presumptuous in me, as a very young farmer, to say anything about this matter; but, having used Mr. Hannam's excellent carts for two years, perhaps you will excuse me if I give you my opinion and such calculations as I have made with respect to them.

I need not tell you that on my farm in Essex waggons were formerly the order of the day; but by good fortune I happened to stumble on Mr. Hannam's most admirable paper in the Royal Agricultural Society's Journal, on the subject of carts and waggons, and I immediately sent down an order to sell off all the latter. My people wrote up a protest; they had considered me half mad before; but on receiving that order they considered me raving and entirely mad. "How," said they, "are we to get in our harvest?"—a very natural and important question. "Well," I said, "I will show you by-and-by." The lamentations on the occasion were, I assure you, very loud and sincere; but I was stern and resolute. The waggons were sold, and some of my neighbours are now congratulating themselves on having bought Mr. Mechi's waggons cheaper than they could have bought waggons of any other person. I pity them, however, for what they have done (Hear). When I read Mr. Hannam's admirable paper—which every agriculturist should peruse, if he wishes to understand the question—I saw at once that it was much easier to carry a load upon an implement which weighed 7 cwt., running on one pair of wheels, than upon one which weighed from 22 to 24 cwt., running on two pairs of wheels. My powers of calculation were sufficient to convince me at once that we had been committing a perfect barbarism in the matter of waggons. Well, gentlemen, I ordered four of these carts, at a cost of £12 10s. each. When they came, I ordered 6 qrs. of wheat to be put on one cart as a trial, and to be sent to the neighbourhood of Witham. "Where is the skid?" I was asked; "the horse has to be driven down hill, and how is he to be stopped with a heavy weight on his back?" I said, "Try him." The horse went over the brow of the hill; the man, I have no doubt, turned pale, but the horse, more sensible than the man, walked down the hill as though he had not the slightest weight on his back. Now, here is one point which Mr. Hannam has not quite explained to-day—it is, however, fully explained in his admirable paper—namely, that the pressure on a horse's back or belly down hill depends on the weight of the load. The longer, the lower, and the broader the load, the less will be the pressure on the horse's back or belly. Mr. Hannam has also omitted to state that the utmost pressure on a horse's back down a very steep incline with three carts is 63lbs.; that is, on such an incline as we cannot get in Essex. Therefore, let us bear in mind that the whole principle of carts depends on their being long, low, and broad. The Scotch carts, and the Cumberland and Westmoreland carts, are not good ones; because, from their particular form, when loaded with a quantity equal to what you can put in these carts of Mr. Hannam's, the weight, with the same incline, would be 463lbs., the difference arising simply from the load being short and high. This is very easily illustrated. This paper (exhibiting a newspaper folded in quarto size, and placing it edgewise) will balance itself in that position; but the moment you put it off the level, the horse's back is the resistance, the axle is the fulcrum, and the length of the paper is the lever; and I need not say that the higher the lever the greater

will be the pressure on the horse's back. Well, gentlemen, the result was that these carts became extremely great favourites. In the course of a month hay-time came on, and the men said, "How easily we can load these carts!" The hay could be got in before a heavy shower, which might have caught it if there had been the usual delay. I think, gentlemen, that the question of shortness and highness in loading is very important. I have often found it objected to the use of carts, that they cut into the horse's back in going down hill. Mr. Hudson, of Castleacre, has made that objection. Now, I am prepared to prove that with any reasonable weight a horse will go down a steep incline. The load of wheat which we put on is six quarters to one horse. Last week, the roads being very rotten, there were twelve quarters of wheat with two single horses and two carts; a man driving the first cart, and a boy the second. They were delivered eleven miles, and they brought back a ton of coals each on the return journey. I use the skeleton carts for every purpose except that of carrying dung. I reckon that the carting of my wheat to market with these carts costs me 6d. per quarter, the distance being an average of ten miles. If I deduct the chalk or the coals which they bring back that will make a considerable reduction. There is hardly any purpose which a waggon is used for to which a cart may not be applied. You may put nearly as much wheat on a cart as on a waggon. I do not recommend that that should be done, because these are essentially one-horse carts; but I have put four tons of wheat on one of these carts with three horses, on a level piece of ground; and I believe that on a level piece of ground you may safely put that quantity. Now, for harvest purposes, I have used these carts for two harvests; and with four carts and four horses I have readily cleared one hundred acres of wheat and beans. Mr. Baker has truly and clearly explained wherein consists the difference. The sheaves are whipped on without any effort; the horse keeps continually moving, and the boy driving. To see what quantity could be put on one of these carts, I counted the number of sheaves; and I found that in a comparatively low load, somewhat bigger than a nag horse, I had two hundred and fifty mowed sheaves of good wheat. That is rather too much, perhaps, to put on; I consider that an extreme load for a small horse; and, being liable to slip a little, it would require cording on an incline. Still there were two hundred and fifty sheaves put on for one horse without distressing him at all; and I believe that that is an average waggon load; is it not, gentlemen (several gentlemen assented)? However, we commonly put on from 180 to 200 sheaves of mowed wheat. Now, gentlemen, you could not put the same quantity on one of your ordinary carts; there is not space enough to do it. You must bear in mind that the superficial area of one of Mr. Hannam's carts is, within a very few feet, equal to that of a waggon with its rails or ladders. Then, at harvest time, there is no knocking down of a gate-post, no shouting and hallooing. There is a boy, there is a pitcher and loader at the field, and of course the requisite number of hands at the stack. And to meet the difficulty of unloading, when we have

got high up, we have used a stage for the operation of throwing up the sheaves, and I consider that that stage facilitates our progress very much indeed. Then again, as I have said, we cart coals and chalk without any difficulty; and, on the whole, I am prepared to prove that there is immense economy, both of time and of cost, in carrying by cart instead of by waggon. If a heavy machine is objectionable for a short distance, it surely is so for a long one. Now, gentlemen, let us look at the importance of this subject in a national point of view. It is allowed that we have twenty-four millions of acres of land under the plough; at a very moderate computation, there is one waggon required for every one hundred acres of land (Mr. Beadel intimated that the average number was two). I do not wish to overstate the matter, but I will assume that the whole number of waggons required is 480,000. I think I am also safe in stating that the average price of those waggons is £30 (several gentlemen thought £25 must be taken as the average). Many of us in Essex, I think, pay £40 for our road waggons. Well, then, 480,000 waggons at £25 a piece will give £12,000,000 as the amount of capital thus invested. Now, gentlemen, if we take the same number of carts at £12 10s. each, we find a saving of £6,000,000, which might be much better employed in drainage, or some other purpose. Now, it is allowed that for every hundred acres you want half a horse; that is a very liberal calculation; and if you would want half a horse less in consequence of using carts, that would make the use of them a very important national affair. There would, in fact, be a saving to the extent of 120,000 horses.

A MEMBER: You do not say that a cart will do the work of a waggon for a considerable distance.

MR. MECHE: There are 120,000 extra horses required by the use of waggons, at an average cost of £12 10s. each. That involves an outlay of £1,500,000. As regards the price which I have fixed, I would ask Mr. Hutley whether he has got a horse which cost him less in the first instance than £20?

MR. HUTLEY: I do not go with you in reference to carts.

MR. MECHE: Now there is the keep of those horses, when you have got them. I will suppose the keep of these 120,000 extra horses to cost £20 each per year.

MR. BEADEL: You must deduct the manure.

MR. MECHE: I cannot give you the manure in for £20. The keep of the number which I have stated amounts to £2,400,000 annually. Then there are the shoeing, the harness, the doctors' bills, and the extra stable room, all very considerable items. The annual depreciation of horse-flesh is 10 per cent; that is £2 a year more. The amount in question is, in fact, three or four times as great as the malt-tax; and as we are all in favour of economy in farming, and as I have sometimes been called an extravagant farmer, I think it right to show what a large sum of money is uselessly expended. If this money were spent in drainage, in road-making, and in various other ways which I need not specify, it would be much more beneficial to the country.

Any money that is wasted as this is must be a national loss. I do hope and trust, from what I can see and hear, that the fate of the unfortunate waggons is sealed. I shall have a few hard battles to fight yet, no doubt; but I am happy to be able to tell you that the desire for Mr. Hannam's carts is daily increasing, and that a poor wheelwright in my neighbourhood has become a rich wheelwright, in consequence of the introduction of these carts. I consider that the whole merit of the change which is going forward is due to Mr. Hannam, for explaining in detail, in the Royal Agricultural Society's Journal, the error committed in the case of waggons, and the gain which would be effected by substituting for them carts. I believe that we owe everything to him in that respect. In conclusion, let me express a hope that every gentleman here will use a cart instead of a waggon, and recommend all his friends to do the same.

MR. HUTLEY said: I have heard the discussion this evening with very great pleasure; but I cannot say that I think all the views which have been taken are correct. In the first place, Mr. Baker observed that the quantity carried from the field to the stack by carts was most extraordinary. To that I would reply that the sheaves can always be carried faster than they can be stacked, and that the waggons are always, to a certain extent, standing. If you were keeping a double quantity of men employed by using the one conveyance instead of the other, I could easily understand that argument; but so long as you can only keep one set of men at work, and the men with the waggons are occasionally standing still, I cannot perceive what great advantage is gained. Unless the saving of horse labour produces some benefit, unless the horses could be employed in ploughing, which is very seldom the case at harvest time, it really appears to me that these long figures come to nothing. Our friend Mr. Hannam says that he has reduced the number of his horses from fifteen to six. Now my notion is that if I were to take a similar course I should only use wheelbarrows. I think you cannot reduce in that way unless you resort to manual labour. If you go to digging and hoeing you may certainly save in one way, and the question then becomes one of pounds, shillings, and pence. That, however, is not the precise question before us. You cannot have production without horses, unless you resort to manual labour; and that does not at all settle the question of the advantages of carts as compared with waggons. My reason for rising was that things have been said which might lead agriculturists to get rid of their horses at once, or at least to endeavour to do with six horses instead of sixteen. As to Mr. Mechi's plan of saving millions by getting rid of horses, I believe that no such result can ever be attained. I believe that waggons will carry home equally as much corn as carts; and if my friend Mr. Mechi will send his men and his carts to my farm, in order to show me practically that they will trundle more than mine in a fair trial, I shall then be satisfied. I therefore hope and trust that agriculturists will not be led away by the arguments which have been used; although I admit that carts are lighter than waggons, and

may be used in some cases with advantage. Really, when we hear statements of millions and billions of money to be saved by the proposed substitution, the whole thing becomes frightful to contemplate; and I fear that when these statements are found to have come from Mr. Mechi, of Leadenhall-street, they may have some influence upon others. My notion, I say again, is that a trial ought to take place; and I repeat the offer which I before made to Mr. Mechi.

MR. MECHE: I accept the challenge.

MR. HUTLEY: As regards the number of horses, if you have 200 acres of land you will have more horses than you require; and I venture to say that your horses will carry home the wheat faster than it will be required for stacking. I always give 1s. 6d. an acre for my wheat, and seven pints of beer a-day; and I carry between two and three hundred acres of wheat every year.

MR. BENNETT said: My prejudices ought certainly to be in favour of carts, for I was bred in a cart-district, and I now live in a cart-district: viz., Bedfordshire. I served my apprenticeship in Norfolk; I have, therefore, had an opportunity of seeing both systems in operation; and the result is that I have not come to the same conclusion as my excellent friend, Mr. Mechi. I think, in fact, that the saving of all these millions of money by using carts instead of waggons is a complete mistake. If you get the most modern and the best made carts which can be found in the present day, and put them by the side of the worst waggons, those of fifty or sixty years ago, there is gross unfairness in such a comparison. If we are to compare waggons with carts, you ought to select the best made waggons of the present day, and put them side by side with modern carts; and you should let the two be used with the same skilful hand and under the same circumstances. I am perfectly well aware of what Mr. Baker has said about pitching; I happen to have done a good deal of that kind of work myself, and I am therefore able to speak of it by the light of experience. Having seen the relative merits of carts and waggons, I admit that in carrying a high load, carts are faster than waggons; but the work does not end there. Gentlemen talk as if the stack were completed when you have got the sheaves into the little squatting carts: it is no such thing. On this subject I entirely agree with what has fallen from Mr. Hutley: there is not much difference, in my opinion, between good waggons and carts. On good level ground I believe you may get on as fast with waggons as with these carts; but if you get upon difficult roads, there will be a vast deal of time lost in binding and unbinding, and in raking and scratching about the load. My firm belief is that if you have to go a considerable distance from home, waggons will do the work more safely than carts. In Bedfordshire it is as common as possible for the corn to be pushed off here and there: you cannot make the sheaves ride on two wheels; they will not keep so steady. Now I am not prepared to say that waggons are decidedly preferable to carts. There is one respect in which carts have certainly an advantage; it is, that with them you do not require to have two classes of im-

plements. It is, I admit, a very great inconvenience, when you have carts for carrying hay and for other purposes, to require waggons in addition; and it would be good husbandry if you would always use the same. But still I would advise my friends to be very careful how they get rid of their waggons: to do so rashly would be the right way to get into the *Gazette*; and, unfortunately, we have not all got such an establishment as that of our friend Mr. Mechi, to fall back upon in case of necessity. Mr. Mechi is positively intoxicated on this subject (laughter). The agricultural world is very much indebted to Mr. Mechi for his public spirit, for his invariable good temper, and for the able manner in which he always discusses subjects upon which he enters: at the same time, when he talks of loading one horse with six quarters of wheat, and that horse worth 50s., I put it to you whether that can be done in an ordinary way. I have heard him advocate good wages, and declare that he thought farmers generally were not sufficiently careful of the comforts and conveniences of those whom they employ; but I must really say that he would be a brutal master if he required a horse, as a general rule, to carry six quarters of wheat. It is well known that if you load a vehicle too much you will strain something, and run a risk of injuring the implement; and I must say, that in reference to that subject there have been some statements made which would not bear examination. I live in a neighbourhood where, as I have already intimated, the prejudices of the labourers are in favour of carts. When I went into Norfolk I took some carts with me, and my own prejudices had to give way to waggons on the farm where I lived. I feel satisfied that, with the light waggons which we had there, weighing only 14 or 15 cwt., and neatly made and put together, we could carry as much corn as any set of men could stack within the same time; and that is the real point to be considered. I think that before we pronounce a general condemnation on a system, we should be quite sure that we are going to adopt a better; and, with all deference to my friend Mr. Mechi, I must say that I think he is rather too sanguine with regard to the use of carts. They may, perhaps, in many instances be preferable to waggons; but when he talks about millions being saved through using them, one might be led to imagine that horses were not wanted for anything except the carrying of corn. It is very true that when we are carrying we sometimes have horses to spare; but it must not, on that account, be supposed that we could do without them altogether.

MR. BEADEL said—I think we have rather wandered from the question before us; we have had three gentlemen addressing us on this occasion—my friend Mr. Mechi, whom I will call the cart; my friend Mr. Hutley, whom I will call the waggon; and my friend Mr. Bennett, who is somewhat between a waggon and a cart. (Laughter.) To my mind sufficient evidence has been afforded to-night that carts are preferable to waggons. If I do not state rightly the facts which have come before us, I hope I shall be contradicted. It appears that before you put any thing into the cart, the

weight which the horse has to draw is  $6\frac{1}{2}$  cwt. The lowest weight which I have heard stated for a waggon is 15 cwt. : if you put two horses to the waggon, each horse will have to draw  $7\frac{1}{2}$  cwt. ; and, therefore, there is something in favour of the cart on that account. Again, there was one statement made by Mr. Baker, which I have not heard contradicted by any one this evening, viz., that if a given quantity of land has to be cleared of corn, it will be cleared quicker with one-horse carts than with waggons. Mr. Hutley says, indeed, "I can always send my corn home quicker by waggon than I can get it delivered." Why, if you have one or two extra men for the purpose, I suppose that forms an element in the consideration of this question. Besides, the labour must be much less of pitching the wheat off a three-foot cart than over the rounds of a waggon ; I think any one, who at all understands the economy of labour, must perceive the difficulty and loss which are incurred when a man has to reach several feet in order to get to the top of a load. Then, with regard to the question of waggons, it is argued that every farmer has necessarily at harvest time more horses than he requires, unless he resorts to spade husbandry ; and that he may therefore as well use them in carrying wheat. Now, as a farmer, I always fancied that the very best fallowing that I made was in the harvest month (Hear, hear) ; and the difficulty always was to get horses enough not employed in carting the corn, to enable me to go on with the process of fallowing to a sufficient extent ; and having seen Mr. Hutley's farm, I know that his horses are not left idle or unemployed at that time. Mr. Bennett brought forward one point of very great importance : if a farmer stocks himself with implements to carry his corn, and does not require them during the remainder of the year, he evidently suffers a very great loss. He has an expensive implement, which is very liable to get out of order, and yet he can only use it for one month in the year. I think that in looking at the comparative merits of waggons and carts, that consideration should be taken into account. Mr. Bennett spoke of my friend Mr. Mechi having a very capital establishment in town. I wish we all had : but I have yet to learn, that because Mr. Mechi has an establishment in town, therefore he has gone into Essex to fool all his money away. He says, that he shall obtain a good return for the money which he has invested. We all admit that he has done a great deal to benefit agriculture, and that he has called attention to many subjects of great interest and importance which were never attended to before ; and if he should happen to fail in one or two of the hobbies, or fifty shilling ponies which he rides (laughter), I shall not think the worse of him on that account ; it is the lot of humanity sometimes to fail. If he occasionally gets on a pony which carries him along faster than we have been accustomed to go, we may find, if we do not take care, that he will get to the winning post, and that we shall be left behind. (Hear, hear.)

Mr. WOOD said—Although I am not able to follow Mr. Mechi in his millions, and so forth, I think that some alteration might be successfully made with regard

to waggons. In my district waggons are only dragged out at hay time and at harvest time, lying idle at all other periods, and that strikes me as being a serious loss of capital. Where I reside we use our implements under favourable circumstances, having a level country with no hills. I have sold off all my waggons except such as are necessary for the purpose of carrying flints and similar loads. I have found in practice that I can get a great deal more work done with carts than with waggons ; it is needless for me to state the reasons ; I will simply say that I find a great deal more activity in going to and returning from the field with carts than with waggons. Nothing scarcely has been said this evening with respect to the saving of horse-power, and yet that is surely a very important consideration. I have observed that when horses are pulling in a line, and all using the same foot, they pull against each other, and there is a consequent loss of power. I do not know whether very long teams are to be commonly found in Bedfordshire, but I recommend those gentlemen who have three or four horses to use bells ; that is the fashion in my country, and I like it exceedingly. I believe the expense of the music is quite repaid by the superior manner in which the horses draw ; it is a positive fact that they act more in concert under such circumstances. The observation of Mr. Hannam with respect to the power of the horse at a greater or a shorter distance is, I think, perfectly correct ; but still, I think there is a disadvantage arising from the fact of the horses not all moving precisely in the same manner, and at the same time. On the heavy lands in Sussex, before they have been drained, I have observed that one horse has been treading in the furrow, which was wet, and another on the land, and there was a decided disadvantage in this circumstance. I would remark, as regards the sending of corn to market, that, having invariably paid for that kind of work by time, I have always observed that the corn has been taken by carts in less time than by waggons. There is much less time lost in the mere wheeling and turning about.

Mr. BAKER, on rising to reply, said : I have very little more to advance. I think one point has escaped the observation of all who have been speaking, viz., the difficulty of getting rid of the wheat after you have got it on the carts. I have always considered that the carrying of the corn from the land on which it stands on to the stack is one continuous operation, and that the important point is to keep the road ready for the men to set forth. Now, if we could adopt the carts at one height of the stack, and then have waggons to finish, I have no doubt we should obtain the desideratum which we require. The low cart would do best with a low stack, and the waggon would do best when the stack becomes high. Now, I have observed that in Bedfordshire they get over the difficulty by not having such high stacks as we put up in Essex. Those who get up their corn exceedingly quick, do not carry it so high as others. I have no doubt that the Bedfordshire plan involves a little more thatching, but that is the least labour of the two. The cost of a cart, too, is less than that of a waggon. The superior utility of a cart, as compared with a waggon, for general purposes, is placed beyond doubt.

It has been shown to-night that two waggons out of three are almost useless until hay and harvest time come round ; and not only are waggons kept standing, taking more injury than they otherwise would, for ten months in the year, but you require a large extent of building to cover them. So great have I found this last difficulty, that, though I have been led to build a new waggon lodge every year, I still seem to get no forwarder. We meet here for most important purposes, and we must come to some decision on the question before us. That question is—which, upon the whole, for the general purposes of a farm, as well as for harvest and for hay time, is the better implement of the two ? If a person were now beginning to farm, and had an opportunity of purchasing his implements for the first time, I think there is no one in this room who can doubt that he would act wisely in preferring carts such as have been introduced by Mr. Hannam. Carts might be used for general purposes throughout the year, and if waggons were wanted for any extraordinary purpose they might be resorted to ; but such a description of cart as we have been considering would be decidedly preferable to any kind of waggon that you could introduce on a farm. A resolution has been prepared, according to our custom on these occasions, and if you approve of it you will adopt it. If you are of opinion that waggons should be abolished, and that we should gradually introduce carts, you will adopt the resolution ; if you are of a contrary opinion, you will reject it. Having told you before that I have not directed my attention to the subject in the manner that I ought to have done, I hope that you will therefore excuse the imperfections which I have exhibited.

The CHAIRMAN said: This subject has, as I anticipated, led to a very useful discussion. I was very happy to find that we were not all of one opinion upon it, because facts have, in consequence, been brought to bear upon the question, of which we should not otherwise be in possession. There are two or three remarks which it occurs to me to make before you proceed to vote. I think most of you have been in error with regard to Mr. Hannam's statement ; I am sure that Mr. Bennett has, because he has alluded to the Scotch and Northumberland carts for harvest purposes. Neither Mr. Hannam nor Mr. Mechi recommend the Scotch and Northumberland carts ; and when you remember that the area of Mr. Hannam's carts is 12 ft. by 6 ft., I am sure that you will come to the conclusion that for harvest work they are decidedly preferable to waggons.

Mr. BENNETT : Do they answer the purpose of dung-carts ?

The CHAIRMAN : Decidedly not ; but when you can purchase one for £25, and the other for only half the money, I think you must admit that the carts are preferable. Two years ago I placed three of them on a farm where there are a number of labourers as much prejudiced as any body of labourers in Essex, giving my bailiff instructions to let them be used if they were approved. To my surprise, at the last harvest the labourers came to me, and said that they could cart ten

times easier than they could use the waggons. Two carts with one horse to each on one occasion took fifteen quarters of wheat to Colchester, a distance of four miles ; the quantity of corn in each cart being 34 cwt. 1 qr. and 4 lbs. My bailiff told me that the men liked the carts because they went easier. I can declare, from my own practical knowledge, that those carts of Mr. Hannam's are, for the common purposes of harvest work, and for the conveyance of corn, preferable to waggons. Mr. Hutley stated that he should become a convert to carts, provided an experiment took place which convinced him of their superiority. Now, I have, for the last two or three years, entertained the opinion that this question was settled ; it has certainly been settled in my own mind. There have been three or four great experiments tried, which have tended to set the matter at rest. I have met with the case of a person who was ten times more prejudiced than our friend Mr. Hutley. Mr. Harris, of Hinton in Berkshire, near Mr. Pusey's, was certainly as prejudiced on this subject as any man well could be. I met him at Mr. Pusey's ; a trial took place there, in order to test the comparative merits of waggons and carts ; and immediately afterwards Mr. Harris sold off his waggons and took to carts. He is, as some of you are aware, quite a man of the old school ; but he was convinced even against his will, and that led him to adopt carts in preference to waggons. Gentlemen, this being the case, I have no doubt that this club will come to the right conclusion on the subject ; and I have prepared a resolution in the expectation that you will adopt it. That resolution is as follows :—“ That it is the opinion of this meeting that one-horse carts are preferable to waggons for the general purposes of agriculture, not only as regards economy in the original cost, but for the saving they effect in the various operations of the farm.”

Mr. SHAW (of the Strand) seconded the resolution, which was carried.

The meeting then dispersed.

AGRICULTURAL EDUCATION.—We deem it a matter of congratulation that an attempt is now made for the establishment of an Agricultural School at Kimbolton, on the borders of our own county. A prospectus has just been issued under the direction of a provisional committee, consisting of His Grace the Duke of Manchester, Lord St. John, Francis Pym, Esq., and J. Rust, Esq., (names well known in the agricultural world), in which the intentions of the promoters are thus set forth :—

“ The theoretical department will embrace, together with the necessary preliminaries, the most approved method of keeping farming accounts ; land surveying ; the rudiments of agricultural chemistry ; lectures on the veterinary art ; so much of the science of geology as will give an insight into the theory of draining ; entomology, so far as to give the habit of those insects which prey upon farm produce ; vegetable physiology, so far as is necessary to unfold the function of plants ; and the theory of mechanics, as applicable to agricultural implements and to the erection of farm buildings.

“ In the practical department it is intended to pursue, on



the farm attached to the Institution, the most improved systems of culture, in the application of manures, natural and artificial; and in the use of the most approved agricultural implements—the object being always to give a practical exemplification of the theory inculcated in the scientific department.

“By such an education our young yeomen will be fitted for farm bailiffs, for occupiers of farms, and for managers of estates.”

This is a movement in the right direction. In order that the advantages of the Institution may be available

to all, the charges are fixed at an exceedingly moderate sum—less than is paid at a finishing boarding school; and it appears that the committee have already in view a suitable house, capable of accommodating about 60 boarders. There is so much earnestness on the part of the promoters, and the plan is so desirable, that we most sincerely hope the scheme will meet with the support of all our wealthy neighbours, as well as of our agricultural friends, for the benefit of whose particular class this has been specially designed.—Bedford Times.

## THE GAME LAWS.

### PRESENTATION OF PLATE TO THE REV. NATHANIEL BOND.

The respectable tenantry of the Rev. N. Bond, by whom he is held in the highest respect, as an excellent and considerate landlord, a kind neighbour, and a valued friend and adviser—this feeling of general esteem having been much heightened from his long practice of keeping down the game on his estates—determined, a short time since, upon presenting the rev. gentleman with some substantial token of their regard; for which purpose a committee was formed, and subscriptions readily obtained. No sooner, however, had the circumstance become known, than many other farm tenants, who hold estates of different landlords, and who deeply complain of the evils and losses arising from the excessive preservation of game, earnestly desired to add their subscriptions in aid of carrying out an object which they so highly approved of, as well on account of the principle involved as of the individual to be honoured, which was acceded to by the committee. A resolution was eventually agreed to that the testimonial should consist of a massive and elegant silver punch-bowl, of beautiful design and workmanship, appropriately ornamented, of size to hold more than two quarts, and having a suitable inscription engraved thereon. This was accordingly procured, and the day fixed for the presentation was Tuesday, the 16th inst., at the Red Lion Hotel, Wareham, when a public festival was held, which attracted an assemblage of upwards of eighty, principally tenant farmers.

Mr. William Marshallsay, the chairman of the committee, ably presided. He was supported on his right by the Rev. N. Bond, Mr. Joseph Garland, Mr. John Hyde, Mr. S. Bennett, Mr. Taylor, Clavel Filliter, Esq., &c.; on his left by the Rev. C. Onslow, the Rev. T. H. House, Freeland Filliter, Esq., Mr. Joseph Willis, jun., Mr. Parry, Mr. R. Hill, &c. The duties of the vice-chair were efficiently discharged by Mr. Newbery, of Kimmeridge. Among the company were also Messrs. W. Fooks, J. Fooks, J. House, R. Damen, J. A. Damen, S. House, W. Brine, W. Voss, E. Randall, Jos. Ricks, J. Davis, H. Churchill, Jos. Rawlins, G. Shepherd, T. Symes, John Symes, T. Kesman, L. S. Green, C. Selby, Joseph Panton, Jos. House, G. Richards, John Sly, T. H. Saunders, E. Card, J. Sampson, M. Lillington, J. Waters, G. Panton, —

Sealey, F. Bedloe, J. Reader, T. Parmiter, G. Sampson, G. Smith, W. Dawe, T. Randall, Jas. Greening, J. Squire, J. Tuck, C. S. Gunn, G. Burt, jun., W. Pike, John Adey, C. Groves, S. Land, Joseph Atkins, E. Randall, L. Neale, — Redman, J. Squire, W. H. Marshallsay, G. Burgess, James Seymour, R. Slade, Joseph Ricks, J. W. Salway, E. Whittle, Parmiter, Rollins, Johnson, Pike, Hopkins, Eaton, Dodson, Elms, &c.

The dinner was served in a style of first-rate excellence by the respected hostess, Mrs. Jenkins; the wines being of choice quality, and the dessert profuse. The cloth being removed,

The CHAIRMAN, in brief but suitable observations, proposed “The Queen,” “The Queen Dowager, Prince Albert, and the rest of the Royal Family,” “The Army and Navy,” “The Bishop and Clergy of the Diocese,” which were severally drunk with the usual honours.

The Rev. C. ONSLOW sincerely returned thanks, on behalf of their excellent diocesan and the clergy, for the kind and handsome manner in which this toast had been proposed and received. He had attended the meeting because the clergy were intimately connected with the agriculturists; for himself and his brethren could not do the work of their parishes without the co-operation of the yeomen. He would not say much on the immediate purpose of the meeting; but he was also happy to be present, because they were about to present a piece of plate, which they should shortly see, to an excellent friend and neighbour, as a mark of right feeling and good fellowship (cheers). He again thanked them for the honour they had done the bishop and clergy (applause).

The punch-bowl, which had been placed at the head of the table, was now uncovered, amidst loud and reiterated applause. It is a splendid and valuable ornament, combining utility with elegance, and a good specimen of art. We understand the chaste and beautiful design, which includes the rabbit and other characteristic devices, and also the inscription, were by Mr. Charles Groves, of Wareham, who is entitled to credit for the good taste and judgment evinced.

Mr. MARSHALLSAY, the president, then rose to present the testimonial, and said—

Gentlemen: I think I ought not longer to delay the

principal object of our present assembling together; but I now feel the responsibility of the situation you have placed me in, and my want of words to express the united sentiments of the subscribers who have obtained the testimonial we are now to present. Having taken the chair at our first meeting, I have continued to hold it; and although there may be many present whose greater experience and more eloquent language would have fitted them much better to carry out the object; yet, if zeal, and sincerity, and plain language will compensate for any deficiency, I fearlessly say that I will give place to none (cheers). I can neither eulogise nor express to you more than you already know of the Reverend Nathaniel Bond; but I deem it right thus to explain why I have continued to hold the situation you originally placed me in, and, as a tenant of Mr. Bond, why it falls to my lot to carry out our original object. [Here Mr. Marshallsay moved the piece of plate towards Mr. Bond, and addressed him]—

Reverend Sir,—Having to convey to you, the united feelings of the committee and subscribers, and fearing that, unused to public speaking, I may fail to embody in my remarks the sincere sentiments of respect and regard we all entertain towards you, I have thought it best not to trust myself with so onerous a duty, but rather to embody those sentiments in a written address. I know not, Sir, whether I can express the motive which has led us to presume to request your acceptance of this testimony of our gratitude, better than in reading the inscription on it (Hear, hear).

PRESENTED

TO

THE REV. NATHANIEL BOND,

OF GRANGE,

by his Tenants, and other Tenant-Farmers, of the Isle of Purbeck and neighbourhood,

as a Testimony of their gratitude for having kept down the Game upon his Estate, and his considerate regard for the general Welfare, Prosperity, and Happiness of every Resident thereon.

January, 1847.

This, Sir, is the motive that first prompted us to endeavour to keep constantly in your remembrance the fact that your tenantry, and those other farmers who have joined them, are most grateful for the spontaneous and noble example you have thus set, and the kind consideration it implies for the welfare of those who are so happy as to rent under you, and whose individual interest you have at all times shown yourself so ready to advance (cheers). You are aware, Sir, of the vast injury and great loss which the tenant-farmer *must* sustain, where the landlord is so forgetful of the mutual interest that should subsist between him and his tenant, as to carry the game-preserving system to an extent that, in many cases, is ruinous to the hopes of that tenant (cheers). That this state of things is in progress of gradual diminution is a source of gratification to us all (cheers), and we are proud that it has fallen to our lot, *to lead the way*, as it were, and to mark the sense of the obligation we are under, by subscribing to the piece of plate we now present, and which we are sure you, Sir, will value more for the sentiment it conveys, than for the intrinsic worth

of the offering. I would beg to express to you, personally, our united thanks for the obliging manner in which you have conferred on us the honour of your company this day, and for thus publicly accepting this inadequate token of our gratitude. It is our sincere wish and ardent prayer that you, Sir, may long live to enjoy the noble mansion you are now erecting, and that your family may follow in the steps you so admirably trace out for them in your sacred calling as a clergyman (cheers), in your position as a private gentleman, and in the more valuable, and if possible more praiseworthy, character of the farmer's friend and poor man's advocate (reiterated cheers). In the name, then, of myself and the subscribers, and I would add of the renting farmers in general, allow me to have the honour of begging your acceptance of this testimonial; and we trust it will continue an heirloom, as it were, in your family, whom God preserve (much applause). And now, gentlemen, I call upon you to fill a bumper, and drink "Health, long life, and happiness, to all who bear the name of Bond, and especially that of the Rev. Nathaniel Bond." Sir, your health (tremendous and prolonged cheering).

The inscription, with a list of the subscribers, as subjoined, printed on white satin, had been placed in the bowl:—

William Marshallsay	Joseph Garland
Richard P. Newbury	Stephen Bennett
John Sampson	George Smith
John Damen	Joseph Ricks
Joseph Willis, jun.	William Fooks
Joseph Atkins	William H. Marshallsay
George Mayo	George Burgess
William Voss	James Burgess
George Richards	John Burgess
Robert Damen	Robert Taylor
William Salway	John Dunning
Richard Slade	Thomas Saunders
John Tuck, sen.	George Strickland
John Tuck, jun.	Henry Fooks
Thomas Randal	Joseph House
Jeremiah Reader	James Seymour
Henry S. Fooks	Joseph Boyt
Samuel Braithwaite	John Symes
William Brine	Robert Symes
Charles Kent	H. H. Newbury
James Kent	Joseph Cooper

The Rev. N. BOND rose, and, on the hearty applause with which he was greeted subsiding, said,—Gentlemen, many as have been the tokens of kindness and gratification which I have received in this room—many as have been the acts of individual kindness and good fellowship I have had the happiness to receive from almost every individual amongst you, never on any former occasion did I feel so inadequate to express the feelings that animate my heart as I do at the present moment. If ever there was a time when, in reference to anything of a temporal nature, I might have wished for eloquence, it is now; when I would desire to possess that gift that I might be able to express to you what at this time animates my inmost heart. But it is a vain wish, and I can only acknowledge what I feel I owe to you, in the old-fashioned, frank, and plain manner, by saying, with sincerity—I thank you, with all my heart (loud cheers). Could I think I do really deserve such kindness; did I

know that I have a tenantry whose comforts I had increased by removing the thatch from their dwellings and covering the roofs with slate, whose fields now stogging them with mud I had improved by thorough draining; or had I benefited and elevated the condition of the labourers, who are the right arm of the agricultural interest (Hear, hear)—did I feel that I had done these things, my satisfaction would be greatly enhanced. But I cannot boast of having done this ("You have"); for through circumstances, of which you are aware, my first effort has been to put a roof over a house for myself. This, however, I may be allowed to assure you, I have done that I may have a place where I, like my father before me, may be able to dwell in and reside among you (much applause), and that my children, and those I may hope of succeeding generations, may also continue to live among the tenantry as I now do (cheers). But I see, from the list I hold in my hand, that there are tenants, not occupying lands of mine, who have subscribed to this piece of plate; and to them I return my most heartfelt thanks, feeling, as I do, that their testimony is doubly valuable. With respect to them, however, I must not throw out a covetous wish, and hope they were also my tenants; but this I will say, that I hope each of their landlords may deserve such a testimonial of respect as that which I have now received (Hear, hear). As to the plea of my having merited this mark of respect because I have kept down the game on my estates, I can hardly think that this is the real, or at least that it is the entire reason that has induced the proceedings of this day, because I am not one of those who have done service to the tenant by abstaining from sport, inasmuch as I have never taken delight in or enjoyed it. I am certainly far more the friend of the farmer than of the game-keeper (cheers). I am far more gratified at seeing a good turnip or potato on my table than I am with seeing a hare or a pheasant; I am better pleased to see a stock of corn and other produce on the farms occupied by my tenants, than I should be in witnessing large covers, from which my larder might be constantly supplied with game fed in any way at the farmers' cost (loud cheers). Let me now, gentlemen, assure you that this testimonial shall be preserved by me, and that it shall be handed down, as a heirloom, to the latest generation in my family (cheers). Permit me to observe that it is a beautiful and most appropriate gift, as well regarding myself as the farmers on my estates; for on those agreeable occasions when it will be brought forth, it will, I may hope, always indicate that rents are paid—that there are no balances behind (Hear, hear). And beautiful as is the outside, the inside is perhaps still invested with more pleasant associations, as it will not be presented empty when I meet my tenants at the festive board. It will also remind me, and those who come after me, whenever it is brought forth, of one significant hint which it forcibly gives—remember the rabbits! (a laugh and much applause.) If I, or they, forget the principle upon which it has been given, and become rigid game preservers, I may say, for myself, that I must not give my tenants punch, and that I shall only be able to look upon the punch bowl with shame and confusion of

face (Hear). Allow me, gentlemen, to apologise for the length at which I have spoken ("No, no"). You are aware that when the heat is full the tongue runs fast; but I do assure you that I value the good opinion of my tenants and neighbours, of those to whom I am known, and who have known me from my boyhood to mature age, as have many who are contributors to this gift—I most deeply value the opinion they have expressed of me. Now, gentlemen, permit me to thank you for all your kindness, and again and again to assure you what a deep and abiding impression this proceeding has made, and always will make, on my heart.

On the reverend gentleman sitting down, the cheering was tremendous, being reiterated for some minutes.

The Rev. N. BOND again rose, and said there was a good old custom, which he had witnessed at the agricultural meetings, that when persons were presented with plate, they filled their prize cups with punch or wine, and sent them round the table (a laugh and cheers). He then ordered two bowls of punch, which were speedily brought in, and sent round.

Mr. SLY was loudly called on, and gave in good style a song composed for the occasion, which embraced the principal incidents of the meeting. This was received with loud applause.

The Rev. C. ONSLOW rose to propose the health of a gentleman who had so ably discharged the duties devolving upon him, and who had, with so much good taste and feeling, presented the piece of plate (cheers). He was sure they would all heartily join in drinking, with full honours, the health of Mr. Marshallsay, their chairman (three times three, and the musical honours).

Mr. MARSHALLSAY returned his warmest thanks for the honour done him, and said he was glad to know that they were now, with respect to game, bringing things to a point they had long wished for, so that landlord and tenant would understand one another much better than they had hitherto. He had two landlords, and he understood both of them, which was more, he supposed, than many present could say (a laugh and applause). He respected age, and he would first notice the Rev. William Bond, as one of them; and a better man or a kinder landlord he was sure there could not be: then there was the other, the rev. gentleman to whom he had had the honour of presenting the piece of plate. He had long heard the complaints against game by farmers; indeed, when he called on many of them, the first thing brought up was "game" (a laugh, and cheers). He had, in some instances, asked why he did not see corn where it used to be grown? The answer was, "It's no use to grow corn there, for it's all eaten up by game." He knew the great evil of this, and how it operated to damp the exertions, and to vex the tenant, so that he became careless of his cultivation. Many a man, through this cause, was a worse farmer when he left an estate than he was when he came to it. He wished they could all say they had such good landlords as he had (cheers). He hoped the time was fast approaching, when they would but rarely hear complaints of the grievances of their farms being overrun with game (cheers).

Mr. JOSEPH WILLIS, jun., rose to propose a toast

which, he said, he was sure they would all drink with enthusiasm. They had most properly drunk the health of their rev. friend, Mr. Bond, who had accepted the present of plate, but they had not drunk the health of those who had been instrumental in getting up the testimonial. No set of men could have used greater exertions, and they had nobly carried out their object. He proposed the health of the committee (three times three).

Mr. MARSHALLSAY, as the chairman of the committee, in briefly returning thanks, expressed his hope that no ill feeling would be created in any quarter through what had been done, as he could say that the object was to promote good feeling (Hear).

Mr. JOHN SAMPSON, of Wallington farm, as one of the committee, and a tenant of Mr. Bond's, observed that he could say what but few could, that he was now living on the farm where his great-grandfather lived; he was of the fourth generation, and hoped as long as he continued there he should be able to look his landlord in the face (a laugh, and applause).

Mr. JOHN TUCK, also a tenant of Mr. Bond's, briefly returned thanks.

The Rev. N. BOND, in an eloquent and complimentary speech, proposed the health of Mr. Newbery, their excellent vice-president (three times three).

Mr. NEWBERY returned thanks at much length, and entered upon the evils of the extensive preservation of game, touching upon some points with considerable force of argument. He observed that it was not altogether on account of the character and conduct of the Rev. Mr. Bond, in this respect, that the piece of plate had been presented, it being also intended to show the feeling and opinion of the tenantry to other landlords, who, as excessive game preservers, he fearlessly condemned. They must all know that Mr. Bond was intimately connected with the aristocracy, and that many of the aristocracy were addicted to the practice they were met to remonstrate against; so that they were indebted to the reverend gentleman, who had a far higher reward than anything they could bestow upon him, within his own breast, in the knowledge that he had acted upon principles of honour and justice (cheers). He did not wish to speak so harshly of other landlords in that neighbourhood as some might be disposed to do, because he thought their persisting in the preservation of game, to the extent they carried it, must arise from their ignorance of the great destruction caused to the crops, and consequent lessening of the food of the people, and of the moral and social evils arising to the peasantry through the practice, which caused burthens to fall heavily upon the farmers in the shape of increased county and poor rates. He thought the game preservers could hardly be aware that they were acting not against the tenant-farmer's interest only, not in opposition to the opinion of persons in this district of the county, but of those of every county, and indeed against the public opinion of the nation. He did not wish to see the amusements, in the way of fair and moderate sport, of the landholders destroyed, and he would say that he believed if ever the day should arrive when the position and influence of the aristocracy were taken away, that would

be a dark day for England (Hear). The best way, however, for the aristocracy to cause their rights and privileges to be respected and maintained, was for them to respect and support the just rights of the tenant farmers. The tenantry had no other complaint against their landlords than this of the game, which was a grievance of such serious consequence that they were entitled to have it removed (cheers).

Mr. C. GROVES, on a call from the chair, sang, in his usual good style, a capital song (applause).

Mr. JOHN TUCK, as one of the committee, desired to express his gratitude to those who were not tenants of Mr. Bond, and had so readily subscribed to the testimonial. There was no want of money, and had it been made generally public among the farmers, he believed a thousand pounds might soon have been raised.

Mr. JOSEPH WILLIS, being called on, said he rose, with the greatest pleasure, as one of the committee, to return thanks. He had been asked by Mr. Marshallsay and another farmer, to subscribe to a piece of plate for the Rev. N. Bond, and he did not for a moment hesitate, as from what he had known of Mr. Bond, from his youth up, no gentleman could be more deserving of such a mark of respect; but on his being told what the main intention was, that it was on account of his keeping down the game, he could not have desisted from supporting the testimonial had he not known anything of the reverend gentleman otherwise. He had been a great sufferer from the ravages of that detestable—vermin he would call it—the rabbit (Hear, hear). He had been himself a sportsman, and he hoped he should continue to be so; but when he got on his horse, and rode over his farm, and saw the destruction to his crops caused by those vermin, he could not bear it (Hear, hear). The loss he had sustained only during the past year from this cause was very heavy, as much as would have enabled him to employ several labourers. The farmers were told they must raise more food for the people, but how were they to do it, if this destruction was continued (Hear)? Mr. Marshallsay had observed that he had two landlords, and he understood both of them; now he (Mr. Willis) had three landlords, but one of them he did not understand. There was a practice among some landlords, not only in this but in other counties, to preserve a large quantity of game on their farms. Good; but they preserved it to sell and make a profit of it (Hear, hear, and "It's true"). He did not see any reason why the renting farmer should not have as much liberty to destroy rabbits which ate up his crops, as he had to kill the rats which plundered his ricks (cheers). There could be no adequate compensation made for the damage done by game on the farm, and consequently the loss was more considerable to the tenant than the landlord could be aware of (cheers). He was glad to come forward in this cause, and to take part in ordering the plate, which was useful and ornamental (Hear). He thanked them for the manner in which they had heard him, and hoped that, before long, landlord and tenant would meet together more agreeably in respect of the matter of game (cheers).

Mr. Voss being called on, expressed his opinion fully

against the present system of game preserving, the evils of which, in many respects, he explained. In the course of his observations, he said a rabbit was supposed to consume a bushel of wheat in the season: the rabbit was worth 6d., and the bushel of wheat 6s.; so that the amount of loss, if the farmer were to have the rabbit, must be apparent to every one.

Mr. NEWBURY, as a subscriber to the plate, again addressed the meeting, and dwelt chiefly upon the effects of the system upon the labourers and their families, upon which he made some strong remarks. [The length of the proceedings, and our limited space, has compelled us to condense most of the speeches, and we must be very brief with the subsequent proceedings.]

The CHAIRMAN proposed the "Health of Mrs. Bond, John Bond, Esq., our future landlord, and the rest of the Bond family." (The musical honours, followed by three cheers for Mr. John Bond.)

The Rev. N. BOND returned thanks, and made some touchingly eloquent observations on the comfort and advantages of home and the family circle. The gentleman concluded by proposing, in warm and eulogistic terms, the "health of Mr. Weld" (drunk with the musical hips).

Mr. HYDE, steward to Mr. Weld, returned thanks,

and made some judicious remarks on the game question, in reference to the recent amicable proceedings at Lulworth. In the course of his observations, he said that it may be very well to talk of tenant rights and long leases; but unless there was a good understanding between landlord and tenant, very little good could be done (cheers).

Mr. JOHN SAMPSON gave a song with spirit and effect.

Mr. PANTON, in a very able and well-timed speech, proposed the health of Mr. Hyde, which was drunk with three times three, and that gentleman returned thanks.

Mr. HYDE proposed "Mr. Farquharson and his fox hounds" (three times three and the view-halloo).

Mr. R. DAMEN proposed "The Town and Trade of Wareham," coupling with it the name of Mr. Panton (three times three).

Mr. PANTON returned thanks amid loud applause.

The Rev. N. BOND took leave soon after nine o'clock, amidst the enthusiastic cheers of the company.

The worthy Chairman kept up the spirit of the meeting; several other toasts were drunk; songs were sung: at length the soothing pipe was introduced, and the harmony and conviviality of the proceedings were kept up by most of the party to a late hour.

—Dorset County Chronicle.

## ON THE COMPOSITION AND RELATIVE NUTRITIVE VALUES OF THE POTATO, THE YAM, THE SWEET POTATO, MANGOLD-WURTZEL, THE CARROT, THE BEET, THE PARSNIP, AND THE CABBAGE.

BY JAMES F. W. JOHNSTON, F.R.S.S. L. & E.

As public attention is at the present moment very much directed to the consideration and discussion of the propriety of substituting different root crops in place of the potato, the following summary of the actual state of our knowledge, in regard to the chemical composition and relative nutritive value of these several root crops, will not, I think, be unacceptable to the agricultural public:—

### § 1. OF THE COMPOSITION OF POTATOES, AND THE EFFECT OF CIRCUMSTANCES IN MODIFYING THEIR QUALITY AND COMPOSITION.

The composition of the potato is, in one respect only, very different from that of our cultivated corn crops. Like all the other root and green crops we cultivate, it is distinguished from grain and pulse by the presence of a large per-centage of water: in other respects it agrees with them. It contains the same kinds of nutritive matter which are found in the grains. It differs in the relative proportions only in which these substances are found in it.

1°. *Per-centage of Water.*—The mean proportion of water contained in the potato is about 75 per cent., or three-fourths of its whole weight. But this proportion varies with the age or state of ripeness of the potato, with the part of the potato ex-

amined, with the variety, with the rapidity of growth, with the length of time they have been kept out of the ground, the place in which they are kept, and possibly also with the soil, manure, and climate.

*a. Influence of the State of Ripeness, &c.*—The quantity of dry solid matter contained in the potato, depends very much upon the state of ripeness to which it has attained. The ripest gave 30 to 32 per cent. of dry matter, the least ripe only 24 per cent. The mean result of Körte's examination of 55 varieties of potato, gave him for the solid matter 24.9, and for the starch 11.85 per cent.\*

The result of 27 analyses made in my laboratory, in 1846, gave, for the maximum proportion of water in young potatoes, 82, and for the maximum in full grown potatoes, 68.6 per cent. The mean of 51 determinations made upon potatoes of all ages was 76 per cent.

*b. Water in different Parts of the Potato.*—As a general rule, not without exceptions, however, the proportion of water is greater in the rose or upper end of the potato from which the young shoots

\* Schübler, "Agricultur Chemie." ii. p. 213.

spring, than in the heel end by which it is attached to the rootlet. The proportion in the middle of the potato is sometimes intermediate and sometimes greater than at either end. This appears in the following, selected from among many similar results obtained in my laboratory:—

No.	Rose end.	Middle.	Heel end.
No. 1. ....	82·88	....	80·15
” 2. ....	79·60	....	77·83
” 3. ....	64·41	....	63·08
” 4. ....	88·89	....	88·07
” 5. ....	80·07	73·77	65·33
” 6. ....	76·56	75·30	71·78
” 7. ....	71·97	79·91	74·64
” 8. ....	82·60	85·13	74·80

c. *The influence of variety* upon the quantity of water in potatoes of the same year, grown in the same field and under the same circumstances, has also appeared from many experiments I have caused to be made. Thus, while the cup potato gave 74, the variety called buff's gave 77 per cent. But it is impossible always to determine how much is really due to variety, and how much to the period of growth or other causes.

2°. *Proportion of Starch.*—A large proportion of the solid matter of the potato consists of starch. When the potato is grated upon a fine grater under a stream of water, the starch passes through in the form of a fine white powder, and the fibre or cellular matter remains behind.

The average proportion of starch in the potatoes of this country, according to the numerous experiments made in my laboratory during the year 1846, is

In the natural state ..... 15·72 per cent.  
 In the dry state (free from water).. 64·20 ”

But this proportion varies with many circumstances. Thus—

a. The heel end usually contains most starch, and the centre least. In three varieties we obtained of starch per cent.—

	Belfast rounds.	Red potato.	Kidneys.
Rose end .....	19·15	16·42	14·84
Centre.....	14·40	13·73	13·87
Heel end.....	18·70	20·93	17·48

b. The variety also affects the proportion of starch. Thus I obtained the following among many other results from potatoes grown in Scotland in 1846:—

	Per cent. of starch.
Red potato (Lanarkshire) .....	14·08
Small Americans .....	17·80
Orkney potatoes.....	17·42
Buff's (Forfarshire) .....	20·71
Kidneys .....	14·93
Cups (Argyleshire) .....	15·14

Different varieties grown on the same soil also differ in their yields of starch.

Thus the following varieties of potato grown by Mr. Fleming, at Barrochan, in Renfrewshire, in 1842, yielding respectively of starch—

	Per cent.
Connaught cups .....	21
Irish blacks .....	16½
White dons .....	13
Red dons ... ..	10¾

while, according to a starch manufacturer in that neighbourhood, 11½ per cent. had been the average quantity obtained from the common *rough red* of good quality during the previous four years.

The difference in the quantity of starch yielded by the above-named varieties is the more striking when it is taken in connection with the weight of each per acre, raised from the same land treated in the same way. These weights were as follows:—

Manure.	Produce. of starch.	Containing
Cups ... with 4 cwt. guano	13¼ tons	2·9 tons.
Red dons . with 4 cwt. guano	14¼ tons	1·5 tons.
White dons with 3 cwt. guano	18½ tons	2·4 tons.

So that of these three crops, that of *cups*, which weighed the least, gave the largest produce of starch. They yielded nearly twice as much as the *red dons*, which were half a ton heavier, and one-fifth more than the *white dons*, the crop of which was greater by five tons an acre. Such differences as these, in the relative quantities of starch, which may be obtained from an acre of the same land by the growth of different varieties of potato, are deserving of the attentive consideration of the practical man.

c. The soil, locality, or mode of treatment also affect the proportion of starch in the potato. Thus the same variety of potato grown in different localities gave me

	Mid-Lothian.	Forfarshire.	Mid-Lothian.
Buff's	14.89	20.71	
			1. 2.
Cups	15.14	23.82	18.94

d. The effect of keeping upon potatoes is to diminish the proportion of starch. Their weight diminishes from four to seven per cent., and the proportion of starch lessens at the same time. Thus Payen found the same variety of potato to yield, in

	Per Cent.
October .....	17.2
November .....	16.8
December .....	15.6
January .....	15.5
February.....	15.2
March.....	15.0
April .....	14.5

This diminution is probably owing to the con-

version of a portion of the starch into the sugar and gum.

When potatoes are rendered unfit for food by being frozen and suddenly thawed, the quantity of starch which they are capable of yielding when immediately grated has undergone no diminution.

3°. *The proportion of fibre* is very variable, but in the ordinary state of the potato it averages about 3, and in the dry state about 13 per cent. of the whole weight. It varies, however, very much; in some being as little as 1½, in others as much as 10 per cent., even in their natural state of dryness. I give the following as some of the extreme determinations of the fibre in the natural and in the dried state, obtained from Scotch potatoes grown in 1846. I have included also the proportion of starch:—

	FIBRE.		STARCH.	
	In natural state.	In dry state.	In natural state.	In dry state.
Cups, Mid-Lothian	1.75	10.91	18.94	75.14
Buffs, do.	4.45	17.70	14.89	59.16
Whites, do.	5.69	19.51	16.73	57.31
Orkney potatoes	8.41	24.10	17.42	49.91
White, Argyle	10.60	32.12	18.07	60.82

From these results it appears that the proportion of fibre varies very much, though in most cases a portion of starch, and always a small quantity of coagulated albumen, adheres to the fibre and adds to its apparent weight. It is to the presence of this starch and albumen that the nutritive properties of the potato fibre—the pulp of the potato-mills—is partly owing, though the tender fibre (cellulose) is capable of being partially dissolved or digested in the stomachs of the animals that are fed upon it.

4°. *Proportion of Fat*.—When the potato is sliced, dried, and digested in ether, a portion of fat is extracted from it, which is usually smaller, however, than from any of our grain crops. It varies from 0.15 to 0.52 per cent. in the potato in its ordinary state, but it averages about 0.24 in the one, and 1.0 per cent. in the other.

5°. *Proportions of Gum and Sugar*.—In the watery solution which floats above the starch, when a potato has been grated in a stream of water, and the water allowed to settle, there is always contained a small quantity of sugar, and of that species of gum which is formed by the action of sulphuric and other acids upon starch, and to which the name of dextrin is given. The maximum, minimum, and average of these substances in the healthy potato is nearly as follows, as deduced from numerous analyses made in my laboratory:—

	In Natural State.		In Dry State.	
	Sugar.	Gum.	Sugar.	Gum.
Maximum ..	5.1	0.94	23.2	3.0
Minimum ..	1.1	0.07	5.5	0.35
Mean .....	3.3	0.55	13.47	2.25

In diseased potatoes the sugar is sometimes upwards of 7, and the gum of 2 per cent. in the natural state of the potato. This, however, is the result of a change of the starch into these substances as a result of the progress of disease. In all cases when these two substances are unusually large, the starch is small in like proportion.

6°. *Proportion of Protein Compounds*.—When the water with which the grated potato has been washed is filtered and then boiled, a small quantity of albumen coagulates and falls in flocks. If, after this is separated, and the liquid allowed to cool a little, acetic acid (vinegar) is added to it, a white powder falls, which, like that obtained in the same way from oatmeal, peas-meal, or from wheat or barley-flour, has much resemblance to the curd of milk, and therefore for the present, and till it has been carefully analyzed, is called casein. Further, if the dry potato in powder be boiled in alcohol, the solution evaporated, and water added to it, a white glutinous substance is separated, resembling the gluten of wheat. Lastly, if the dry fibre or pulp be boiled in acetic acid, and carbonate of ammonia afterwards added to the clear solution, a portion of white matter falls, which is believed to be albumen existing in or attached to the fibre in a coagulated state.

Thus the potato contains all the different protein compounds usually found in the cultivated grains, though in its natural watery state they are at present in it in small and variable proportions only. Thus, in the natural state of the potato, according to experiments made in my laboratory,

	Per Cent.	
The gluten varies from ..	0.11	to 0.56
The albumen .....	0.03	0.75
The casein .....	0.02	2.41

But the average sum of these three constituents extracted in the way I have described is about 1.4 per cent. of the weight of it in its natural state, or 5.8 per cent. when freed from water.

But by the method of extraction above described the whole of the protein compounds is not obtained, and therefore their true proportion in the potato is incorrectly estimated. By determining the nitrogen, and from its amount calculating the protein compounds, a higher number is obtained for their proportion in the dry potato. Thus Horsford obtained for the per-centage of these compounds in the dry matter of potatoes grown at Giessen—

	Per Cent.
In white potatoes .....	9.96
In blue .....	7.66

And my assistant, Mr. Fromberg, obtained from 7.3 to 14 per cent. in different portions, samples, and varieties of potatoes. He found also that not only is the proportion different in different varieties, but that it is greater also in young potatoes than in old, and often also in the one end or in the centre of the potato than in the other end.

According to Boussingault, the proportion of these protein compounds diminishes the longer the potato is kept. Thus in newly-dug potatoes he found them to amount to 2½, but in long-kept potatoes to only 1½ per cent. of their weight. These are equivalent to 9 per cent. and 6 per cent. respectively in the dry potatoes at the two periods.

In potatoes attacked with the prevailing disease the proportion of protein compounds diminishes. They are partially decomposed, producing ammonia and other compounds.

The proportion of protein compounds, chiefly coagulated albumen, in the potato-fibre is also greater than we should suppose—being found by Fromberg to vary from 3.2 to 6.3 per cent. of the weight of the fibre in the dry state, the mean being between 3½ and 4 per cent. This must contribute, as I have already said, to the nourishing properties of the refuse of our potato-mills.

7°. *Proportion of Saline Matter.*—The potato, when dried and burned, leaves a quantity of ash, which varies from 0.76 to 1.58 of the weight of the potato in its natural state, or from 2.3 to 4.7 per cent. of the weight of the potato in the dry state. This ash consists in large proportion of potash and soda salts.

It is a curious circumstance, in reference to the inorganic matter of the potato, that a considerable proportion of the lime it contains exists in the state of crystallized oxalate of lime. These crystals are in many cases readily seen by the microscope, but what functions they perform—whether they are a natural and necessary, or a diseased product—it is impossible as yet, with any degree of confidence, to pronounce. When the potato is burned, this oxalate is decomposed, and the lime is found in the ash in the state of carbonate—unless it combine during the heating with some of the phosphoric or other fixed acids contained in the potato.

8°. *Average Composition of the Potato.*—The several ingredients of the potato vary, as I have stated above. Its average composition is nearly as follows:—

a. Taking the mean of the results of Einhoff, Lampadius, and Henry—

	In natural State.	In dry State.
Water .....	75.28	..
Starch .....	14.25	58.12
Dextrin (gum) and sugar .....	2.08	8.24
Protein compounds ....	1.10	4.50
Fibre .....	7.12	29.14
	99.7	100

b. Taking the mean of the numerous analyses of healthy potatoes, made in my laboratory in 1846—

	Natural.	Dry.
Water .....	75.52	..
Starch .....	15.72	64.20
Dextrin (gum) .....	0.55	2.25
Sugar .....	3.30	13.47
Albumen, casein, gluten, &c..	1.41	5.77
Fat .....	0.24	1.00
Fibre, with a little starch adhering .....	3.26	13.31
	100	100

When the above substances are separated from each other in the way I have described, a portion of the albumen and gluten still adheres to the fibre, and of both, with some of the so-called casein, to the starch, so that the true per-centage of protein compounds is something higher than in the above table.

In round numbers, indeed, the average composition of the dry potato may be represented pretty nearly as follows:—

Starch .....	64
Sugar and gum .....	15
Protein compounds .....	9
Fat .....	1
Fibre .....	11
	100

The dry potato, therefore, in nutritive value is not far behind the average of our finer varieties of wheaten flour, and is about equal to that of rice.

This appears in the following comparative view of the composition of dry rice and the dry potato.

	Dry Potato.	Dry Rice.
Starch .....	79	87.4
Sugar and gum .....	9	7.5
Protein compounds .....	1	0.8
Fat .....	11	3.4
Fibre or husk .....	..	0.9
Saline matter (ash) .....	100	100

The principle difference here is in the proportions of fibre or husk. But the fibre of the potato, as I have already said, retains a portion of starch and other nutritive matter, and therefore the real quantity of indigestible fibrous or woody matter in the potato is by no means so great as the per-centage of fibre appears to represent it.



§ 2. INFLUENCE OF SOILS AND MANURES UPON THE QUANTITY AND QUALITY OF THE POTATO CROP.

The potato thrives best on a light loamy soil—neither too dry, nor too moist. The most agreeably flavoured table potatoes are almost always produced from newly broken up pasture ground, not manured or from any new soil.\* When the soil is suitable, they delight in much rain, and hence the large crops of potatoes obtained in Ireland, in Lancashire, and in the west of Scotland. No skill will enable the farmer to produce crops of equal weight on the east coast, where rains are less abundant. *It has not been shown, however, that the weight of starch produced in the less rainy districts is defective in an equal degree.* Warm climates and dry seasons, as well as dry soils, appear to increase the per-centage of starch.

Potatoes are considered by the farmer to be an exhausting crop, and they require a plentiful supply of manure. By abundantly manuring, however, the land in the neighbourhood of some of our large towns, where this crop is valuable, has been made to produce potatoes and corn every other year, for a very long period.

11°. *Saline mixtures* exercise a remarkable influence in promoting the growth and increasing the quantity of the potato crop in some localities. The most striking effects of this kind hitherto observed in our island have been produced by mixtures of the nitrate of soda with the sulphate of soda, or with the sulphate of magnesia.† The effect of such mixtures affords a beautiful illustration of the principle I have frequently before had occasion to press upon public attention—that plants require for their healthy growth a constant supply of a considerable number of different organic and inorganic substances. Thus upon a field of potatoes, the whole of which was manured alike with 40 cart-loads of dung, the addition of

- a. Nitrate of soda alone gave an increase above dung alone of ..... 3¼ tons.
  - Sulphate of soda alone gave no increase
  - While one half of each gave ..... 5¼ ..
  - b. Sulphate of ammonia alone gave .... 1½ tons.
  - Sulphate of soda, no increase. ....
  - But one-half of each gave ..... 6½ ..
  - c. Nitrate of soda alone gave an increase of 3¼ tons.
  - Sulphate of magnesia alone gave .... ½ ..
  - And one-half of each gave ..... 9¾ ..
- Such results are very interesting, and if followed up by an examination of the *quality and composition*

of the several samples of potatoes produced, cannot fail to lead to very important practical and theoretical conclusions.

2° *Failure of Seed Potatoes.*—The seeds of all cultivated plants are known at times to fail, and the necessity of an occasional change of seed is recognised in almost every district. In the Lowlands of Scotland potatoes brought from the Highlands are generally preferred for seed; and on the banks of the Tyne, Scottish potatoes bring a higher price for seed than those of native growth. This superior quality is supposed by some to arise from the less perfect ripening of the up-land potatoes, and by others to some peculiar effect or quality of new land, on which skillful farmers, who do not import or buy, raise the potatoes they intend for the next year's seed.

These may in part be true explanations of the fact. The better quality of unripe seed may arise from its containing a larger per centage of nitrogenous (protein) compounds, if, as many believe, *whatever increases the per-centage of starch, increases also the risk of failure in potatoes that are to be used for seed.* The subject is deserving of further investigation.

It may be doubted, however, whether the relative proportions of starch are to be considered as the *cause* of the relative values of different samples of seed potatoes. This proportion may prove a valuable test of the probable success of two samples when planted, without being itself the reason of the greater or less amount of failure. With the increase of the starch, the albumen and the saline matter of the potato may in some degree diminish, and a certain minimum proportion of *both of these* is necessary to its fruitfulness when used for seed.

The value of the saline matter is beautifully illustrated by the observation of Mr. Fleming, that the potatoes top-dressed with sulphate and nitrate of soda in 1841, and used for seed in 1842, "presented a remarkable contrast to the same variety of potato, planted alongside of them, but which had not been so top-dressed in the previous season. These last came away weak, and of a yellowish colour, and under the same treatment in every respect did not produce so good a crop by fifteen bolls (3¾ tons) an acre." This observation, made in 1842, was confirmed by the appearance of the crops of 1843, upon Mr. Fleming's experimental fields. In later years, however, even his doctored seed has not escaped the destructive ravages of the disease of 1845 and '46.

It has been said, in some parts of Scotland, that the disease was prevented by the use of saline mixtures in 1845, but the same mixtures failed of their effect in the hands of the same parties in 1846. In Norway, common salt is supposed to have saved the potato from disease. At the present moment sulphate of magnesia is lauded as a specific against the

\* London's "Encyclopædia of Agriculture," p. 847.

† See the Author's "Suggestions for Experiments in Practical Agriculture."

disease, because of some supposed good effects produced by it near Whitby in 1846. I fear, however, that should the disease be equally virulent and extensive in 1847, that this salt will lose its character like all the others.

§ 3. COMPOSITION OF THE YAM AND THE SWEET POTATO.

The destruction of the potato crop in Europe having turned public attention very much to the nature and value of the productions of other countries, it has been thought by some that the yam and the sweet potato may possibly form useful articles for importation.

Of both roots or tubers, I believe there are several cultivated varieties. Two varieties of the former—the water and the Guinea yam—and one of the latter were imported from Barbadoes during the last summer (1846), and put into my hands for examination by my friend Mr. Milne: they were analyzed in my laboratory, and were found to consist respectively of—

	Water yam	Guinea yam.	Sweet potato.
Water .....	64.80	75.53	59.31
Starch .....	24.10	17.45	16.62
Dextrin .....	0.36	0.21	0.55
Impure sugar .....	3.92	3.47	7.99
Albumen .....	0.25	0.70	trace.
Casein (so-called), impure ..	2.69	1.74	2.66
Fibre, with a little oil and coagulated albumen ....	3.76	1.61	12.88
	99.88	100.71	99.41

In these analyses, and from these specimens, it appears—

a. That the Guinea yam has much resemblance in composition to the potato—the proportion of water being the same, and that of starch being only a little more than in the potato.

b. That the water yam contains 11 per cent. less water than the potato, and 8 or 9 per cent. more starch.

c. That the sweet potato contains less water and about the same proportion of starch as the potato, with 5 per cent more sugar—to which its sweetness is owing—and nearly 10 per cent. more fibre.

d. That of protein compounds (albumen, &c.), capable of being separated and collected, these three samples all yielded a larger per-centage than the potato.

When burned, however, for the determination of the nitrogen and the protein compounds calculated

from the latter, they do not appear to exist in either the yams or the sweet potato in so large a proportion as in the average of our cultivated potatoes. At least my assistant Mr. Fromberg found by this method the proportion of protein compounds to be—

	Natural state.	Dried at 212 degs.
Water yam .....	2.08	5.92
Guinea yam .....	1.49	6.16
Sweet potato .....	2.27	5.50

These numbers are less than those which represent the weight of albumen and of so-called casein actually extracted; and though these latter substances were necessarily impure, yet the subject is obviously open to further investigation.

§ 4. COMPOSITION OF THE TURNIP.

The potato, among cultivated roots, is characterised by the large proportion of starch it contains. The turnip, carrot, beet, mangold-wurtzel, and parsnip, differ from it in containing much more sugar, with little or no starch, but in its stead a large proportion of a substance to which the names of pectose and pectic acid are given. The nature and properties of these substances it would be out of place here to describe.

The turnip is a root which, to the skilful cultivator, yields a very large return of nutritive matter. Crops of thirty tons of bulbs per imperial acre are not unfrequently grown, but very much greater returns are occasionally published.

Thus in 1814, the Duke of Portland's farm, in the parish of Dundonald, yielded, of a variety not mentioned—

	Scotch acre.	Imperial acre.
Without leaves.....	76 tons	61 tons
With leaves.....	90 ..	72 ..

And in the parish of Irvine, in the same county, Mr. Taylor of Stonearth grew, of white turnips, 68½ tons per Scotch, or 55 tons per imperial acre.

The first of these crops is equal to 6 tons, the latter to 5½ tons of dry nutritive matter per imperial acre.

These roots contain a very large per-centage of water, a circumstance which renders them less fit for human food, and, because of the cost of transport, makes it necessary in most cases to consume them near the spot where they are grown.

Many varieties of turnip are cultivated, but they have not been subjected to a rigorous chemical analysis—an object of much importance to practical husbandry. The following table represents the composition of certain varieties of Scotch turnips, which have been examined in my laboratory:—

	Grown on different soils.			On same soil.		On same soil.	
	No. 1.	No. 2.	No. 3.	Purple No. 4.	Yellow. No. 5.	Purple. No. 6.	Yellow. No. 7.
Water .....	89.30	89.42	89.00	88.46	88.60	87.45	88.31
Sugar .....	5.61	6.21	6.54	6.90	6.92	} 8.39	7.67
Gum .....	0.11	0.11	0.16	0.09	0.09		
Albumen .....	0.72	0.47	0.36	0.19	0.22	0.32	0.21
Pectic and meta-pectic acids ....	1.76	1.33	1.51	..	..	} 3.84	3.81
Oil .....	0.19	0.22	0.18	0.26	0.30		
Cellular fibre .....	1.63	1.75	1.59	3.39	3.00		
Saline matter .....	0.54	0.49	0.59	0.68	0.62	..	..
	99.86	100.	99.93	99.97	99.65	100.	100.

The first three of these analyses represent the composition of the same variety of turnip grown on different soils by Mr. Mylne, farmer, near Tranent; the next two were grown on the same soil, by the late Mr. Aitchison, of Drummore, near Musselburgh; and the two last were grown on the same soil, near Haddington, by Mr. Roughead. Most of the analyses were made for practical purposes, and therefore all the ingredients were not in every case determined separately, as the table shows.

The proportion of sugar contained in these roots is greatest when they are young, and diminishes as they ripen. In the beet it has been observed that the nitrates of potash and ammonia are present in considerable quantity, and that in the old beet these nitrates become more abundant as the sugar diminishes. In the beet also, when raised by the aid of rich manure, the production of nitrates is increased more than that of sugar. According to Payen, the beet, when raised with street manure, contains 20 times as much *saltpetre* as when raised in the ordinary manner. The same may possibly be the case with the common cultivated turnips.

The proportion of albumen and other protein compounds is not truly represented in the analyses above given. When the turnip is grated in water, and the clear liquid boiled, as in the case of the potato, a portion of albumen coagulates and falls, and on separating this, and adding a little acetic acid, a small proportion of a substance resembling casein is thrown down. Alcohol extracts from the fibre a portion of gluten (?), so that the turnip contains all the same principal varieties of the protein compounds which are present in our other cultivated crops.

By this method of separating them, however, it is impossible to obtain exact results, and the quantity obtained is generally less than the truth. By the method of combustion, however, which gives the proportion of nitrogen, and of thence calculating the protein compounds, a more accurate determination is in general obtained. Thus three varieties of turnips, grown in Germany, gave Mr. Horsford by

this method the following proportions of protein compounds, in their natural and in their dried state, respectively:—

	In natural state.	Dried at 212 deg.
Yellow turnip .....	1.54	9.25
Red turnip .....	2.83	15.50
Kohl Rabi .....	1.54	12.64

According to these results, the dry matter of the yellow turnip contains a little more of the protein compounds than the average of our cultivated potatoes, while that of the red turnip and the Kohl Rabi are as rich in these ingredients as the average of our barley, wheat, or oat crops. It would be interesting to test these results by a greater number of such analyses.

§ 5. COMPOSITION OF MANGOLD-WURTZEL, AND OF THE BEET, CARROT, PARSNIP, AND CABBAGE.

1. *Mangold-wurtzel*.—Very large crops of this valuable root are obtained from some soils. The crop from which the specimens were taken, for the subjoined analyses, was grown by Colonel Kinloch of Logie, in Forfarshire, upon land forked 2½ feet deep, and was “considered to be fully 40 tons an acre” (Scotch). This root is a very valuable food for cattle, is much relished by them, fattens well, and gives a rich milk. The orange globe is preferred to the other varieties usually cultivated. Three of these examined in my laboratory by my assistant, Mr. Cameron, yielded, per cent.—

	Long red.	Short red.	Orange globe.
Water .....	85.18	84.68	86.52
Gum .....	0.67	0.50	0.13
Sugar .....	9.79	11.96	10.24
Casein (so-called)....	0.39	0.26	0.33
Albumen .....	0.09	0.18	0.03
Fibre and pectic acid	3.08	3.31	2.45
	99.20	100.89	99.70

It appears from the above results that they contain less water, and therefore more solid and nutritive matter than the turnip.

Few accurate determinations have yet been made of the per-centage of protein compounds in this root. The sum of the albumen and casein above given represents them as forming only 0.5 or  $\frac{1}{2}$  per cent. of their weight when fresh. This is, no doubt, too little—an error which, as in the case of the turnip, necessarily attends the method of analyses adopted.

In the dry mangold-wurtzel, of the three varieties above mentioned, my assistant, Mr. Fromberg, obtained, by the method of combustion, the following proportions of the protein compound in the natural state, and when dried at 212° F. respectively:—

	Orange globe.	Short red.	Long red.
Nitrogen .....	2.29	2.21	1.72
Protein compounds (in dry state) .....	14.40	13.88	10.79
Ditto (in natural state)	1.94	2.12	1.60

It is probable that the so-called red turnip examined by Horsford, and said by him to contain only 81.6 of water and 2.83 of protein compounds, or 15.50 per cent. when dried at 212°F., was in reality a variety of mangold-wurtzel. If so, this root must be considered as very rich in these compounds.

It is a practical objection to this crop, which does not apply to the Swede turnip, that it is unable to stand the frost, and must therefore be taken up and stored when severe weather is expected. It is said also to produce paralysis in the cattle which are fed with it. I should not, however, think this likely to be a frequent occurrence.

2°. *The Carrot, the Beet, and the Parsnip.*—These roots have been examined respectively by Hermbstädt, Payen, and Crome, with the following results:— Common Carrot. Sugar Beet. Parsnip. (Hermbstädt.) (Payen.) (Crome.)

Water .....	80.0	85.0	79.4
Starch and fibre..	9.0	3.0	6.9
Gum .....	1.75	2.0	6.1
Sugar .....	7.8	10.0	5.5
Oil .....	0.35	—	—
Albumen .....	1.1	?	2.1
	100.	100.	100.

The above analyses are very imperfect, and require

to be repeated. Horsford determined the proportions of water and protein compounds in a carrot and a red beet, grown at Giessen. The following were his results per cent.:— Protein compounds.

	In natural state.	Dried at 212 deg.
Carrot .....	86.10	1.48
Red beet ....	82.25	2.04

The dry matter in these roots is by these experiments richer than that of the potato, in compounds containing nitrogen.

3°. *The Cabbage.*—I regret to say that our present knowledge of this valuable esculent is almost nothing. In my laboratory, the proportion of water in the leaves of several varieties of cabbage has been found to average 92 per cent., and in the stalk 84 per cent. The dry solid matter of the leaf contains from 7 to 20 per cent. of inorganic or mineral matter, in which there is much sulphuric and phosphoric acids.

The dry matter of the cabbage is unquestionably very nutritive, though the proportion of protein or supposed muscle-forming constituents, has not as yet been determined.

The flower of the cabbage, however (cauliflower), in the dry state, has been found to contain as much as 64 per cent. of those compounds, gluten, albumen &c., or more than any other known vegetable substance. The common mushroom in the dry state is the only vegetable as yet known, which approaches to this proportion.

Were it possible to dry cabbage, therefore, it would form a very concentrated food.

§ 6. RELATIVE NUTRITIVE PROPERTIES OF THE POTATO, TURNIP, CARROT, MANGOLD WURTZEL, AND CABBAGE.

The large proportion of water in the turnip, carrot, and mangold-wurtzel is a point of much importance in reference to their nutritive and economic value. This proportion varies in different samples and varieties—though the extent of this variation has not yet been ascertained by a sufficiently numerous set of experiments. The following table exhibits the different results hitherto published. Those marked J. were obtained in my laboratory.

	Einhof.	Playfair.	Hermbstädt.	Horsford.	J.
White turnip .....	92	87	79	..	..
Yellow (Swedish) .....	87½	85	80	83	88, 88½,
Purple top do. ....	..	..	..	..	87½, 88½,
Kohl rabi .....	86	..	78	88	..
Red turnip .....	..	..	..	81½	..
Mangold wurtzel .....	..	..	..	..	84½, 85, 86½
Cabbage .....	..	..	..	..	92
			Payen.		
Sugar beet .....	..	..	85	..	..
Red beet .....	..	..	..	82	..
			Hermbstädt.		
Red carrot .....	86	..	80	86	87, 80
White do. ....	..	87	..	..	80

The differences among these results, or their important relation to the economic value of the several roots, will become more striking if, instead of the water, we consider the proportions of dry solid

matter which they severally contain, according to the different experimenters. These appear in the following table, which exhibits the per-centage of dry matter in the different roots named:—

	Varieties of Turnip.				Mangold-Wurtzel.			Beet		Carrot.		
	White.	Yellow.	Purple top.	Kohl rabi.	Red.	Long red.	Short red.	Orange globe.	Red.	Sug.	Red.	White.
Einhof .....	8	12½	..	14	..	..	..	..	..	..	14	..
Playfair .....	13	15	..	..	..	..	..	..	..	..	..	13
Hernbstädt .....	21	20	..	22	..	..	..	..	..	..	20	..
Horsford .....	..	17	..	12	18½	..	..	..	18	..	14	..
Johnston .....	..	{ 11½	{ 11½	..	..	15½	15	14½	{ young.	..	13	20
Payen .....	..	{ 12	{ 12½	..	..	..	..	..	{ 15	..	..	..

In reference to the nutritive value of these roots, the above table presents to us three considerations.

1°. That in the same kind of root and even in the same variety the proportion of solid nutritive matter varies very much. Thus the white turnip, according to three authorities, contains 8, 13, and 21 per cent. of nutritive matter; while in the yellow turnip the solid matter varies from 11½ to 20, in the kohl rabi from 12 to 22, and in the red carrot from 14 to 20,

My own experience, however—and it is supported by all the other results—inclines me to reject the numbers of Hernbstädt as generally too high. They would, I fear, form a very unsafe basis for any reasoning as to the economic value of most of the root crops of the above kinds which are raised in this country.

Rejecting these, therefore, we have the solid matter in the yellow turnip varying from 11½ to 17 per cent., or from 2 to 3—some crops containing one-half more nutritive matter, that is, in the same weight, than other crops. In other words, 20 tons of one crop may be as feeding as 30 tons of another. This is a very important fact in reference to the actual value in feeding cattle of any given crop of yellow turnips, and has probably much to do with the very discordant results obtained by different farmers from the use of this kind of food in feeding or fattening their stock.

In the turnips of this winter (1846 and 1847) some peculiarity has, in certain districts, appeared. They do not feed so well as usual, and, by practical men, are said to be *watery*; though, whether they really contain more water than usual or not, no one has as yet thought of examining.

2°. Taking the mean of the other proportions of water in the white and yellow turnips, the mangold-wurtzel, and the carrot, we have for the rela-

tive amount of sold food in these four roots the following numbers:—

Turnips.			
White.	Yellow.	Mangold-Wurtzel.	Carrot.
10½	13½	15	14

so that the yellow turnip and the carrot, in so far as these numbers are to be depended upon, are worth one-third more than the white turnip—while the mangold-wurtzel is nearly one-half more nutritive than the white turnip, and about a ninth part more so than the yellow turnip.

3°. But if we compare these numbers with the average proportion of solid matter contained in the potato—25 per cent.—we see that even the mangold-wurtzel contains only three-fifths of the solid nourishment present in the potato, while it of course conveys into the stomach a proportionably large quantity of water. Another point, however, is to be borne in mind in comparing those two roots—that the protein compounds exist in the solid matter of the mangold as well as in that of the yellow turnip in larger average proportion than in that of the potato. Thus they contain respectively, when dried at 212° F.—

	Protein Compounds.	Other nutritive matter.
The dried potato.....	8 per cent.	82
yellow turnip....	9½ ..	80
mangold-wurtzel	15½ ..	75

or the protein compounds in the mangold-wurtzel are nearly double of what they are in the potato. This is a very important fact, and is deserving of further investigation. If, as at present supposed, the protein compounds serve the purpose, when eaten, of supplying the materials of their muscle to animals, the mangold-wurtzel ought to be considerably superior in this respect to the potato. Even in their natural state this should be the case,

since 100 pounds of the mangold-wurtzel contain of these protein compounds, according to the above determination,  $2\frac{1}{2}$ , while the potato contains on an average only 2 pounds.

It is to be desired, therefore, that the mangold-wurtzel should be more generally cultivated wherever circumstances are favourable to its growth.

In reference to the subject of the preceding paper, I think it proper to add two observations.

1°. Though I have been able to introduce many new facts—the result of researches made in my own laboratory—yet the intelligent reader cannot fail to have been struck with the imperfect state of our knowledge in regard to these vegetable substances. And yet, upon these green crops, the present condition of our improved or alternating husbandry almost entirely depends. Upon a knowledge of their composition, the most economical and profitable use of these crops in the feeding of stock can alone be securely based. Why, then, should so important a branch of rural economy be permitted to rest on so insecure a foundation? Why should we remain so long in ignorance of the true nature of the relative nutritive property of crops so very important? Their composition is a matter of national concern. Government might be supposed likely to interest itself in procuring the solution of our doubts. But have our national agricultural societies no fund to devote to subjects so important? or, where funds abound, is knowledge wanting? It is to be regretted that the income of the Agricultural Chemistry Association is not sufficient to enable it alone to solve all these important chemical questions, within any reasonable period of time.

2°. It must have also struck the reader, that, among all the crops above mentioned, there is none which can be recommended as a useful substitute for the potato. The mangold-wurtzel comes nearest to it; but still, while 100lbs. of potatoes contain 25lbs. of dry nutritive matter, the same weight of mangold-wurtzel contains only 15lbs.

The potato is inferior to rice, in containing ten per cent. more water. Mangold-wurtzel is inferior to the potato, in containing ten per cent. more water still. It is this large proportion of water which, as a main reason, renders all these root crops inferior to grain: it is for the same reason, chiefly, that the turnip and mangold-wurtzel are inferior to the potato.

There is, however, another reason also why the potato cannot be replaced by these other roots. In the healthy ripe potato, the principal ingredient is starch. The properties of this starch are such as to allow the potato to be boiled, and in other ways cooked, without sensible loss. Not so the turnip, the carrot, or the mangold-wurtzel. They contain much sugar, and of this a considerable proportion is removed by boiling in water, or is destroyed by roasting, and similar methods of preparing for the table.

I have also said, that these roots, instead of starch, contain a large proportion of a jelly-forming substance, to which the name of pectic acid has been given. It has not yet been ascertained in what degree this pectic acid can replace the starch of the potato, and of our cultivated grains, as a nourishing food for man.

Used alone, however, I think we may fairly conclude that the turnip, carrot, cabbage, &c., can never take the place of the potato as food for man; as, in the feeding of cattle, some dry food must be given along with them, if they are to become healthy articles of nourishment.

Bread made from wheaten flour, with a certain admixture of turnips or mangold-wurtzel, has, therefore, been recommended above as nutritive and economical. To such admixture there can be no theoretical objection, provided the taste of the people takes to them, and they prove to be really economical. I fear, however, that the final result must be, should the potato continue to fail, that a diet of grain, almost alone, must succeed to a diet of potatoes.—Journal of Agriculture.

#### GUILDFORD FARMERS' CLUB.

The monthly meeting of this club was held on the 2nd of March last. A large number of members and visitors were in attendance. Among those present were H. Drummond, Esq. (president), Mr. G. Turvill (vice-president), R. A. C. Austen, Esq., and Mr. Messenger (joint secretaries), Lord Lovaine, J. M. Molyneux, Esq., Captain White, W. H. Smallpeice, Esq., R. Goldhawk, Esq., Messrs. Page and Wilson (of the Dorking Farmers' Club),

Messrs. Isaac Ellis, jun., and John Ellis, jun., S. and C. Evershed, &c.

After the minutes were read, Mr. G. TURVILL rose to introduce the subject for the evening, which was "On the Cultivation of Mangel Wurzel."

He said: The subject which I have been requested to bring before you, for this evening's discussion, is one deserving great attention, on what may be called our light convertible soils; and, as

we are greatly indebted to the vegetable kingdom for the supply of food for man, I think the mangel wurzel ranks amongst the most useful in certain localities of our islands. I will divide the subject into four distinct heads—1st, the best mode of preparing and cultivating the soil for the plant; 2ndly, the time for planting, quantity of seed necessary, and the proper food to develop the plant; 3rdly, the best method of consuming the roots, and for what animals they are most adapted; and 4thly, the soil and climate least calculated to produce them. Autumn cultivation is the most certain method of securing your plants (never ploughing in the spring), and is particularly desirable on strong, retentive soils. In Essex, last spring, we hear they lost nearly all their plants; and we may reasonably suppose, on their strong soils, it was in consequence of its being ploughed in the spring of the year. I have been selling mangel wurzel to the cow-keepers in London, in consequence, delivered at 30s. per ton, which will make a good return per acre. We find, by experience, that the plants thrive best where the soil has been once deeply cultivated. If the action of the atmosphere during winter has not sufficiently solidified the surface, it should then be compressed by mechanical aid; then the manure (of which I shall hereafter speak) should be applied. A heavy drag-harrow then used will be generally sufficient to incorporate it in the soil, and produce a necessary tilth for covering the seed. The plan generally adopted in this country is to grow the mangel wurzel on a level surface, which I think is best, not causing so much risk in getting a plant. Then drill in rows, not exceeding four feet apart, nor less than three; I think three-and-a-half feet a better distance between the rows. The plants should be placed about two feet apart in the rows, and when strong enough, give them as much deep horse-hoeing as can be spared; for by loosening the earth, the roots, as well as the leaves, are benefited by the organic gases. I shall now proceed to the second part of my subject—namely, the proper time for planting, the quantity of seed per acre, and the food necessary to develop the plant. The last week in April, or the first in May, is considered the best time to plant mangel wurzel; but in very warm situations it would admit of being planted rather later. If planted too early, they are liable to run to seed. I have found from 4lb. to 6lb. of good seed per acre produce a good plant, although some persons plant half-a-bushel, which will exceed 9lb. The seed should never be deposited at too great a depth—say from one to one-and-a-half inches. It is found by experience that transplanted mangel wurzel will not produce so large a bulb, growing only very short and pollardy,

which fully accounts for the most experienced growers using seed liberally; and I should strongly recommend all growers to select the best roots every year to raise their own seed; it will then only form a small item in their expenditure, and at the same time it will secure to them a root far superior to that which we have purchased from the London seedsmen. In reference to their food, as they are potash plants, they require little, if any, phosphoric acid, which is the product of bones. Liebig tells us that scarcely any trace of this constituent is found in them, every 100 parts containing 88 parts of potash and soda, the remaining 12 parts salt of magnesia, and only slight traces of phosphate of lime. The principal use of the application of bones to the mangel wurzel is to supply the magnesia, which probably may be supplied cheaper from Epsom salts. Some few experiments, I hope, will be tried this spring by the mangel wurzel growers in this district, relative to its comparative effects and value. I remember reading some experiments (tried by Mr. Pusey) on the growth of mangel wurzel with bones, by putting on a good quantity, and then increasing the proportions, to test the advantage. He of course found none. I suppose this was before Liebig had given us the knowledge which I now hope is generally possessed. I think it may be interesting to some present, to look a little into the composition of mangel, when in a fit state to be removed from the field. We shall find by slicing them and drying them, they lose 90 parts out of 100, which is pure water, supplied by the rains. You may think this a very great loss to the bulk, but you will find turnips and potatoes contain about the same. Now we have only to look to the 10lb. left from the 100lb.; and if we burn this, we shall discover we have lost 9 parts more. Now, the latter portion being the organic part of the plant, or, in other words, that which is derived from the atmosphere, we have in reality only 1lb. to supply as food for every 100lb. removed from the field. And, as 1lb. of ash gives 100lb. of mangel, we shall require to furnish for every ton so produced, per acre, 22½lb. of the mineral ingredients; then, assuming 30 tons per acre to be an average crop, we remove 675lb. of ash; and as potash and soda furnish 88 per cent., and the remaining 12 parts are composed of salts of magnesia, with slight traces of lime, we have to supply 594lb. of the former and 81lb. of the latter, and so in proportion for any given quantity removed per acre. Last year I grew five pieces of mangel—in the whole eight acres: only one was manured with dung, which was not by any means superior to the others. The best were grown from 1 cwt. of dissolved bones and 20 bushels of wood ashes mixed together and sown broadcast, 2 cwt.

of Peruvian guano, and 3 cwt. of nitrate of soda per acre. The land not being ploughed in the spring, the manure was all sown broadcast, and incorporated in the soil by means of a drag-harrow. I prefer sowing the manure to drilling it, as you then allow all the roots of the plant the means of carrying out the laws of nature, for which they were given, to supply food to the bulb. This piece produced 40 tons per acre, at an expense of manure—dissolved bones, 6s.; 20 bushels wood-ashes, 8s. 4d.; 2 cwt. Peruvian guano, 21s.; 3 cwt. nitrate of soda, 50s.: making a total of £4 5s. 4d. Mr. Stafford, of Godalming, a young mangel-grower, last spring inquired of me the best manure for mangel. I recommended him to use—1½ cwt. nitrate of potash, £1 19s.; 1½ cwt. nitrate of soda, £1 4s.; 2 cwt. of Peruvian guano (not having any Peruvian, he applied Saldanha, costing 15s.); total expense, £3 18s. per acre. And to test its efficacy, he manured part of the field with 20 cart-loads of good dung, the expense of which, with drawing out and spreading, amounted to 6s. per load, making a cost of £6 per acre. The manure direct from commerce was by far the most successful, it developing the crop full one-third in addition. It is simply because the dung does not contain sufficient saline matter, the mangel requiring little else to mature them; and, as I have before stated, they remove a great quantity from the soil. I have found a considerable advantage every year by strewing between the rows 3 or 4 cwt. of common salt per acre. When the mangel is strong enough to bear it, let it then be well horse-hoed, the expense about 5s. per acre, which has produced in every instance an additional three tons. I think, in the early stage of their growth, a little Peruvian guano of great importance to the plant, as the great amount of ammoniacal salts, with other organic matter that it contains, is assimilated by the roots, till the leaves are sufficiently developed to inhale it from the atmosphere. In some places I used only 1 cwt. of Peruvian guano per acre, sown from a seedlip after the seed was drilled, the sower taking two rows at a time, and strewing it upon the rows, and then harrowing it in with the seed—a tedious process, I admit; but a man can do four acres a day. I prefer this plan to stilling it under the seed, as the first falling rain renders it in a state of solution around the young plant, near the surface, where it has greater capabilities of absorbing its food. The saline substances, of course, had been previously applied. Comparatively speaking, man has but a small part to perform, having only to supply 1lb. to the 100lb. removed from the soil; but we must remember that it is by furnishing this 1lb. liberally, with its equivalents, that the great laboratory of nature will

then yield her benign influence. I may remark that there are five species of beet, of which three are cultivated: these are the *white beet*, the *sea beet*, and the *common beet*, of which last the different kinds of mangel wurzel are only varieties. The white beet has succulent leaves with very thick ribs, and is largely cultivated in gardens in France, Switzerland, and Germany, as a vegetable for the table. The green part of the leaf is commonly a substitute for greens and spinach; the thick mid-ribs and stalks are also dressed like asparagus. This vegetable is generally considered to be more nutritious and wholesome than the cabbage. It has been suggested that this plant might be a good substitute for a fallow on certain soils, and be a useful addition to the plants raised for feeding cattle. The leaves have a sweet taste, from the quantity of sugar they contain, for which reason cattle are very fond of them. With cows, they add much to the milk, and without imparting any disagreeable taste, as turnips and cabbages do. I call your attention to the sea beet, because it is a native of Great Britain; and the best way in which to ascertain the conditions most favourable to the growth of particular plants when under cultivation is to observe the situations and soils in which they are found in their wild state. The sea beet is a common plant on the sea-shores of England and Scotland, particularly in muddy places. This plant more nearly resembles the common beet than the white beet, inasmuch as it forms a large, fleshy root; its leaves are eaten as greens on many parts of the coast. This species of plant is, therefore, what is called a "salt" plant, or one which only grows naturally in situations where it finds a ready supply of the salts contained in sea-water. The quality of soil which it prefers is an admixture of sand and mud, or what is usually described as a sandy loam. The common beet is a native of the south of Europe, where, like all English species, it is found on the sea-coast; it is a plant which, on this account, is apt to be injured by late spring frosts, and should therefore never be grown in high situations. Lands sheltered from the cold winds, and open to the sun, will be most favourable to it. I shall now proceed to the third part of my subject, and endeavour to show for what animals the mangel is most adapted, and also if it is not capable of being applied to a higher and more useful purpose as food for man, in the present season of scarcity. As mangel contains an excess of water, it is therefore advisable to reserve it till the spring of the year, in order that a portion of this element may evaporate; and when vegetation commences, a chemical action takes place, the starch with which the plant abounds being converted into sugar, similar to the starch in barley when malted.



This scientific information is fully proved by practical experience, as we find animals thrive faster on them during the spring and summer months. I have generally used it till August. Beasts, sheep, pigs, and all poultry will consume it eagerly. I have for the last month been feeding some working bullocks with one bushel and a half of mangel per day, with some inferior old hay; the improvement of the animals is truly surprising. Last spring, up till July, I fed sheep on them, with cut tares and trefoil, giving a portion of each in their troughs, with plenty of succulent food. The animals were as eager for the mangel as you see sheep for hay when the ground is covered with snow, making it difficult for the shepherd to get among them. When given to pigs it is generally to those that are not full grown; they, however, will require beans, peas, or lentils, containing gluten, which is formed from the phosphoric acid, and is the bone and muscle-making constituent, without which they will gain fat but not size. The same thing must be observed with regard to young bullocks and young sheep; they likewise require hay or corn to furnish materials to develop the frame. Liebig highly recommends mangel for feeding purposes, from the great amount of nitrogen it contains. I think any of us who may have been unfortunate enough to have had a quantity rotted from the frost, or heated in the stack, may speak with confidence to the ammonia contained in them, this being a combination of 14 parts of nitrogen and 3 of hydrogen. Dr. Lyon Playfair has published a statement, which has appeared in the *Gardener's Chronicle*, relative to the comparative value of wheaten flour and beet as nutriment for human food. He states that 6 stone of beet, costing 1s., are equal to 1 stone of flour, costing 2s. 10d.; and that there are two functions in the animal economy which food has to perform: one is to preserve the parts of the animal machine, and restore those which are wasted; the other is to sustain the temperature necessary to keep it in action. Now, 1 stone of wheat, costing 2s. 10d., is equivalent in respiratory value to 8 stone of beet, costing 1s. 4d.; so that in this point of view also beet has a superior economic value. I was in hopes to have been able to submit to the meeting specimens of bread made partly from mangel wurzel; but it has not reached me from the party from whom I expected it. Lastly, I will refer to the soil and climate least adapted to the growth of mangel wurzel. We find this root will not flourish in wet, cold soils, or at any great altitude above the level of the sea. The farm I occupied in Hampshire, on the upper green sand formation, was a good hop, wheat, and clover soil; but the mangel wurzel would not thrive there. I merely mentioned this,

that it might induce any one so situated to cultivate it only on a small scale; for when 400 or 500 feet above the level of the sea, the Swedish turnip will be grown to greater advantage.

After the address the Chairman put questions as to whether Mr. Turvill recommended common rolling for compressing the soil, as he had seen on headlands where the soil had been trodden down some very fine mangel, and whether Mr. Turvill recommended subsoiling.

Mr. TURVILL, in reply, preferred common rolling; subsoiling might be resorted to, previous to sowing.

THE CHAIRMAN.—Did I understand bones were not required?

Mr. TURVILL.—Only to supply the magnesia.

Mr. A. C. AUSTEN said he had had no experience in growing mangel-wurzel, and he felt that the communication made by Mr. Turvill was a valuable one, and contained some important suggestions. Though agreeing with him mainly on the habit of the plant, he (Mr. Austen) did not consider it a potash plant, and therefore differed with him on the mineral that was to be supplied for its growth. Mangel-wurzel resembled rather more the beet plant generally cultivated in France than the common beet, the native of Germany, where the winters were colder and the summers warmer than in this country. The English plant was a hybrid plant—a cross of the *beta maritima* and the red beet; and like nearly all hybrid plants, it was of earlier growth than its progenitors. It was of the same family as the goosefoot, which grew plentifully in places kept continually moist. Doubtless they had noticed it growing by the side of their dung heaps, where it often grew in great abundance, nourished by the saline moisture emitted from the manure. The wild spinach which grow at the sea side was of the same order, as was also the atriplex, the common white spinach, and others of that character. They could only grow wild in situations where there was a ready supply of the salt contained in sea-water. Being sal-silaceous plants, they absolutely required that supply. The muriate of soda in the sea water seemed to be the ingredient necessary. In the cultivation of beet-root in France, where that plant was so extensively grown for the production of sugar, they employed in many instances saltpetre as a manure. This might seem expensive enough; but it was to be remembered that owing to the duty, there was not that difference between the price of saltpetre and common salt in France as there was in their own country. Taking into consideration the nature and constitution of the plant, and the locality where its prototypes were found in a native state, he (Mr. Austen) thought that the best as well as the cheapest ma-

nure that could be applied to the cultivation of mangel-wurzel would be the impure salt of commerce, procured solely by the evaporation of sea-water, and therefore containing all the ingredients for the purposes of the plant which sea-water contained. He thought this would be the cheapest manure, as there was no expense of refining. Some experiments were made in France touching upon this point by M. Girardine. For two months he watered one beet-root with sea-water and another with pure water. On analysis at the end of that time he found that the plant upon which sea-water had been applied contained one-tenth more carbon than the other. That was, the sea water had enabled the plant to assimilate from the air a greater amount of carbon than did the application of pure water.

Mr. TURVILL, while admitting the soundness of Mr. Austen's remarks, said his experience was always to the effect that nitrate of soda did better than the common salt. They found the leaves of the plant where the former had been applied looked of a healthy green colour, while the latter caused them to look yellow. Mr. Drummond followed out different systems of cultivating mangel, and he would remember that when he (Mr. Turvill) went to look at some of his, he remarked, on seeing one place that salt had been applied, the leaves looked so yellow. He next alluded to the remark that used to be made by the growers of mangel-wurzel, that the plants took such a lot of dung.

Mr. AUSTEN said, they would take up all the alkalies they could find. So much at one time were they thought to exhaust the soil, that their very name, which was derived from the German, was "the root of scarcity." The French called it the same, but having learnt a better mode of cultivating it, they now called it the root of abundance.

Some conversation then arose as to what sort of mangel-wurzel was the better to cultivate—long-reds, or yellow-globes.

Mr. ISAAC ELLIS remarked that he used to prefer the long-reds till two years ago, when happening to be at the Smithfield meeting, and conversing with a Scotch gentleman upon the subject, he told him that the yellow-globes required to be placed closer than long-reds. He (Mr. ELLIS) tried the experiment of planting yellow-globes closer than the long-reds, and found it answer; he planted them in rows 27 inches apart and at intervals of 22 inches in the row.

Mr. JOHN ELLIS, after expressing the gratification he had derived from Mr. Turvill's address, gave a detail of an analysis, made by Mr. Hyatt, of the comparative amount of nutritious matter contained in turnips, Swedes, mangel-wurzel, and sugar beet, which shewed a great superiority of the mangel over Swedes and turnips. Taking a thou-

sand parts of each, he found turnips contain 42 parts of nutritious matter, Swedes 64 parts, mangel-wurzel 135 parts, and sugar beet 146 parts. Other analyses differed in a certain degree, but all shewed a superiority of mangel-wurzel over both Swedes and turnips. With regard to ploughing in the autumn instead of the spring, and compressing with the drag-harrow, he (Mr. Ellis) thought it would not be expedient on heavy lands. He agreed with Mr. Turvill on the quantity of seed required, and the time of planting; but he should be glad if Mr. Turvill would give them some explanation as to the best mode of depositing the seed. He (Mr. Ellis) had experienced, occasionally, some difficulty in covering the seed. He used Bennett's drilling machine, and found that neither the rake nor harrow would at all times cover the seed properly. He should also like to be informed whether there was any other reason for mangel not growing well on elevated situations, than that such situations were deficient in alkalies or general vegetable matter, in consequence of the saline particle being washed down by the rains.

Mr. TURVILL deposited the seed with a common Suffolk drill. He had not experienced any difficulty in covering the seed. He did not consider that the reason that mangel would not grow in high situations was because of the deficiency of alkali in such situations. On these lands in Hampshire they grew hops, wheat, clover, &c., which they could not do if there was a deficiency of the alkalies. The reason they could not grow mangel was, that plant would not flourish in cold bleak situations, let the quality of the soil be whatever it would. He did not believe any manuring, however liberally applied, would cause mangel to flourish on Leith Hill, which was 995 feet above the level of the sea.

Mr. AUSTEN then spoke of the advantages derived from the application of liquid manures to the cultivation of mangel-wurzel. Lord Lovelace had grown 50 tons per acre by such application.

Mr. ISAAC ELLIS said he had better wheat after mangel and carrots, than he had even after ley. He then described his mode of planting his mangel, a process which he performed himself. He deposited six seeds in each hole, and used 4lbs. of seed to an acre.

Mr. Austen then made some remarks on the flesh-producing capability of mangel-wurzel, and noticed the fact that while the generality of plants emitted oxygen, mangel emitted nitrogen.

The discussion was then declared at an end, and it was arranged that at the next monthly meeting, Mr. Drummond, the president, with the assistance of Mr. Goldhawk, should introduce the subject of the cultivation of flax for feeding purposes.

## SEWAGE MANURE,

IN REFERENCE TO ITS USE FOR AGRICULTURAL PURPOSES.

There is no subject, perhaps, within the memory of man, connected with the proceedings of the British legislature, that has developed more important matter for national reflection and practical operation than the facts elicited by the Health of 'Towns' Commission—an inquiry which, while it has made us acquainted with the most appalling evidence of the diseases of humanity consequent upon the absence of municipal precautions, has also pointed out the means by which the calamity may be in future permanently averted; those means, too, having not only the advantage of eradicating what has been hitherto so fatally noxious to human health, but at the same time—as has been more obviously shown by a subsequent inquiry—of providing a new agent for augmenting the productions essential to the sustentation of man. In a word, more commodious and sanatory dwellings for the labouring poor, improved ventilation, and an extended system of sewage, have been the judicious recommendations of these respective investigations.

It is in reference to the latter—namely, sewage and its invaluable properties for husbandry purposes—that a few useful hints may be brought under the notice of agriculturists; for at no period could they be more appropriately made known than the present, when the peculiar position of the British farmer, and the direful necessities of millions (through a visitation of Providence), alike claim the sympathy and co-operative suggestions of the community at large.

It is not a little remarkable that while the system of agriculture of this island is admitted to be transcendently superior to that of any other country, one of the most valuable agencies for stimulating the produce of the soil should have been at all times so little regarded by the English cultivator. The collection of manure in other countries, and that too in a manner totally different from anything ever adopted in this country, has for ages constituted a prevalent and most lucrative pursuit. In China, for instance, its collection is an object of so much attention that a prodigious number of old men, women, and children are, we are told, constantly employed about the streets, public roads, and banks of canals and rivers, with baskets tied before them, and holding in their hands wooden rakes to pick up the dung of animals, and offal of any kind that may answer the purpose of manure.

In various parts of a farm, and near the paths and roads, large earthen vessels are buried to the edge in the ground for the accommodation of the labourer or passenger who may have occasion to use them. In small retiring-houses, built also upon the brink of the roads, and in the neighbourhood of villages, reservoirs are constructed of compact materials, to prevent the absorption of whatever they receive. Such a value, in short, is set upon the principal ingredient called *ta-fou* (night-soil) for manure, that the oldest and most helpless persons are not deemed wholly useless to the family by which they are supported.

In Belgium, as in China, manure is also an article of trade. The towns let the cleaning of the streets and public retiring places at great rents. In every town, travellers tell us, there are sworn brokers expressly for the purpose of valuing night-soil, the price of the different manures varying from 5 to 24 francs the cart-load of 1,500 lbs. The most efficient applications of the town manure in that country are in the liquid form; it is there applied, not by a water-cart, but by hand labour: a man carries on his back a *dossier*, from which he sheds it out and distributes it.

In Paris the very stuff which in London washes through the streets and under the streets of London into the Thames, is carefully collected. At Meurice's Hotel, early in the morning, may be seen some 50 or 60 large quarter-casks rolled up out of the subterraneous part of that establishment, containing the water of the water-closets, and the water from washing, all of which is sent into the country, and "people (says the conductor of that house) are glad to fetch it away." While in the British metropolis it is a well-ascertained fact, so slightly is such an invaluable commodity appreciated, that "three loads a day of dung are dropped in Regent-street, between the Quadrant and Oxford-street! and that the amount of actual solid fertilizing manure, deprived of all its liquid diluting substances, that goes into the Thames, is, from the different sewers, actually 725,000 tons a year!" In short, the whole of the towns on the continent make an annual revenue by the cleaning out of cesspools.

To a limited extent, the use of sewage water as an efficacious manure has been availed of by the farmers in this country, particularly in Scotland. At Stirling, the well-known Mr. Smith, of Deans-

ton, not very long since instituted a set of experiments which produced the most satisfactory results. Some land was laid out in portions, in rather a sandy loamy soil. First, a division was manured with farm-dung and ashes mixed, at the rate of 12 tons per acre, and at a cost of 48s.; a second portion, with the same compost, giving 16 tons per acre, and at a cost of 64s.; a third division, with guano, 2 cwt., costing 16s.; a fourth with guano, 4 cwt. per acre, at a cost of 32s. Another ridge, similar in extent to the whole of this, was manured with sewer water, at the rate of 16 tons per acre, and taking it at 3d. per ton the cost would be 4s. The average produce of the whole variety (the different specimens were not ascertained separately) was, with the dung and guano, 45 bushels per acre of good barley; that with the sewage water averaged 42 bushels per acre—showing that this small quantity of 16 tons had the effect of coming very nearly up to the dung and the guano, but showing also that more liquid manure might be given with safety. The 16 tons were applied twice; all the others were once. The sewage water was taken from a tank, into which it flows from the streets of Stirling. A second experiment was made in raising turnips (the green top yellow) upon a similar soil, to the extent of a quarter of a rood, with two tons of sewage water, equal to 32 tons per acre, costing 8s.; the produce 28 tons per statute acre of bulbs—so that a ton of sewage water very nearly raises a ton of turnips. Another experiment was made in 1845, also by Mr. Smith. This was by retaining the night urine of two people during a given time, to enable them to apply it to a rood of land. This being mixed with ashes, to make it applicable in that way, gave 27 tons per acre of turnips; and calculating from that, Mr. S. found that the urine of two persons would suffice for an acre per annum. The remainder of the ground was manured somewhat differently: one with 500 cwt. of guano, the produce 32 tons per acre; one with farm-yard dung (20 tons), 31 tons per acre; another with ash-dung (30 tons), 31 tons of bulbs per acre; one with ash-dung alone (12 tons), 23 tons per acre. Another experiment was made upon a farm at Glasgow, where the liquid manure was put over the land, and the growth continued during the whole of the winter of 1845-6 in a very remarkable way. That season, it is well known, was a great season for grass everywhere; but notwithstanding that, Mr. Smith says it was distinguished before all the grass of the country round, he having seen in the beginning of December, 1845, 43 Irish bullocks wading to the fetlocks in grass upon some of their fields, and eating it most greedily, while the fields upon the farms in the neighbourhood were perfectly bare.

Mr. Harvey, of Glasgow, also applied sewage water to some wheat land before the crop was sown, and he had a luxuriant crop, more so than the other crops in the neighbourhood, and upon land which was rather cold, backward land.

The following is another instance, showing how the solid manure of farms may be converted into a liquid form. A gentleman near Dumfries has made a tank, into which he has carried all the water from his farmstead and his house, the sewage of his house, and also has put in some solid manure, and has applied water to it; and just with a common pump, which is worked by two men, he was, during the whole of the winter of 1845, irrigating his lawn, which produced the most beautiful flush of fine grass. The operation was performed with the hose-pipe early in the morning, and without emitting any annoying smell. Indeed, when the sewage water is sufficiently diluted to be most beneficial to the earth, there is very little smell.

The result of the comparison between the effects of liquid and solid manure is shown in the following experiment: Mr. Barber, of Muirdroachwood, had 27 acres of land before his house, and the land was so poor that it originally only fed two cows; he had 40 cows and four horses in his stable close to his house. He put the dung of 40 cows into a tank, and passed a rill of water through the tank, and irrigated 22 acres. With the miscellaneous refuse of his house, the scullery, he irrigated five acres. The produce was so large that on that same plot he has been enabled to feed the 40 cows and his four horses.

Another very important fact is also deserving of mention. At Edinburgh, where sewage water is also very extensively used, land which formerly let near the sea, sandy land at not more than half-a-crown an acre, and from that to five shillings, has been let regularly for many years at £20 an acre.

Such are some of the results of the application of sewage manure by practical agriculturists in Scotland. Nor are there wanting similar instances by others south of the Tweed. Mr. Dixon, the well-known horse-dealer, by the application of liquid manure—in this case urine and water, which is very similar to the sewage water—has kept 100 horses (as far as grass was required) from the Italian rye-grass grown upon four acres. The water is collected from the stables by small covered drains, and conveyed into a tank in the yard. Mr. Dixon, in his evidence before the Parliamentary Committee last session, says:—"I have a drain down the centre of the stall, connected with the stink-trap, before it is carried away into the urine-tank; but I have from time to time discovered the value of the urine to be so great that I have altered

my mode of drainage, to catch more forcibly all its power with it; because the urine contains various descriptions of food, the life-restoring principle, which is the ammonia. Ammonia revives us when we have lost blood, and it does the same to the plant. The salt is the life-sustaining principle, and we lose both these when we allow the straw, which contains lime, to evaporate the liquid. I have endeavoured, as I have discovered the value of urine as gold among the metals, to catch it immediately it falls, and catch the whole of it with all its power." Mr. D. added, that in his stables each horse would produce three gallons of urine in a day, and eleven gallons of urine he deemed sufficient to manure one acre of grass.

For the irrigation of meadows sewage manure has also been applied with similar efficacy. Mr. Magnay, a farmer and land-agent in Yorkshire, has practised the use of sewer water extensively in irrigation, and has laid out considerable tracts of land in Cumberland for that purpose. "My attention," he says, "was first drawn to the subject from the circumstance of a great quantity of water flowing through a village which I considered of value: I applied it to about 20 acres of meadow, which I increased to four-fifths of the produce which had been previously obtained from it. The most advantageous way of applying it was by a level gutter, laying it out in levels so as to flow over all points of the level alike, passing over the plane at a distance of about 21 yards, and the re-collecting it and carrying it to a further level down again."

We believe one of our most intelligent and experienced Essex farmers, Mr. Baker, of Writtle, entertains doubts as to the preference of liquid manure over solid manure, by reason of the expense of carriage, if conveyed any distance by water-carts. As this opinion may probably be held by others, it may be useful to give the results of Mr. Edwin Chadwick's inquiries, at home and abroad, into the applications of liquid manures:—

"I obtained (says Mr. C.) an account of the irrigations with the refuse of Milan (which is given in the Report of the Health of Towns' Commissioners), and in company with Dr. Arnott I visited the irrigated meadows near Edinburgh. I also visited the Clipstone water-meadows, formed by the Duke of Portland, near the town of Mansfield. From the information collected in this stage of the inquiry, I conceived the conclusion established that there are no means of applying manure so cheaply and productively as in the liquid form. Some inquiries as to the expense of cleansing streets by watering by the hose, as at Philadelphia, where they have a constant supply of water, instead of by the watering-cart, showed that two men, when

pipes were properly fixed, might water an extent of street equal to nearly twenty acres per diem. It suggested itself to me that this instrument might be made the means of achieving what was wanted for the distribution of liquid manures. In the summer of 1842 I was staying with a friend—Mr. Thomson, of Clitheroe, where Dr. Lyon Playfair was also staying. Mr. Thomson has extensive print-works, where he employs about 1,000 persons, and from the works has much liquid manure. I then advised the application of this manure by means of the hose. So far as I am aware, this was the first suggestion and experiment of the kind. The only modes of applying liquid manure then in use were by the method of irrigation, by the water-cart, or by hand. The land adjacent to Mr. Thomson's works was a stiff clay. I advised that it should be previously drained, and that Mr. Smith, of Deanston, should be consulted as to the drainage, and on the mechanical appliances for applying the refuse. Mr. Smith very soon entered into my views on this subject. The drainage was carried out as he recommended. Mr. Henry Thomson, jun., who took great interest in the subject, carried out the first experiment of the application of the refuse by the hose, which appears to me to have been completely successful. In another place in Lancashire I advised a friend to apply the liquid refuse by means of the hose, and to engage Mr. Smith to carry out the preparatory work of land-drainage. Mr. Thompson pumped up the sewage water from a well or shaft, into a tank made at the top of a field about 80 feet above the rest of the farm. He found that under that 80 feet pressure, by means of the hose, with the labour of two men, one to remove the hose, and another to direct the nozzle, they could distribute about 2,000 gallons of liquid manure in an hour (per acre). The important result was this: that it was to be accomplished by the labour of two men; and suppose we give 2½d. or 3d. an hour, that delivery of the 2,000 gallons was accomplished for 6d. They tried the water-cart (this was on land immediately adjacent to the farm); the water-cart, and expense of delivery of the same quantity by that was, I think, about 5s.; the expense of leading and spreading stable-dung was about 11s. That was about the relative mechanical cost: 6d. for the delivery by the hose; 5s. by the water-cart; 11s. or 12s. in the distribution of stable manure." There is this great advantage also (adds Mr. C.) in favour of the hose, though you cannot give an estimate in money value as to the relative amounts—that in the distribution by the water-carts there is the poaching of the land by the weight of the cart and hose, and probably the damage of which would be more than 5s., and, of course, still

greater damage in the case of the cartage of the heavier produce of stable manure. Mr. Chadwick subsequently says:—"I think these 2,000 gallons of sewer water were found equal to about 3 cwt. of guano, and about 15 tons of stable manure. But there was another important point which was established beyond a doubt, which was, that the friction through the hose, for a considerable length, was much less than we anticipated; for instance, we used half a mile of hose, and, carrying it on the surface, over furrows, and through a ditch, and over a hedge, I think at the end of 800 yards it gave out a jet something, as near as I could judge, of 40 feet, nearly half the height due to the pressure. These experiments appeared to establish the fact that the hose, in many circumstances, for the delivery of a given quantity of water, even considering it as a means for the distribution of simple water, would have been cheaper than the water-meadow itself; and you have the advantage, also, with that, of being able to apply the liquid manure to arable cultivation. With the water-meadow you only apply it to grass land. There are several gentlemen now who, have recommended this process of distribution by the hose, who are now applying it."

The experiments made by horticulturists have also been equally successful. Mr. Pince, a very able horticulturist near Exeter, applies the liquid manure twice a week; and with one of plain water, as he expresses it, in the interval between each watering with the liquid manure, he gets rid of fibrous matter; and to use his own expression, "I give this water with the manure in it so clear, that if you were not to know what it was, you would not object to drink it." Mr. Knight, the horticulturist of Chelsea, is also of opinion, from the successful experiments he has made, that "farm-yard manure will not be much regarded after a few years; people will give attention to the preparation of manure in a liquid state." And another authority, which we have already quoted more than once—Mr. Smith, of Deanston—says, "I have no doubt that when farmers come to know better the fact and advantages of using this liquid, they will make their dungsteeds in covered tanks, and fill their tanks with the liquid, and mix it with their manure."

The experience of the Duke of Portland and others discloses also another curious fact, namely, that the liquid manure is equally efficacious during frost as at other periods.

Here, then, we bring the subject to a close. Enough of practical experience has been brought forward to show the vast benefit that cannot fail to accrue by the general application of this new species of manure to both tillage and grass lands;

and no question is more deserving of a deliberate discussion by those useful institutions, the farmers' clubs, than the information that may be elicited by such of their members as have found their account in its adoption. F.

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### FARMERS' CLUB-HOUSE, MARCH 1.

#### MONTHLY MEETING OF THE COMMITTEE OF MANAGEMENT.

Present—Messrs. W. Anderson, R. Baker, J. Beadel, W. Bennett, W. R. Browne, W. Cheffins, W. Gray, W. Fisher Hobbs, J. Hudson, W. Hutley, Fielder King, T. Knight, E. Lewis, J. Oakley, J. Pain, W. Purser, J. A. Ransome, W. Shaw (of the Strand), R. Smith (of Burley), J. Tyler, and J. Wood;

W. Shaw, 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:—T. Allsop, Esq., Cornmonger Farm, Reigate; B. Edgington, Esq., 6, Duke-street, Southwark; W. Knightley, Esq., Albury Lodge, Newbury; T. Langridge, Esq., Mereworth, Maidstone; J. N. Lee, Esq., Nelson-square, Blackfriars.

The names of fifteen other gentlemen were read for the first time.

A Report was presented, and read from the Committee appointed for the further consideration of Tenant Right, having especial reference to the Bill which had been submitted to that Committee by Mr. Pusey.

A variety of other business was gone through, and at five o'clock the Meeting broke up for the Discussion.

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TESTIMONIAL TO R. M. JAUQUES, ESQ.—On Thursday evening last the friends of R. M. Jaques, Esq., of Easby-abbey, near Richmond, dined together at the Black Swan Inn, York, on the occasion of the presentation of a splendid candelabra to that gentleman, for the great exertions he had rendered in the promotion of the restoration of York races. The Lord Mayor occupied the chair, and W. North Esq., was in the vice-chair. There were also present several gentlemen residing in the neighbourhood, who take an interest in the prosperity of York races, as well as many of the principal merchants and tradesmen of the city. The testimonial consists of a silver candelabrum, which comprises a large centre piece, with a tripod foot with three large shields of elaborate workmanship. The principal consists of rich chased fluting, entwined with acanthus leaves, from which rise three branches to hold two candles each, with a higher branch with three candles, and a centre with one, making altogether ten candles. Its weight is upwards of 250 ounces, at a cost of £150. On one shield is the inscription:—"Presented to R. M. Jaques, Esq., by the Citizens of York and the gentlemen of the neighbourhood, as a mark of respect for his invaluable services in support of York races. Feb. 1847." On the second shield are the arms, crest, and motto of Mr. Jaques; and on the third, the arms of the city of York, with the name of George Hudson, Esq., M.P., Lord Mayor, 1847.

## THE LONDON FARMERS' CLUB.

## SPECIAL MEETING—PAROCHIAL SETTLEMENT—ITS EFFECTS ON THE INTERESTS OF THE TENANT FARMER, AND ON THE CONDITION OF THE LABOURER.

A special meeting of the club took place on Monday, March 15, at the Club House, Bridge-street, Blackfriars, to consider the Law of Settlement, and to elicit from the members an expression of their opinion on that subject. The chair was taken at half-past three by W. F. Hobbs, Esq. E. Chadwick, Esq., the Sec. of the Poor Law Commissioners, attended, and took part in the proceedings.

The CHAIRMAN said: Gentlemen, on the first of the present month the subject of Poor-law Settlement came under the consideration of the committee of this club. At that meeting Mr. Chadwick, the secretary of the Poor-law Commissioners, attended, and to that gentleman the committee expressed their views in a firm and decided manner, in opposition to the present law, and decidedly recommended a measure which would place free labour in competition with the present slave labour of this country. The subject of poor-law settlement is one that deserves the grave consideration of the practical farmers of England; and such being the case, although the committee expressed their own views decidedly upon this question, they have thought it a legitimate subject for discussion by the members of the club. They have therefore taken upon themselves to call a special meeting on this occasion. Mr. Shaw has kindly consented to bring forward the leading points for your consideration. I am happy to say that we have the honour of Mr. Chadwick's presence on this occasion, and I am sure that he will be ready to explain any points upon which you may request explanation. I therefore hope that this meeting will entertain the subject fairly, and express the views of the practical farmers of the country. I beg now to introduce to you Mr. Chadwick, and also to state that Mr. Shaw will proceed to open the discussion.

MR. SHAW, of London, said: Gentlemen, the Chairman having stated to you the circumstances under which this meeting has been called, it now becomes my duty to state those under which I appear in my present position. A meeting of the committee having been held a fortnight ago in reference to the communication made by Mr. Chadwick, it was, as your Chairman has stated, deemed expedient not to give publicity to any view which the committee might entertain on this important question, without consulting the club as a body; and having learnt from the communications received by the secretary of our club, and by individual members, that a strong opinion was entertained upon the question, the committee felt that they would only be performing their duty to themselves, to the club, and to the tenant farmers at large, by affording to all an opportunity of expressing their opinion on that important subject. As time did not admit of the assembling of the committee for the purpose of determining who should open this question, it was necessary that some one should be prepared to

introduce it, and hence it is that I am now placed in a position in which I am only anxious to say as much as will afford to those who shall follow me an opportunity of expressing their opinions (Hear, hear). It happens, fortunately for me, that I am to-day in the situation of junior counsel, having only to open the pleadings, as the weight of the case will fall upon my senior, Mr. Chadwick (laughter). Gentlemen, I apprehend that it will be unnecessary for me to offer any lengthened remarks upon the Act of last session. It is a most remarkable instance of what, I regret to say, we have so many examples of upon our statute books, namely, legislation without inquiry. I believe there is no legal code in the world which exhibits so much as ours does of that species of chance legislation to which this country has ever been subjected; and it is only of late, since men have begun to understand their own business better, and the middle class of society has begun to appreciate its position, that a new system has been commenced, so that we now have something like a disposition on the part of our legislators to inquire from practical men what are the real facts bearing on the question upon which they are about to legislate. It seems scarcely possible to believe that previous to the passing of the Act of last session, with reference to the removal of the poor, any inquiry at all had been made, that any communication had been held either with men who had a knowledge of the working of the poor-law, or with persons who were at all competent to draw up an Act of Parliament. Of all the Acts that were ever passed by any Legislature there could not possibly be one more contradictory, more unlike law, more unlike anything framed in accordance with the smallest possible experience (Hear, hear). Nay, I venture to say that if you were to select the most inexperienced clerk in any union in England, who had only held the office of clerk for a year, he would draw an Act better than that which was thus passed by the Legislature of the United Kingdom. I now hold this Act in my hand. It is not a very long one. It contains ten sections, three or four of which are mere matter of course, and have nothing at all to do with the principle of the Bill. This little pamphlet (exhibiting it) contains the notes of a barrister who has had very great experience in sessions practice, and is well known as the author of many of the most valuable books upon points of practice and sessions law. This gentleman, in speaking of the first clause of the Act—I will not read his remarks at length, but simply refer to a few passages to shew what the Act is—says, in reference to the first clause, "This section was probably well intended, but it seems to me that it might be so easily evaded that it is not likely to be of any practical benefit." That is his comment upon the first section. Upon the

second section he says "This proviso has seemingly been drawn without sufficient consideration." Again he says upon the same section, "This clause is another portion of the statute which seems to have been written without sufficient consideration." (Laughter.) He then goes on to the third, and says "In any parish with his father," taking the words of the Act, is an expression of rather doubtful meaning, and should not be used in an Act of Parliament: and then he remarks upon the same section, "But really this is not the mode in which an Act of Parliament ought to be drawn." (Laughter.) Upon the sixth section he observes, "This clause is framed in a very extraordinary way, and is not very intelligible. There are ten parts in the sentence, independently of the assignment of the penalty, some in the conjunctive, some in the disjunctive; and the and's and the or's are in such abundance, that they are quite enough to puzzle any person who is not in the habit of dissecting sentences, and considering each part by itself. Add to this, that the one clause professes to define four offences." Now, gentlemen, I merely mention those points in reference to the Act itself. So far as the Act of last session is concerned, I believe the only reason on earth why we have to be indebted, either to the man who drew it, to the Ministry who introduced it, or to the Legislature which passed it, is, that it has created so much confusion, and aroused so much attention to the law of settlement, that we have now a chance of something like legitimate, straightforward, reasonable, legislation upon the subject. I trust that, hereafter, this species of legislation, whether it be amateur or class legislation, both of which I contend are injurious to the country at large, will be put an end to, and that whenever our rulers require to legislate upon any question, even though it should not involve such vast and important interests as this question does, they will take the sense of men who can bring every-day experience and practice to bear upon it; that they will make up for not having knowledge on the subject themselves, by communicating with those who possess both knowledge and experience (Hear, hear). Gentlemen, I believe that this Act originated in a desire to make certain portions of the community bear that fair proportion of the weight of the poor-rates which it was supposed they did not bear. It was assumed that towns did not bear their fair proportion; that there were certain localities which did not do so; and it was thought necessary that a measure should be passed, to equalize the burden. And here it is that the framers of this Bill have most signally failed; they did not take pains to ascertain what was the state of facts before they legislated. I believe that a short experience of the working of this Act has shown that so far from equalizing burdens, the measure has had the opposite result (Hear, hear). It has induced evils most injurious to the labourer, and eventually most prejudicial to the farmer. It has had the effect of inducing landowners and others to pull down the cottages of labourers, and of driving the labourers themselves into the purlieus of towns (Hear,

hear). It has had the effect of removing labourers from the place of their employment, and of mixing up both them and their families with the very worst characters in the country (Hear, hear). It has had the effect of placing labourers at such a distance from their daily labour that a great portion of their strength is exhausted before they can commence their work; and, finally, it has had the effect of degrading the labourer, and rendering him much less useful to the farmer, thereby making the farmer himself the greatest sufferer in the end (Hear, hear). Gentlemen, I have already, perhaps, gone beyond what I contemplated. As I stated before, I only appear as junior counsel on this occasion. I have, however, felt it my duty to call your attention to some of the points in which the last act has proved so defective. The economical part of this subject, that which has reference to the position of the labourer as connected with the tenant-farmer, embracing the consideration how far the benefit of the labourer will lead to that of the farmer—in fact, the whole of the economical question will be laid before you by Mr. Chadwick, into whose hands I now resign, with great gratification, a task which I know will be performed by him in a much more able manner than I can do. I have simply endeavoured to explain in a few sentences the object to which your attention will be directed, and to point out the glaring mischief and ill consequences created by the last Act of Parliament on this subject. (Cheers.)

MR. EDWIN CHADWICK.—Gentlemen: Having been summoned to give evidence before the Committee of the House of Commons appointed to investigate the law of settlement, and believing it to be necessary to state what was its operation upon tenant-farmers, as well as agricultural labourers, to obtain the most recent information I consulted some members of your club, to know how far the present state of things corresponded with the results of my earlier investigations: this led to a consultation with the members of your committee, and I asked of them a resolution, to authenticate my statement of their views and sentiments. As I was to be examined the next day, there was then no time to convene a general meeting. But this special meeting having been called, I have thought it proper to attend for my own information as to the feelings of the tenant-farmers, and I will, with your leave, restate, as nearly as I can, the facts which I placed before your committee. I will pass over the circumstances which have lately aroused general attention to the law of settlement. In 1833 I publicly expressed the opinion, the grounds of which I have now to repeat, that it affected the very foundations of agricultural industry, was of mutual injury to employer and employed, and ought then to be abolished. I will describe its operation first on a large proportion of labourers who are "unsettled," and then on those who are settled. The lower districts of Reading were severely visited with fever during the last year, which called attention to the sanitary condition of the labouring population. I was requested to visit it. Whilst making inquiries upon the subject, I learned that some



of the worst-conditioned places were occupied by agricultural labourers. Many of them, it appeared, walked four, six, seven, and even eight miles, in wet and snow, to and from their places of work, after twelve hours' work on the farm. Why, however, were agricultural labourers in these fever-nests of a town? I was informed in answer that they were driven in there by the pulling down of cottages, to avoid parochial settlements and contributions to their maintenance in the event of destitution. Amongst a group, taken as an example there, in a wretched place, consisting of three rooms, ten feet long, lived Stephen Turner, a wife, and three children. He walked to and from his place of work, about seven miles daily, expending two hours and a half in walking before he got to his productive work on the farm. His wages are 10s. a week, out of which he pays two for his wretched tenement. If he were resident on the farm, the two hours and a half of daily labour expended in walking might be expended in productive work; his labour would be worth, according to his own account, and I believe, to a farmer's acknowledgment, 2s. 6d. per week more. For a rent of £5 5s., such as he now pays, he would be entitled to a good cottage with a garden, and his wife and children being near would be available for the farm labour. Why, then, should there be this displacement, so injurious to the labourer, and, as it will appear, so unprofitable to the farmer? The answer was, it is brought about by the law of parochial settlement; and, as an example of its working, I understood on the very farm to which this labourer was attached, the following note was given to me of a former trial at the assizes: "At our assizes last week, amongst the *Nisi Prius* cases was the following: *Blount, Esq., v. Pearman*.—This was an action brought by the plaintiff, a gentleman of fortune at Maple-Durham, against the defendant, who had been a principal tenant, occupying a mill and several farms of the plaintiff's, to recover two penalties of £50 each, for having, during the space of ten years, made two parishioners, contrary to a covenant in the lease granted to him by the plaintiff. Mr. Serjeant Talfourd conducted the plaintiff's case, calling evidence to prove that the defendant had been guilty of the breaches of covenant set forth in the declaration. Mr. Serjeant Ludlow, for the defendant, addressed the jury, commenting with great force on, and reprobating the conduct of the plaintiff. The learned Serjeant took numerous objections, of which the judge took notes, in order that they may be brought before a higher tribunal. The jury returned a verdict for one penalty, so that the case will be the subject of further proceedings in the courts above." This covenant in the farmer's lease was in the following terms: "And shall not hire any servant, male or female, thereby to gain a settlement in Maple-Durham." Such covenants many here will be aware are common (Hear, hear), but the like result can be and is extensively produced without any covenant whatsoever (hear). So far as I could learn, there are between one and two hundred agricultural labourers living in the borough of Reading, and the numbers are increasing. The following extract from some information I have received from a relieving-officer at Read-

ing, is illustrative of the operation of this state of things. After speaking of the injuries done to the farmers as well as the labourers, by the unsettling and displacement of them, he states: that "One of the farmers to whom I have been speaking told me a fact concerning a labourer whom he employs, that during the week he found that his earnings were 2s. less than the other labourers, from the reason he had about two-and-a-half or three miles to travel to his work; but, as the man was a good labourer, he kept him on his employ, the man not being enabled to get a cottage near. Another person informed me, and this person was one of \* \* \* \* \* tenants, that it is a service of much hardship to the labourer and of injustice to the farmer, to draw his labour from a distance. Now these persons are really practical men. I forgot to add, it was the opinion of the last that it would make 2s. per week in a man's labour. The last week brought to my notice a fact illustrative of the present unjust state of things, so far as regards the labourer. A man belonging to Maple-Durham lived in Reading, walking about four miles per day to his work, the same back, frequently getting wet, took fever, continued ill some time, assisted by the Reading union in his illness; recovered, and could have returned to his former employment of 10s. per week, but found he was incapable of walking the distance: the consequence was, he took work that only enabled him to earn 5s. per week; he is now again unable to work" (Hear, hear). Whilst adverting to these evils in the neighbourhood of Reading, it is just and proper to state that when I visited the county in 1833, Mr. John Walter, of Bearwood, then set himself against them, and endeavoured to get the labourer back to the farmstead, and wrote to me to urge the efficiency of well-paid agricultural labour, in which objects I could not but concur, though I might differ as to the practical modes of attaining them. To take another example, Bedford has been severely visited by fever; and it appears, upon the like enquiry, that agricultural labourers, of whom there are between one or two hundred, are there driven by the operation of the law of parochial settlement to reside in some of the over-crowded ill-conditioned districts. These, too, have to walk to and from their work four, six, and eight miles daily. Mr. Wing, the clerk of the Bedford union, has transmitted to me the following description, by one of the medical officers, of the effects upon the labourers within his observation: "To persons of sedentary habits," he says, "a walk to and from their places of work would be conducive to health: not so with the agriculturist, who is laboriously occupied from an early hour in the morning till night; and if he is compelled to sally forth (with his bundle of cold provisions for the day) an hour or an hour and a-half earlier, and to walk four or five miles, at all seasons of the year and in all weather, in order to be in the field or the barn at the same time with his fellow-labourers on the spot, his sleep is prejudicially curtailed, and he is, in the long run, predisposed to the inroads of disease. I have repeatedly observed the ill effects of this daily extra exertion and curtailment of rest, and have often, in cases of conva-

lence under these circumstances, found it necessary to advise men not to resume their work so soon, by two or three weeks as they otherwise would have done. One case to the point particularly recurs to my mind, of a man who lived at a distance of three miles from his work, and had recovered from fever; two other members of his family were also labouring under the disease, and he was anxious to return to his work, in order the better to provide for their wants. He procured my reluctant consent: within a fortnight he was seized with a relapse of the disease, through which he struggled difficultly with his wife; and I have no doubt that the early and late walks in the winter season, with deficient rest, mainly contributed to produce the second attack, to say nothing of their probable predisposing influence in reference to the first. A man having to walk three miles to his place of labour and three miles back daily, is equivalent to two hours' extra work. Thus, he must rise one hour earlier in the morning, and be kept from home one hour later in the evening, than if resident in the place where his work is situated; he has also to endure greater fatigue, and of course greater wear and tear of his system. John Freeman states that in haytime he has been obliged to leave home at 2 o'clock in the morning, and has not returned till 10 o'clock in the evening, and that when he has reached his place of work in the morning he has felt as much fatigued as he ought to have done in the evening. Amongst other injuries which this separation from the place of work entails is, diminution of income from non-employment of children. A man living in the place where he works can generally procure employment for boys twelve years old: this he cannot do where non-resident, as boys of that age would not be able to go backwards and forwards, and work all the day. Besides these losses he incurs extra expense. A man and family cannot live in Bedford under £5 for rent and taxes of house, whereas at \* \* \* \* \* the rent of a house, with a large garden attached, would not exceed 25s. He is thus obliged to fare harder with respect to food and clothing than if living in his village. He is moreover subjected to loss of comfort. He is separated from his wife and children, excepting in the night, and of course is prevented from taking his meals with them, and thus he loses the comforts to be derived from association with his family. \* \* \* \* \* states that for seven years he had not a hot breakfast or dinner, except on the Sunday, in consequence of his having to go to another place to work. Persons who have recently come to live at Bedford, from the villages, have been much more liable to typhus fever than the long residents or natives. Three families of the name of \* \* \* \* \* and one of the name of \* \* \* \* \* were expelled from \* \* \* \* \* some years ago, because they did not belong there. They \* \* \* \* \* were natives of \* \* \* \* \* and had resided there from birth until the time of their expulsion. They came to live at Bedford. Two of them have since left. John \* \* \* \* \* who has a wife and five children: he belongs to \* \* \* \* \*. For about seven years he continued to work at \* \* \* \* \* but of late he has obtained employment at Bedford; when out

of work here, he is obliged to go \* \* \*, from four to seven miles from Bedford, for employment. This system destroys all sympathy between the employer and employed, and all identity of interests.' Even in Lincolnshire, where the agriculture is of a high order, and the wages of the labourer consequently not of the lowest, similar displacements have been made, to the prejudice of the farmer as well as the labourer, and, as will be seen, of the owner himself. Near Gainsborough, Lincoln, and Louth, the labourers walk even longer distances than near Reading. I am informed of instances where they walk as far as six miles, that is, twelve miles daily, or seventy-two miles weekly, to and from their places of work. Let us consider the bare economy, the mere waste of labour, and what a state of agricultural management is indicated by the fact that such a waste can have place. Fifteen miles a day is the regular march of infantry soldiers, with two rest-days—one on Monday and one on Thursday; twenty-four miles is a forced march. The man who expends eight miles per diem, or forty-eight miles per week, expends to the value of at least two days' hard labour per week, or one hundred in the year uselessly that might be expended usefully and remuneratively in production. How different is it in manufactories, and in some of the mines, or at least in the best managed and most successful of them! In some mines as much as two and three thousand pounds is paid for new machinery to benefit the labourer, and save them the labour of ascending and descending by ladders. In many manufactories they have hoists to raise them and their loads from lower to upper rooms, to save them the labour of toiling up stairs, to economise their strength for piece work to mutual advantage. The Rev. Frederick Peel, of Gainsborough, informs me, "I have farms under my knowledge where the labourers going to and fro do not walk less than 400 miles a week." The whole of this mileage, paid partly by the farmer and partly by the labourer, and in part, eventually, by the owner himself, may be set down to the law of parochial settlement. I might adduce similar instances from Hampshire, Wilts, Dorsetshire, Warwickshire; but instances will be within the knowledge of the tenant farmers assembled here from every part except from the north. The census returns show agricultural labourers within the precincts of boroughs, where they ought not to be, or if any, in far smaller numbers. There are 846 agricultural labourers in the boroughs of Bradford, Salisbury, and Trowbridge; 863 in the boroughs of Bristol, Cheltenham, and Gloucester; 1,033 in the boroughs of Boston, Lincoln, and Stamford; 271 in the boroughs of Buckinghamshire. But it is not in county and borough towns only that this unwholesome over-crowding is going on; I am informed that from the like cause the evil of over-crowding is going on in the ill-conditioned villages of open parishes. The effect of these displacements, on which I wish to consult you as to whether I am correct, appears to be to reduce the efficiency and the value of the best conditioned labourers, those who are free from the parochial influences and habits (who you all know were worth and received the most constant employment, and the best

wages, generally one-sixth more than the parish labourer), down to the level of the latter. I have not time to pourtray half the hastening ills of which you must be cognizant, and all might be adduced in declamations against owners; but on behalf of the owners it may be said that they do no more than would be done by the declaimers, if they were in their position. The effect of the law of parochial settlement is, as I have stated, to beget a servile and inferior conditioned labour; and the owner of the close parish may frequently allege valid public as well as private considerations for not doing in respect to pauperised labourers, in effect much what Irish landowners are now blamed for having done. I believe, nevertheless, that to avoid a two or three shilling burthen, owners frequently incur a six or a twelve shilling deterioration of the value of their own property, as well as depress wages and injure their tenants; but still the main blame is with the present law of parochial settlement, and whilst it continues they have extensive justification. Before, however, I advert to remedies, I wish to consult you, for my information, as to your view of the correctness of my impression as to the continued operation of the law of parochial settlement on the condition of what is called the "settled" parish labourer. It is admitted and made manifest in extensive evidence given before a committee of the House of Lords by practical farmers, that when an agricultural labourer applies for work, the first question put to him, is not what has been his experience, what can he do, but to what parish does he belong? If he do not belong to the parish of the occupier, the reply is usually an expression of regret that he can only employ the labourer of his own parish. To the extent to which the farmer is directly liable to the payment of rates, by the displacement of a settled parish labourer, he is liable to a penalty for the employment of any other labourer who is not of the parish. To that same extent is he liable to a penalty if he do not employ a parish labourer who is worthless, though a superior labourer might be got by going farther a-field, to whom he would give better wages. The labourer who would go further is thus driven back upon his parish, that is to say imposed, and at the same time made dependent upon the two or three or several farmers by whom the parish is occupied. He then says "If this or that farmer will not employ me, one of them must; if none of them will, the parish must keep me, and the parish pay is as good as any." Labour well or ill, he will commonly get little more, and it is a matter of indifference to him; it is found to be in all its essential conditions labour without hope—slave labour (Hear, hear), and he is rendered unworthy of his hire. On the other hand, in what condition does the law place the employer? It imposes upon him the whole mass of labourers of a narrow district, of whatsoever sort, without reference to his wants or his capital. He says, "I do not want the men at this time, or these men are not suitable to me; they will not do the work I want; but if I must have them, or pay for keeping them in idleness if I do not employ them, why then I can only give them such wages as their labour's worth to me—and that is little." (Hear, hear). Hence wages are inevitably reduced. One proof of this

as a cause of depression is that wages rise in places out of the direct influence of the law of parochial settlement, and where the employer and the employed are both free. What must be the effect upon the manufacturer if he were placed in the same position as tenant farmers are in the smaller parishes in the southern counties, if he were restricted to the employment only of the labourers in the parish?—if before he engaged a smith, or a carpenter, or a mason, he were compelled to inquire "to what parish do you belong?" Why that the 24s. a week labour would fall to 12s. or 10s., or the price of agricultural labour (Hear, hear). Those tenant farmers who have seen no other than the common parish labour are scarcely aware of what is to be achieved by skill and free labour. Only now and then an enterprising labourer, who has broken away, returns and shows the difference. The following is an example given in the evidence of an extensive farmer before the committee of the House of Lords. Mr. Edward Horwood, Aston Clinton, Buckingham, was asked (2256.) "Do you consider that the money payment you make to the poor rate is the only burden which the poor laws compel you to suffer? 'No. I consider that the great burden is the responsibility of the maintenance of the unemployed labourers. We, as farmers, cannot make the bargain with the labourers that other people do, because we are liable to have those labourers taken off for some time, and employed upon railways and public works, and we are left to pick up labourers where we can. Those parties are not subject or responsible for the maintenance of those people when they have done their work, and that is the reason why we are obliged to give more money in proportion than those people, because we have a certain number of labourers to employ, and we do not find it our interest to make men work very hard. I have had labourers who have come home from public works where they had been having their 3s. a day. Men of that description working against my own men as parish men would do a day's work by twelve o'clock, and take their spades on their shoulder and go home, and they would have done as good a day's work as my ordinary labourers do. Therefore I consider that we pay more in proportion to our labourers than those people who employ the men on public works, without any responsibility for the men after the work is over.'" Agriculturalists from northern districts, who work their farms with 12s. and 15s. a week free labour, have declined the temptation of low rents to take farms in parishes where the wages were 7s. or 8s. a-week. Whilst inspecting a farm in one of these pauperised districts, an able agriculturist could not help noticing the slow, drawing, motions of one of the labourers there, and said—"My man, you do not sweat at that work." "Why, no, master," was the reply; "seven shillings a week is 'nt sweating wages" (Hear, hear, and a laugh). The evidence I have cited indicates the circumstances which prevent the adoption of piece-work, and which, moreover, restrict the introduction of machinery into agricultural operations, which, strange though it may appear to many, is greatly to the injury of the working classes; for wherever agricultural labour is free, and machinery has been introduced, there more and higher-paid labour

is required, and labourers are enabled to go on and earn good wages by work with machines, long after their strength has failed them for working by hand (Hear, hear). In free districts, and with high cultivation by free and skilled labour, I can adduce instances of skilled agricultural labourers paid as highly as artisans; I could adduce an instance, bordering upon Essex, where the owner working it with common parish labour, at eighteen-pence a day, could not make it pay; and an able farmer now works it with free labour, at 2s. 6d., 3s., and 3s. 6d., and even more, per diem, for task-work, and, there is reason to believe, makes it pay well. A farmer, who died not long ago immensely wealthy, was wont to say that "he could not live upon poor two shillings a day labour; he could not make his money upon less than half-crowners" (Hear, hear). There are those here, members of your committee, who can speak practically of the superiority of free labour, and of its commanding its price with mutual advantage. For myself, in official inquiries, I have seen much of the common manufacturing districts and manufactures; I think I should be able to demonstrate that there is no reason peculiar to agriculture why skilled labour should not be as productive to the employer, as much in demand, and the average profits of capital as high, if the agricultural labour market were as free. The first step to this freedom would be the abolition of the law of parochial settlement. If we went no further than to extend the chargeability of future cases from the parish to the union, in the event of a settlement or a chargeability to a district or union, say of twenty or thirty parishes, each for a time contributing to the common funds on the average of the past expenditure, what would be its effect? In the first place, the owner would perceive that, in the event of future chargeability of any particular labourer or group of labourers, his land would only have to pay one-twentieth or one-thirtieth proportion of the charge; consequently, it would, in respect to the chargeability, be no longer of any importance in which of the twenty or thirty parishes he resided; it would be no matter of serious consideration to keep the labourers out of the district. The agricultural considerations of having labourers near their work would then have its due effect. Improved healthy cottages would be built for their residence in or near the farm; the single labourers might then again be taken in numbers into the farm steading, to be at hand and ready for their work. The agricultural labourer would no longer be unsettled, but become settled in the best sense—settled naturally. Instead of forming part of the wretched groups seen at all times on Sunday in the lower and filthy suburbs of an ill-conditioned town, in his working clothes, dirty, unshaved, cadaverous, and discontented, he would soon again be seen with the rural flock at the village church, in his clean frock and clothes, with a bright face, from the contentment of better wages, with a nosegay at his breast in the summer time, the growth of his own cottage garden (Hear, hear). The enterprising labourer would find, by the extension of the area of chargeability, that he was no longer in subjection to the farmers of the one

parish; that if they were harsh or illiberal, or if their places were otherwise unsuitable, he might seek to better himself in twenty or thirty others, or out of the district if he thought fit, and yet, in the event of destitution, be entitled to as good a measure of relief. And lastly, the tenant farmer would be told by the measure, that in the choice of hands and operations he was as free as the manufacturer; it was no longer imposed upon him as a task to work with slave labour and worthless or discontented hands. The mode of change, the extent of district, the incidence of contribution, involve numerous and complex considerations, forming matter for separate discussions. I will at present ask your consideration and opinion only on the one point—the abolition of the law of parochial settlement—and whether, as agriculturists, you agree with me as to the importance to yourselves, as well as the labourers, of setting free the agricultural labour market (Hear, hear). The freedom of labour, not only in the northern counties, but in some places near the slave-labour districts of the southern counties, is already attended with higher wages, at the rate of 12s., 14s., and 15s. weekly. In such counties as Berks and Bedford, the freedom of the labour-market, when it came into full operation, could not raise wages less than 2s. a week, and 2s. a week would in those counties represent a sum of productive expenditure and increased produce equal to the whole amount of unproductive expenditure on the poor's rates. I have been three days under examination before the Committee of the House of Commons, and I have not fully developed the considerations involved in this important subject. I have not yet developed the large practical errors which have arisen from economists and members of the Legislature confounding under the term "an interest," the two widely distinct elements—an interest in employing labourers to avoid a burthen, and an interest in employing them for the sake of a profit on their labour (Hear). Under free labour, the produce is greatly increased; under high cultivation there is the more labour employed. At no time is it of more importance that every restriction should be struck off agricultural labour. The increase of population in England and Wales alone is at the rate of upwards of 230,000 annually, which, according to my computation, would require either an increase of territory under ordinary cultivation equal to such a county as Cambridge or Warwick, or a total amount of land equal to 109,000 acres of good pasture land annually; or, what is better, an increased production by high and improved cultivation on the same land equal to the ordinary produce of such a space under good cultivation. Now, when we know what has been done on such land as Lincoln Heath; when we know that land which was once thought only capable of growing ling, now in summer bears heavy crops of corn; when we know how much of the same land there is untouched by tenant-farmers such as many of those whom I have the honour to address; when I know that—even when drain tiles, which now may be made for ten shillings a thousand cost forty, and the expense of draining was three or four-fold the present charge, that permanent expense was, on the average, repaid by the increased produce in three years; when I

know that only a small per centage of the land has yet been raised by drainage and other labour to the proper condition for the reception of seed ; when I know that the immense mass of manure which now pollutes as filth the atmospheres of towns, as yet to be conveyed and properly distributed in your fields, to give them increased fertility, I may confidently aver that there is no ground for doubting the capability of English agriculture to do more than provide for the new-comers. Unfortunately, it yet depends too much on administration and legislation whether the new-comers come as consumers of your produce without return, or as producers, aiding and remunerating your exertions. That you may pleasantly and successfully achieve your task, it appears to me to be essential that both you and your labourers should be entirely free. That they and the new and rising population in the southern counties should be healthier, stronger, and self-supporting and independent, it appears to me to be essential that their habitations should be improved, their food and comforts increased ; but this can only be by the rise of wages in the depressed districts, and wages will only rise with increased productiveness of labour, and labour will be more productive and more in demand only when it is more free (cheers). You have been told, and many persons have frightened themselves with the notion, that you have to compete with the cheap labour of the continent. Gentlemen, the high-priced free labour of England is, in respect to its production, as cheap or cheaper than any in the world. You have been told that wages are one-half lower in France and in Germany, and lower still in Poland ; but you have not been told what is the produce of that low-priced labour. I can state, for your information, that throughout France the yield of wheat is not more than five-fold on the seed sown, whilst in England it is seldom less than twelve, and where the drill is used fourteen, and where it is dibbled sixteen and even twenty. In the department of the Seine, with all the advantages of soil and climate, and the maure of Paris, the yield of wheat has not averaged more than thirteen or fourteen bushels per acre. In the Rhine provinces, the best cultivated in Germany, the average yield is not more than twenty bushels ; in Hungary it is sixteen bushels, and throughout the rest of Germany not more than ten bushels. In Poland and Russia the yield on the seed sown does not generally average more than three-fold, whilst they state at Mark-lane that with you the average yield is rising above thirty bushels per acre. You have good reasons for not overstating these matters ; but farmers working with free and well-paid labour, of the class who have declined even the temptation of low rents when coupled with the obligation, or, as some would deem it, the boon of the 7s. and 8s. weekly parish labour of Dorset and Wilts, such farmers have admitted a yield of forty or fifty bushels, and even more, under disadvantages of climate. I will not, however, trespass further on your own province, and I must beg of you to excuse me for having done so. I will now only ask whether you agree with the propositions submitted, in respect to the operation of the law of parochial settlement on wages and agricultural economy, and concur in its abolition (cheers).

Mr. BAKER said :—At the last committee-meeting which I had the honour of attending, I treated the question in exactly the same light as Mr. Chadwick has done. Since that occasion I have had various opportunities of introducing the question amongst farmers of my own locality, and more especially in the board of guardians of which I am a member. Rather to my surprise, I have found that there appears to be rather an objection to this measure. I cannot tell how it arises, unless it is in this way—that farmers perhaps do not look so far forward, in reference to the result of an alteration in a law of this nature, as they ought to do ; that they look more particularly to its immediate operation upon their particular interest (Hear, hear). Now it must be evident to all of us, that the more you extend labour, and the greater the field you give for its employment, the more competition you produce, and that by such means you will be more likely to obtain a good class of labourers than by confining the sphere of labour, as it is confined at present, to particular parishes and districts. But there seems to be this difficulty, that if you do away with the law of settlement altogether, as regards parishes, you must still have some limit, either that of a union, a county, or something else (cries of “ No, no”). Do you mean by saying “ No” that the law of settlement should be abolished altogether ? (several voices, “ Yes”). Do you mean that we should go back to the principle which existed before, I believe, the time of Elizabeth, that “ where the tree falls there shall it lie ?” (A voice, “ Decidedly so”). I contend that if you establish that system you will establish that which will act most injuriously as respects the poor (Hear, hear). It must be obvious to all who have had the management of the poor, that there is a certain class of the poor who are always dependent on the parish ; I will not say that they are always the worst workmen, or the least to be depended upon, but there are some who are more deficient in skill than others, some whose bodily strength is not sufficient to enable them to toil to the requisite extent. These are passed over by farmers ; and whilst better labourers are generally engaged, the parties of whom I have been speaking are frequently out of employment. Now I contend that if you should be so fortunate, as you would consider it, as to do away with the law of settlement, all the weaker portion of the labourers would be very much injured by the alteration of the law. I know, with regard to the parish in which I live, how the present system operates with me and with the principal parishioners there. We are brought into direct contact with the poor of the parish ; we understand their feelings, we know their wants, and we apply ourselves to relieve them in the best manner we can. Now, those persons who have even now so much difficulty in finding employment, if there were no law of settlement, would be frequently out of employment for months together (Hear, hear). Through a long series of years, during which I have directed my attention to parish matters, I have observed that the smaller the parishes are in our immediate neighbourhood, the better

are the wants of the poor attended to, and that it is in the very large parishes, those parishes which are near large towns, that they are the worst off. In the upland parishes, as they are called in the county in which I reside (Essex), the poor are better attended to than in the larger parishes in the neighbourhood of towns. Now, why is this so? It is because in the smaller parishes every farmer finds it to be to his interest to give employment as far as possible to the labourer; he discovers that it is his interest even to make some sacrifice, seeing that if the labourer is not employed, the labour of supporting him falls upon himself in the shape of poor's-rate; and therefore he exerts himself to find employment for the labouring man in some way or other (Hear, hear). I am quite satisfied that if this field of labour were extended, great advantages would accrue; that if you could extend the law of settlement over unions, the result might be very beneficial. But, upon reflection, I could not see where the extension was to end (Hear, hear); because unions are only extended parishes, and therefore the same effect would be produced upon the labour of the union as upon that of the parish. We have found that difficulty as regards the present law. There was in the union in which I reside a proposition made, when the present law was passed, which was certainly a very singular one; it was that each parish in that union should maintain the poor that belonged to it, exactly as if the law had never passed. But we found this difficulty, that although we might make such a regulation as regarded our own union, yet we could not do so as regarded other unions, and those parishes which bordered on other unions would have just the same difficulty as we had in our own; consequently, the plan was abandoned. But while the present law is in operation, every parish takes charge of those who have been attached to it for five years; and complex as this may appear, we have not found it complex in the working. We find upon the balance of the relieving-officer's books, that the number has not very much increased. If you look at the Act, you will find that very few of the poor can be removed. None of those who have resided for five years can be removed, and only a few of those who have received temporary relief can be removed.

A MEMBER.—They cannot be removed if they have lived there for five years.

MR. BAKER.—The effect of this law, therefore, is almost that which you are seeking to produce. Although the law of settlement were abolished, the poor must still be attended to; wherever the poor were found, they must still be relieved. I really cannot see my way through this question; I do not see how the law is to be altered, and the principle adopted of having the settlement attached in future to the place where a person happens to be found. Now the difficulty with which we should have to contend would be principally this—that if the poor were removed from our immediate care, persons paying rates would be almost indifferent as to the operation of the law. There would be no determination on the part of the occupiers in a particular parish

to exert themselves to employ the greater number of the poor when it became necessary to do so; but, as the charge was provided for by general taxation, every one would cease to view himself as having any individual interest in the matter. I quite concur with you, Mr. Chairman, to this extent—that if the law of settlement could by any means be simplified or got rid of beneficially, it would be a very wise thing to have an enactment for that purpose. But I cannot understand how this new state of things is to be adapted to the habits of the people; I cannot imagine how you are to produce an equal assessment extending over the whole kingdom, and how, at the same time, the poor are to be cared for as they are now, and benefited by the change (Hear). As an occupier of land, I would not hold up my hand in favour of abstracting from the poor one iota of the enjoyments which they obtain under the present law. I believe that the whole operation of the poor law has, up to the present time, been against the poor man, whatever may be its ultimate object or end. The poor man has a great claim upon our attention; and if he is to come into competition with foreign labour to any great extent, he will require our care more than he has had it of late. I now leave the question, having merely stated to you what opinions I have gathered upon it without giving any opinion of my own. Although I have looked into the question, reflected upon it, and for many years endeavoured to see my way clearly out of it, I am quite as much in a maze as I have ever been. I am quite satisfied that if you could introduce a system of rating upon the principle on which the rating is now carried out in the unions for the maintenance of union houses, and by which all the money collected should form and be disbursed as one fund, you could then advantageously do away with the law of settlement; but without that, I think there is vast difficulty involved in the upsetting of the present law (Hear, hear).

MR. EAGLE said: I think it is desirable that we should have an opportunity of pronouncing a distinct opinion on this subject. We all agree that the present law is not a good one, but I for one cannot vote for abolishing the law of settlement altogether. There is at present no question before the meeting. The opinion of the meeting should be taken with respect to the present law, leaving the other part of the subject for future discussion; and I think it would be best to leave it to Parliament. I am not for abolishing the present law unless we can make all persons contribute as they ought to do to the support of the poor; and I think that to any declaration of opinion which we may make, we ought to attach that statement.

MR. BENNETT said: I wish to make a few remarks. I quite agree with Mr. Eagle that it is important that we should have a clear view of the point under discussion. An opinion was expressed at the last meeting of the committee. It is now intended that the opinion of the committee should be considered by this general meeting; of course, we want a resolution in the first instance similar to that which was passed at the meeting referred to. It is known to the gentlemen who compose the committee that the committee passed a resolution de-

clearing the present law of settlement to be bad, and that the system of poor relief should be extended, in one sense, as far as possible. That was the effect of the wording of the resolution, respecting which there was no difference of opinion. We did not go into other questions, such as how far the settlement should be extended, or what, in fact, should be done, which, I concede to Mr. Eagle, is a very knotty point. But with regard to the first point, there was no difference of opinion on the point that the present law is bad in principle, both on account of the poor and because of the unjust measure in which the maintenance of the poor falls upon property. There can be nothing more unjust than that a man should pull down cottages for the sake of ridding an estate of certain expenses which must be incurred by the maintenance of the feeble and worn-out poor in cases of extreme necessity. There can be nothing worse than that persons should have the labour of able-bodied men as long as they want it, and that, by just pushing parties across the line of demarcation, they should be able to compel them to live in a filthy condition, and under circumstances discreditable to the nation, in order to escape from all liability. You will perceive that whenever labourers are driven into towns or large populous villages, carpenters and builders raise cottages reckless of all consequences so long as they get their rent; and the labourers, instead of renting a decent cottage of the lord of the manor or the owner of the soil, are driven to spots where they are surrounded by the most mischievous influences. There can be no difference of opinion amongst us on that subject; it cannot be denied that this tends to do away with every kindly feeling between the labourer and his employer, and that a worse state of things altogether could not exist. The question, then, is—what is the best remedy? It depends on circumstances how far we should go into that inquiry on the present occasion; but my own conviction is, that extending the settlement as far as possible is the best course that could be adopted. I think that the poor-rate can never be placed on a right principle until it is made a national charge; that although a union settlement or a county settlement might be a great improvement on the present state of things, still if the nation recognises the principle that it is bound to take care of the worn-out poor, and proceeds on the assumption that there are at all times a number of persons who, owing to infirmity, disease, or misfortune, are placed in a position in which they require relief, then I say there can be no juster or more correct basis upon which to carry out the object than that of a national charge (Hear, hear). How the funds should be raised is another and a very different point. I agree with my friend, Mr. Baker, that it is very desirable to keep up that kind of sympathy amongst the poorer and the middle classes, which is necessary in order that the latter should be induced to make a proper provision for the former. I should be sorry if the present guardians were dispensed with, and government-officers were dispersed throughout the country (Hear, hear). I doubt whether by such means we should secure a better state of things (Hear, hear). I think the machinery in such a case would be

much more expensive, and that the poor would not be so much cared for, or their wants so well attended to. However, I think the great object with all right-minded men is, in the first place, to secure a free market for labour. We know that this is not the case now; a man cannot go to the best market for his labour. There is a system of slave labour prevailing in the country at the present time; for with more or less truth may the labour generally existing be so denominated. I think the great point which we have to aim at is, to see how far we can induce the Government to extend the law of settlement—if, indeed, that law should be continued at all, which I very much doubt. I question whether there ought not to be a national charge, whether the maintenance of the poor should not be thrown equally upon the whole country.

A MEMBER: Yes, but the management to be still parochial.

Mr. BENNETT: I agree with you on that point. It is quite evident that if the Government take the greatest interest, they will want to have the entire management; at the same time, I think it would be a fearful state of things, and much to the prejudice of this country, if the middle classes had no interest whatever in the employment of the labourer. I know Mr. Chadwick will say that this argument does not apply to manufacturers; but I think it applies very generally to the case of the poor whom I have described. What we want to impress on the Legislature is, that while extending the settlement, and making it national, there should be an endeavour to give to the board of guardians, and to the middle classes generally, as much interest as possible in the proper working of the system, and in the well-being of the poor. There ought to be an interest of that kind in keeping the rates within reasonable bounds, and this will always be better done by a number of men moving in a tolerably respectable sphere in the neighbourhood, than by trusting to paid agents. Such persons, too, feel a greater interest than others would do in the welfare and comfort of the poor. I thought it necessary to make these few remarks, concurring in the sentiment expressed by the committee, that the present system is bad, and that it is necessary to have a new one. The remedy requires great judgment, and the exercise of much discrimination; but I agree with Mr. Shaw that, if this Act has done nothing else, still, through its having directed public attention to the subject, great good is likely to come out of it (Hear, hear).

Mr. SHAW said: In order to raise the question, I beg leave to move the resolution which was adopted by the committee—"That parochial settlement should be abolished, and that the system of arrangement by which relief to the poor is administered be extended to the utmost practicable limits."

Mr. FORDHAM seconded the resolution.

Mr. WYATT said: I think that by adopting the resolution, we might appear to be putting the cart before the horse. The abrogation of the law of settlement must depend entirely upon the method of administering relief, and the means by which that relief is raised. That appears to me to be the first question. When you have



arrived at a conclusion with regard to that, we may proceed to consider the law of settlement with advantage.

Mr. FOOTE said: I apprehend, from what has fallen from Mr. Baker and Mr. Bennett, that all their objections would be removed if we could have a national charge, with relief administered as at present in unions and by guardians. The great objection to abolishing the law of settlement ever has been, and still is, the unequal burden which, without such a system, might be imposed upon particular bodies of rate-payers; and the effect of what has been done to prevent this result has been to deprive the public of the benefit of free competition in labour. Now, it is undeniable, and I need not go into proof of the statement, that, under the old poor-law previous to 1834, this country groaned under a system that rendered necessary a measure which, however harsh and oppressive it may have appeared to be, was still absolutely required to overcome a great evil. We are now in a far different position from that in which we were placed in 1834. I have here the report of the commissioners, which led to the introduction of the new poor-law system. The commissioners there state that they are in favour of the abolition of the law of settlement; and their report proceeds as follows: "If a local charge is inseparable from the system of poor-laws maintained in this country, some mode of determining the incidence of that charge on each particular place is a necessary consequence, and when it is so determined, some means must exist for practically causing the relief to be administered by the parish which is liable to the burthen. In other words, if we have a law of settlement, that settlement must be adjudged in disputed cases, according to fixed rules; and when it is so adjudged, either the relief must be brought to the man, or the man must be taken to the spot which is to give him the relief. An universal system of non-resident pauperism or a system of removals is the necessary result of the condition of things already existing, *unless indeed all settlement is abolished, and every one relieved at the expense of the parish in which he happens to be.* The former of the two alternatives, that is to say, non-resident relief, might, at first sight, seem the easiest; but independently of the fact that it is contrary to the whole mass of principles on which the English poor-laws have been and are administered, no one who has the slightest experience can hesitate to affirm that its prevalence would tend to more gross imposition on the part of the recipients of relief, and more undetected fraud on the part of the agents who administer the funds, than the records even of the poor-laws previous to 1834 can produce. The authorities in immediate contact with a non-resident case have not their vigilance stimulated by any sense of self-interest; they are spending other people's money; nay more, perhaps they are reaping the benefit of it by employing the man at lower wages than he could otherwise subsist on. The authorities at a distance have no means of ascertaining the truth of the pauper's story, nor any means of verifying the punctuality and veracity of their own agents. But it is

needless to condemn a system which, by common consent of all experienced persons, is vicious in principle and in practice, and at best can be considered but as barely tolerated by law, however deeply it may be by long habit in particular districts. Our endeavours have been, and will be, constantly directed to its diminution and gradual extinction. The only course open then, if we have a law of settlement, as distinguished on the one hand from a right to permanent relief wherever a person may be, and from an unlimited extension of non-resident relief on the other, is to retain a law of removal with all its accompanying evils and inconveniences. We may assume that an universal system of non-resident relief is utterly inadmissible; we may further assume that to enact at once that every man should be relieved permanently, or so long as he chose to stay on the spot where he chanced to become destitute, would be objectionable (to say nothing of other reasons), both as a sudden innovation, too deeply affecting existing interests, and as an experiment fraught with danger in this country. A local congestion of population may, by a sudden failure of trade, be thrown entirely on the resources of a small district at the moment when the district is least able to support such population, and it would thus be deprived of one of the artificial channels by which the burden is now somewhat diffused, and the mass of applicants for relief or work lessened by removal to other parishes." Such, gentlemen, was undoubtedly the operation of the law of settlement, previous to the old system of parishes being combined into unions, 13,000 parishes being reduced into the narrow compass of 600 unions; and it may be assumed that for the beneficial working of the new system, a new mode of settlement was naturally required. As to the union settlement, for which Sir James Graham made so great a stand last year, that only extends the parochial settlement to the wider area of a union; and if you admit the principle that the limits ought to be such that the burden of a particular parish will not fall unduly on the ratepayers, you thus concede the principle that the range of settlement should be so far extended as to embrace the whole country as one parish (Hear, hear). I consider that the union settlement is very objectionable. It is objectionable, because it fixes the poor in the union. I proceed on the broad comprehensive principle, that as agriculture now requires the aid of many hands, it is most unwise to confine the labourer to a particular spot. Look at the immense horde of railway labourers. How is the place of their settlement to be ascertained? Look at the case of a man who has been absent for a number of years. I am summoned to give evidence to-morrow on this subject before one branch of the Legislature, and I shall be able to mention cases in which as much as £40 or £50 has been expended in trying the question of settlement at the sessions. This surely adds force to the claim that the law of settlement should be abolished, if it can be so by any feasible and reasonable means. I have gentlemen, published a plan for abolishing this



law of settlement. I will refer just for a moment to a remark of Sir James Graham's, when he introduced the proposition for an union settlement, that such a settlement would be the means of preventing that destruction of cottages which was so much complained of, and that he considered that the establishing of a national charge would have the effect of destroying every cottage, and of driving paupers to reside in towns; whereas, the endeavour ought to be to spread them over as wide a surface as possible. But Sir James Graham's theory was wrong. The introduction of a national charge would not have the effect of destroying cottages, but it would tend to diffuse labourers over a wider space. How is this latter object to be secured? Why, by providing that one parish shall not be chargeable with the excess of another. There would then be no temptation to destroy cottages; the farmers would not then be interested in driving away labourers, but in encouraging them to reside within the parish. I have the plan here. I wish to caution you, in reference to my proposal, that it is not that of a national assessment, but in the nature of a national charge. A national assessment must come from the consolidated funds. You do not know whence these funds come, or by what means they are raised; you know how they are applied, but you cannot tell the source from which they are derived. Another peculiarity in a national assessment is, that you must charge every species of property in the same way. There can be no diminution; the farmer can claim no drawback, nor can any such claim be made by the professional man with £150 a-year—everything must be taxed to make up a certain amount. But I take the national value of property as it stands, and the less that value is, so much the less of course will be collected. I wish particularly to distinguish between a national assessment and a national charge. A national assessment comes from the funds of the country; a national charge remains as a sensible charge upon land, to which you must chiefly look for the prosperity of this country. I feel confident of the truth of this latter statement; and it here occurs to me to observe, that the introduction of the poor-law of this kingdom has raised and steadied property to the great advantage of the whole country in the diminution of pauperism. Why has this effect been produced? The burden is a sensible charge on land; the labourers look to the land for employment, and the farmers for remuneration. The great bulk of the wealth of this country arises from land in the hands of farmers and other persons. When the old monasteries had been broken up, it became necessary to impose a charge upon land; and it is a remarkable fact, that it was in the reign of Queen Elizabeth that the foundation of the present poor law was laid. We have now arrived at such a state of things, that in the reign of her present Majesty it has become desirable that this law of settlement should be abolished. Gentlemen, the plan which I propose is this:—“1st, That the law of settlement which gives a person the right to be relieved by a particular parish in consequence of having done some act prescribed by law, or by having derived such right through a parent, and which gives one parish the right

to put in force a compulsory process for the removal of a pauper to another parish, shall be abolished. 2nd, That every poor person shall be entitled to receive relief in any parish to which such poor persons may become chargeable. 3rd, That for the purpose of providing proper funds for affording such relief, an equal sum, by way of poor rate, shall be levied upon all rateable property throughout England and Wales. 4th, That no one parish shall be charged with an excess of rate in the pound greater than another. 5th, That the distribution of relief, and all local expenditure out of the poor rate, shall be left in the same state and under the same control as at present.”—

MR. SHAW: I rise to order. If we go into questions of detail, I am quite sure that we shall arrive at no conclusion (Hear, hear). There is a distinct question before this meeting, and I submit that to that question we must confine ourselves.

THE CHAIRMAN said: I think I am deserving of censure for not having stopped this kind of discussion before. I quite agree with Mr. Shaw, that the question upon which we are met to-day is that of the abolition of the law of settlement, and not the manner in which, after having abolished that law, we shall secure our object in future. Mr. Chadwick has very clearly and properly explained to you the operation of the present law; and I hope that gentlemen will henceforth confine their attention exclusively to the question of abolishing the law of parochial settlement (Hear, hear).

MR. FOOTE said: I only wished to show by what means the difficulty which has occurred to the mind of Mr. Baker can be surmounted. If the only question mooted is the abolition of the law of settlement, I conceive that there will be very little difference of opinion on that subject. I think that, after what has been said, there can be no doubt that the law of settlement is most unjust, harsh, and oppressive; and I shall therefore vote for a resolution which will put forth that declaration as the opinion of this club.

MR. WOOD said: I do not think it necessary to go into any lengthened disquisition as to the manner in which the law has operated heretofore. Our friend Mr. Shaw has passed an able criticism upon the wording of the Act; but I think we should now confine ourselves to the resolution that the law as it at present stands should be repealed, and that a new law extending the range of settlement should be passed. Even if we had an opportunity of going into the effect of abolition altogether, I do not think we should come to any decided opinion: there would certainly be great difficulty in dealing with that question. There are many points connected with this subject which might, I think, be entered upon with great advantage at another period, as showing the injurious effect which the system has upon the country at large; but the principal point we have to discuss, the point which especially bears on the question before us, is whether we shall be induced to employ agricultural labour for the purpose of affording employment, or for the purpose of gaining a profit out of it (Hear, hear). It is clear that if we merely employ the labourer under circumstances in which his work

will afford us a profit, we shall not be called upon as heretofore to employ him merely out of charity. I do think that the circumstance of our being called upon to employ labourers out of charity has been the cause of a great deal of misapprehension with respect to the effect of the poor-laws generally. How that has been brought about is a question which I need not discuss. No doubt something is morally wrong. I am one of those who consider that the poor-law is absolutely necessary—that it is impossible to do without it; but the causes which render it necessary is not a matter for discussion here. I heard with great pleasure the observations of Mr. Chadwick with regard to the necessity of abolishing the law on account of the agricultural labourer. I have myself witnessed some illustrations of the operation of the system. About two years ago I went to a tenant of mine, who is a tailor, and told him that he must not take a certain young man as an apprentice. This young fellow would by going to the tailor have acquired an opportunity of getting an honest living; but he lived in a neighbouring parish, and I was bound, out of sympathy with my neighbours and for my own sake, to object to his becoming one of our parishioners. Such is the injurious operation of the system as regards the working classes. I maintain that a man when acting in his own district is bound to do the best he can for that district; when he is dealing with a public question, on general grounds, the case is different (Hear, hear). I have myself removed houses in order to get rid of the poor; and I beg to say that I shall continue to do so as long as the law shall remain in its present state. If the law were altered, and a good system introduced, instead of pulling down houses I should be induced to build them. It is on the ground which I have stated that I act as I do; and I apprehend that many others are guided by the same motive. No other cause could have induced me to interfere with this boy, who had lost one leg. I was not induced to act as I did by my own feelings towards him, but for the protection of my property. It is necessary, however, to do away with all such causes of the oppression of the poor (Hear, hear). Without going further, I will say that it is the duty of the middle classes of society, as being the classes who have the chief dispensing of wealth, so far as they are able to protect the labourer. We ought to give our opinion in his favour; and we ought to remember that, if not the legislature, we are the makers of those who legislate (Hear, hear). The labourers ought to be protected by law; and if the middle classes do not protect themselves, let the shoe pinch and they will then get themselves better fitted. It is not sufficient, however, that we should merely protect our own interest; we must also provide for the interest of those below us (Hear, hear).

Mr. J. A. GORDON said: I cannot but regret that the resolution combines two things. Upon the question "that the settlement be extended," we should perhaps all agree; upon the question "that it be extended as far as possible," we may perhaps differ (Hear, hear). Though I am in favour of the settlement being extended, yet I cannot say that it should be extended as far as

possible. There are so many conditions involved in a national settlement and a national rate—such a variety of circumstances of an important character—that I could hardly venture to give my vote for such a proposition. I would take the liberty of saying that the resolution might be conveniently divided into two parts, and the first be put separately. I believe that the proposition that it is necessary that the settlement should be extended, would meet with hardly any opposition. I could not consent to commit myself to the second proposition, that it should be extended as far as possible. From the very beginning of the new poor-law I have felt—and I believe Mr. Chadwick will bear me witness in this statement—that the Bedminster Union, to which I belong, is considerably too large; but, on the other hand, I consider that the law of settlement should not be confined to parishes, but should be extended to unions. I think that, if the first part of the resolution were put alone, it would be carried unanimously; the second might be left, on account of the difference of opinion respecting it.

Mr. SHAW said: If the gentleman who seconded my resolution has no objection, I will yield to the suggestion. My great object is to come to a decision upon the pith and marrow of the question; and, if it be felt by the meeting that this resolution is clogged by the second point, I will confine it to the question "that parochial settlement should be abolished."

Mr. BAKER said: I should object to the resolution as put by Mr. Shaw, because I think that, by adopting it, we should commit ourselves too much. It would be a serious matter to come to a resolution so comprehensive and decisive as that proposed, upon so short a notice. I think we should not be doing what we ought to do in the face of the country. I would rather put it in this way—"That the present law of settlement be repealed, and that a more extended and simplified law be introduced, that will give a greater scope for the employment of labour, and a more equitable distribution of the burdens imposed for the maintenance of the poor."

Mr. GORDON: I beg to second that resolution.

Mr. BOWYER said: I came here to protest as strongly as I could against the present law, considering it especially bad on account of the inequality which it establishes as regards different unions. I know a parish in which there is one inhabitant to thirteen acres of land, while in another there is one inhabitant to two and a-half acres.

Mr. SHAW: Unanimity is important; but even gold may be bought too dear. It is my intention to adhere to my original resolution, leaving the meeting to determine whether they will adopt it or the amendment. We might reasonably infer that, communications having been made to upwards of 400 members of this club, those who take the greatest interest in such matters would be anxious to express their sentiments and views on this important question, and that those who could not attend would take some means of communicating those views which they could not convey in person. Now, it happens that the secretary has received a variety of communications from different parts; and, though I do not mean to say that I should be justified in using the conclusions to which these parties have come, for the purpose of influ-

encing the decision of this meeting, I yet think it may be well to draw your attention to the opinions of persons whose duties require them to take part in matters which must give them an opportunity of forming a correct judgment on this question. I find that a gentleman at Rye, Mr. Smith—one of the largest farmers in England, and, I believe, either chairman or vice-chairman of the Rye Union—writes most strongly in favour of an extension of the settlement. In the Staines Union, near Windsor, the Board of Guardians have decided in favour of a national rate. The Hon. Mr. Wilson, who, I believe, takes peculiar views on this subject—I think he binds his tenants down, under pain of very heavy penalties, not to create a settlement—approves of a national rate. The guardians of the City of Norwich, who have a pretty large district under their care—the district being, in fact, chiefly a manufacturing one—are for a national rate.

Mr. EAGLE.—What are we to understand by a “national rate?”

Mr. SHAW.—I am giving what I find in these communications for the purpose of showing you that the parties are in favour of altogether abolishing the law of settlement.

Mr. EAGLE.—Do you mean a national rate on all kinds of property, including personal and real?

Mr. GORDON.—I still think we should confine ourselves to the question of the abolition of the law of settlement.

Mr. SHAW.—I did not anticipate this interruption, but I should be sorry to occupy the time of the meeting unnecessarily. I will merely state, therefore, that we have received, from thirty or forty different quarters, letters and communications of various descriptions, from some of the most leading and practical farmers in the country, in favour of the view which was taken in the resolution of the committee a fortnight ago. The information which we have received from so many parts of the country corroborates the opinion which was expressed on the occasion to which I have referred.

Mr. EAGLE.—The letters do not favour the proposal of a national rate.

The CHAIRMAN.—They unanimously recommend the abolition of the law of settlement, and are favourable to a national rate; and as they emanate from influential parties, I do not think the introduction of them by Mr. Shaw was at all irrelevant to the question before us. That question seems to be, at present, whether or not we shall give our opinion this evening in favour of the entire abolition of the law of settlement, or in favour of modifying the present law.

Mr. BROWN.—Allow me, Sir, to state my opinion on the two questions before us. Mr. Shaw has observed that unanimity is desirable on these occasions. After hearing both the resolutions read, it does seem to me that there is so little difference between them that it is immaterial for which we vote. The one resolution is, “That parochial settlement be abolished,” the other, “That the present law of settlement be repealed.” So far, at least, they agree. (A voice, “Read on.”) “And that a more extended and simplified law be introduced, that will give a greater scope for the employment of la-

bour, and a more equitable distribution of the burdens imposed for the maintenance of the poor.” That is implied in the original resolution.

Mr. BAKER.—You are putting a construction on my words which they do not bear. It has been proposed on the one hand that the law of settlement should be abolished: that is the intention of the first resolution. On the other hand, I have said that I think we might commit ourselves too far by saying that all settlement should be abolished. I agree with Mr. Brown that the two resolutions appear very much alike, but still mine leaves a loophole by which to escape as regards the question of entirely abolishing settlement.

Mr. KEMP said—This is the first time that I have had the pleasure of attending a meeting of this Club, and I rise with considerable diffidence. There are two distinct propositions before us. The first goes to the extent of advocating a national settlement, first doing away, of course, with that which already exists. Mr. Baker's proposition is a more limited one, and by adopting it we should express no opinion as to a national settlement. I think Mr. Shaw was quite right in giving us the information received in communications from various parts of the country. I look upon this meeting as a rather limited one, and, as we shall be taking upon ourselves some degree of responsibility in deciding this question, it must be satisfactory to our minds to derive information and assistance from other parties who are members of this club. As an individual, I am certainly in favour of the entire abolition of settlement. I can see nothing prejudicial to the interests of any parties in the adoption of such a course. I think that where the labourer performs his labour, he should be relieved when he requires assistance. I shall be very happy to find that this meeting takes the same view as Mr. Shaw has done, with regard to the mere question of abolition. Although an Essex man, I cannot concur with Mr. Baker in the necessity for a limitation.

The CHAIRMAN said—I am rather surprised that Mr. Baker has taken the course which he has on this occasion, seeing that his name is attached to the resolution of the committee.

Mr. BAKER: Not attached.

The CHAIRMAN: You were at the meeting, and the meeting was unanimous. If any gentleman chooses to leave before we come to a division, we cannot help his doing so: but I am surprised that after what took place on the former occasion, Mr. Baker should now turn round and seem to oppose us.

Mr. BAKER: I confess that my opinion is now rather different from what it was then. My opinion now is the result of the opinions which I have collected in my neighbourhood. I told the meeting before that I had taken the opinion of a number of farmers.

The CHAIRMAN: I did certainly consider that the feeling expressed in the letters and documents which have been forwarded to our secretary, is that of the members of this club, and also that of the farmers of the country generally; and I had hoped that the views which the committee entertained were so much shared

by all present, that we might have expressed an unanimous opinion on this question. It strikes me that even now, if Mr. Baker could add something in the form of a rider to his resolution, we might do what would be far better than passing an amendment.

MR. NEAME: I think that Mr. Shaw's resolution, taken alone, appears too abrupt.

MR. SHAW: I had prepared a series of resolutions, introductory to the principal resolution, and which would soften down that appearance of abruptness. With permission, I will read them to the meeting: "That the law of parochial settlement interferes injuriously with the administration of relief"—

MR. EAGLE: I rise to order (loud cries of "Chair, chair.")

The CHAIRMAN decided that Mr. Shaw was in order.

MR. SHAW: "That the law of parochial settlement interferes injuriously with the administration of relief, by occasioning laborious and vexatious inquiries into the previous legal settlement of the pauper at the time of his application for relief, and often by throwing unequal, unjust, and fluctuating burdens on narrow and capriciously-formed areas. That in the agricultural districts the law of parochial settlement, in addition to such evils as those above recited, which only remotely influence trading and manufacturing operations, if at all, has a direct and much more injurious effect in interfering between the owner and the occupier, and between the employer and the employed, in the application of their capital and industry to the cultivation of the soil. That, as respects the agricultural labourer, the law of parochial settlement tends to prevent him obtaining work out of his parish, commonly by subjecting the employer in any other parish to direct expense, from displacing a parish labourer and throwing such parish labourer on the rates, so as immediately to affect the amount of contribution by the individual employer. That the agricultural labourer is thus commonly driven back upon his parish, and compelled to work there under circumstances which narrow, and often preclude, any choice of employers, and depress his motives and energy for the most profitable work for himself and his employer of which he may be capable. That the extent of such depression upon the parish agricultural labourer is marked by the better work, higher wages, and more constant employment commonly given to labourers who, though they have a claim to relief in the event of destitution, are not under the immediate influences of the law of parochial settlement. That the law of parochial settlement commonly imposes upon the farmer the labourers whom it has thus depressed, and imposes upon him at inconvenient times labourers not of his choice, under such circumstances as to prevent him giving suitable wages, though not obtaining a fairly remunerative return for their labour. That the amount of the depression of wages produced by the law of parochial settlement is shown by the increased wages given as due to the increased efficiency and productiveness of the labour at different places in England and Wales, where, from various circumstances, the agricultural labour market is

more free, the pernicious effects of the law of parochial settlement being thereby prevented. That the operation of the law of parochial settlement upon small agricultural parishes, in the hands of one or few owners, affords a motive to pull down cottages, or to prevent the erection of new ones, to accommodate properly the labourers requisite for the cultivation of the land. That the letting of land in such places, under covenants not to allow labourers to reside on the farm, or to gain settlements, occasions a displacement and waste of labour highly injurious to the tenant farmers and to the labourers—injurious to the farmer in diminishing the efficiency and amount of his immediate available labour, and in depressing the moral and social condition of the labourers whom he employs—injurious to the labourers by diminishing their working ability and their return of wages, and by driving them to seek habitations in the poorer suburbs of towns, or in the commonly ill-conditioned tenements in the villages of distant open parishes, at such distances as to prevent their children or their families from freely participating in the advantages of the farm labour. That the evil of such injurious interferences and displacements of labour is increasing, and must affect the value of land to an amount greater than the liability to poor's-rates evaded or shifted. That, for the several reasons stated, it is important that the law of parochial settlement should be immediately and wholly abolished, and relief administered in districts so large as not to continue any restrictions on the agricultural labour market, or afford any motives to influence the choice of labourers for the sake of diminishing the share of any future chargeability to the poor's-rates."

The Chairman then put Mr. Baker's amendment, which was negatived. On Mr. Shaw's original resolution being put, there was a large majority in its favour; it was therefore adopted, with the addition of the clauses last read by Mr. Shaw to the meeting.

The CHAIRMAN said: Gentlemen,—I am sure you will all agree with me that we are very much indebted to Mr. Chadwick for the kind and interesting manner in which he has explained his views with regard to poor-law settlement (cheers). I may say, on behalf of the club, that our best thanks are due to him, both for the manner in which he met us on a late occasion, and also for his kindness this day (cheers).

MR. CHADWICK said: I have briefly to return my thanks. In doing so, let me remark that I have watched with great interest the operations of your club. Although I have not a single acre of land, or any direct pecuniary interest in land, I note with great interest all agricultural improvements, because I am quite confident that you cannot move one step forward without proportionately improving the condition of the agricultural labourer. I am sure that it is only on the furtherance of that general object, concurrently with your own interest, that the true prosperity of agriculture can be firmly based (cheers).

The meeting then separated.

## OBSERVATIONS ON LIEBIG'S PATENT MANURE; WITH A COMPARATIVE VIEW OF THE THEORIES OF THAER AND LIEBIG.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

SIR,—The prestiges of celebrated names have at all times caused numbers to fall into error. If such error relate to mere speculative philosophy, as in the case of the late Professor Hegel, of Berlin, who could boast that among the thousands who had wasted their intellectual faculties in trying to fathom his system only one had understood him, and even that one but imperfectly, common sense may have a laugh amidst lamenting such an awful display of human folly. But the case is very different when, for erroneous systems overruling any one of the practical sciences, as medicine or agriculture, millions have to pay with their health, lives, or prosperity. Timely and strenuous efforts ought then to be made, by such as know the danger attending even the ephemeral rule of such an upstart, in order to put him down before he has done too much mischief.

It is this conviction which induces me to address you, from my study at Weimar, on the subject of Professor or Baron Liebig's *patent manure*, though I confess I am not sufficiently acquainted with what may have been done already in Old England itself to burst that agricultural bubble. However, as Professor Liebig does justly rank so high as a chemist, and as he has preconised the efficacy of his manure with equal confidence in England as in Germany, it may be surmised that a number of English farmers and agricultural amateurs have been induced to listen to his proposals, and to leave the safe path of experience for that of a false and visionary theory. If, therefore, you think that this communication would be of some interest or usefulness to your countrymen, you will oblige me by giving it a place in your journal.

Professor Schulze, director of the Agricultural College connected with the University of Jena, has just rendered a most essential service, both to the science of agriculture and the practice of husbandry, by proving that Liebig's system of manuring is utterly false, as well in theory as in practice. In Germany the question may be considered as having been settled by Mr. Schulze's treatise, "Thaër or Liebig?"\* The learned author has

beaten his antagonist completely out of the *field*, by first showing that the very method which Professor Liebig has used in founding a new system of *chemical agriculture*\* by *progressive* or *dogmatical* reasoning is altogether unphilosophical and inapplicable to those theoretical or experimental sciences where the object in view can never be gained by mathematical principles alone, and where the only rational method is that of *regressive* and *regulative* reasoning. By thus proving, *a priori*, that Professor Liebig's system is false and unphilosophical, and that it *must* fail in its application—just as the chemical systems in medicine, which bears so close an analogy to agriculture in likewise applying to living organisms laws arrived at by experience, have been abandoned, after having done infinite mischief to mankind—he has, in fact, refuted Professor Liebig on grounds from which there is no appeal, as they rest on maxims laid down by the most profound thinkers, as Bacon, Kant, &c., which nobody has ever dared to doubt. But after having done justice to science considered in the abstract, Professor Schulze, who is likewise distinguished as a practical agriculturist, has exposed a great number of palpable practical errors into which Professor Liebig has been led by his

Von Liebig besonders dessen Minereraldünger betreffend. Nebst Erörterungen über Erfahrungswissenschaft und bloss speculative Theorie, insbesondere über falsche Anwendung der Chemie in der Land- und Forstwissenschaft. Jena: Friedrich Frommann, 1846." Albrecht Daniel Thaër was a most eminent and successful physician before he became an agriculturist. In 1790 he was named body-physician to the king of England. In 1798 he published his description of the English agriculture. In 1806 he became the founder of the agricultural academy of Möglin, and his "Principles of Rational Agriculture" were published only 1810-12, after he had been a practical agriculturist for 24 years. Professor Liebig has been bred an apothecary, and has become an eminent chemist; his system of agriculture is founded on no practical experience of that science whatever.

\* Had Professor Liebig contented himself, as he ought to have done, being perfectly unacquainted with practical agriculture, with writing a work on "Agricultural Chemistry," he would have deserved the thanks of all farmers; whereas the road which he has shown them, as it is, must needs mislead them, in spite of the new truths which he has disclosed to them.

\* The complete title of this book, a translation of which would, no doubt, be a valuable acquisition to the literature of any other country, is—"Thaër oder Liebig? Versuch einer wissenschaftlichen Prüfung der Ackerbau theorie des Herrn Freiherrn

system, and as to which we may safely appeal to the experience of every practical farmer. In this department the refutation of Liebig's system is of course less absolute, though sufficiently complete to strip it of that glory of infallibility which its self-idolizing originator has been confident enough to shed round it. Considering the radical fallacy of his system, we may now account for the circumstance that the five editions of "Liebig's Organic Chemistry" are, as to the practical applications they propose, like so many dissolving views, where one illusory apparition supplants another, illumined by the same artificial light. We make no doubt, therefore, that Professor Schulze's formal appeal to the farmers to adhere to the late Albrecht Thaër's system of rational agriculture, instead of following the visionary theory of Professor Liebig, will meet with that general approbation which it deserves. We shall at once try to elucidate by an example the essential differences which the two systems present, as to their influence on the theory and practice of agriculture.

A farmer, who follows the method of Thaër, having, for example, observed that when pulverized sulphate of lime (or gypsum) has been scattered on young clover, lucerne, medic, sainfoin, &c., those plants will grow more luxuriantly than when not treated in that manner—having, moreover, observed that sulphate of lime does not produce the same beneficial effect on the blade of the white crops, nor on natural meadows, unless clover, lucerne, &c., form a great proportion of the plants growing on such meadows—does, with the assistance of botany, arrive at the conclusion that manuring with gypsum will favour the vegetation of papilionaceous plants generally, and makes it a rule to act up to that conclusion. Guided by chemistry, that teaches that gypsum consists of lime and sulphuric acid, and that the latter is a compound of sulphur and oxygen; taking moreover into consideration that certain plants grow most luxuriantly on soils containing sulphur, he concludes that sulphur is one of the principles forming the food of papilionaceous plants, and thus he is able to give a much more satisfactory reason for the efficacy of gypsum than before, when it was vaguely surmised that gypsum did act by dint of its power of absorbing watery vapour.

Now it may be easily shown that such a theory, which a farmer has formed with the help of botany and chemistry, is of great practical utility. Botany teaches him that the vetch is a papilionaceous plant, therefore he concludes that it will be benefited by gypsum. He tries that manure with the vetch, and the result does warrant the justness of his conclusion. Many farmers did burn their gypsum previous to applying it to the clover, &c., because

experience had taught them that burning carbonate of lime did render it more efficacious; but such as had a sufficient knowledge of chemistry saved the expense of burning gypsum, knowing that carbonate of lime becomes caustic by the process of burning, whereas gypsum does not become so. Then, chemical analysis having shown that gypsum is composed of lime and sulphuric acid, the knowledge of this fact led to the inquiry, whether sulphuric acid alone would not act as a manure? and thus it was discovered that the vegetation of clover, &c., may be rendered more luxuriant by sulphuric acid as well as by gypsum.

Professor Liebig, on the other hand, goes to work in a very different manner. He does not set out from any observations on manuring with gypsum, but from chemical propositions, which he does not use as leading maxims, but as mathematical axioms. He adopts the following course of reasoning. However rich in humus (animal and vegetable mould) a soil may be, it is impossible that any plant can develop itself on it without a supply of nitrogen or of some substance containing nitrogen (fundamental hypothesis). The nitrogen of the atmospheric air is capable of being combined, even through the most active chemical processes, with any other elementary substance except oxygen (first supplementary hypothesis).\* The development in the white crops of gluten containing nitrogen bears a constant proportion to the quantity of nitrogen introduced into the plant in the form of ammonia (second supplementary hypothesis) — therefore plants want ammonia, to become saturated with nitrogen. The atmosphere and rain-water are the sources on which the plants draw for their nitrogen in the form of ammonia. Now, as gypsum is composed of sulphuric acid and lime, and as sulphuric acid has a greater affinity for ammonia than for lime, the gypsum serves to fix the ammonia existing in the atmospheric air, and to secure that proportion of nitrogen which would have evaporated again with the water from a soil not manured with gypsum. Thus we arrive at the rule that meadows ought to be manured with gypsum in order that the grasses may vegetate more luxuriantly.†

But this rule, arrived at by the above train of reasoning, is at variance with the experience of practical agriculturists, who are sufficiently aware

\* No hypothesis whatever has the least claim to our consideration, if it want another hypothesis to support it; as has been amply shown by Kant and other logicians. See Kant's Works, Leipzig, 1838, vol. iii., p. 263.

† See "Organic Chemistry," fourth edition, pp. 64 et seq. We must quote from the German editions of the work, as we have not the English ones at hand.

that manuring a meadow upon which there grow but grasses, is perfectly useless. In the fifth edition of his Organic Chemistry (p. 69), Professor Liebig has modified his expressions, by putting "many species of plants" instead of "grasses," and "fields" instead of "meadows;" but the method which has generated a rule so decidedly false has remained the same, and in the fifth edition his system rests upon the same untenable hypotheses as in the fourth.

Leaving aside, in this hasty sketch, all that might appear too abstruse, in Professor Schulze's treatise, for general and practical readers—though, in fact, the whole book recommends itself by the clear simplicity of its explanations—let us now plainly consider wherein Professor Liebig's system of manuring does essentially consist, what advantages its originator ascribes to it, and whether there be any sound reasons to warrant such expectations.

The *great rule* of the new system of manuring is the following:—Let the fields not be manured with stable-dung, nor with any sort of dung whatever that contains organic (vegetable or animal) substances, along with its inorganic (mineral) principles. This mineral manure the farmer has to procure, either by incinerating all the vegetable substances that he has reaped, and which he cannot profitably sell or consume on his farm, especially by burning the straw; or by applying to a chemist with a view of having both the soil to be manured and the ashes of the plant to be cultivated duly analyzed, and of getting prepared conformably to the result of such analyses an artificial manure (mineral manure, manure of ashes) containing the very mineral food that the plant wants, and that is not already contained in the ground.

The great argument on which that rule is founded is, that organic substances, especially carbon, do not only exist in the soil, but likewise in the air, and that the plants may absorb it from that inexhaustible source in any quantity they please. The atmosphere, it is stated, contains 2800 billions of pounds of carbon. The mineral substances, on the other hand, can only be obtained by the plants from the ground. Therefore the fertility of any soil, and the fertilising power of the humus in particular, does principally depend on the quantity of inorganic food existing in the same. To justify that view, the author refers to the water-plants, which take their food from the air and water exclusively, as well as to the meadows and forests, which continue to yield crops without being manured.

The *advantages* of the new system of manuring are represented to be the following:—

1. The farmer saves almost the whole of the expenditure for transporting manure to the fields, as

the weight of the mineral manure he wants is only 2.6 per cent. of that of the stable-dung hitherto used.

2. On fields manured after the new system, the vegetation cannot materially suffer from want of rain.

3. The straw may be sold; and most of the live stock, that scarcely ever yields a net revenue, may be dispensed with.

4. The rotation of crops is rendered unnecessary, and any sort of crop may be raised on the same field without intermission.

This theory of Professor Liebig is refuted by the following principal facts:—

1. From the most remote times to ours, the experience of farmers has gone to prove that the fertility of the fields can only be kept up and increased by their being regularly supplied with vegetable and animal manure, particularly stable-dung.

2. On many farms, experience has shown that mineral manure cannot become a competent substitute for stable-dung. In Mecklenburg, Pomerania, &c., it has been found that fields which are marled, without being supplied at the same time with a proper quantity of stable-dung, become quite barren at last, which has given rise to the proverb, "Marl makes rich fathers and poor sons."

3. The *débris*, that is washed down on the fields of many valleys, *ex.gr.*, that of the river Saale, from the adjoining shell-lime mountains, contains a great proportion of mineral plant-food; still cultivated plants will thrive in such new surface-soil only when it is duly supplied with stable-dung or humus.

These agricultural facts being the result of long experience, can only be supplanted by other facts likewise arrived at by experience. If anybody were to prove that fields hitherto treated with stable-dung do really yield the same return for a long succession of years by being treated only with mineral manure, such a fact would carry conviction along with it; but if somebody tries to prove to us the uselessness of manuring with stable-dung by arguments resting on mere speculation or learned sophistry, we ought to listen to him as little as to one who might assert that plants can thrive without air. If such a learned gentleman would tax us with ignorance for that, we might simply appeal to good sense, though we might refer him likewise to the well-known logical maxim, that no hypothesis can compete with experience.

Now, in examining all that Professor Liebig has advanced in his writings against the above experience of farmers and in favour of his own new theory, we seek in vain for any agricultural experience. Neither he nor any of his followers have



proved by actual facts that his patent manure is preferable to stable-dung. All the arguments in favour of the former rest on mere speculation. The chemical results at which Professor Liebig has arrived in his laboratory, we have no hesitation in acknowledging as true; but the conclusions he draws from them as to the practice of agriculture we know by experience to be false. It has been proved, *ex. gr.*, by the experience of the chemists, that the atmospheric air contains a proportion of carbon; and we hold this to be an undeniable fact; but it follows by no means therefrom that the agricultural plants can altogether dispense with the carbon contained in the soil.

The great importance of chemistry is duly appreciated by every enlightened farmer, and he will thank the chemist for supplying him with such scientific explanations of the phenomena he daily observes as will give him a clue and impulse for making new and useful observations and experiments;\* but if the chemist presume to enlighten him on subjects which the former does not understand, the latter will serve him with the answer that Apelles gave to the cobbler. Professor Liebig has gone a step beyond such presumption: he desired the farmer to forget all he knows to be true, and to put implicit faith in a theory which he does not understand, and which is without any experience to support it.

Although the arguments which Professor Liebig uses to combat our views and to support his own theory have not been arrived at by practical experience, but by mere speculation, we shall examine them a little more closely.

1. "The atmosphere," Professor Liebig says, "contains 2600 billions of pounds of carbon, and therefore is an inexhaustible source of that sort of plant-food." We may grant him that; but if he goes on concluding that "because it makes not the least difference to the plants whether they draw upon the carbon they want from the atmosphere or from the soil," they can dispense with carbon contained in the soil, nothing can be more absurd. The plants are fixed to the soil, and deprived of locomotion. Could they soar on high, like birds, one might perhaps in fairness bid them go in search of carbon through the different strata of the atmosphere.

2. That many plants vegetate in water, without being rooted in the bottom of it, is a fact; but the farmer has nothing to do with such water-plants. Though pikes feed on fish, we cannot conclude therefrom that sheep do so.

3. As Professor Liebig refers to the meadows as wanting no stable-dung for yielding crops year after year, we have to remark that this is the case only with such meadows as are well watered, naturally or artificially. Water, therefore, is the medium from which plants do chiefly obtain their carbon, hydrogen, nitrogen, silica, alkaline principles, and other organic or inorganic substances. Several chemists have shown that water contains those principles in sufficient proportion to account for the phenomenon in question. Could we water our fields as often as we pleased, even they would be able to dispense, in a great measure, with stable-dung.

4. The circumstance that forests continue to be productive without being manured is no argument neither for Professor Liebig's theory, as the forest trees do essentially differ from the agricultural plants in spreading with their leaves twenty to thirty times higher, and as much deeper with their roots; wherefore the spaces from which they can obtain food are considerably more voluminous.

Besides, stable-dung and humus do favour the growth of plants, not only by supplying the latter with food, but likewise by attracting moisture; by making clayey soils less stiff, as well as sandy ones more consistent; by rendering cold soils warmer, and hot ones cooler. These physical effects of stable-dung are altogether overlooked by Professor Liebig.

Add to this that Liebig's manuring-powder is to be intimately mixed with the surface-soil, so as to be within the immediate reach of the roots and rootlets of the plants. But we think it quite impossible to fulfil this condition of blending 5 cwt. of powder with the surface-soil of one English acre; wherefore Liebig's theory, even though it had truth on its side, could not be properly put into practice.

As to the advantages which the new system of manuring is said to afford, we might make several objections:—

1. With reference to the expense, we shall take our standard of comparison from the model-farm of Zwätzen, near Jena; where the fields, forming an area of 806 Prussian acres, are manured every year with 2400 waggons (each containing 15 cwt.) of stable-dung, exclusively of composts, the expense being booked at about fivepence per cwt., or at 4800 dollars, sum total. For manuring this area (600 acres yearly) with Liebig's patent manure, there would be required 1800 cwt. a year, causing an expense of 3½ doll. per cwt., or of 6300 doll. altogether; so that the annual expense would exceed the present one by 1500 doll. Add to this that these 6300 doll. must be spent in cash, whereas the stable-dung is produced on the farm.

\* In this respect, it must be allowed, Baron Liebig's influence has been unprecedented and very beneficial in several instances.



Those 4800 doll. which are spent now on manuring the fields do cover part of the expenditure caused by the live stock, which would be a losing concern if that item were abolished. The fourteen draught-horses that are kept on the farm could not be reduced to a less number, as they are indispensable for ploughing, harvesting, &c.; but they would stand idly in their stables, whilst they are now used in transporting the stable-dung.

2. The rest of the advantages which Professor Liebig and Co. ascribe to their mineral manure are too visionary to make any impression on the minds of sensible farmers. We shall therefore conclude with the following remark:—

These gentlemen have fallen into a most glaring contradiction, in first declaring this important chemical discovery or invention to consist “in their being able to give to any soluble principle of the manure any degree of solubility, by combining it with other principles, and in the mixture being adapted in their manufactures to the mean annual quantity of rain,”\* and by their maintaining, on the other hand, “that the efficacy of their manure is not lessened by *different* degrees of moisture.”†

We shall now give a comparative view of the theories of Thaër and Liebig, arranged in the form of a table:—

(A) *With Reference to the Method.*

1. We, that theorize on manuring after the method adopted by Thaër, set out from agricultural experience, and, using doctrines of natural philosophy as leading maxims, go to work *regressively*, so as to arrange into a scientific system the materials furnished by experience.

2. We found our theory not exclusively on chemistry, but also on physiology, physics, meteorology, and the other branches of natural philosophy.

3. We employ chiefly such fundamental doctrines of natural philosophy, as are safely established, keeping our

1. Liebig and his followers set out from principles of natural philosophy, and, without taking any notice of the experience of practical agriculturists, go on *progressively*, using those principles as *constitutive* ones.

2. Liebig considers chemistry to be the sole foundation of a competent theory.

3. Liebig's theory is chiefly founded on hypotheses. It explains many phenomena by imaginary analogies, de-

theory as free as possible from the mere hypotheses of natural philosophers. We prefer leaving a phenomenon unexplained to connecting cause and effect by an imaginary link. We prefer being led by empiric rules to being guided by such as flow from hypotheses.

4. Our theory is so simple that any farmer can understand it, as well as contribute towards its development, although he be no professional chemist, but merely acquainted with the elements of chemistry.

5. The teachers of the old school do not profess to give the student full information on the subject, but think they can put him in the right way towards it.

6. Our theory is still very defective; but we know its defects, and remove them successively, leaving the great pillar of it—unerring experience—unshaken.

(B) *With Reference to the Contents.*

1. We hold that plants must take all their constituent principles from without, and that they cannot generate one principle from another. Those principles consist in carbon, hydrogen, oxygen, and nitrogen, as well as in sulphur, phosphorus, potass, soda, silica, lime, etc.

2. These principles, which the plants assimilate as food, are obtained

rising from chemical hypotheses rules that are at variance with experience.

4. Liebig's theory is so complicated that no farmer can master it, without being at the same time a thorough chemist. Liebig and his followers do even appear to believe that a chemist is the only competent person to understand and apply it; for they propose establishing manure-manufactures and county-chemists to superintend the operations of manuring.

5. The teachers of the new school fancy they know already everything worth knowing on the subject.

6. The theory of Liebig must break down as soon as its great defects are understood; for they do materially affect the very foundation of the system.

1. Liebig and his followers are of the same opinion.

2. The same.

\* See Liebig's Address to the Farmers of Great Britain.

† See Petzhold's Treatise on Liebig's patent manure, p. 2.

from the ground, air, and water, by penetrating into the roots and leaves in the fluid or gaseous forms.

3. The compound substances that form the food of plants are chiefly carbonic acid, ammonia, water, and atmospheric air, besides different aqueous solutions.

4. Carbon is the principle which the white crops and other agricultural plants require in the greatest proportion, as it does constitute 44 per cent. of the weight of the dry substances.

5. The agricultural plants obtain their carbon from the soil, the water, and the atmospheric air; under the forms of humic extract, water impregnated with carbonic acid gas, and carbonic acid gas.

6. By manuring we are to supply the plants not only with the so-called organic constituents, as carbon, nitrogen, &c.; but likewise with the inorganic principles, as silica, phosphorus (or

3. The same. However, Liebig appears to hold the atmospheric air to be plant-food only as far as it contains carbonic acid or other accidental admixtures, not as to its essential constituents, oxygen and nitrogen.

4. In Liebig's Organic Chemistry (p. 13, of the fourth edition), the proportion of carbon in plants is stated to be about the same; still (p. 14), we find the assertion that equal areas of cultivated land produce an equal amount of carbon throughout.\*

5. The plants receive their carbon exclusively from the atmosphere, in the form of carbonic acid gas. The only exception to that rule takes place in the instance of young plants, which are supplied with carbon through the decomposition of the humus or manure.

6. Supplying the plants with inorganic principles is the sole end in manuring with vegetable substances, since they may easily obtain their other constituents, especially carbon, from

their acids), lime, potass, soda, &c.

7. We are to return to the soil the nourishing principles of which we have deprived it by cultivating plants on it; but, as we do not know exactly what are the substances which the plants extract from the soil, we do carefully collect the refuse vegetable substances produced on our lands, especially straw, adding to them other vegetable materials from the woods, peat-bogs, &c., and carry them to our fields in the form of manure.

8. The rotation of crops can but in very rare cases be rendered unnecessary by manuring.

9. Vegetation does not depend exclusively on the manure, but likewise on the degree of moisture in the soil and air, as well as on other physical qualities of the same.

the atmosphere. Animal manure is of some additional use in generating ammonia.

7. We ought to restore to the soil whatever nourishing substances we have deprived it of through the cultivation of plants. We need not, however, return to it the carbon; but chiefly the inorganic or mineral principles. We may, therefore, burn or sell the straw of our harvests without the least danger of impoverishing the soil, provided we give it back the ashes of the straw, these containing the whole of the mineral principles. Instead of these ashes we may employ an artificial mineral manure, fabricated by the chemist.

8. In using the mineral manure of Liebig, we may cultivate wheat, &c., year after year, on the same field.

9. The efficacy of this manure is neither lessened by different degrees of moisture, nor by any of the conditions of locality with plants that are perfectly developed; it is not even checked by absolute dryness of the soil (see "Organic Chem.," 4th edit., p. 46).

(C) *With Reference to the Results.*

\* Here we have again one of those palpable absurdities to which Liebig's theory does consistently lead. He very dogmatically says—"Whether you manure or not, whether you cultivate rye or turnips, the quantity of carbon you raise from a given area of the same soil remains constantly the same." But the mean proportion of carbon contained in the dry substance of any crop being 44 per cent., the above proposition, if founded in truth, would lead to the conclusion—"Whether you manure or not, whether you cultivate rye or turnips, the weight of the dry substance of your crop will constantly remain the same!"

The practical utility of our theory has been established by the experience of these last fifty years on many thousands of farms. There are whole districts in Germany where the gross and net produce of the fields have been doubled or tripled by its application.

Liebig's theory has no practical proof whatever to support it, as far as we are aware of.

We shall not omit mentioning here the results of a few comparative experiments that have been made with Liebig's patent manure and stable dung in 1846, on the farm of Zwätzen, near Jena:—

*Experiment 1.*—The soil of the field on which this experiment took place is a deep rich loam, containing a good proportion of lime, and has a warm, south-eastern exposition. In 1844 it had been manured, and yielded a crop of beet-root; in 1845 summer-colza had been grown on it. On the 26th of April one-half (A) of it, measuring 1-12th Prussian acre, was top-dressed with 20lbs. of Liebig's patent manure for white crops, and then sown with 5½lbs. of barley (*Hordeum distichum*). The other half (B) was not manured at all; but sown with the same quantity of the same variety of barley. The weather being favourable, the barley did thrive; and during its development not the least difference could be observed between the vegetation of the two areas. The crop was cut on the 8th, and housed on the 11th of August. From A there were obtained 23 sheaves, weighing 222½lbs., and containing 92lbs. of grain, 103¾lbs. of straw, and 26 7-12 lbs. of chaff and other refuse matter. From B there were harvested 22 sheaves, weighing 234¾lbs., and containing 95½lbs. of grain, 108 8-15 lbs. of straw, and 30 12-15 lbs. of chaff and other refuse matter. Liebig's manure had not, therefore, benefited the crop of barley at all. On the contrary, the land that had not been manured gave a somewhat better return.

*Experiment 2.*—It was made on an area of 18 Prussian square-ruthen (1 ruthe=12 feet); soil and exposition as in the first experiment. In 1845 the field had yielded a crop of winter wheat. In 1846—

A.—Six square ruthen were manured with 18lbs. of Liebig's patent manure for leguminous plants. By mistake 18lbs. were employed instead of 9lbs., which would have been the proper quantity for that area, according to the instructions given by the firm of Messrs. Pfeiffer, Schwarzenberg, and Co., of Hesse-Cassel:

B.—Six square ruthen were manured with stable-dung:

C.—Six square ruthen were left without manure.

On the 4th of March the whole of the area was sown with 7½lbs. of vetches. The vegetation did present no difference on A and C; but was more luxuriant on B. The crop consisted on A in 63lbs., viz., 15¾lbs. of grains, 47½lbs. of straw; on B, in 68½lbs., viz., 18½lbs. of grains, 50lbs. of straw; on C, in 63½lbs., viz., 15lbs. of grains, 48½lbs. of straw. The grains from A, B, and C present no difference as to their size and specific gravity; therefore Liebig's manure had not benefited vetches neither.

*Experiment 3.*—On poor mountain-land there

were sown with vetches:—A (6 square ruthen) manured after Liebig's system; B (6 square ruthen) manured with stable-dung; C (6 square ruthen) without manure. The vegetation on A and C presented no differences whatever; on B it was considerably more luxuriant.

We anxiously hope that the above article will contribute towards circulating sound views respecting Liebig's manuring system, and especially his patent manure, among a class of society, on whose prosperity the welfare of the commonwealth does so materially depend, and who are threatened in their most vital interests by a new code of agriculture concocted in the laboratory, which treats them like so many old crazy heads, and tells them that the corn they have raised, as well as the wealth they have collected, have been obtained in spite of their preposterous practice; ordering them in the most peremptory manner to forget all their experience, and to buy Professor Liebig's patent manure, it being the true agricultural panacea. We are not in the least disposed to quarrel with a man who has gained to himself everlasting merit, in having advanced his own important science, for having fallen into obvious errors in theorizing on a science with which he is perfectly unacquainted; but we think it our duty to contribute our mite towards cautioning the public against the danger of taking those errors for truth; and we cannot refrain from remarking that founding a money speculation on scientific speculations that have no experience to support them is not exactly what we should admire in a first-rate scientific man, particularly if such speculation of every kind relate to that ancient, noble, and universal profession, where withholding any great truth or discovery from the public even for a year must be considered as a public calamity. But we are strongly reminded of the mote and the beam, and we find it difficult "satiran non scribere," when Professor Liebig, who has not raised one grain of wheat, sallies forth from his laboratory with such denunciations as this:—"Had ye teachers of agriculture made fewer theories, your science would be advanced a step farther; but ye have bewildered the minds of your disciples by your *theoretical views*, ye have left them *nothing to inquire into, nor to explain*: ye have revealed to them why water does not burn, and why fire does give out light, &c.;" for we know of no teacher of agriculture that has been guilty of all that to the same extent as Professor Liebig, who sets out from mere theory, gives mere theory, and wishes to reduce the farmers to the condition of mere machines put into motion by the hand-gear of the chemist.

Weimar, I am, &c.,  
March 1, 1847. W. WEISSENBORN, Ph. D.

\* "Organic Chem.," 4th edit., p. 80; and "Annalen der Chemie und Pharmacie," 1841, p. 256.

## ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A WEEKLY COUNCIL was held at the Society's House, in Hanover-square, on Wednesday, the 24th of February; present, The Earl of Egmont, President, in the Chair; Hon. Capt Rushout, Mr. Raymond Barker, Mr. Humphrey Brandreth, Mr. G. J. Bosanquet, Mr. F. C. Cherry, Mr. A. E. Fuller, M.P., Mr. W. G. Hayter, M.P., Mr. J. Kinder, Mr. P. Pusey, M.P., Professor Sewell, Mr. Wm. Shaw, Mr. Barugh Almack, Dr. Calvert, Mr. E. Parkins, Mr. T. Turner, Mr. T. R. Tweed, and Mr. W. B. Webster.

*Poisons in Land.*—Mr. Read, veterinary surgeon, of Crediton, having at a former meeting called the attention of the Council to the noxious effects which may probably result from the extensive agricultural use, and consequent distribution over the surface of the country, of mineral poisons, such as white arsenic and blue vitriol, Mr. Pusey, M.P., Chairman of the Journal Committee, to which Mr. Read's communication was referred, reported the result of his inquiries at the Custom-house, in reference to the quantities of arsenic imported in the years 1843, 1844, and 1845, and of his application, through Mr. Purser, of New Bridge-street, to the wholesale druggists in London on the subject: from which it appeared that the amount of arsenic actually employed for agricultural purposes is not so great as to lead to any apprehension of evil consequences to the land, or to animals feeding on it; and that, although extensively employed in the manufacturing arts, the quantity of that deleterious mineral used by farmers for steeping grain and dipping sheep appears to be decreasing annually.

*Superphosphate of Lime.*—Mr. Pusey, M.P., having communicated in the "Journal" (vol. vi. page 324), the results of his trials made with the genuine superphosphate of lime manufactured by Mr. Lawes, laid before the Council a statement he had received from that gentleman, dated 5, Upper Portland-place, Feb. 10, 1847, cautioning the public against the spurious articles extensively sold at the present time under the name of superphosphate, in which one-seventh part only of that substance was to be found. Mr. Pusey then read to the Council the following analysis of one of these adulterated mixtures sold to the public at a high price, as genuine superphosphate of lime; and recommended such of the members as wished to make trial of the manure in question to obtain their supply from the original manufacturer, Mr. Lawes himself, at his factory, Deptford Creek, near London, who, he understood, had a stock of 1,000 tons already prepared for sale.

	ANALYSIS.	Per cent.
Superphosphate of lime.....		14
Sulphate of lime (plaster of Paris or gypsum)		64
Water .....		20
Residue .....		2
		<hr/>
		100

*Potato Crop.*—Lord Kenyon called the attention of the Council to the important inquiry respecting the kind of crop to be recommended to cottagers in lieu of that of potatoes.—Mr. Webster understood that in Paris the supply of potatoes was still plentiful, and the tubers free from disease.—Mr. Shaw had been informed by Messrs. Keeling and Hunt, the well-known fruit and vegetable brokers of Monument-yard, that no foreign potatoes they had yet been able to procure since the breaking out of the malady were found to be in a perfectly sound state, and free from disease. He had himself made extensive inquiries on the subject; and from all that he could learn, the round, rough potatoes, known as the "Scotch reds," were the least affected of any of the varieties in this country.—Mr. Fuller, M.P., had just returned from the Island of Anglesey, where the potato crop had failed very generally; but where, fortunately, the Holyhead Railway company had given such constant employment to the Welsh labourers as to enable them to maintain themselves independently of that failure.

*Jerusalem Artichokes.*—Mr. Tweed, of Bowater Crescent, Woolwich, favoured the Council with specimens of Jerusalem Artichokes grown by him agreeably with the recommendation of Mr. Pusey, as given in the Journal of the Society (vol. vi. p. 581); along with the following statement of their cultivation:—

"Having a small piece of ground (sandy soil), almost useless, shaded from the south sun by a brick wall, I was, two years ago, advised to plant some Jerusalem artichokes; and they succeeded very well. I did not further notice the crop; but took it up in the autumn, and put some Brussels sprouts on the same ground, from which I had a good supply. In the spring following I read the account of the Jerusalem artichoke, given in our Journal, along with Mr. Pusey's remark thereon, and was induced in consequence to carry out the plan without manure. The tubers were planted accordingly; but my gardener having another piece of ground close by to manure with stable dung for potato settings (some of the most putrid whole potatoes I could procure, by way of experiment), he misunderstood me, and laid it upon both pieces; by this mistake the most beneficial results transpired. Instead of 4 tons 3 cwt. 3 qrs. 6lbs. per acre upon sandy soil, or of 14 tons 8 cwt. 2 qrs. 27lbs. per acre at Bechelbronn, as stated by Boussingault (Journal, vi., p. 581), I had the extraordinary produce of 32 tons 1 qr. 3lbs. per acre. They were twice hoed, and the stems ran 12 feet high." Mr. Tweed thought the stems might be turned to good account, and also that the tubers grown under favourable circumstances would, on chemical investigation, be found to yield a greater proportion of nutritive matter than shown by the ordinary analyses.—The Council returned their thanks to Mr. Tweed for the favour of this communication.

*Deep Draining.*—Mr. Webster laid before the Council several communications which had been addressed to him on the subject of deep draining, and its failure in strong clays; and he thought it desirable that the Society should not sanction, by publication in their "Journal," the extension of a system regarded by himself and his correspondents as both unsafe and unsatisfactory.—Mr. Pusey, as Chairman of the Journal Committee, reminded Mr. Webster that the Journal of the Society was open to opposite (though not to controversial) opinions, and that any facts which he would furnish to the Journal Committee would receive their best attention. The Society was not answerable for the opinions entertained by the different contributors to the pages of the Journal; the best collection of facts connected with the most important inquiries in reference to agricultural improvement were obtained and made public by its means, and people having these facts fairly placed before them must of course judge for themselves. With regard to the quality of land, he thought there was no term so vague as that of "clay," and it was only by the inspection of an actual specimen that the exact kind of clay land meant in many cases could be understood. Mr. Pusey then proceeded to state to the Council the result of some interesting trials he had made in draining his land.—Mr. Hayter, M.P., had himself drained deeply in strong lands, and from the success of his trials he was inclined to go still deeper. He conceived that the object of the Society was to invite statements on both sides of any important question, in order that truth may be eventually derived. In Mr. Parkes's papers in the Journal, specific cases had been adduced in favour of deep draining; but these, of course, like any others, were open on the one hand to stronger confirmation, or on the other to modification and limitation, as parallel or opposite cases were adduced, and the stock of our knowledge increased.—Mr. Pusey then invited Mr. Webster to prepare a paper as proposed for the Journal, observing that the more facts we had on this important subject the better.

*Grass Seed.*—Messrs. Youell and Co., of Great Yarmouth, transmitted to the Council a supply of Grass seeds just received by them (ex "Mayflower") from Van Diemen's Land, for presentation to the Society, on the part of Mr. Charles Cox, jun., of Liverpool-street, Hobart Town, along with the following statement enclosed with the seed by that gentleman: "I beg to send you a small parcel of a new Grass seed, a native of Norfolk Island. This grass stands the heat of that climate remarkably well, and forms a very luxuriant pasturage on all soils. With you it ought to be sown on rich, arable soil. It seeds well, and the seed is easily collected." The thanks of the Council were ordered for the favour of these communications.

*Glass Milk Pans.*—Messrs. Edwards and Pell, of Southampton-street, Strand, presented to the Society various specimens of glass milk pans, along with the following statement, dated the 19th inst.:—"Last year we first introduced glass dairy pans to the notice of the Royal Agricultural Society. They were of foreign manufacture, but were too expensive to be brought into

general use. We have now the honour of presenting to the Society glass pans of British manufacture, which can be sold at nearly the same price as ordinary earthenware. From the time we first introduced these pans into England the demand has been rapidly increasing, and we have great pleasure in being able to state that they have given the utmost satisfaction."—Mr. Hayter, M.P., suggested that it would be a great improvement in all vessels of this kind, if some scale were shown on them, indicating at once by inspection the quantity of liquid they contained at successive depths.—Thanks were ordered for these presents and communication.

*Inhaling Apparatus.*—Professor Sewell favoured the Council with the result of his inquiries into the most economical and efficient modes of administering the vapour of ether in the case of animals connected with a farm. He found that the simplest and most economical of these modes was at the same time the most efficient; and that in many cases, especially when the smaller animals, such as lambs, were to be operated upon, a sponge, moistened with ether and held in the palm of the hand, was amply sufficient to induce the required insensibility, when the more cumbersome and costly apparatus prepared expressly for the purpose had entirely failed. For larger animals a bladder, with breathing mouth-piece, was found to answer quite well, and by passing elastic bands over this bladder at different distances, the quantity of ether required in any case could be nicely adjusted. For dogs, or other animals in a state of madness, he had a wire-work muzzle secured over the nose and mouth, and the whole inserted into a small cylindrical vessel containing the sponge and ether. He then explained to the members present how the process of inhalation was conducted, by closing one of the nostrils when the animal inspired, thus obliging it to draw up into the other nostril the vapour of the ether through the sponge applied to it; and then opening the closed nostril in order to allow the expiration to be made through that channel; so that to one of the nostrils, the ether was constantly applied, while the other was alternately left open or closed, as the animal inspired or expired from its lungs. He thought that in spasms of the intestines and in cases of locked-jaw, this induction of insensibility would be found of the highest value; and in all operations on animals connected with a farm, it would afford the greatest facilities, to say nothing of the humanity attending its application. He however thought that it should be used with caution in animals reduced by privation or fatigue, and debilitated by disease, injury, or loss of blood. He exhibited and explained to the Council the various simple contrivances, made at an expense in each case almost nominal, for each kind and size of domesticated animal. The thanks of the Council were then presented to Professor Sewell for the trouble he had kindly taken, at their request, in submitting these results to their notice.

Captain Pelly, R.N., presented papers connected with the new Islington Market; Mr. Williams and Mr. Palmer, communications connected with Draining Ploughs; Mr. Reed, of No. 4, West Brixton, specimens of Diseased Potatoes, in which he believed the disease

had been arrested by an inexpensive process; Madame Seeburg, a notice of a substitute for Guano; Dr. Smee, an invitation to his Lecture on Potato Disease, at the London Institution; Mr. Glover, a copy of the First Report of the Newcastle-upon-Tyne Farmers' Club; and Mr. Oldham, of Mansfield, samples of his Foot Rot Preparation—for which, and other communications received by the Council, thanks were ordered.

The Council then adjourned to Wednesday next, the 3rd of March.

A MONTHLY COUNCIL was held at the Society's House in Hanover-square, on Wednesday, the 3rd of March. The following Members of Council and governors were present; namely, Mr. Miles, M.P., in the chair, Duke of Richmond, Sir Charles Lemon, Bt., M.P., Sir John Johnstone, Bt., M.P., Mr. Alcock, Mr. Raymond Barker, Mr. Bennett, Mr. Brandreth, Mr. Browne, Colonel Challoner, Mr. Clifford Cherry, Mr. Garrett, Mr. Gibbs, Mr. Grantham, Mr. Fisher Hobbs, Rev. C. E. Keene, Mr. Kinder, Mr. Neill Malcolm, Mr. Milward, Mr. Pusey, M.P., Mr. Pym, Professor Sewell, Mr. Shaw, Mr. Shelley, Mr. Robert Smith, Mr. Stokes, and Mr. Thompson.

*Finances.*—Mr. Raymond Barker laid before the Council the report of the Finance Committee for the month just ended; from which it appeared, that by the purchase of £1,200 stock, the invested capital of the Society had amounted to £8,200 stock; and that the current cash-balance in the hands of the bankers on the last day of February, was £2,766. Mr. Barker explained that this balance was made up of £39 on arrear account, £633 compositions for investment, £1,160 Northampton balance, and £914 available balance for current purposes.

*Journal.*—Mr. Pusey, M.P., Chairman of the Journal Committee, laid before the Council a complete copy of the new part of the Journal received from the printers that morning; and, agreeably with the suggestion of Colonel Challoner, he had given instructions that the distribution of the free copies of the Journal to the Members should be made at the Society's office with as little delay as possible, and previously to the publication of the new part by the booksellers, and its indiscriminate sale to the public in general.

*Essays.*—Mr. Pusey then reported that a very promising list of Essays, between fifty and sixty in number, had been received by the Journal Committee, in competition, for the various prizes offered by the Society for the present year.

*Implement Judges.*—On the motion of Mr. Shelley, seconded by Mr. Barker, the following Committee was appointed for the selection and recommendation of Judges of Implements for the Northampton meeting, from nominations to be made by the Members of the Society at large, at the ensuing general meeting in May; namely, Lord Portman, Colonel Challoner, Mr. Shaw, Mr. Miles, M.P., Mr. Brandreth, Mr. Fisher Hobbs, and Mr. Shelley.

*Implement Prizes.*—Mr. Brandreth then called the attention of the Council to the importance of settling and

publishing the specific Prizes offered by the Society for Implements, at an earlier date previously to the time for the holding of the particular Country Meeting at which such prizes are to be awarded, in order that the implement-makers may be more fully prepared to meet the views of the society, and supply well-tested implements for exhibition and trial.—Mr. Garrett, on the part of the implement makers, expressed his entire concurrence in the advantages which would result from the adoption of such lengthened period of preparation for the competition.—It was then moved by Mr. Shaw, and seconded by the Duke of Richmond, "That in future the Prizes to be given for Implements at any particular Country Meeting shall be discussed and arranged at the Monthly Council in June, and be finally settled and published at the ensuing Monthly Council in August, in the year preceding that in which such Country Meeting is to be held."

*Implement Stewards.*—On the motion of Mr. Bennett, seconded by Mr. Shaw, the Council agreed to the following resolution, namely:—"That when the Stewards of the Yard are appointed for the next Country Meeting of the Society, three persons shall be chosen for each department—three for the Implements, and three for the Stock—one of whom only, in each department, shall go out of office at the end of the year, and another be appointed; so that two experienced Stewards may remain in office."

*Vice-President.*—On the motion of the Duke of Richmond, seconded by Mr. Browne, the name of the Earl of Egmont was unanimously placed on the list of the Vice-Presidents of the Society, in the vacancy occasioned by the decease of the Duke of Northumberland.

*Adulteration of Manures.*—Mr. W. C. Spooner, of Southampton, communicated to the Council the result of an analysis he had made of a sample of Saldanha Bay Guano, placed in his hands as genuine, but which was found to be adulterated with common chalk to the extent of fifty per cent., and to contain only two per cent. of phosphoric acid—the substance essentially constituting the peculiar essence of that guano. He thought that these nefarious transactions could not be too generally exposed, in order that farmers may be put upon their guard in purchasing manures; for the sample to which he alluded had all the external characters, in colour and odour, of the genuine article, while chemical analysis had proved it so utterly worthless.—Mr. Spooner having gained the prize of the Society by his Essay on Vitriolized Bones, his attention had for some time been particularly drawn to the economical preparation of that manure; and he took that opportunity of transmitting to the Council a sample from a large stock he had prepared, in order that such sample might be submitted to the test of examination and trial.

*Market Gardening.*—Mr. Barngh Almack, of 18, Sackville-street, Piccadilly, transmitted to the Council a communication on the subject of the advantages to be derived at the present time by the intelligent farmer from the practice and experience of the market-gardener, in reference to the introduction of some crop, commonly grown with profit in the market-garden, into the open culture of the field. In a highly-cultivated

market-garden he considered that the effects of high cultivation might be seen in the most striking forms, and some of the best lessons learned as to the proper course of cropping. As an instance, among many others, of the proposed transfer of such crops, he adduced those of garden-peas and beans; for, although the "broad" beans of the garden may not be so valuable per bushel when ripe as the same measure of the common field-beans, he thought it likely, taking quantity per acre into consideration, and the various uses to which the broad beans may be applied in their green state, that the garden-bean would be a more valuable crop than the common field-bean, especially in cases where labour is cheap. It had been observed that wheat was generally better after beans than after any other crop ripened on the land and afterwards totally removed from it; and the experience of the market-gardener confirmed the fact generally that beans are in some degree valuable as preparing the land for future crops.

*Australian Wheat.*—Mr. Gillies, of Mark Lane, presented to the Council a couple of bags containing wheat which obtained the first and second prizes at an agricultural show at Adelaide, in South Australia. He stated that this wheat arrived in London about a month ago, and was sold in Mark Lane last week at 90s. per qr.

*Potato Seed.*—Mr. Lance, of Blackwater, near Bagshot, having paid much attention to the cultivation of the potato, and to the management and growth of the seed, presented to the Council several samples taken from various portions of his collected stock, along with an account of the course he had adopted to obtain the seed, and prepare it for sowing.—On the suggestion of the Duke of Richmond, these samples were distributed among the Members then present, with a request that they would report to the Council the result of their respective trials.

*Veterinary Grant Committee.*—On the motion of Mr. Fisher Hobbs, seconded by Mr. Smith, the Duke of Richmond was elected Chairman of the Veterinary Grant Committee, which His Grace accordingly directed forthwith to be summoned to meet on the following day.

The Council agreed that as the day for the next Monthly Council would fall this year in Easter week, no meeting should be held on the 7th of April, but the President be requested to summon a Special Council for the monthly business on the 14th of April. The Council then adjourned to their weekly meeting on Wednesday.

A WEEKLY COUNCIL was held at the Society's House, in Hanover Square, on Wednesday, the 10th of March: present, Mr. Pusey, M.P. in the Chair; Sir Robert Price, Bart., M.P.; Mr. Alcock, Mr. Almack, Mr. Bosanquet, Dr. Calvert, Mr. Cherry, Mr. Cottam, Mr. Crisp, Mr. Fuller, M.P., Mr. Fisher Hobbs, Mr. Hussey, Rev. C. E. Keene, Mr. Kinder, Col. Mac Douall, Mr. Majendie, Mr. Parkins, Mr. Paynter, Capt. Rushout, M.P., Professor Sewell, Mr. Stansfield, M.P., and Mr. T. Turner.

*Potatoes.*—Sir John Lister Kaye, Bart., of Portland Place, presented to the Society two sacks of seed-potatoes, grown on his estate at Denby Grange, near Wake-

field; along with a statement transmitted by his steward, Mr. John Wilson, of the circumstances attending their culture and management. These potatoes appear to be similar in their character to the variety known throughout Yorkshire as the "Regents;" they are of large size, sound in tuber, and when cooked, are light and very mealy. They were grown on the cold clay lands of the coal districts of that part of England; and, during the last two seasons, the whole of Sir John Kaye's crops had been spared, although those of most of his neighbours, and nearly all his tenants in Yorkshire, had exhibited the effects of the prevailing disease. Mr. Wilson knew of no other cause for this particular exemption, than the care that had been taken under his direction to have all the potatoes, as they were taken up on a wet day, in the autumn of 1845, stored away in the potato-house with an equal bulk of wheat-chaff, for the purpose of keeping the tubers separate from each other, and absorbing any moisture that might exude from them. The potatoes and chaff thus mixed together were formed into beds three or four feet thick, and covered over with straw, for the winter. But at the end of a month, Mr. Wilson had the curiosity to inspect the potatoes, and ascertain the progress of his experiment, when he was surprised to find that so great a fermentation of the tubers had taken place as to create considerable heat in the potato-house, and render the chaff mixed with the potatoes "as wet as though it had been in the farm-yard on a rainy day." He immediately ordered the wet chaff to be riddled out, the potatoes to be sorted over, and a small quantity of fresh dry chaff to be again mixed with them: "after which," says Mr. Wilson, "they were as dry and sound as potatoes possibly could be until all were used and planted in the middle of May. In the autumn of 1846, we had them taken up during the dry weather, when, after picking out all having the least taint of decay (amounting to about one per cent.), the remainder were mixed with chaff as the year before; and although so clean and dry when taken up, the chaff was again very wet, and therefore separated as before from the potatoes, and a small quantity of fresh dry chaff put among them; since which time scarcely an injured potato has been seen." The potato had been planted in the ordinary way: namely, small potatoes six or seven inches' distance from each other, in ridges two feet apart, only half decayed farm-yard manure being spread upon the plants, and the soil then ridged up with the plough. The potato-gatherers never found any of the potatoes injured where fresh long manure had been used; but only in those parts of the field where the manure had been the rottenest and the clay the strongest.—The Council ordered their thanks to Sir John Kaye, for the favour of this present, and for the communication with which it was accompanied.—Mr. Robert Richardson, of Nottingham, informed the Council that he had adopted the following management of his potatoes with much success: 1. Soak the seed-potatoes in a strong brine of common salt and water. 2. Cut the tubers for seed, and soak the cuttings in similar brine. 3. Riddle slaked lime over the cuttings and set them, thus coated with lime, as

soon afterwards as possible; and before covering in, shake a little soot over the potatoes in each drill.—Mr. Fuller, M.P., stated that the results he had obtained from his own personal inquiries and experience, respecting the potato disease, were most unsatisfactory and capricious. The identical seed-potatoes which had been pronounced by one of the highest authorities in such matters, as tainted by the prevalent disease, had been equally declared by one of the first gardeners in the country, who had planted and grown them, to be perfectly free from any disease whatever; while, on the contrary, tubers had, with the same confidence, been pronounced to be sound, which experience had proved to be completely diseased. In the Island of Anglesey, last year, the potatoes were good, which this year had failed; while in Sussex, his potatoes were bad last year and good this season.

*Jerusalem Artichokes.*—Professor Sewell presented to the Council two classes of specimens of the Jerusalem artichoke, each of which had been self-sown, and had remained in the ground all winter. The tubers of the first kind, grown in a light gravelly soil, at his farm, near Reading, were of the size of large potatoes, and of a very healthy appearance. While those of the second, grown in a clay soil in the neighbourhood of London, were only half the size of the former, and appeared paler in colour and less hardy in character. He stated that these tubers required very little attention to their cultivation, and when standing through the winter in the ground had a more agreeable flavour than when taken up earlier and kept in store for use. For the guidance of those who might feel disposed to cultivate them, he referred to an article he had observed in the number for the 5th inst. of the "Scottish Farmer," a periodical paper published at Aberdeen. Professor Sewell had found that the self-sown plants run small, compared with those planted regularly, and that they required, when young, to be hoed out like the turnip crops. The plants of the Jerusalem artichoke proved useful as a light screen, or detective fence, against intruders, for garden-borders, though not so ornamental as those of the dahlia or sunflower. He conceived it was only in the case of continued failure in the potato crop that the Jerusalem artichoke would be cultivated expressly as a substitute for that tuber; but it well deserved a greater degree of attention than had hitherto been paid to it, as an agreeable variety of vegetable for the table. He feared that to cottagers or the poor it would be too costly to purchase for seed-planting, and not sufficiently substantial as an article of diet.

*Mangold-Wurzel.*—Mr. Fisher Hobbs stated a circumstance connected with the cultivation of mangold-wurzel which had been related to him by the Duke of Richmond, namely, that the same quantity of seed having been divided into two portions, one of these had been sown at Goodwood, in Sussex, which had succeeded remarkably well, and the other at Gordon Castle, in the north of Scotland, which had failed, in consequence of its running away to seed.—The Chairman having inquired of Mr. Hobbs, as an experienced cultivator of that crop, whether mangold-wurzel is not more liable to run to

seed in wet than in dry districts, and being answered in the affirmative, he thought it probable, as the early turnip sometimes fails in this way while the late one succeeds, that the mangold-wurzel seed in the instance cited by him, having been sown at the same time in parts of the country widely apart in locality, and differing much in climate, may have been similarly influenced by the respective coldness of Scotland and the mildness of Sussex at the one and same date when both portions of the seed were sown.

*Australian and African Wheat.*—Professor Sewell then exhibited a portion of the Australian Prize Wheat, distributed among the members present at the previous meeting, in a perfect state of germination. Having received it on Thursday, the 4th instant, he had steeped it in water the same night, and then sown it in garden-mould, kept at a temperature varying from 45° to 56° during the twenty-four hours: and, as it would then be seen, every grain had germinated. He had also sown, under the most favourable circumstances, his share of the Barbary Wheat presented to the Council on a former occasion by Sir Arthur Broke, and which had been twelve years in this country; but in this case, Professor Sewell's trial had not been successful: every grain rotted, without a vestige of germination making its appearance; and whether the failure occurred from the age of the grain, or in consequence of any process to which it might have been subjected in Barbary, he considered to be mere conjecture. He feared that the fine quality of the Australian Wheat would render it, as in the case of the Talavera Wheat, suitable only to our finest summers, such as the last, and to light dry soils, and that it would ill accord with the ordinary coldness and humidity of our comparatively ungenial climate. The latitude of Australia, in the Southern Hemisphere, being similar to that of Barbary in the Northern, it cannot, he thinks, be reasonably expected that Wheats grown under those favourable circumstances can very soon become acclimatized sufficiently to be depended upon for a general crop in this country.—The Chairman then favoured the Council with an interesting statement of the mode in which grain, in hot dry countries within the tropics, is preserved under-ground, in chambers prepared for its reception; these subterranean cavities being formed in the shape of a bottle, and, when filled with grain, are closed up almost hermetically at the mouth.

*Agency of Lime.*—Mr. John Towers, of Pinkney's Green, Maidenhead, transmitted to the Council a paper on Lime, and its peculiar agency in Soils. He considered that this alkaline earth was still too much used empirically, and under the impression that its good effects consisted in its "burning," or caustic properties. On the contrary, he ascribed much of its beneficial results to the alkaline character of its action, in neutralising either acid matter, or substances of which it counteracted chemically the injurious tendency, forming with such acid or astrigent matter compounds which were of value to the land. He recommends that lime should be obtained fresh and direct from the kiln; and although prejudicial as a chemical agent on soils sparingly supplied with decomposing vegetable remains,



it is, he thinks, essential in its mildest form, to temper such soils into loam as are naturally deficient in chalk. He then refers to the error formerly entertained of the direct nutritive agency of humus, and to the mode of obtaining humic acid by alkaline agency; and having pointed out the evil arising from too great an accumulation of decaying vegetable matter in the soil, he states his opinion, that humus, so far from being in itself, as formerly supposed, the "food of plants," can only act beneficially when it exists in such due proportion with the staple loams, whether sandy or clayey, as to admit of a progressive decomposition and consequent intro-suspension of the thus elaborated sap. He then proceeds to show that lime is the most advantageous alkaline substance for applying to land in which vegetable matter so much abounds as to defeat the operations of tillage, and enumerates the forms under which humus generally occurs, namely—the black spit-dung of an old mixen, the mould at the bottom of decayed wood-piles, thoroughly rotten leaves, the earth from peat-bogs, and even the heath-soil of moors, usually but erroneously termed "peat" by gardeners. By means of lime, he considers the nature of those substances to be beneficially changed, by the gradual conversion of their disarmed humus into humate of lime; and concludes his paper by reference to the influence of external agencies on the vital functions of plants.—Mr. Alcock remarked that it would be highly desirable to have it ascertained from what source the best lime is to be obtained. From analyses with which the Rev. Mr. Huxtable had favoured him, of lime from common chalk and the grey limestone, the comparative value was strikingly shown in favour of the latter.—The Chairman informed Mr. Alcock that it was the intention of the Journal Committee to propose next month to the Council, among the new prizes to be offered for Essays, a prize for the best Essay on Lime generally—its management, applications, and results—so that the whole subject may be included.—An interesting conversation then ensued on the state in which lime is applied to land in different parts of the country, and the sources from which it is obtained.

*Spanish Phosphorite.*—Mr. Stansfield, M.P., inquired of the Chairman whether any recent efforts had been made to introduce into this country the native phosphate of lime from Estremadura, as an article of commerce.—The Chairman detailed the exertions which had been made on the part of the Society, and under the protection of the Government, by Dr. Daubeny and Capt. Widdrington; and referred Mr. Stansfield to the papers of those gentlemen published in the Journal of the Society. He regretted that a mineral bed of the best manure in the world, although close to the Tagus, lay unavailable for the purposes of commerce and agriculture, entirely through the apathy and want of enterprise of the people among whom it occurred; had Russia or Austria been favoured with the possession of such a treasure, every difficulty would soon have been surmounted, and the ships of the respective countries would long ago have been laden with it as their cargoes to our shores.—Mr. Cherry (veterinary surgeon to the army), having been employed many years during the Peninsular war in devising means

for the transport of baggage through every part of the district in which the phosphorite is stated to abound, expressed to the Council his firm belief, founded on his past personal experience, that it would be easy to effect an object which appeared so desirable. Difficulties, in the case of the transfer of baggage, had in the early stage of the undertaking arisen, which practice and a determination to surmount every obstacle had soon removed. The commissariat mules of the army, he stated, carried 200lb.; while the rude, but simple and efficient bullock-cars, each drawn by two small bullocks, carried 600lbs. The Tagus, when he knew it thirty years ago, was efficiently navigable as high as Abrantes; the main difficulty being in *ascending* the river. Boats were at that time on that river at a point thirty or forty miles higher up. He stated that the Guadiana ran through Portuguese Estremadura, and he thought also through Spanish Estremadura. The common car of the country was among the most simple kind of wheel carriages that could be well imagined, yet for most purposes, extremely efficient. Experience, he repeated, had very materially diminished the difficulties, certainly very considerable ones, of transport in the Peninsula during the latter campaigns of the army in that country.

*Cottage Stoves.*—Mr. M. C. Salvin, a Member of the Society, residing at Brussels, addressed a letter to the Council on the subject of the economical stoves used by the peasantry in Belgium, and expressed his wish to present one as a model for the acceptance of the Society; an offer which the Council accepted with their best thanks. In travelling through Flanders, Mr. Salvin's attention had been called, during the past severe winter, to the stoves used by the peasantry for warming their houses and cooking their victuals. Having been resident for some months at Brussels, he was induced to give these stoves a fair trial; and has found them so economical in point of fuel, and so useful in cooking, and warming an apartment, that he has felt it to be a pleasing duty, as a member of the Society, to bring them under the notice of the Council. The expense, he states, of each stove, is from 30 to 60 shillings; but he thinks they might be made in England at a cheaper rate. The amount of the small damp coal which they consume in a day is in value only 1½d.; and he thinks in the south of England, and in other parts of the country where the price of coals is high, this stove will prove very advantageous in point of economy; and trusts that its introduction into England will be the means of contributing to the comforts of the poorer part of his countrymen, by the communication of that warmth which these stoves produce in a most extraordinary degree.—The Chairman had for some time considered this to be a subject well deserving the earnest attention of the Society. Cottage tracts had already been reprinted from the Journal, and distributed to the amount of 30,000 copies among the cottagers of the kingdom, at the prime cost of printing and paper, on the subjects of Cottage Gardening and Cottage Cookery and Economy; and this one on the economical production of heat seemed naturally to present itself as the next in the series. Wood having formerly been the fuel employed in this country,

the hearths and chimneys were not adapted to the most advantageous combustion of coal for the purposes of economy conjoined with comfort. He thought that, at one of their meetings in May, it would be interesting to have a comparative trial made of the various stoves designed for cottagers. He had himself an American one in the course of trial, which he found was capable of cooking, at an inconsiderable expense of fuel, no less than nine different articles of food in about one hour.—Mr. Cherry was well acquainted with the simplest and most general of all stoves, namely, the one so common from time immemorial throughout Flanders, France, and other parts of the continent. It is made of tin, and in shape is similar to an inverted bell, having an opening at the side for the flue, another at the top, with a set of differently sized rings to receive the pot, and a third covered with an iron plate to supply fuel to the fire. It is only capable, however, of cooking one thing at a time, but its cost is only 3s. 6d. It was the simplest mode of generating heat with which he was acquainted. He had long used a French oven, which was very efficient, and cost only 16s. He would present one of them to the Society. By this oven the concentrated heat was absorbed by the article undergoing the process of cooking, and reflected or radiated by means of its convex outer-surface into the atmosphere of the apartment.—Mr. Paynter had long used the simple Belgian stove; but he found it to require constant attention, and to consume much fuel.

The Council having then agreed that the business of the Society should be suspended on the 24th inst., adjourned to their weekly meeting on Wednesday next.

A WEEKLY COUNCIL was held at the Society's house in Hanover Square, on Wednesday, the 17th of March: present, Mr. Pusey, M.P., in the chair; Earl Somers; Hon. R. H. Clive, M.P.; Hon. Colonel Dawson Damer, M.P.; Sir Charles Lemon, Bart, M.P.; Mr. Alcock; Mr. Almack; Mr. Raymond Barker; Mr. Browne; Dr. Calvert; Colonel Challoner; Mr. Cherry; Dr. Drummond; Mr. Fuller, M.P.; Mr. B. E. Hall; Mr. E. Hussey; Colonel MacDouall; Rev. C. E. Keene; Mr. Kinder; Mr. Majendie; Mr. C. Miles; Mr. Parkins; Mr. P. Pole; Professor Sewell; and Mr. T. R. Tweed.

*Indian Tuberous Roots.*—Dr. Abraham Gesner, of Cornwallis, King's County, Nova Scotia, having been engaged for some time in making a geological survey of Prince Edward Island, and of obtaining, at the suggestion of the Royal Agricultural Society established at Charlotte Town, in that colony, a correct analysis of its different soils, had his attention particularly drawn to those vegetable productions of the district allied in their character to the common potato, with a view to their trial and substitution for that tuber, which had been then attacked by a disease that threatened its entire destruction. Having been successful in this search, and met with two varieties of tuber which he considered worthy of trial, he addressed, in the autumn of last year, two communications on the subject to the Royal Agricultural Society of England, which had been reserved for public

notice until the arrival of the roots themselves, to which these communications had reference. The roots in question having reached the Society's rooms a few days previous to the present meeting, they were submitted to the inspection of the Council, and the communications of Dr. Gesner read in explanation of their history and character. 1. *Saa-gaa-ban.*—This is the wild farinaceous root of a hardy plant found on the islands of Richmond Bay, its favourite situation being along the basis of the higher sand-hills which form the lagoons of the coast, where it grows amidst wild grass, tares, and ferns, and in a sandy soil fertilized by decomposed seaweed and shells. It is also found on an island of Orwell Bay, on the other side of the province, in a dry loamy soil in a natural opening into the forest. The blossom and leaves resemble those of the potato; and from the examination of a few flowers found in a shady place, the plant had been decided by the botanical friends of Dr. Gesner to be the *Glycine apios* of Linnæus. The leaf is like that of the *Solanum nigrum*, or nightshade, of that climate. The stalk resembles that of the vine. The roots are two inches below the surface of the soil; the oval bulbs being strung together like beads by means of a strong ligament, while the tubers, of a blackish-brown colour, also resemble potatoes in their general characters. These are considered as a great dainty by the Indians, who have long endeavoured to keep all knowledge of their existence a secret from the European inhabitants; and their preservation on these small islands may be ascribed to the absence of both wild and domesticated animals. The tubers become ripe towards the end of September; and those that remain in the ground during the winter send up green shoots in the succeeding spring, the decayed roots being found with the ripe vegetable.—Dr. Gesner thinks it a favourable fact, that wherever the Indians had moved the earth by digging, the saa-gaa-ban had increased in size and flavour: he had himself eaten several dishes of it cooked, and always found it very dry, mealy, and palatable. It yielded a high per centage of starch, and he considered it very wholesome. It had always been highly valued by the Indians, who, by employing it for food, were enabled to continue their wars against the early settlers of North America.

*Mus-qua-sete.*—This root was found in a very shady, but warm and dry situation, on a small island of Richmond Bay, in a wild forest of beech, birch, and maple, an inch deep, in very good soil, covered by a thin layer of decayed leaves; but the tops of the plants having withered, no correct opinion could be drawn from its appearance above ground; though it may be inferred, Dr. Gesner thinks, from general considerations, to be the *Claytonia Virginica*, or spring-beauty of Linnæus. The tubers have the external appearance, as well as the smell and taste, of the common potato. But although some were found of tolerable dimensions, the average size was only that of large cherries. The skin of the tuber is of a rusty brown colour; its internal substance white. The Indians state that this vegetable may be preserved in a dry or moist condition for a long period. It is highly esteemed by them as a very farinaceous and excellent food; and though Dr. Gesner has little doubt

that by proper cultivation it might be rendered prolific, it is very rare in the island, and he has much less confidence in its success than in that of the *Saa-gaa-ban*. Dr. Gesner states that from these roots the aboriginal tribes of Prince Edward Island derived a part of their subsistence, before the country was occupied by Europeans; and that it was by the aid of several intelligent Indians that he obtained these roots, previously unknown to him, but which are still employed by them as food. Both varieties, he adds, differ very materially from a bulb known in the provinces as the pig-nut, a wild artichoke, and the Indian turnip. He considers them as not inferior in size and appearance to the wild potato carried from America to Ireland by Sir Walter Raleigh, from which the present common stock has been derived. Dr. Gesner has found both plants in Nova Scotia and New Brunswick, and thinks it probable that they are widely but thinly scattered over that part of North America. He recommends their being planted early in the spring, in a sandy or loamy soil.—The thanks of the Council were unanimously voted to Dr. Gesner for the favour of these communications and specimens.

Sir Charles Lemon remarked that the two plants referred to by Dr. Gesner have been well known in this country for more than a century; and although constantly grown in English gardens during that period, he believed they were considered to be totally unfit for field cultivation. In the communications then read, it is stated that the *Saa-gaa-ban* is the *Glycine apios* of Linnæus, and has blossoms similar to those of the potato plant; but, as the *Glycine apios* has blossoms like those of the laburnum, and not like those of the potato, Sir Charles Lemon thought there must be some great mistake in one or other of those particulars. He did not know anything of the *Claytonia Virginea*, excepting that it was introduced into this country in the year 1748; but this plant, as well as the *Glycine apios*, would be found figured in the *Botanical Magazine*. The one was a leguminous trailing plant, the other a sort of purslane; and in making trials of this kind, it should be borne in mind that the roots of leguminous plants are often poisonous, although their seeds, as in the case of peas and beans, may be perfectly wholesome. He doubted whether any good result would be obtained in cultivating these Indian roots as a substitute for potatoes; at the same time, he thought it right to state that the Horticultural Society had adopted the suggestion made to it of trying some experiments with the *Glycine apios*; and that the account of these experiments, with their result, would appear in the next Journal of the Horticultural Society. He added that the "*Glycine Apios*" is now better known as the *Apios tuberosa*.—Dr. Lindley favoured the Council with a reference to the *Apios tuberosa*. It was a small trailing plant, and had been often mentioned. Elliot, in treating of the plants of Carolina, had merely said of it—"The tubers formed an article of food to the aborigines." Nuttall had described them as "edible and farinaceous, much like those of *Lathyrus tuberosus* sold in some of the German markets, and rarely larger, though very numerous." Dr. Lindley believed

this lathyrus, to which the apios was thus compared by Nuttall, to be of no value, indicated as it was by "Dutch mice" as one of its names, and ranking no higher than with pig-nuts.—The Chairman remarked that he feared the cultivation of these plants in our flower-gardens for so long a period, with so little improvement in their tuberous roots, did not hold out much hope of a different result on transferring them to the open culture of the field; but the Society gave, of course, no opinion on the subject.

*Potatoes*.—The Earl of Egmont, President of the Society, transmitted to the Council the following result of an experiment communicated to him from Ryde, in the Isle of Wight. On the 2nd instant, three potatoes, which had already burst, but had not yet made any length of shoot, were selected for a week's experiment. Two of these potatoes having been steeped in brine for four hours, one of them was dusted with lime, and then both were planted along with the remaining potato, in its ordinary state, as dug out of the ground. Each of these three potatoes, thus planted in separate pots, were put the same day under a frame of glass, without artificial heat, or being covered over at night. On the 9th instant they were examined. The potato which had been brined had increased somewhat in the size and strength of the shoot; the one which had been both brined and limed was found to be stationary; the remaining one, planted in its natural state, had increased more than either of the others, but not very considerably. The party by whom this experiment was made considers that this result shows that, if the brine and the brine and lime had retarded the growth, no injury had been sustained in either case, as both potatoes were in a growing state. He hoped to report further progress.—Mr. Raymond Barker submitted to the inspection of the Council several specimens of potatoes, of large size and very fine quality, taken without selection from the crop grown by a common agricultural labourer, on an allotment piece in Mr. Barker's neighbourhood, near Hambleton, in Buckinghamshire. This crop, on which no particular pains had been bestowed, had succeeded, and remained in verdant leaf, while those of the other labourers, raised from different seed potatoes, in its immediate vicinity, and apparently under exactly the same circumstances, had all withered and died away. The allotment-pieces are on common arable land, inclined to gravel, with a chalky subsoil, and are situate on the flat bottom of a narrow valley. The ordinary manuring had been applied without any artificial dressing whatever. In the successful instance, the seed-potatoes were of the variety known in Berkshire as the Hampstead-norris variety. The crop was dug up in the third week in October last, and measured 16 bushels, of which the 15 bushels selected for family use had furnished a supply of food during the winter, with an excess of 2½ bushels left on hand at the present time, all perfectly sound. Mr. Barker concluded by remarking that so unaccountable were the various cases of failure and success in the potato crops of the two last seasons, that the longer we live the less we seem to know of the mysterious nature of the disease with which they are affected.—The Hon. R.

H. Clive, M.P., mentioned an experiment made on the growth of potatoes by a clergyman in Worcestershire, in which the seed manured with lime and that with common yard-manure had failed, while that with which salt had been sown succeeded. In some cases he had also heard of potatoes being particularly healthy near the sea, as at the Steep Holmes, for instance, near Cardiff, where the wind sweeps the spray and saline vapour over the adjoining country. He had heard of cases also in which the potatoes were much better both as food and for seed when not gathered at once, but kept in the ground without heating during the winter till required. He would obtain for the Council a statement of the management adopted by a gentleman, with great success for ten years, in the Isle of Man.—Mr. Pole related the result of an experiment with the ash-leaved kidney potato manured with lime. They all came up good, but of those that were allowed to remain in the ground all the winter till March all proved sound, while of those that were taken up earlier all withered.—Sir Charles Lemon remarked, that in Cornwall, where the sea air may be supposed to have a more immediate influence, the potato crops had failed lamentably; in fact, that the anomalies in connection with the potato disease were beyond anything he had before met with; and so various were the secondary causes at work in producing the same result, that every theory yet advanced might be disproved by facts as certain as those on which any of the foregoing theories had been raised. He then related experiments made by Lord Shannon on potato and bean crops, in reference to the influence of an eastern or western aspect on the result. It appeared that on eastern ridges the crops failed, while on the western ones they succeeded.—Mr. Browne, through the kindness of Mr. Longbottom, Secretary to the Royal Polytechnic Institution, and the personal attendance of Mr. Robert Murray (on the part of Mr. Newman, mathematical instrument maker, of Regent-street), was enabled to exhibit to the members present the various parts of a diseased potato, in which it has been alleged that insects were to be discovered, under the magnifying power of a fine achromatic microscope; but no such insects could be detected, only the ordinary fungi present in the diseased parts. Observations had been made by a Berkshire gentleman on the natural history and habits of insects affecting the potato, and experiments in field culture under the full presumption of their injurious attacks. Imagining that the aphides are produced or sustained by an east wind, he had protected, as he believed, his potato crop by the screen of a bean crop on the east of it. Whatever might be the cause, Mr. Browne had certainly found that potatoes planted early, and with beans or cabbages between the rows, had succeeded, while other crops in the neighbourhood had failed.—Dr. Calvert had made inquiry on the subject of the attacks of insects on the potato crops, and he was far from satisfied that the prevailing disease had its origin in such cause. He had satisfied himself—1. That no animalcules are to be found feeding on the diseased potato bulbs, at least so far as microscopic investigations have hitherto been carried. 2. That as to the aphids

being concerned in its production, he had not been able to discover that any demonstrable facts can be brought forward to establish such a supposition. 3. That there appear to be three or four specifically different diseases to which the popular appellation of "potato disease" is applied, namely, *a*. The one to be seen in every potato warehouse in the metropolis, attacking the end of the potato to which the connecting cord is attached, and extending along the circumference or outside, the diseased portions remaining dry rather than moist. *b*. The one affecting the crops grown in the North Riding of Yorkshire, commencing in the internal part of the bulb, which becomes so much hardened on being boiled, that pigs and cattle are thought often to refuse it on that account, as they will sometimes eat the same kind of potato in its raw state in preference. The internal disease is indicated in the first instance by stains on the skin of the potato, seen more distinctly on its immersion in water: the tubers are quickly decomposed, becoming soft and moist, and of dark colour, but without any particularly disagreeable odour. *c*. The disease on which Dr. Playfair lectured before the members of the Society in the Theatre of the Royal Institution, on which occasion the fetor of the potatoes was exceedingly offensive, the specimens exhibiting both external and internal ravages of the disease. *d*. A disease in the ash-leaved kidney potato growing on the grounds of the Earl of Chichester, in which the potato appears in the early stages to be firm and sound; but its substance becomes fluctuating, and yields to external pressure as the disease advances. On being broken, the potato, though apparently sound, is found to contain a cavity at its centre, filled with a fluid matter, which on escaping evolves the most intolerable stench. Dr. Calvert suggested that, should any future premiums be given, the competitors should be required to characterize the distinct disease to which the potato is liable in any particular locality. He had read the potato essays in the Journal with much interest, and particularly called the attention of its readers to the recommendation of pulling up the haulms of the plant after the disease had made its appearance, and to that of thin planting, namely, 12 inches from set to set, with 30 inches between the rows.—Mr. Graham, of Cranford, presented to the Council a supply of Fox's Seedling Potatoes, which had been seven months out of the ground, kept in a house built upon the plan given by Mr. Graham in his Prize Essay (Journal, vii., p. 379). He considers this potato to be very prolific, and, in his opinion, superior in flavour to that of every other variety.—Mr. Majendie stated that cargoes of potatoes received into this country from Russia were by no means of good quality; but those from Portugal were better. Next month a cargo was expected from the Bermudas.—Mr. Curtis, of Hayes, having had his attention particularly drawn to the subject of the potato during his recent scientific investigations, had devoted a plot of ground to experiments on its culture, and he would, in the course of the autumn, report to the Council his results.—Mr. Gethen, of Plaistow, presented a collection of papers on the subject of the Potato Disease for the consideration of the Journal Committee.—

Mr. Lister Maw transmitted from Tetley, near Crowle, the supply of yam potatoes, of which the offer had been accepted with thanks by the Council at a former Meeting.—Dr. Parkin transmitted a copy of his work on the prevention and treatment of disease in the potato and other crops, which was also accepted with thanks by the Council.

*Super-phosphate of Lime.*—Mr. Fothergill, of Upper Thames-street, having furnished to Mr. Pusey the Super-phosphate of Lime with which the experiments recorded by Mr. Pusey in the Journal (vi. 324) were made, informed the Council that such supply of that article was furnished for the purpose of those experiments in the summer of 1845, fifteen months after his transactions with Mr. Lawes, whose agent he had never been.—The Chairman (Mr. Pusey) took that opportunity of calling the attention of the Council to the important subject of the adulteration of artificial manures, which was at the present time, he feared, carried to an extent that would justify the Society in again offering a prize for the most economical and simple modes for their detection. He had at a former meeting laid before the Council the chemical analysis of a sample of what purported to be “super-sulphate of lime,” and which was offered to the public at a high price accordingly, but which in fact contained only about one-seventh (or 14 per cent.) of that essential substance: namely—

Super-phosphate of lime . . . . .	14
Sulphate of lime (plaster of Paris, or gypsum) . . . . .	64
Water . . . . .	20
Residue . . . . .	2
	100

It had occurred to him, that in the process of the decomposition of phosphate of lime by means of sulphuric acid, for the purpose of converting that neutral salt into an acid-salt, or super-phosphate, a corresponding quantity of sulphate of lime, or gypsum, would of course be obtained, and which could not fairly be regarded as a spurious addition made with the nefarious intent of adulteration. He had accordingly written to Mr. Lawes to inquire what proportion of sulphate of lime the “super-phosphate” might be allowed to have mixed with it as the result of such decomposition. He had been favoured by Mr. Lawes with the following statement on that point: “The following is what I consider should be the composition of good super-phosphate. I believe mine would yield an analysis fully equal, if not superior to this: namely—

Phosphate and bi-phosphate of lime . . . . .	35 to 40 per cent.
Sulphate of lime . . . . .	20 to 25 ”
Organic (animal) matter . . . . .	20 ”
Water . . . . .	20 ”
	100”

*Spanish Phosphorite.*—The Chairman was also favoured by Mr. Lawes with the following statement in reference to the important question of the introduction of the Estremadura native phosphate of lime into England:—“I perceive inquiries were made at your last Meeting concerning the importation of the native phosphate of lime

from Spain. I took a great deal of trouble about this substance a year or two ago; and sent a person to the place with orders to forward a quantity for the purpose of ascertaining at what price it could be delivered in this country. The results were such as to satisfy me that it could not be delivered in this country at a sufficiently low price to make it available for agriculture. I imported twelve tons, which cost me, delivered in London, £12 per ton; and although some of the expenses may be reduced, I do not think it could ever cost less than £7 per ton, while its real value would not exceed £5. I have not yet used this substance.”

*Crustaceous Manure.*—Mr. Thomas Rogers, of Bolton Street, Edge Hill, Liverpool, having been engaged for forty-six years as a practical gardener, informed the Council that the most powerful manure he had ever employed for grass land, and the destruction at the same time of insects, was that obtained by the burning of shells of all kinds and refuse bones, in a kiln; the residue from the kiln is then reduced into a fine powder, and sprinkled thinly over the surface of the land. Mr. Rogers transmitted to the Council a supply of this manure, which was received with thanks. It may be inferred, from a chemical consideration of the elements of the substances thus exposed to heat, that this manure consists chiefly of a mixture of quicklime and phosphate of lime.—Sir Charles Lemon stated, that from the time of Charles II, shells in a comminuted state, for the purpose of manure, had been taken from the coast of Cornwall, which was entirely strewn with them. The only new feature in the management of them at the present day was their being burnt for conversion into lime.

*Canadian Gypsum.*—Mr. Moyle having transmitted from Canada a ton of carbonaceous or cretaceous gypsum (composed of chalk and gypsum), orders were given by the Council for its trial in this country; and the Chairman directed that the various roots and manures then presented to the Council should be distributed among the members present for the favour of their trial, and a report of any results they may obtain.

Colonel MacDouall presented a paper from Dr. Murray, of Hull, on the fertility of Egypt as connected with the chemical condition of the soil; which was reserved for the next weekly meeting.

Thanks having been ordered for numerous presents made to the society, the Council adjourned to their weekly meeting, to be held on Wednesday, the 14th of April.

NEW MEMBERS.

- Allen, Thomas, Thurmaston, Leicester.
- Berry, John G., Dewsbury, Yorkshire
- Bond, Thomas, Bishop's-Lydeard, Taunton, Somerset
- Bowden, Henry, Coopers, Chiselmhurst, Kent
- Buck, William, East Farleigh, Maidstone
- Clarke, Rev. Francis, Eydon, Brackley, Northamptonshire
- Clarke, George Rochfort, Chesterton-Lodge, Bicester, Oxon
- Coward, Charles Leach, Masbro, Rotherham, Yorkshire
- Fitz-Gerald, William Seymour, Hollbrook, Horsham, Sussex
- Fullerton, Rev. Arthur, Thyberg Rectory, Rotherham
- Fust, Right Hon. Sir Herbert Jenner, Chiselmhurst, Kent
- Hicken, John, Dunchurch, Warwickshire

Hyde, Thomas, Manor House, Maidstone, Kent  
 Johnson, William Breer, Stratfield-Saye, Hampshire  
 Kerr, Robert Heywood, Kington, Herefordshire.  
 Lake, Machin, Saham, Wattou, Norfolk  
 Mellows, William, Carburton, Worksop, Notts.  
 Montgomery, Rev. Robert, Holcot, Northampton  
 Newbery, Richard Phelps, Kimmeridge, Corfe Castle, Dorsets.  
 Norwood, Thomas, Pellham Place, Hastings

Paynter, Thomas, Boskenna, Cornwall  
 Peacey, Robert, Chedgelow, Tisbury, Glouc.  
 Pickard, Henry William, Hooton-Robert, Rotherham  
 Scott, Sibbald, St. Ann's Hill, Midhurst, Sussex  
 Smith, John Thomas, Thornby Grange, Northampton  
 Vaughan, John, Velin-Newidd House, Brecon, S. W.  
 Walter, Stephen, West Farleigh, Maidstone  
 Webster, Baron Dickenson, Penns, Birmingham.

## TENANT-RIGHT.

SIR,—In my opinion nothing more is wanted to place tenant-right on a good foundation or a right footing than to let practical farmers have full scope in the discussion of it. A man ought to know best what is his own interest; and, if he does not know it himself, who can be expected to take the trouble to think for him? Tenants know doubtless pretty well what are their own rights, and so do landlords too. Without a good understanding between these two parties there can be no adjustment of the differences prevalent on the subject of tenant-right. The tenant cannot be righted without the concurrence of the landlord, nor, on the other hand, can landlords altogether dispense with the services of tenants, and take their lands into their own cultivation, and commit the management of them to Scotch bailiffs. A hint of this sort seems to have been thrown out at a meeting of the North Walsham Farmers' Club, by the Hon. W. R. Rous, as it were *in terrorem*, if the tenants should turn out to be obstinate in their demands, and should not readily accede to what was for the advantage of the landlords. A few landlords here and there might refuse to comply with such a bill as Mr. Pusey's, if it should pass into a law, but it would not be practicable for the whole acreage of England to be converted into model-farms, which would be powerless as examples of profitable husbandry, because there would be no tenants to copy any improvements in their own occupations. Now that the corn-laws have been repealed so lately as last session of Parliament, it is not quite seasonable for landlords to entertain the idea of consulting their own interests solely, to the exclusion of the rights and circumstances and position of tenants altogether. The abstract right of landlords to do what they like with their own, cannot for a moment be questioned, for there is no country where indisputable rights are more inviolable than in England. But, in questions of national policy, which involve the well-being of the community at large, it is hardly becoming in landlords to insist upon their strict and exclusive rights. Tenant-right, as has been said over and over again, stands upon its own rights, and it requires only to be understood to be immediately conceded by the great tribunal of the nation, on the broad principles of common justice. A good landlord naturally requires good and responsible tenants, men who have a sufficiency of capital, and are well acquainted with the most approved and scientific modes of agriculture. But where are such men to be found, except you mean those who have money but who will not

invest it on bad security? When an enterprising tenant expends his capital on the land, if he does reap the benefit of his industry and outlay, the fault cannot be in the land, but it may be in the circumstance that advantage is taken of better farming to raise the rents, or he may unexpectedly be compelled to quit his holding, and then his case is hopelessly sunk, and he has no remuneration or redress of his grievances. On the other hand, a landlord may have a bad tenant, who, not studying his own interests, neglects the property of the owner of the soil, and leaves the land in an impoverished and harassed condition. Tenant-right provides against both these contingencies, which operate so unfavourably to the proper cultivation of the soil. If the landlords now stand out on their inalienable rights and refuse to enter into any compact with their tenants for a longer period than one year, then the control over their property may not be interfered with; then they must bear in mind that we are living in *peculiar* times, when it is necessary to tax to the very utmost the powers of the soil. We are seriously affected by our relationship with Ireland. It is next to madness to talk of a repeal of the union between England and Ireland, when we are so disinterested in our endeavours to relieve the starving Irish. But land going out of cultivation in Ireland, instead of Irish bogs being reclaimed, lays upon English agriculturists the extraordinary necessity of raising as large crops as possible from the soil of England, and in as rapid succession as to courses as our climate will admit of and skill and enterprise will insure. A greater abundance of the fruits of the earth are required in England at this moment, at the same time we have cause to be thankful to Providence that we have something to spare for the cause of charity after supplying our own wants. Tenant-right, then, ought at once to be placed on some sort of legislative foundation. For a preliminary measure Mr. Pusey's Bill seems to be as well conceived as can be at first, and whatever defects may be discovered in the working of it can be amended afterwards. Difficulties dismay the sluggard, as if he saw a lion coming before him. It is something to have made an approach, by the medium of law, to give a more commercial character to the transactions of landlord and tenant, and it is very unbecoming at least for landlords to be detected wincing when the machinery comes to be considered by which their movements and those of their tenants are to be regulated, *for the benefit of society*. Property must be

looked upon philosophically and actually, as well as on higher grounds, as a stewardship or trust. So says Drummond: "Property has its duties as well as its rights." The Hon. W. R. Rous, be it observed by me, to do him justice, subscribes to this dictum, and he neither desires nor expects to see landlords having over from Scotland intelligent men to farm for them at 7s. or 10s. per acre. But suppose, for the sake of argument, a landlord to be induced, by the effects of Mr. Pusey's Bill, to act upon the principle of being independent of tenants, and to depute his interests in the soil to the care of numerous agents. He would probably find that rents paid better than responsible culture. It is well known that Norfolk stands in the highest position among the counties of England for its agriculture, and it is desirable that by means of some enactment that good system of cultivation should become general throughout the country, which has been induced in Norfolk by a regard to the mutual interests of landlord and tenant. Last Monday week Mr. Shaw mentioned in the House of Commons that the rental of Norfolk was two millions per annum, a conclusive proof that this country has both good landlords and good tenants. Mr. John Postle, at the meeting before alluded to, well said: "Neither did he admit that he farmed for the community, he farmed for himself, profit being the basis of all business. No man either could or would long carry on an unprofitable business." True enough this. A man

thinks of himself chiefly who makes money by farming. But farmers are not, as it is well known, isolated characters; they occupy a relative position in society, and the bulk of their produce they must bring to market, to meet the wants of the community: and hence it is that he who produces most is the best friend to the consumer; for political economists are agreed that an enlarged supply tends to bring down prices, that is of course supposing the consumers not to be increased in number. But the arguments prevailed last session of Parliament, when the corn-laws were under discussion, that the population of the kingdom was increasing at so great a rate that it was absolutely incumbent on the Legislature to have recourse to every available means for opening up fresh channels of supplying the necessaries of life. With accumulated weight may not this plea be urged in favour of tenant-right, considering the present critical position of Great Britain and Ireland, not to mention France. In fact, under a new or modified shape the arguments of the Protectionists are reacting on the free-traders. An eloquent public writer observes: "It is a maxim of jurists that possession of land is only held by its culture; that man in effect has no right in the soil, except to make it show forth the Creator's bounty, and render it grateful and acceptable to human life. The principle may be extended to the possession of empires." Your's, &c.,

March 20.

A SUBSCRIBER.

## BREEDING OF HORSES.

"Omnium rerum ex quibus aliquid acquiritur, nihil agricultura melius, nihil uberius, nihil dulcius, nihil libero homine dignius."

While agriculture was a mere dry bundle of empirical rules, still shifting according as in individual prejudice or temerity predominated, whilst among husbandmen themselves it consisted of little else than traditionary lore, gleaned from practices sanctioned, indeed, by immemorial usage, but the principles of which were oftentimes misunderstood, more often entirely overlooked, while men were satisfied with the knowledge of results only, or never employed further than their most overt and proximate causes, without laws, without system, without scientific embodiment, it could not form a subject for the study of the scholar in his closet, who is mainly conversant with theoretic reasoning and demonstrable truths. The lapse, however, of a very few years, after commencement was once made, has sufficed to remedy this want with a despatch so rapid, a lavishness so overflowing, that one hardly knows whether more to admire the inveteracy of the defect, or the promptitude of the supply. And, verily, it were passing strange, if even the pettiest and least respectable trade had its appropriate art, yet husbandry, of so paramount and universal an interest, be denied it—*Nullam dicere minimarum rerum artem esse, quam minimarum sine arte nulla sit, nonimum est parum consideratè loquentium atque in minimis rebus errantium.* That other causes have been at work in furthering this very

desirable consummation may not be gainsayed, but that to the laboratory of the chemist it is chiefly attributable must be conceded by all. Sprengel, Liebig, and Mulder, among foreigners—Davy and Johnstone, among our own countrymen—are we to thank that, in lieu of the rambling, fitful efforts of empiricism, we have now the unerring coherent processes of true science; for instability, steadfastness; for meagre partial notices, a copious and elaborate literature, wherein results are painfully traced to their causes, the various conditions needful to ensure them accurately registered, new laws enunciated and verified by manifold essays, apparent contrarieties satisfactorily reconciled, and seeming identities for ever sundered. Seeing, then, that agriculture has received its most remarkable impulse from without, seeing that it is indebted to extrinsic aid for the honourable position it now occupies, I am emboldened to bespeak the attention of Herefordshire farmers to the advice a bookish man ventures to proffer touching one division of their calling, namely, the breeding and rearing of horses. That this is a subject which is daily becoming more important, that it promises every year to be the most remunerative investment of his capital the husbandman can make, to any one who has noted with an observant eye the present indications of the great horse fairs, must be abundantly obvious. Howden, Horncastle, Stourbridge, and, in our own county, Brampton Bryan, are no longer the same amply supplied marts which they were a dozen



years ago. That this is true of the last-cited place yourselves are eye-witnesses; and that it is no less universally true, may be gathered from the unanimous testimony furnished by newspapers relative to the other famous horse-staples. At the meeting at Goodwood, in the autumn of the past year, we were informed that the two topics which equally divided and distracted the deliberations of that assemblage of advocates of protective duties, were the impending ruin which the relaxation of the corn laws threatened to the agriculturist, and the difficulty of procuring hunters for the ensuing season. Again, in the last number of the *Veterinarian*, we are advertised by Mr. Goodwin, veterinary surgeon to the Queen, that whereas "twenty years ago a purchaser would have had no difficulty, when looking into the stables of Messrs. Anderson, Dyson, Elmore, Tilbury, Sheward, and others, of finding at least some fifty 200 guinea horses for his inspection; he may now look in vain for a tenth of that number, and still be disappointed, it being but too true that the superior riding horse or valuable hunter has become almost a *rara avis* as compared with former days." Moreover, that the demand is not merely of a temporary nature may be fairly inferred from the number of public works in progress that crave a constant supply of horses of almost every description; and, also, because it is a physiological fact, that no country can rear a race of horses at all comparable with that nurtured by the soil and climate of these kingdoms, as is very pertinently illustrated by what Mr. Goodwin records, in the article above quoted, respecting the "Creams" transported from Hanover to Cumberland Lodge in Windsor Park, "where, in a few years, their progeny became so large in size, that all those bred there were no longer a match for the small ones in the royal stables, which had come from the same stock in Hanover: that after the peace, the whole stud being sent back to Hanover, the supply became so diminutive again, from the same mares in Hanover, that they were under the necessity of once more sending for mares in order to commence afresh breeding the creams in

England." Nor is it needful to do more than barely advert to what must ever give us, as breeders, a most decided advantage over other nations, the inexhaustible storehouse, to be found in our racing studs, of the best stallions. In order to meet the growing demand, and recruit our wasted stocks, Mr. Goodwin goes so far as to propose the establishment of a company to undertake the breeding of horses. Meanwhile, the main cause of this dearth of good horseflesh he is disposed to find in the annual purchase by foreigners of our best mares; and, certainly, not twenty years back I myself can well remember that farmers might be seen riding to market mounted on some of the finest mares that ever carried a saddle; whereas, now they are fain to put up with a superannuated jade, stunted pony, or leggy, immature, colt. But, however, this is by no means the sole or principal source of the scarcity in question; yourselves may be taxed too justly with contributing to produce it, by the indiscreet treatment of your filly foals. When a foal of this sex is dropped, you deplore your ill luck, regard it as scarcely worth rearing, and so leave it to take its chance, and shift for itself as it best may: if, maugre your neglect and illiberal usage, it should happen to turn out better than your deserts, it finds its way into the market along with the colts, and is disposed of, while such as prove no other than your niggardly treatment might warrant you to expect, and are quite unsaleable, are reserved to breed from, to perpetuate and chronicle your folly in produce as worthless as the dam, and lend a false sanction to the usual allegation that horse-breeding is not remunerative. Why it is not so, as at present conducted, but how it may be made so, especially in the existing state of the market, I will, as room can be spared me in the columns of our invaluable county paper, and leisure serves, endeavour to substantiate, at the same time pointing out the common errors which lead to inevitable failure and ensure disappointment.

Leominster, Feb. 8.

Φίλιππος.

## SYSTEM OF REARING CALVES AS PRACTISED IN NORTHUMBERLAND AND TWEEDSIDE.

In the February number of "The Farmer's Magazine" is a paper, by S. A. Bates, Esq., "On the Treatment of Calves." As the plan recommended differs materially from that long practised with success in this neighbourhood, where large herds of cattle are kept, and thousands of splendid animals fattened for the markets of the manufacturing and mining districts, it may not be useless to those farmers commencing the breeding of cattle, to state shortly the system followed in this district.

The farmers of North Northumberland, and the adjoining portions of Roxburgh and Berwickshire, have a peculiar facility in obtaining a large number of calves for rearing, without the expense of keeping a very numerous stock of cows; each farm labourer, or hind\* (as he is here called) having, as a part of his hiring or wages, a

cow kept. These animals vary in every conceivable degree of cross, from the black West Highland kyloe, the polled Galloway and Ayrshire cow, to the noble and massive short-horn. The most part have several crosses of good short-horn blood, and their produce is invariably got by a short-horn bull, and will feed to sixty or seventy—sometimes eighty—stones, of fourteen pounds to the stone. The calves are all purchased by the farmers; so that a farmer having twelve men has the command of twelve calves, to add to the number produced by his own cows.

The calf, as soon as dropped, is removed from its mother, which is kept in a house or byre, fastened by a chain round the neck to an upright stake; the byre containing a number suited to the size of the farm. The



calf-house is divided by rails into square pens, each only large enough for one inmate; as it is of some importance to keep them separate to prevent them from sucking each other, and that each may get its own share of food. A portion of the beasting or first milk is given, and some add a little castor oil, but it is not a general practice. The beasting is provided by an all-wise Creator with a laxative quality, and carries off from the alimentary canal the viscous matter always found gorging the intestines of newly born animals.

For the first week the cow is frequently milked to break the udder and prevent fever, and a little of the milk is given three or four times a-day to the calf, care being taken not to overload its stomach. After the first week three quarts of new milk, night and morning, is considered sufficient for a calf; and if the mother prove a good milker, one or two other calves are purchased, to consume the extra milk, and to add to the stock. Calves are regularly brought to the country markets from Newcastle, Shields, and other towns where cows are kept to supply the inhabitants with milk; and these added to the numbers produced by the cows of the servants, yield an ample supply; so that with four good cows a farmer may easily rear sixteen calves each year.

At three weeks old a little hay is given in a rack, and a small manger hanging on the outside of the rails is supplied with a little cake and some slices of turnips—which food is increased with the age of the calf. If more calves are rearing than the milk will support, a drink is made to eke out the allowance of milk: various means are resorted to; one farmer using oatmeal gruel, another the water from boiled wheat, some sago; but the food most nearly approaching milk, and most congenial to the constitution of the calf, is a gruel prepared by boiling bean or pea meal in water, and adding the warm gruel to the quantity of milk which can be spared for each calf; making the whole about four or five quarts per head for a calf of a month old; and no animal should, except in cases of necessity, have any of these messes until about that age. As they get stronger, eat more turnips, hay, &c., more of the artificial drink may be given, and more of the milk kept for the younger part of the stock. When from three to four months old they may be weaned, giving, if in winter, a full supply of turnips sliced, and hay, with 1 lb. a-day of cake, or an equivalent in bean meal. As soon as the grass is forward enough, they may be turned out during the day to harden, and after a week left out all night, except in rainy weather. In October they should be housed at night, and given turnips (without the tops) in a green field during the day; but if housed, very few turnips should be allowed, and in lieu, 2 lb. of cake, which keeps them in excellent store condition, and is a great preservative from that scourge of yearlings, the black-leg or black-quarter, and which is more apt to attack them if fed on turnips with the leaves. Many nostrums are recommended to prevent this disease, but the best preservative is regular feeding, and giving a share of dry nourishing food, such as oil-cake, bean meal, or crushed corn.

If it be desired to feed off the animals at two years old, they should be kept fully supplied with cake, and be pastured on the richest old sward, and the second winter get full turnips with a little cake or bean meal, &c. Yet, in this neighbourhood few farmers give cake except to young stock, fattening off their three year olds with white turnips up to Christmas, and Swedes after that, and a daily supply of oat straw. This may appear a startling assertion to many south country farmers, yet it is strictly true. Hundreds of fat oxen, of sixty to eighty stone, are sold weekly in the northern markets that have tasted nothing during the winter months save turnips and straw, and are innocent of even a mouthful of bad hay.

G. DARLING.

*Helton House, near Wooler, Feb. 20.*

## REVIEW.

### COATES'S HERD-BOOK. Vol 7.

BY H. STRAFFORD.

London: J. Rogerson, Norfolk-street, Strand, 1847.

In a work of this description, it is absolutely necessary that the author should be practically acquainted with the subject, as well as have means of knowledge at hand to obtain from the breeder satisfactory information on particular points in the pedigrees of animals in which his own experience may have been deficient. Mr. Strafford has ably executed the work, and gives the fullest and most specific information with regard to the pedigree of the several bulls and cows belonging to the most celebrated breeders in England. The alphabetical arrangement, with two copious indexes, renders a reference to any particular animal or breeder, most complete; amongst upwards of three thousand animals whose pedigrees are given, it is as easy to find any given one as if there were but fifty. It is illustrated with beautifully engraved portraits of several remarkable animals; and as a work of typography it reflects the greatest credit on the spirited publisher. Any person who prizes pure blood, and wishes to breed profitable cattle, will find it his interest to possess himself of the seventh volume of "Coates's Herd Book;" as, for the want of it, he may experience serious loss.

HARLESTON FARMERS' CLUB.—Subjects for discussion for the present year.—March 31: The Root Crop; Propriety of substituting, to a greater extent, Carrots and Mangel Wurzel for Swede Turnips, in consequence of the diseases to which the latter are liable. April 21: Burdens on Land; The Rent-charge. May 19: The comparative advantages of a Dairy and Grazing Farm. June 16: Agricultural Education. July 21: The system of Gleaning. Sept. 15: Cattle Epidemics and Insurance. Oct. 27: The Housing of Stock and advantages of Warmth in Fattening. Nov. 24: The Game Laws.

\* See Mr. Grey's Report, "On the Farming of Northumberland."

METEOROLOGICAL DIARY.

BAROMETER.			THERMOMETER.			WIND AND STATE.		ATMOSPHERE.			
Day.	8 a. m. 10 p. m.		Min.	Max.	10 p. m.	Direction.	Force.	8 a. m.	2 p. m.	10 p. m.	
	in cts.	in. cts.									
Feb.	21	30.22	30.26	43	49	46	W. by South	gentle	cloudy	cloudy	fine
	22	30.28	30.28	45	46	45	N.E., East	calm	cloudy	cloudy	cloudy
	23	30.25	30.20	43	43	37	East	brisk	cloudy	cloudy	cloudy
	24	30.20	30.19	31	40	31	E., E. by N.	brisk	haze	sun	fine
	25	30.15	30.10	31	38	29	East	gentle	fine	sun	fine
	26	30.08	30.10	29	39	30	East	lively	cloudy	sun	fine
	27	30.08	30.08	30	34	28	E. by North	variable	cloudy	cloudy	fine
	28	30.17	30.20	28	35	35	E. by North	brisk	fine	sun	cloudy
March	1	30.24	30.24	35	40	34	N. by East	variable	cloudy	cloudy	fine
	2	30.43	30.48	34	42	40	North	brisk do.	cloudy	cloudy	cloudy
	3	30.48	30.48	39	42	35	N. East	brisk do.	cloudy	cloudy	fine
	4	30.49	30.40	30	42	39	N. by East	gentle	cloudy	cloudy	cloudy
	5	30.28	30.28	38	43	38	N. East	brisk	cloudy	cloudy	cloudy
	6	30.20	30.09	36	40	38	N. East	brisk	cloudy	cloudy	cloudy
	7	29.99	30.08	38	42	38	N. East	brisk	cloudy	cloudy	cloudy
	8	30.16	30.06	36	47	43	N. West	gentle	cloudy	cloudy	cloudy
	9	30.00	30.00	38	43	33	N.W., North	gentle	fine	sun	fine
	10	29.96	30.10	30	39	27	N.E., East	gentle	cloudy	cloudy	fine
	11	30.22	30.16	22	40	30	E. to South	variable	fine	sun	cloudy
	12	30.04	30.20	31	46	34	N., N.W.	lively	fine	sun	cloudy
	13	30.00	30.30	31	47	42	N.W., West	gentle	fine	sun	cloudy
	14	30.33	30.30	31	51	33	S. West	gentle	fine	sun	fine
	15	30.20	30.04	31	57	39	S.E., East	gentle	fine	sun	fine
	16	29.94	29.80	37	58	49	South	brisk	fine	sun	cloudy
	17	29.80	29.80	42	59	45	Southerly	brisk	fine	sun	fine
	18	29.80	29.81	37	61	41	Southerly	gentle	fine	sun	fine
	19	29.75	29.50	38	58	50	S.E., S.W.	brisk	fine	sun	cloudy
	20	29.50	29.51	46	59	47	South	brisk	cloudy	cloudy	cloudy
	21	29.50	29.63	43	56	46	S. by West	gentle	fine	sun	fine

ESTIMATED AVERAGES OF MARCH.

Barometer.		Thermometer.		
High.	Low.	High.	Low.	Mean.
30.77	28.87	66	24	43.9

REAL AVERAGE TEMPERATURE OF THE PERIOD.

Lowest.	Highest.	Mean.
35.27	49.5	42.385

WEATHER AND PHENOMENA.

The reader is requested to notice the high range of the barometric column during so long a period, and to compare with it the all but sunless gloom, which was equally remarkable. The heavy snow furnished the supply of water to the land; without that (8th February) the rains about this part of Berks have been a mere nothing.

Feb. 21. — Pleasant and warm. 22 and 23, gloomy, keen biting air. 24, fine and calm, Lunar halo, chilly night, and frosty in the morning, with haze. 25, fine and sunny. 26, and 27, both frosty; clouds all day, the evening

clear. 28, keen morning, clear day; frost leaves, and clouds form.

LUNATION.—First quarter, 22rd day, 3h. 5m. afternoon.

March 1 to 9, with constant clouds, a trace of rain on the 3rd—day of full moon. 10, some sun; scuds of snow, very cold. 11, still more sharp; but here we have rarely any instance of the low degree which are elsewhere noticed: the temperature by day and night is far more equable. 12, more snow, but the wind change; then succeeded that season of brilliant sun which our table above registers: the barometer began to change, and the mercury sank gradually till on the 19th it stood at 29.50; then, with a few floating black cumuli, a marvellous phenomena presented itself at 9h. 30m. to 50m. in the evening. A luminous arch of pale light extended itself from the western horizon nearly across the heavens to the direct east; it fluctuated a little, but at length became more defined. Passing near to Aldibaran, in Taurus, it ascended to the two stars

of Gemini, and thence to Arcturus, or rather to the south of it, in the east. Clouds hid the beam, and soon after 10 a blaze of white aurora borealis broke forth at due north. Gusty winds and clouds arose, and thus the *equinox* appeared to approach with a threatening aspect; but no rain fell, the weather improved, and now the cold, sunny weather from the east has returned.

The truly electro-magnetic phenomenon was an occurrence of rare interest, and ought to be chroni-

pled. It is highly probable that the two agencies thus manifested almost simultaneously, neutralized each other. Had the beam, as in 1826, or the aurora been alone present, wet weather would surely have followed; as it is, and has been, agriculture progresses under most propitious circumstances and aspects. Rain, gentle warm showers, alone are wanted.

J. TOWERS.

Maidenhead Thicket.

## CALENDAR OF HORTICULTURE.—APRIL.

I propose, in commencing this article, to notice two subjects that seldom claim the gardener's attention, and thus to correct some errors and customary miscalculations. In the first place, the *equinox* (or the period so-called) is at hand, and some weight has been attached thereto relating to the character of the future weather. It, therefore, is desirable that the truth or fallacy of the notion should be determined by repeated observations. But, *de facto*, there is *no real equinox*, or any certain day on which the sun rises and sets at precisely six of the clock; for, since the calendars have adopted "a mean noon and mean time throughout," the hours of sunrise and sunset never accord. In the present year, the sun set at six p.m. on Sunday, 14th March, whereas he will not rise at six precisely on any one morning, the nearest approach to that hour being between the 22nd and 23rd days. The only point from which we may date our equinoctial observation will, therefore, be the hour at which the sun enters *Aries*, at his intersection of the equinoctial and ecliptic circles; and this will occur on the 20th day, at the 17th hour 33rd minute, *astronomical time* (24 hours to the day), or, in other words, before sunrise on the 21st March. I commence this notice on the 18th, and intend to close it on the day last named, when this apparent digression, it is to be hoped, will be brought to a useful close.

One of the remarkable phenomena of the rising year has been the extraordinary height of the mercury for nearly five weeks, during which there was little sun, but a prevailing stedfast gloom. The calendars and weather diaries will record the peculiarities of the late winter; but, in passing, it must not be overlooked that a greater contrast has never been presented than that of the gorgeous splendour which at this moment, and for several days past, has made the third week of March so remarkable. Rain has been wonderfully deficient this year. One heavy fall of snow alone, with a brisk thaw, cer-

tainly rendered the land moist; but as a whole, since the frost unlocked the earth, the gardener has been highly favoured by the admirable temperament produced, which has abated fifty per cent. of his labour.

### OPERATIONS IN THE KITCHEN-GARDEN.

Sow *sea-kail* and *asparagus* for new plantations, or to raise young moveable plants. It must be recollected that both these vegetables like great depth, laboration, and enrichment of earth; they also delight in salt, so that many pounds may be safely mixed with the soil of a bed thirty inches deep, ten yards long, and four feet wide. If the asparagus beds and plots have not yet been dressed, we would rake them thoroughly, to remove stones and litter; then dress over the rows with three inches of leafy dung, turn a shovelling or two of the upper soil of the alleys neatly upon the dress, and replace the earth taken from them with strong manure, after which a liberal sprinkling of common salt will finish the work. *Sea-kail*, after the crop is taken, should be cut over level, the ground forked, dressed, and salted, between, but not over the crowns; and in no case must salt be scattered over any growing plants. And here it will be proper to caution every one to let no particle of salt fall on or close to box-edgings: it is fatal beyond everything to that otherwise iron-hardy shrub.

*Broccoli*.—Commence sowing early for winter and spring varieties, as Grange's early and cauliflower, the Walcheren, the Portsmouth, cream-colour, and sulphur, and Millers' hardy dwarf. Sow in rows, a few inches apart. Sow also the borecoles, Brussels', Savoys, York cabbages, and, at two or three times in the month, summer spinach, lettuce, salads, radishes, turnips, and, indeed, all the approved spring crops, according to taste and quantity demanded.

Remember the often-prescribed rule of sowing

peas whenever a previous crop has appeared. Some direct the same practice for beans; but it is certain that they do better if sown largely in February and early March.

*Second Week.*—Commence with the French beans and runners. Warm, dryish ground, drills open some hours and exposed to the sun, are essentials; but previous sowing in pots, to be ready by the end of the month, affords the best security.

Look well to the *potatoes*. If any blotching of leaf appear, sprinkle salt between the rows. Try two experiments—one by dredging the under surface of the leaves with dust-lime, flowers of sulphur, and soot, which mixture develops ammonia, and at the same time checks mildew; another by cutting back the haulm to within a leaf or two of the soil. It is not probable that the disease will appear so early as April; but, since we know nothing of its actuating cause, and some writers look to aphid or mildew, and stoutly defend each his own theory, it will be right to try various things as remedies.

Dress *artichoke* and *asparagus* early. Transplant cabbage, sea-kail, and cauliflowers. The latter does admirably in asparagus alleys, when they consist of nearly all dung.

Attend to the routine of earthing-up, hoeing, weeding, sticking peas, &c., and to all the offices of cleanliness and good order.

#### FRUIT DEPARTMENT.—OPEN GROUND.

*Comparative Remark.*—On the 21st of March, 1846, after that winter of extraordinary mildness, when the thermometer never indicated a *night-average* of any degree approaching to frost throughout December, January, and February, and when, as a consequence, the pear-blossoms, and those of all the wall-trees, were either open or just expanding, I registered *eight degrees* of actual frost before sunrise (24° of Fah.). The air also had been frosty from the 18th, the sun by day having much power. But the 21st was the climax, and by it the first blooms were destroyed or paralysed to an extent which the utmost rigours of 1814, 1829, and 1838 had failed to approach. Now, in 1847, after eleven weeks of cold if not severe weather, a few apricots and peaches show the tips of the blossoms, and the spur-bearing trees are scarcely on the move; yet all are safe, and the bloom, though late, will be very fine if a few showers and mild nights be granted to us.

I say nothing of pruning, because it is to be presumed that by the 1st of April that process will have been duly completed; but I must remind the reader that *disbudding* should be prepared for. And here I may recommend the tyro to consult and give heed to those articles on the habits

and treatment of fruit-trees which the *Gardeners' Chronicle* is giving in series weekly; the wood-cuts also are instructive, and appear faithful. Disbudding is a gradual process: it implies the removal of all the wood shoots upon the *last year's* bearers—of the nectarine and peach particularly—excepting one at the upper extremity, to carry on the flow of the sap, and one at or nearest to the base of the shoots, to be retained and encouraged as a successor for the next year. Some persons leave an intermediate shoot, in the event of accidents, &c.

*Vines* must be watched, to keep a due supply, but no more, of fruitful wood; or, in the "long-rod" system, to provide new shoots for 1848. In 1846 the buds were expanding in March!

*Figs* should be uncovered, and carefully trained. On the south coast they bear admirably without such training, but they should always be planted against a wall facing the south.

#### FORCING DEPARTMENT.

*Cucumbers and Melons.*—Attend to the heat: stop at a showing fruit—with cucumbers particularly. Tilt the lights by day, in sunny weather; but close by two o'clock, with a full, solar heat. I object to impregnation whenever the fruit is intended for exhibition. It is a vital process so far as the seed is concerned, but tends to injure the figure of the cellular tissue and its external covering. These circumstances and conditions ought to be carefully studied.

The vines that are colouring their fruit require air, and also transparent light-shades or screens. I have seen a crop scalded, and the leaves burnt, by an hour's sun: a diffused light is most beneficial. Gardeners still say much of warm and protected borders. One of the first fruit-growers I ever conversed with cared nothing for external protection, or rather for deep coatings of manure. "If," said he, "the entire stem of a vine be within the house, and enjoy its warm temperature, the whole will be safe." My experience goes with his belief; but there is one point which should always be attended to. The outer bed or border, when still warm, in September, ought to be so covered by mulch, over which tarpauling or boards should be laid, as to *retain* the heat, and entirely exclude cold, rain, and snow. Never suffer the bed to become wet and cold, and there will be small danger.

In proof how a very light covering will protect plants during weeks of frost, I mention the fact that, against the front low wall of a small stove, I have a *jasminum revolutum*; the heat of the hot water within cannot reach it, yet, by the aid of only a few fronds of dry fern, laid around and among its foliage, and kept together by a small frame, the

glass of which had been removed, the leaves are now quite fresh and green.

Space is not sufficient to say more on the treatment of other departments. The weather, however, claims notice.

The *equinox*, or ingress of the sun into *Aries*, is past, and on this 21st day of March the wind south-west, the night temperature bland and gentle, and that of the day at noon above 56°, there is a fair prospect of a growing. Rain, however, becomes very desirable.

The grand meteoric display of Friday night, the

19th, with gusty wind and rapidly-passing black cumuli—these phenomena connected with an entire change of wind, that had occurred with the new moon of the 16th, gave threats of “dire portent.” Storm and rain—a thoroughly wet equinox—appeared certain and at hand; but no! the night passed calmly, the 20th was all that gardener or husbandman could desire, and now the barometer is gently rising from its lowest depression (29 in. 50 cts.). Let us hope for the promise of bygone years—true and fertilizing “April showers.”

March 21.

## AGRICULTURAL REPORTS.

### GENERAL AGRICULTURAL REPORT FOR MARCH.

This has proved an unusually propitious month for the agriculturists. During nearly, or quite the whole of it the weather has been extremely favourable for all out-door operations, which have progressed with a degree of rapidity seldom or never recollected. So far matters are very satisfactory; but we regret to be compelled to state that our accounts relative to the appearance of the growing crops in some localities are by no means satisfactory. The young wheats, taken as a whole, are withered, the result, possibly, of the long-continued frosts; yet we doubt not a few weeks of fine weather will set matters to rights in this particular. Notwithstanding the assertions of some parties to the contrary, there is a manifest inclination on the part of the farmers to increase the breadth of land under wheat culture this year; indeed we may state that the quantity of land sown with that description of produce during the autumn of last year, and that laid down for wheat cropping this spring, has never been equalled for a long series of years past. This is going in a right direction; and we sincerely trust that the evils of scarcity, so severely felt in many parts of the United Kingdom, will be thus averted in future.

We regret to state that our accounts from the various grazing districts relative to the condition of the stock, both beasts and sheep (but more particularly the latter), are very unfavourable. The epidemic has committed most serious ravages amongst the beasts in Lincolnshire, Leicestershire, and Norfolk; while the lambing season, even allowing for a full average fall as to number, has proved a disastrous one—immense losses having been sustained in the young lambs, which have been suddenly seized with a disease peculiar to that observed in the beasts, and which have been carried off in a few hours. It is quite evident that the supply of

sheep in this country is smaller than at the same time during the last fifteen years; and yet the quotations, from causes very difficult to explain (unless, indeed, we may attribute the fall in them to the increasing importations of provisions from Holland and America), have had a downward tendency. There is one feature we may notice in connexion with the cattle trade, which is in itself highly important—we allude to the admirable manner in which the stock goes into the hands of the butchers; in fact, we may state that the weight of meat has seldom been equalled. The supply of old hay on most farms is still exceedingly large; but the partial failure in the turnip crop is likely to have a most unfavourable influence upon the graziers' interests during the present year.

Considerable fluctuations have taken place in the value of most kinds of salted provisions, including butter. Bacon, the supply of which is very small, has sold as high as 80s. per cwt. for prime small Waterford.

Our advices from Scotland are to the effect that the corn trade in the early part of the month was firm, at higher rates; but supplies having increased towards its close, prices receded, with a very slow inquiry. The stocks of flour have been very much reduced in most of the large towns.

Throughout Ireland there has been a full average amount of business doing in grain and flour; but prices, owing to the large arrivals of Indian corn and other articles from England and abroad, have not been supported.

### REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

Since the date of our last month's review, considerable inactivity has prevailed in the demand for all kinds of fat stock, and prices have had a down-

ward tendency, say from 2d. to 4d. per 8lbs. This heaviness in the trade and fall in value are attributed principally to the increased supplies of home-fed beasts and sheep brought forward, and to the large arrivals of salted meat and other provisions from America and elsewhere. On a comparison, we find that beef is now selling in Smithfield at 2d. to 4d., mutton quite 6d., lamb 6d. to 8d., veal 4d. to 6d., and pork 6d. to 8d. per 8lbs. lower than at the same period in 1846—which was certainly a very dear season. Throughout the provinces the general trade has been in a very sluggish state, but the fall in the quotations has not been so extensive as in the metropolis.

An unusually large number of lambs has been lost in the principal flock districts during the month, and we are fully impressed with the opinion that no considerable increase can be expected in the actual supply of stock in the country for some considerable time hence.

The following statement shows the actual supplies of fat stock exhibited in Smithfield during the past month:—

	Head.
Beasts .....	16,742
Cows .....	695
Sheep and lambs .....	84,650
Calves .....	907
Pigs .....	2,440

COMPARISON WITH FORMER YEARS.

	March, 1845.	March, 1846.
Beasts .....	13,400	12,579
Cows .....	600	521
Sheep and lambs .....	122,400	77,010
Calves .....	396	731
Pigs .....	2,011	2,081

It will be seen from the above that the numbers of beasts brought forward during the month just concluded have been very large, and that those of sheep have increased in comparison with those shown in the corresponding period last year.

The bullock droves have been derived as under:—

Norfolk, Suffolk, Essex, and Cambridgeshire .....	5,700
Northern districts .....	1,300
Western ditto .....	2,700
Other parts of England .....	2,000
Scotland .....	840

The other portions of the supply have been derived from the neighbourhood of London and abroad.

The imports of live stock from abroad have been liberal, or as follows:—

From whence.	Oxen.	Cows.	Sheep.	Calves.
Rotterdam .....	313	528	380	101
Flushing .....	—	—	324	—
Nieu Diep .....	20	139	759	10
Harlingen .....	43	452	182	3
Total .....	376	1,119	1,645	114

At the outports, 770 beasts, 500 sheep, and 30 calves have been landed (mostly from Holland) in good condition.

Up to Newgate and Leadenhall, the arrivals of country-killed meat have been large,—viz., about seventy thousand carcasses, while the general demand has ruled heavy, as follows:—Beef from 2s. 4d. to 3s. 4d.; mutton, 3s. 2d. to 4s. 4d.; lamb, 5s. to 5s. 10d.; Veal, 4s. to 5s.; and pork, 3s. 6d. to 4s. 10d. per 8lbs. by the carcass.

CAMBRIDGESHIRE.

It has seldom, if ever, fallen to our lot to report so favourable a spring sowing as the present has been, up to this time, for all kinds of peas, beans, barley, and oats; indeed, with few exceptions, where the turnips are not all consumed, the spring sowing may be almost said to be completed, and, according to all human appearances, with a fair season to succeed so favourable a seed time, an abundant crop may reasonably be anticipated next harvest. Through the sharp cutting frost, and the very small quantity of rain which has fallen these last six or seven weeks, the turnip land, for the barley sowing, has dressed up the best, with the least possible trouble, that has almost ever been remembered. The sharp frost and cutting winds, however, have seriously affected some of the latter sown wheat, which has been sown after white clover, tares, or anything of the kind which left the land in a light state at the time the seed was sown, especially upon the light soils which had not been sheep-trodden at the time: many plants appear to be quite dead, and others so lifted up to the surface, that in the present unusually dry state of the weather, it is difficult to know what mode of treatment is best for it: we find some are rolling it, some are feeding the sheep upon it, with mangels, carrots, &c., where the turnips are finished; and were it not for the succession of frosty nights and dry dusty days, we think the latter a very desirable plan. We, however (until some change in the weather takes place), would recommend, upon all dry soils, the use of very light harrows—or what is much more desirable, the treading of the sheep in the damp of the morning, when there happens to be no frost. It is, however, very gratifying to observe that generally the plant of wheat is very good and promising, and although late, may be an abundant crop; but if it prove so, the harvest must be a late one. The thrashing is in a very forward state: barley is almost entirely cleared out, scarcely enough being left with the growers of it for the pigs and fowls, and so few wheat stacks have been visible throughout the county and Isle of Ely for many years past. Keeping (for stock), through the failure of the turnip, has been scarce and dear; with the exception of hay, which has been at a very moderate price throughout the winter, and is now to be bought, of the best quality, at from four to five pounds per ton. The fall of lambs has been good, and generally come strong and healthy, although great losses have been experienced in some flocks through ewes casting their lambs, and great numbers have died

in consequence of it, and other contingencies; whereas, many flock-masters have never had so few losses as during the last trying winter. But little doubt exists that a heavier crop of wool will be produced at shear day, where sheep have been moderately well kept, than the growth of last year, with all the abundance of turnips throughout the previous winter. The epidemic is still raging amongst some flocks, both amongst ewes and lambs; where this is the case, the wool must, of necessity, be very light, as some of the animals are reduced almost to skeletons in a very short space of time. Some heavy losses have been felt in both fat and store beasts through diseased lungs; many have died, and others killed to prevent entire loss. This circumstance, added to the very low price of meat for many months past, will make it a most losing year for the graziers. All out door operations are now getting into a state of great forwardness, considering how late it was previous to commencing sowing, &c., of almost every kind. But few potatoes are likely to be planted this season, on account of the great scarcity of seed, and the consequent high price, added to the fearful loss at places of the last year's crop, which of itself was almost a failure. Good roots, for seed, are now worth from four to six shillings per bushel; and for very choice ones much higher prices are given. Great care should be taken not to plant any sets from a pit which has been at all diseased, if it is possible to procure others. The mangel-wurzel, where properly secured at the time of clamping, is remarkably sound and good, and is at this time almost invaluable; the sort most generally approved of is the yellow globe. The white Belgian carrots are also a good substitute now for the failure of the turnip crop. Our stock markets have been depressed of late, through the great scarcity of food; but as the number of all kinds is very short, prices must advance considerably when the grass and seeds grow, especially as the latter (the artificial grass seeds) paid so badly for growing last year, that but few will attempt the same thing this if the stock can be procured to feed them off with. Good red cloverseed may now be bought from 4d. to 5d. per lb.; white, do., at from 4½d. to 5d., and trefoil at from 2d. to 2½d., the very choicest. Labourers are well employed, at good wages, with a fair prospect of a continuation at the present price of corn.—March 26.

#### AGRICULTURAL QUERIES.

SIR,—In the "Farmer's Magazine" of this month is a report of a meeting of the London Farmers' Club, at which I find that inoculation for the purpose of laying down grass lands was strongly recommended by several eminent agriculturists. As I am now about to lay down a tillage field to permanent grass, and the system so highly spoken of has not been attempted in this neighbourhood, may I beg the favour of some of your correspondents who have practised it to inform me, through the columns of your valuable paper, the particulars of the practice, so as to enable me to adopt it. The field

is now under turnips, being fed off with sheep. By so doing, both they and you would much oblige, not only myself, but many agriculturists in this county.

I am, sir, yours faithfully,  
A MEMBER OF THE WEST HERFORD-  
SHIRE FARMERS' CLUB.

#### ANSWERS TO AGRICULTURAL QUERIES TITHES UPON LAND TAKEN FOR RAILWAYS.

Where land is taken for railways, or for any other purpose upon which the tithes are commuted under the Commutation Act, 6 and 7 Will. IV., the parties taking the land are liable to the same amount as was paid previously to its having been so taken. "A Subscriber" is informed that the railway company is liable from the time that it took possession.

A TITHE AGENT,  
And Author of "Annual Tithe Tables."

In reply to a question from a correspondent as to the rearing of calves, we give from the *Mark Lane Express* the answer to a similar question asked by a correspondent in that periodical on the 1st of February last; the reply we insert appearing in the paper of the 8th of February.

"SIR,—In answer to an inquiry in your paper of the 1st inst., I beg to say that calves may be reared without milk after a few days from their birth. Linseed porridge, made by boiling a quart of seed in eight or ten gallons of water, and further thickened by three pints or two quarts of flour; oats are perhaps best; but flour made of the large broad bean, or even the common field bean or barley, will do. This should be given new-milk warm.

I am, sir, your obedient servant,  
"A STOCK FARMER."

NORTHAM FARMERS' CLUB.—At the monthly meeting of the farmers' club, the subject of "draining," which had been discussed on a former occasion, was resumed by Mr. Edward Lord, who was followed by Mr. Blackman, Mr. M. Body, Mr. Hicks, Mr. James Selmes, and several other members. A long extract, in connection with the subject, from a work of Mr. Mechi's, which that gentleman had obligingly presented to the society, was also read with attention and interest. At the close of the discussion, it was declared to be the unanimous opinion of the meeting that the most efficient, and, at the same time, the most economical, mode of draining the land in this neighbourhood, as to the materials used, was either with pipes of not less than 1½ inch, or tiles with soles, at a depth and distance varying with the nature of the soil. Mr. M. Body proposed, as a subject for discussion at next monthly meeting of the society, on Thursday, April 1—"The best and most economical method of keeping cart-horse teams.—*Sussex Express*."

## AGRICULTURAL INTELLIGENCE, FAIRS, &amp;c.

**ALCESTER FAIR** was well supplied. Good Beef fetched 6½d.; the number of sheep penned was very small; cows, with their calves, were purchased at £14 and £15. Business ruled rather dull.

**AXBRIDGE FAIR** was well supplied with poor stock, cows, and calves, and there was also a fair proportion of fat cattle. Poor stock and cows and calves met with ready purchasers, but the fat beasts mostly remained on hand. Since the communication by railway with the district around Axbridge a large quantity of slaughtered animals find their way to the London markets; and the great depreciation in price that took place last Monday in Smithfield had, no doubt, the effect of making the butchers unwilling to purchase. It is very certain that the adage of "up corn, up horn," this year has not been verified.

**ANDOVER FAIR.**—A small quantity of cheese was offered for sale, and being principally of the best quality it met ready purchasers. In the cattle fair a good business was effected.

**ASHTON FAIR.**—There was a good show of horned cattle, and the best and most numerous lot of sheep ever shown in this market. An unusual number of young horses was exhibited, and a very fair business was transacted, at moderate prices.

**BRIDGNORTH FAIR** was well supplied with good fat sheep and cattle of all descriptions. Sheep fetched from 6½d. to 6¾d., some prime fetched 7d. For five pens of capital ewes (not sold) from 54s. to 56s. per head asked, 50s. were offered and refused. Cattle sold very dull, and 6d. was the highest price obtained, the principal part sold not fetching more than 5½d.; barrens sold much lower, from 25s. to 30s. per head less than last February fair. Good cows and calves sold well, at prices varying from £14 to £18 18. There was a large supply of horses, mostly for agricultural purposes; good and strong ones fetched from £18 to 25s.; horses of superior power and height £40; fair hacks from £12 to 18s. guineas. There was a large attendance of purchasers, but still things went off much duller than at the last fair.

**BALLYBAY FAIR (IRELAND)** was not so largely attended with black cattle as might be expected; they were chiefly dry cattle. Milk and springers brought very high prices. The horses were of a very inferior quality; any of a good kind sold well, and brought high prices. The sheep market was badly supplied, and little business done.

**DERBY CHEESE FAIR.**—There was a considerable quantity of cheese brought to our fair. The sale was not brisk, and we believe the average price was about 63s. per cwt., though many lots were sold at an average of 60s. Of course there were some dairies which fetched a few shillings more money.

**DERBY FAIR.**—There was a very large supply of beasts; not many sheep. The sale was very dull, and none but the best things could be sold.

**GRANTHAM FAIR.**—There was a fair show of stock, for which high prices were asked, but it is said little business was done. Prime fat beasts were in demand, and sold well.

The **ANNUAL STOCK MART**, held at **HORNCASTLE**, was, as usual, well attended. Fat stock was in request, and went off at a high price; but lean animals were rather a drag, in consequence of the scarcity of keeping. The supply of horses was very limited to what has been seen at former marts; but those brought were rather better in quality than usual.

**HEXHAM FAIR.**—A tolerable show of cattle,

which met ready sale at high prices. An indifferent show of horses, and little business done. Pigs plentiful, and met a slow sale at rather lower prices.

**MALTON FAIR.**—The show of horses was very small, and anything that was up to the mark met with ready sale, at good prices. Good draught horses were in request, and sold from 25*l.* to 40*l.*, and choice kinds for hunters from 45*l.* to 60*l.* A very poor show of nag horses and coaching colts sold at good prices. Less business has, upon the whole, been transacted than for many years, owing to the short supply of good horses.

**NEWARK FAIR.**—There was a small supply of beasts, which did not make so much money as was expected. Sheep were less numerous than at the same period last year, and were also dull of sale. Of horses there was an average supply; but the quality, with few exceptions, very moderate. There were 768 sheep, 47 beasts, and 27 pigs penned in the stock market. Last year the numbers were: 962 sheep, 40 beasts, and 57 pigs.

**RETTFORD FAIR.**—The attendance was not near so numerous as usual, nor was the business transacted of an extensive description. The show of sheep was extremely meagre, but those offered were sold at a decline of 3s. or 4s. per head from those prices obtained at some of the recent neighbouring fairs. The exhibition of stock was somewhat scanty; fat beasts realized from 6s. 9d. to 7s. per stone, with rather a heavy sale. Store ones were lower, and many were taken away unsold. The show of horses was not extensive, and several of those exhibited were of an inferior description; nevertheless, anything likely for work fetched very high prices. One good cart-horse fetched £60, and many ruled from £30 to £40. What perhaps tended to lessen the show and lower its character, was the fact that during the greater part of the previous week dealers were scouring the country in every direction, and buying up all the best they could meet with. And this morning every avenue to the town was beset with dealers anxious to pick up everything useful without allowing it to be brought into the fair. We need therefore scarcely say that everything useful was sold exceedingly dear. The quantity of cheese pitched was less than usual, but on account of the high prices demanded there was only a dull sale and very little business done. Nottinghamshire dairies obtained from 60s. to 70s. per cwt.; Derbyshire, 65s. to 70s.—prime, 72s.; Cheshire 72s. to 75s.; and American from 75s. to 80s. per cwt. The inhabitants and tradesmen complain at the paucity of business done, and the extreme scarcity of money; so that upon the whole it has been one of the dullest affairs of the kind we have experienced for several years past.

**STOURBRIDGE FAIR.**—There has not been a good supply of horses. Good horses have fetched high prices, and continue to do so.

**YORK FAIR.**—A large number of purchasers attended, and those who required horses for general hack and farm purposes had plenty of choice; but valuable horses were very scarce. The animals offered met with a good sale at high prices. The cattle market was only thinly supplied, especially with fat beasts, which were readily disposed of at 6s. 6d. per stone. Lean beasts were sold at somewhat lower price.

**DRAINAGE OF WASTE LANDS IN FRANCE.**—**CHAMBER OF DEPUTIES.**—On Wednesday M. de la Haye-Jonsselin brought forward a bill for the improvement of the country by the drainage of waste lands. The honourable member was addressing the House in favour of his motion when the courier left Paris.



## REVIEW OF THE CORN TRADE DURING THE MONTH OF MARCH.

Though the winter has been both severe and protracted, the autumn-sown wheat appears to have escaped injury; in some parts of the country it certainly wears a thin and unpromising aspect at present, and we have heard of instances where it has been deemed requisite to plough it up, and re-sow the ground with spring corn; but instances of this nature occur every year. To draw any conclusions as to the probable result, from the state of affairs at this time, would be a perfect waste of time, and we shall therefore confine our remarks to merely stating that nothing of a decidedly unfavourable character has come to our knowledge in respect to the appearance of the plant. A backward spring is not usually attended by bad consequences; indeed there may be said to be much more danger in a premature forwardness; and should April prove propitious, a sudden impetus would be given to vegetation, which would soon alter the aspect of the country. Up to about the middle of March, the weather retained its wintery character; but since the 13th or 14th we have had a high temperature, with occasional light showers. After the breaking up of the frost, the ground was in first-rate condition for ploughing; and no impediment having been thrown in the way of field-work by too much wet, the preparation of the soil and the seeding of the same have progressed in as satisfactory a manner as could possibly be desired.

Barley and oats will probably be cultivated to about the usual extent; but of beans and peas a larger quantity than in ordinary seasons will most likely be put in, as these articles will, to a certain extent, be planted instead of potatoes.

Rather important fluctuations have taken place in the price of wheat within the month; during the first three weeks the tendency was decidedly upwards, but since then the advance has been checked. The principal cause of the rise has been an extensive demand for wheat for exportation. Independent of the quantity taken for shipment to Ireland, purchases have from time to time been made on French account; and though the foreign demand has lately fallen off, there is reason to suppose that the scarcity of the article in France and the Netherlands will cause buyers from those countries to visit our markets at intervals throughout the summer. The exportation of British-grown wheat on a large scale is a new feature in the trade; and in the present position of this country, the cir-

cumstance has naturally excited a good deal of attention. Purchases have been made for France, on the east coast, to an extent materially to affect prices; and in some cases as much as 77s. to 78s. per qr., free on board, has been paid for fine Lincolnshire. Whilst this drain has been steadily going on, the consumption at home has also been great; and we can therefore come to no other conclusion, but that the quantity remaining in the hands of our farmers must be less than at the corresponding period of the year in ordinary seasons. That such is most likely the case, we have ample reasons for believing; firstly, because the last harvest was not particularly productive in any part of the kingdom, and in many parts the yield was described as decidedly short; secondly, because the deliveries have been on an unusually large scale during the last six months; and last, though not least, the great inducement which the high range of prices has held out to growers to thrash out freely. As there are no means of arriving at the actual stocks of home-grown wheat in the country, this matter must always, to a certain extent, remain in doubt; but taking a common-sense view of the subject, the probabilities are greatly in favour of our supposition. The prices recently paid for wheat could not have been calculated on when the New Corn Laws came into operation, and may therefore be supposed to have well satisfied the growers. Meanwhile the sale was but little interfered with by foreign stocks of the latter having been nearly exhausted; whilst by holding back too long, a favourable opportunity for realizing might be lost, as it was reasonable to suppose that the state of things here would, immediately after the breaking up of the winter, attract supplies to this country. These reasons appear to us convincing, and we shall therefore take it for granted that the quantity of English wheat remaining is small.

The next consideration is the amount of foreign in the kingdom: on this head we can speak more positively, and have no hesitation in stating that the granaries at all the leading maritime ports are comparatively empty. In London, not much more than 50,000 qrs. remain of the 700,000 qrs. imported; and at the outports the case is, we believe, nearly similar, nine-tenths of the enormous importations of 1846 having been consumed. Such being the position of affairs, we may expect a

feverish trade for the next six months; and more than ordinary interest attaches to the result of the next crop. Fine weather, and large arrivals of wheat from foreign countries, may perhaps counteract the effects of short stocks; and in the event of the summer proving very propitious, rather an important reduction in the value of the article might occur; but we must confess that, under all circumstances, we do not expect a low, or even a moderate range of prices. Any remarks as to the future must, at this season of the year, be looked upon as purely speculative; and though the foregoing observations relative to stocks can scarcely be classed under that head, we shall not use the data thereby afforded as a ground-work for entering into prediction.

In reviewing the course of the trade at Mark Lane, it may be worthy of notice that a considerable proportion of the wheat originally intended for the London market never reached its destination, having been re-sold at the ports of shipment for export to the continent; the supplies have, therefore, been moderate from the east coast. The quantity exhibited at Mark Lane, by land-carriage samples from the home counties, has also been small. It may, however, be questioned whether prices would have advanced if our own millers had been the only buyers, the high value of wheat having had the effect of causing the purchasers for local consumption to act on the reserve; but an impetus having been given to business in the early part of the month, by orders from France and Belgium, a rise to the extent of fully 5s. per qr. was established. On the 1st inst. most of the red Essex and Kent wheat was taken on French account, at rates 1s. to 2s. per qr. above those current on that day week; subsequently the inquiry increased. On the 8th a further enhancement of 2s. to 3s., and on the 15th of 1s. to 2s. per qr. was insisted on and obtained. Since then the foreign demand has fallen off, and towards the close of the month prices had receded 2s. to 3s. per qr. from the extreme rates current on the 15th instant.

Of foreign wheat, the quantity remaining at this port is, as we have already intimated, reduced into a very narrow compass; which circumstance has given great confidence to holders. As long as English wheat rose, foreign advanced with it; but the latter has not been much influenced by the recent downward movement in the former, good Polish Odessa being still held at 73s. to 75s., and the best red Baltic at 78s. per qr.

By the latest advices from the North of Europe, we learn that at most of the leading ports the ice had so far broken up as to allow of shipments being commenced; the scarcity of vessels in that quarter is, however, likely to be a great hindrance

to business, and as the French have for some time past been paying higher prices than our merchants have deemed it prudent to venture on, the receipts from the Baltic are not likely, in the first instance, to be very large.

The flour trade has been less active than might have been expected, and notwithstanding the rise which has taken place in the value of wheat, the nominal top price of town-manufactured flour has remained stationary at 65s. per sack. Norfolk households, and other ship sorts, rose 1s. to 2s. per sack at one period; which advance was, however, afterwards lost, and quotations are now much the same as they were at the close of February.

The fluctuations in the value of barrelled flour have not exceeded a shilling or two, the price having ranged from 40s. to 42s. for the best brands of United States, and at present it would be difficult to make sales to any extent at 41s. per brl. It was at one time expected that this article would be taken largely for France; but such has not hitherto been the case, and the quantity remaining in warehouse is relatively much larger than that of wheat, whilst a further addition to our stock may be confidently reckoned on by fresh imports from America.

Though English Barley has come to hand sparingly throughout the month, the supplies have proved more than equal to the demand. Since the weather has become warm many maltsters have left off work, and even the finest sorts have lately been difficult to quit. The top quotation may be considered to be 56s. to 58s., which is 2s. lower than at the end of last month. The reduction in prices of the secondary kinds of barley has been far more important, rather large arrivals from abroad having afforded abundance for grinding purposes. Meanwhile, a material falling off has taken place in the demand for those sorts usually used for feeding, which may be accounted for by the fact that a greater number of pigs were slaughtered last winter than in ordinary seasons, in consequence of the dearth of all articles suitable for fattening. This circumstance may have a material influence on the value of the common sorts of barley hereafter, and perhaps prevent a rally taking place. At present tolerably heavy samples of foreign may be bought at 45s. per qr., being nearly 5s. per qr. below the prices current in February.

The malt trade has throughout the month remained in a very depressed state, with a gradual decline in quotations; the very best sorts may now be procured at 80s. to 82s., and for brown malt it would be exceedingly difficult to obtain over 70s. per qr.

Contrary to expectation, about 20,000 qrs. of oats have been received from Ireland during the month. This quantity is certainly not large, being hardly

more than in former years we are accustomed to get weekly from the sister isle; but in the existing position of affairs on the other side of the channel, it is somewhat singular that shipments should be made at all, of an article which, according to quotations at Limerick and other leading Irish towns, is dearer there than in the English markets. From our own coast the arrivals of Oats have been to a fair extent; besides which, good supplies have reached us from foreign countries: the receipts have, consequently, been fully adequate to provide for the diminished consumption. That the consumption of oats has decreased, and hay been largely employed as a substitute, cannot be doubted. The excellent quality of the latter has allowed of its use more extensively than in ordinary years; and the relatively high value of oats has been a strong argument in favour of the employment of any cheap substitutes. The principal London dealers have all along acted with the utmost caution; and though their stocks are decidedly low, they appear perfectly satisfied to continue to work on the hand-to-mouth system. From the beginning to the middle of the month, prices receded fully 3s. per qr.; afterwards a temporary rally to the extent of about 1s. per qr. took place, but this was again lost on the 22nd, and we must quote all kinds of oats at least 3s. per qr. lower than at the close of last month.

That the quantity of old beans remaining at the time of last harvest must have been large cannot be questioned; for though the yield of this article was undoubtedly very defective in 1846, the supplies have, up to the present period, been fully adequate to our requirements, with very little assistance from abroad. Since our last, all kinds of beans have been greatly neglected, and prices have gradually receded: good ticks having lately been sold at 46s. to 48s., and good harrows at 50s. to 54s. per qr., according to quality, condition, &c. In Egyptian beans the operations have been of quite a retail character, at a decline of 1s. to 2s. per qr. There have not been many offers of the latter to arrive, nor has there been any disposition to purchase for future delivery.

Choice qualities of peas suitable for sowing have moved off rather firmly throughout the month, and at one period fine white touched 63s. and maples 60s. per qr.; these rates are now, however, no longer obtainable, 60s. for the former and 58s. per qr. for the latter being the extreme value.

In prices of Indian corn a very material reduction has, within the last fortnight, occurred: at this we feel no surprise, as the value of this article had risen far above its proper position in relation to that of wheat, and it was therefore to be expected

that upon the first appearance of any thing like adequate supplies a reaction would occur. The extraordinary high rates lately paid in Ireland have, as might have been foreseen, drawn supplies from all quarters; and besides good arrivals from the United States, a large number of cargoes have made their appearance at Cork, from Spain and the Mediterranean. At Liverpool this article has receded quite 10s., and in the London market there have been offers, of late, of cargoes to arrive at 12s. per qr. below the extreme rates of Feb. Whether prices have yet touched the minimum point is doubtful; but as Indian corn has unquestionably become a favourite article of food in Ireland, the recent fall is likely to increase the consumption considerably, and we are disposed to think that the supplies will be speedily cleared off.

We have nothing further to remark in respect to the home trade, and shall devote the remainder of our space to a brief notice of the position of the foreign markets.

The advices from the United States reach to the end of February. About the middle of the month great excitement had prevailed in the flour and grain trade, but the news brought out by the *Cambria* from hence had tended in some measure to allay the ferment, and Western Canal flour after having been sold at 7 d. 50 c. to 7 d. 75 c. per brl. at New York, had on the 27th February again receded to 7 d. This latter rate at the then exchange would, however, stand in nearly 32s. per brl., and the freight to London and Liverpool being 8s. 6d. to 9s., the total cost laid down here would be more than the article is at present worth with us. The continued shipments to Europe had so reduced the stocks that only 50,000 brls. were left in store at New York. As, however, the navigation of the Hudson would probably be open in March, and arrivals take place from the interior, the smallness of the quantity on hand had had little influence on prices. That the shipments of grain and flour from the United States are not likely to be so large as many on this side appear to expect, we feel tolerably certain: in the first place, the extremely high freight demanded must act as a check. During the first part of the six months ending February 26th freights were comparatively moderate, and stocks at the Atlantic ports large; still the total quantity exported appears to be, from 1st September, 1846, to 26th February, 1847—

	Flour.	Wheat.	Indian Corn.
	Brls.	Qrs.	Qrs.
	1,650,000	200,000	575,000
of which had been shipped to Great Bri- tain .....	1,025,000	150,000	531,250
From Canada we have nothing of interest to			

communicate; the shipping season had not at the period of our last advices commenced, but a good deal of business had nevertheless been done in flour at high terms.

The accounts from the northern ports of Europe represent the stocks of wheat as generally small and prices high. The value of wheat has, during the month of March, risen considerably at all the leading Baltic ports, owing to large purchases on French account.

At Dantzig there is hardly any really fine high-mixed quality remaining, and for moderately fine sorts holders had demanded rates equivalent to 72s. per qr. free on board.

The advices from Königsberg, Stettin, Rostock, &c., are of a similar character; holders had everywhere raised their pretensions, and even for ordinary red wheat, of only 59lbs. weight per bushel, equal to 66s. to 67s. per qr., free on board, had been actually paid for France and Belgium. Whether the recent reaction in the British and French markets will have the effect of rendering the Baltic merchants more tractable still remains to be seen.

At Hamburgh, on the 23rd inst., the trade was certainly more calm than it had previously been, and similar qualities of wheat to those sold a few days before at 78s. were then obtainable at 75s. per qr.

The latest news from France and the Netherlands is of a character to induce us to believe that the immediate wants of those countries have been provided for, and prices of wheat seem to have receded more or less as well in the French as in the Belgian markets.

In the Mediterranean prices of wheat have for some time past been relatively higher than in the Baltic, which has no doubt been caused by the great demand at Leghorn, Trieste, Genoa, &c., for shipment to Marseilles. The wants of the latter town having, however, been for a time satisfied, some fall in quotations may be looked for at the various places named.

CURRENCY PER IMPERIAL MEASURE.

MARCH 29.

WHEAT, Essex and Kent, new, red	72	78	White	76	80
Old, red	77	80	Do.	78	80
RYE, old	51	58	New	45	48
BARLEY, Grinding 40 42 Malting 48	52	52	Chevalier	42	—
Irish	—	—	Bere	—	—
MALT, Suffolk and Norfolk	70	72	Brown	74	76
Kingston and Ware	72	78	Chevalier	80	—
OATS, Yorksh. & Lincolnsh., feed 30	35	35	Potato	38	40
Youghall and Cork, black	25	27	Cork, white	30	32
Dublin	27	30	Westport	32	—
Waterford, white	26	30	Black	26	27
Newry	32	34	Galway	23	25
BEANS, Tick, new	44	—	Old, small	34	38
PEAS, Grey	50	52	Maple	52	54
White	52	54	Boilers	54	58
FLOUR, Town-made 60 62 Suffolk	52	52	per sack of 280 lbs.	—	—
Stockton and Norfolk	52	—	Irish	—	—

FOREIGN.

WHEAT, Dantzig	74	78	Fine	78	81
Hamburgh	70	71	Rostock	74	76

IMPERIAL AVERAGES.

Week ending	Wheat.	Barley.	Oats.	Rye.	Beans.	Peas.
Feb. 13th	71 7	51 10	32 8	56 8	53 11	56 11
20th	71 7	53 6	31 11	51 3	53 5	55 10
27th	74 7	55 0	32 4	55 11	53 9	57 5
Mar. 6th	74 4	54 11	32 3	55 14	53 1	56 1
13th	74 2	52 10	31 2	55 1	52 7	54 11
20th	75 10	51 10	31 3	56 8	51 11	57 2
Aggregate average of the six weeks which regulates the duty.	73 8	53 4	31 11	55 3	53 1	56 5
Comparative Average.	—	—	—	—	—	—
Same time last year	54 9	29 9	21 9	33 4	31 8	34 5

PRICES OF SEEDS.

MARCH 29.

Rapeseed, 31l. 33l.	Irish, —l. —l.
Linseed, Baltic, 48 50	Odessa, 47 50
Mustard, per bush., white 8	10 brown, 9 10
Carraway, 4l 43 new, 42 44	Coriander, 18 21
Henpeaced, 35 38 per qr.	Trefoil, 17 19
Canary, 63 64 fine, 64 66	Tares, winter, none.
Linseed Cakes, English 13l.	13l. 10s. per 1000
Linseed, English, sowing 59	60 crushing 40 49 per qr.

POTATO MARKET.

SOUTHWARK WATERSIDE, March 29

Since this day se'night there has been a better demand for second-rate samples, there being but few of the best samples in the market, and the supply has been very limited. Three or four cargoes have arrived from Holland, which are meeting with ready sales.

The following are our present prices:—

Yorkshire Regents..	200 to 220	Lincoln and Cam-	170 to 200
Ditto Reds	200 to 220	bridgshire Regents	160 to 170
Ditto Shaws	200 to 220	Ditto Kidneys	160 to 170
Dutch Whites	160 to 170	French Whites	160 to 180

HOP MARKET.

BOROUGH, MONDAY, March 29.

There have been no transactions in our market during the past week worthy of notice, and prices continue without alteration at the currency last quoted.

Sussex pockets	78s. to 88s.
Weald of Kents	86s. to 98s.
Mid. and East. ditto	95s. to 130s.

WOOL MARKETS.

BRITISH.

LEEDS, March 26.—The transactions in wool this week have not been large and are limited to a supply of the immediate wants of the manufacturers. In prices we do not quote any alteration from last week's rates.

LIVERPOOL, MARCH 27.

Laid Highland Wool, per 24lbs	7 0	to 8 0
White Highland do.	11 0	11 9
Laid Crossed do. unwashed	8 6	9 9
Do. do. washed	9 9	11 6
Do. Cheviot do. unwashed	9 6	12 0
Do. do. washed	12 0	16 0
White do. do.	22 0	24 0

NOTICES TO CORRESPONDENTS.

“A YORKSHIRE FARMER.”—In each number of the Magazine is given the averages for every week in the month; therefore as the yearly average can be made out by our correspondent from these returns, it is hardly fair to tax us in addition to our editorial duties with the working out this question.











# THE FARMER'S MAGAZINE.

MAY, 1847.

No. 5.—VOL. XV.]

[SECOND SERIES.

## PLATE I.

### THREE COLESHILL PIGS; BRED AND FED BY EARL RADNOR.

The subject of our first plate is a pen of pigs, bred by Earl Radnor, and called the "Coleshill pigs," to distinguish them from the Berkshire. These animals obtained the first prize, in class 18, at the late Smithfield show, and also the gold and silver medals. We learn that they are descended from a stock that was in high repute some years ago, and which have since been crossed occasionally with animals of the best blood that could be got. The object of the breeder has been to obtain an animal that would produce the largest weight of bacon on the smallest quantity of food. The subjoined statement of the quantity of food consumed by, and the weight of, these animals will enable our readers to judge how far the breeder has been successful in the object he has in view. These three pigs won a sweepstakes of ten sovereigns in competition with Mr. Pusey's Berkshire pigs. Another sweepstakes, between animals of both breeds, belonging to the same parties, will come off at the meeting of the Royal Agricultural Society, at Northampton. When these pigs were exhibited they were forty-five weeks and one day old, and had only consumed fifty-two bushels of barley-meal, four bushels of pollard, and a few unsound potatoes—the meal being occasionally mixed with a little whey. They weighed upwards of seventeen score each.

## PLATE II.

### "THE SWITCHER;" THE PROPERTY OF THE RIGHT HON. THE EARL OF STRATHMORE,

**PEDIGREE.**—The Switcher, a chesnut horse, bred by Mr. Langan in 1841, was got by Ismael, out of Johnstown Lass, by Carlow, her dam Topsy (first called Young Topsy) by Master Robert, out of Topsy, by Election—Mirth, by Trumpator.

Ismael, by Sultan, dam Sister to Cobweb, by Phantom, has already, though with a very limited number of mares, proved himself a very capital stud-horse, his stock being generally remarkable for their stoutness. As well as of The Switcher, he is the sire of Mickey Free, Burgundy and others—*vide* "Stallions for the Season," in the present number.

Johnstown Lass was bred by Mr. Fitzpatrick in 1838, and, consequently covered at two years old—another proof that first foals and young mares are not invariably bad.

#### PERFORMANCES.

In 1844 he ran eight times (over the flat) and won three :—	
The Second Class of Corinthians, at the Curragh, value clear . . . . .	£60
A Match, at the Curragh . . . . .	50
The Town Plate at Athy . . . . .	50
In 1845 he ran fifteen times (thirteen races and two chases) and won six :—	
The Challenge Cup, at Naas . . . . .	90
The Corinthians, at the Curragh . . . . .	85
The Blythwood Handicap, at Eglinton Park . . . . .	100
The Curraghmore Cup, at Eglinton Park . . . . .	150
The Royal Whip, at the Curragh, with, in specie . . . . .	105
The Railway Plate, at Maize . . . . .	50
In 1846 he ran nine times (two races and seven chases) and won five :—	
The Handicap Chase, at Lucan . . . . .	109
The Chase, at Dundalk . . . . .	105
The chief Chase, at Hooton Park . . . . .	200
The Handicap Chase, at Worcester . . . . .	370
The Handicap Chase, at Newport Pagnell . . . . .	605

Ran thirty-two times (twenty-three races and nine chases) won fourteen times £2129

## ON THE MANURES OF THE FARM.

BY THOMAS SULLIVAN.

*(Continued from page 227.)*

My last paper on this subject concluded with a few observations intended to illustrate the value of liquid manure, and to impress upon agriculturists the advantage and propriety of bestowing greater attention than they, generally speaking, have hitherto done to the collection, preservation, and economical employment of that invaluable, though much neglected, fertilizer. I proceed now to offer a few remarks on the application of the urine of the domestic animals, and of the other liquid matters of a fertilizing character available in the farm-yard.

In certain parts of the kingdom—more particularly in the Lothians, and in Berwickshire—the general method of feeding cattle is in sheds, with attached court-yards, in which the animals enjoy freedom of action; and as these yards and sheds are at all times during the feeding season plentifully supplied with dry litter, the urine is absorbed by the dung, so that little or none of it can escape, except, indeed, in very wet weather. On farms where this system is exclusively adopted, a tank or reservoir may be considered altogether unnecessary; but, even in the districts alluded to, milch cows are almost invariably tied up in byres, the urine from which, as also that from the stables, would certainly go to waste, if not conducted into a tank or some other receptacle; and the one required for this purpose need not be of large dimensions. In those districts in which cattle are usually fattened in houses, and young stock also are housed during the winter months, a liquid-manure tank may be regarded as indispensable on every farm for the reception of the urine, as it flows from the several apartments in which cattle are kept; and an arrangement for this purpose is, of course, doubly necessary and doubly serviceable where the commendable practice of *soiling* horses and cattle during summer is pursued, as a tank is in this case requisite and useful at all periods of the year. It is only, perhaps, on large and medium-sized farms, maintaining and stall-feeding a considerable number of live stock, that a tenant would be warranted in incurring the expense of constructing a substantial and sufficiently capacious cistern, and of furnishing the accompaniments of a pump and liquid-manure cart; but where the useful system of house-feeding during the summer as well as the winter months is adopted, there is no farm on which the urine thus preserved would not amply

repay the cost of forming a sufficient tank, and adding its necessary appendages.

The nature of the food on which cattle are principally fed has obviously a material influence on the quantity of urine produced by them in a given period of time; and hence the capacity of a reservoir constructed for its reception must, in some degree, be regulated with reference to the description of food furnished to the stock. Animals that are plentifully supplied with turnips void the greatest quantity of liquid excrement, owing to the large proportion of water in the composition of that valuable root. It has been estimated that cattle feeding on turnips will individually produce in urine about two-thirds of the weight of turnips consumed by them, or about one gallon of urine for every twelve pounds of turnips. This, in connection with the number of animals whose urine is to be conducted into the tank, furnishes data from which its requisite dimensions may be computed.

Liquid-manure tanks may be constructed in various forms—oblong, circular, or oval, the most eligible shape being dependent upon circumstances. The most suitable material for building is brick laid in cement, but stone also answers the purpose; and to render the walls impervious to moisture, they should be well coated over with cement. The tank should be situated in or close to the dung-yard, and not far distant from the cattle-houses, from which covered drains or pipes are to be conducted. Drains should also be led from the stables, though it is not often that the urine of horses is thus collected, the quantity in one establishment being usually considered too unimportant to warrant the construction of a tank solely for its reception. When, however, the offices of the homestead are judiciously disposed, one or, at most, two tanks will suffice for all; and certainly the utility of any arrangement whereby the urine may be speedily withdrawn from the stables cannot be over-estimated. Owing to the chemical composition of the urine of the horse, its decomposition begins almost instantaneously after being voided, whereby carbonate of ammonia is evolved, producing the peculiar pungent odour characteristic of filthy, ill-ventilated stables. This volatile alkali is most injurious to the lungs and eyes of horses, and its production and retention in large quantity in stables is a fruitful source of inflam-

matory diseases. It is well known to be a powerful element of fertility, and hence the double advantage of so arranging the floor of every stable as to enable the urine to flow off as speedily as possible into an underground tank or cistern.

Although a stone or brick-built tank, with a pump and liquid manure-cart, may be considered indispensable on farms where a considerable number of animals are fattened in houses, yet in general it will not be necessary, or perhaps advisable, for the smaller class of farmers to incur the expense of so costly an arrangement. A common tar-barrel inserted in the ground, in some suitable spot contiguous to the cowhouse, to receive the urine by a covered drain, answers the same end as a tank, and the contents can be removed when necessary, by means of a stable-bucket. The barrel should be furnished with a moveable cover, to prevent the evaporation of the urine, as well as to guard against the entrance of water, solid portions of manure, or other extraneous matters. It is not too much to expect that proprietors would themselves incur the expense of providing tanks as necessary appendages to the homesteads of all their tenants not enjoying the security of a lease. Certainly it may be considered their duty to do so for the smaller class of tenants, at least: such of the latter, whose landlords are indisposed to construct for them a substantial stone or brick tank, should at once resort to the cheaper expedient of a tar-barrel, as one may be purchased for a trifling sum, and will last for a considerable period, instead of a liquid-manure cart, which in this case is alike inaccessible and superfluous. Something similar might be constructed at little expense, to be mounted on a frame, supported by one or two wheels, and moved like a barrow to the field or other place where the urine is to be applied.

The winter is deemed a favourable season for the application of urine, because it is then most abundant; the ground is, for the most part, loose on the surface to absorb it, and comparatively little of its most valuable constituents can at that season be lost by evaporation. Liquid manure is, however, beneficially applied at all periods of the year. The usual practice is to convey it from the tank to the grass fields in a liquid-manure cart, to the hinder end of which is attached a long narrow box or "spreader," perforated with a number of holes, to insure an even distribution of the urine over the surface. It is well known, however, that *fresh* urine cannot be advantageously applied to grass or other growing crops; at least, the full benefit is not derived from its application in that state, and hence the propriety of allowing it to *ferment* for some time before applying it in this manner. But it is found that, while undergoing this process, *i. e.*

in becoming putrid, the most valuable element of the liquid, carbonate of ammonia, is disengaged; and if this alkali is not *fixed*, or deprived of its volatility, the urine will lose very much of its value as a fertilizer. Various substances have been recommended and tried for the purpose of fixing the ammonia in liquid manure; some advise its dilution with an equal bulk of water. Professor Johnston says that by this means "the loss of carbonate of ammonia which would otherwise naturally take place, is in a considerable degree prevented. The quantity of ammonia retained by the urine after dilution was, in the same circumstances, nearly three times as great as when it was allowed to ferment in the state in which it came from the cow." But notwithstanding the efficacy of water in preventing the escape of carbonate of ammonia, the propriety of retaining by this means the gaseous matters of urine is, in my judgment, questionable. This must be obvious when it is remembered that in its natural and usual state the liquid excrement of cattle contains from 90 to 95 per cent. of water; and if it were further diluted with a quantity of water equal in bulk to the urine, it is evident that the really fertilizing ingredients present would bear but a small proportion to the whole mass of liquid, while the labour of applying it to the land would be greatly increased. Dilution with a sufficient quantity of water may be advantageous upon a limited scale; but it appears to me to be impracticable when a considerable quantity of urine is to be conveyed to the fields by means of a liquid-manure cart.

Gypsum and sulphuric acid have each been strongly recommended for the purpose of fixing the ammonia generated during the putrefaction of urine; the former on account of its cheapness and mildness, the latter for its greater efficacy. Either of them is, in my judgment, much preferable to water added in large quantity. Gypsum, as most readers are aware, is a combination of sulphuric acid and lime; and its efficacy as an agent for fixing the volatile carbonate of ammonia, arises from the strong affinity which the acid has for the ammonia, with which it readily combines, forming sulphate of ammonia; while the lime, the other constituent of the gypsum, unites with the carbonic acid, which was formerly in combination with the ammonia, and forms a carbonate of lime. As gypsum is but very sparingly soluble, it is necessary, in order that it may produce any effect in this way, that it be reduced to an impalpable powder before putting it into the tank; and in consequence of its difficult solubility, it requires several days before the ammonia in putrid urine is effectually converted into a sulphate by its use. Hence the necessity of frequently stirring the contents of the tank after the

addition of the gypsum, in order to insure the desired effect. Speaking of powdered gypsum, I may here remark that every farmer should have a quantity of this cheap and highly useful substance always at hand. Its applications are numerous, but in connexion with our present subject, I shall merely observe, in this place, that the floors of stables, cow-houses, cattle-sheds, &c., should be frequently sprinkled over with it, in order to fix the ammonia which is continually disengaged, Sulphuric acid is much more effective than gypsum as a fixer of ammonia in putrid urine. It is not easy, however, to ascertain the exact proportion of acid which should be used for this purpose, as much depends on the stage of putrefaction which the urine has attained, and the strength and purity of the acid employed. As an excess of acid is to be avoided, it may be corrected by throwing small portions of lime into the tanks.

Although the powerful efficacy of urine, judiciously applied in a liquid state, in increasing the productiveness of the soil over which it is scattered, is beyond a doubt; yet, it is certainly questionable if this is precisely the most economical and advantageous mode of application. There can be no objection, indeed it is strongly recommended, to have a tank, pump, and liquid-manure cart in connexion with every extensive homestead; but I certainly do not consider them to be indispensable (as many affirm they are) to the preservation and judicious application of the urine and other liquid matters of the farm-yard; and in this paper I hope to be able to point out how farmers may easily, and, as I think, usefully, in some cases dispense with them.

Many writers urge upon agriculturists the propriety of so arranging their dung-yards, in relation to the position of the tanks, that the latter may receive not only the urine from the cattle-houses, stables, &c., but also drain off all the liquid from the more solid portions of the manure contained in the yards, in order to dilute the urine, and apply both in conjunction, by means of the liquid-manure cart. Now, I feel strongly disposed to question the propriety of this practice. Whilst the smallest doubt cannot be entertained regarding the utility of any arrangement whereby the surplus liquid of the manure-yard may be prevented from going to waste, I cannot conceive what advantage is to be derived from constantly draining off into a tank all the moisture of the dung, for the purpose of applying it either separately or in conjunction with urine. The litter and the solid excrements of the stock, which are daily removed from the offices to the manure-yard, are of course impregnated with a greater or less proportion of the urine, which, with occasional showers, is sufficient to in-

sure fermentation; but when all the rain-water that falls on the premises, and on the roofs of the buildings during a continuance of wet weather, finds its way into the dung-yard, and from thence into the tank, carrying along with it the whole of the urine and the soluble portions of the manure, it is obvious that by a few repetitions of such washings, the most valuable constituents are removed, leaving the residue a mass of dry vegetable matter. I hold it to be a more judicious practice, where a tank and pump are employed, to preserve the surplus liquid in time of wet weather, and afterwards to saturate, thoroughly, the dung with it. Even the urine collected in the tank might be advantageously used in moistening the dung when turning it over in the yard, or during a continuance of drought. By affixing a hose or a long moveable spout to the pump, the liquid manure can be distributed over the dung, and what is not absorbed will again find its way into the tank after permeating the mass. It is only when the liquid matters of the farm-yard are present in excess that I can see any propriety in applying them separately, as a general practice; and it is only when the farmer permits the urine from the offices of his homestead and the drainings from his dung-yards to run to waste, that his management in this respect becomes improper.

The dung-yard may easily be so arranged that no liquid matters could escape from it, by forming it with a gradual inclination towards the centre, where the surplus liquid of the manure will be retained. In autumn, before the dung begins to accumulate, the dung-yards may be well bedded with half-decomposed weeds, vegetable earth, or other dry matters, with a view to absorb the superfluous moisture, and in spring it will be found that the substances thus impregnated have been rendered equally valuable with the dung itself. The rain-water that falls on the passages and on the roofs of the buildings should not, perhaps, be permitted to enter the manure-yard at all. During a continuance of wet weather it should certainly be prevented from doing so, as it would undoubtedly be productive of more injury than good; but after some weeks of drought in spring, it is of considerable advantage to have the dung well moistened; and in turning manure heaps in dry weather it is a useful practice to saturate them thoroughly with water, or with urine from the tank, should it contain any at the time.

Having adverted to the application of liquid manure in a separate state, I proceed to the consideration of the most judicious mode of applying it in the form of compost with other substances. The first question that presents itself is—What absorbent matters are most suitable for that purpose? The choice of

matters to be used in the formation of composts is regulated mainly by the circumstances and the situation in which individual farmers are placed. The great object in this case is to employ such substances as will best imbibe the urine, besides possessing in themselves elements of fertility. The industrious Flemings, whose general management of manures is so well deserving of imitation, mix a quantity of rape-dust with the urine in the tanks, and apply the mixture to their growing crops; but such absorbent matters as exist in, or which may be obtained contiguous to the farm, should be preferred and employed—and there are but few farms, indeed, on which suitable materials for this purpose may not be found. The couch grass, and other weeds, collected while preparing the land for green crops, which at present are too often heedlessly thrown out of the way into the nearest ditch or other waste place, and from whence they are rarely afterwards removed, answer admirably for this purpose, after undergoing a partial decomposition in a heap. The urine may be conveyed from the tank by means of the liquid-manure-cart to the heaps formed in the fields, and poured on the summit, the cart ascending at one end and descending at the other. Peat moss, or bog stuff, is also well adapted for being formed into a compost by the addition of liquid manure. It is found advantageous to expose it for some time to the action of the weather before removing it from the bog; and when carted to the farm-yard, it is to be formed into a heap near the tank, in order that the liquid may easily be poured upon it. The heap must be frequently turned over, that every part may receive a due share of the liquid, and when the mass is thoroughly saturated, a fresh supply is to be added. Bog-stuff thus impregnated, and allowed to ferment before its application, constitutes an excellent top-dressing, especially for clay lands. Dry earth, burned clay, scorings of ditches, and a variety of other matters, may be advantageously used in this way. Composts thus prepared at little expense are of very considerable value, and constitute an important acquisition to the home stock of manure.

But when neither tank, pump, nor liquid manure cart is employed on the farm, a different course of proceeding in the formation of the species of compost must necessarily be adopted. In this case, a square pit of suitable capacity may be excavated, in a convenient situation near the farm buildings; the sides of which, to be permanent, should be built of stone and mortar, or of brick, and the bottom should be bedded with a layer of tenacious clay. Into this pit the urine from the stables, byres, and cattle sheds is to be conveyed in covered drains; and the solid constituents of the compost are to be put in from time to time, as may be required for absorb-

ing the liquid. All ashes, soap-suds, and refuse of every description should be regularly conveyed to this common receptacle, where the whole being combined together will form a most valuable manure, for every description of crop. A small quantity of dilute sulphuric acid, or of calcined gypsum, may occasionally be added to the contents of the pit, in order to prevent the escape of gaseous exhalations. The writer has known excellent crops of potatoes and turnips to have been raised on naturally inferior land, by the application of a compost formed in the manner just described; indeed, its efficacy may be inferred from the nature of the substances of which it is composed; and its value as a fertilizer is enhanced by the consideration that it is produced at little or no expense—that, in fact, it is so much preserved and turned to good account, of matters which are still too often heedlessly permitted to run to waste, or to lie uselessly, if not injuriously, about the farm-yard. One great recommendation in favour of this method of preserving and applying the liquid matters of the farm-yard is, that it can be practised with equal, if not with greater advantage by the small as well as by the large farmer. It requires no costly arrangements—no expenditure for tanks, pumps, or carts; the cost of providing which, in the case of the small and middle class of farmers, forms so great a bar to the preservation and employment of liquid manure. Hence the many instances in which it is either altogether neglected or but imperfectly economised.

With reference to the comparative merits of those two modes of applying liquid manure—namely, in conjunction with absorbent matters, or separately—it is difficult to come to a correct decision, as so much depends on the local circumstances of particular farms. Where absorbent substances of a fertilizing character can readily be procured for the formation of composts, I prefer this method, as it involves little expense at the outset, and because the whole of the urine can be appropriated in this way. Not only is the urine thus prevented from going to waste; but, by its agency, other matters are converted into excellent manure. In estimating the value of composts formed in this manner, it is hardly possible to determine how much of its efficacy is due to the solid matters, or how much to the urine which they have absorbed.

In an article like the present, designed to direct the attention of agriculturists of every grade to the importance of collecting and applying to their lands various substances which have hitherto been greatly neglected throughout the country, it would be an unpardonable omission not to advert particularly to the utility of preserving and turning human excrements to account, the almost universal neglect of which in this country abundantly proves how little

our agriculturists, generally speaking, appreciate their value. This neglect appears the more singular and culpable when we consider the powerful fertilizing properties possessed by the substances alluded to, and the great care and attention bestowed on their collection and preparation for use in other countries, particularly in Belgium and in China, where scarcely any other manure is employed.

It is well known that the value of the urine of horses and cattle as a manure arises chiefly from the large proportion of ammonia in its composition, or rather of elements producing ammonia; this alkali being formed by the union of hydrogen and nitrogen. Now human urine is peculiarly rich in nitrogen. It has been ascertained by analysis that, in this respect, 100 parts of the urine of a healthy man are equal to 1,300 parts of the fresh dung of a horse, and to 600 parts of the fresh dung of a cow. A first principle, laid down and demonstrated by Liebig, is, that "the solid and liquid excrements of an animal are of the highest value as a manure for those plants which furnish food to those of its own species;" a circumstance which forcibly illustrates the efficacy of human excrements in the production of human food. According to the same high authority, the liquid and solid excrements of man contain a very great quantity of the mineral substances of all seeds used as food. It is clear, therefore, that human excrements, though so little prized or appropriated in this country, contain in themselves all the elements essential to the perfect development of plants, and that, too, in a very concentrated form. The importance of preserving and economising these valuable fertilizers must appear strikingly apparent from the following extract from Liebig's *Chemistry of Agriculture*:—

"The powerful effects of urine as a manure are well known in Flanders; and they are considered invaluable by the Chinese, who are the oldest agricultural people we know. Indeed, so much value is attached to the influence of human excrements by these people, that the laws of the state forbid that any of these excrements should be thrown away, and reservoirs are placed at every house, in which they are collected with the greatest care. No other kind of manure is used for their corn fields. On the assumption that the liquid and solid excrements of man amount, on an average, to only  $1\frac{1}{2}$  lbs. daily ( $1\frac{1}{4}$  lb. of urine and  $\frac{1}{4}$  lb. of fæces), and that both taken together contain three per cent. of nitrogen, then in one year they will amount to 547 lbs., containing 16.41 lbs. of nitrogen, a quantity sufficient to yield the nitrogen of 800 lbs. of wheat, rye, oats, or 900 lbs. of barley. This is much more than is necessary to add to an acre of land, in order to obtain, with the assistance of the nitrogen absorbed from the atmosphere, the richest crops every year. By adopting a system of rotation of crops, every town and farm might thus supply itself with the manure which, besides containing the most nitrogen, contains also the most phosphates."

Although few farmers can be entirely ignorant of the fertilizing properties of night soil, yet, as it is hardly necessary to observe, it is too much the custom in this country, from what may be considered a mistaken delicacy, to neglect altogether its application to the land. Its disagreeable odour can, however, to a great extent, be removed by proper treatment; and, by making suitable arrangements for its collection and preparation, it may not only be deprived of its offensive smell, but be rendered portable, and easily applied in a pulverulent state.

## ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

The COUNCIL resumed their weekly sittings after the Easter recess, at the Society's House in Hanover-square, on Wednesday, the 14th of April. Present: The Earl of Egmont, President, in the chair; Duke of Richmond; Earl of March; Earl of Tyrconnel; Hon. Capt. Howard, M.P.; Sir John V. B. Johnstone, Bt., M.P.; Mr. Hudson, M.P. (Lord Mayor of York); Colonel Austen, M.P.; Mr. S. Bennett; Colonel Blgrave; Mr. Brandreth; Mr. Browne; Mr. Burke; Colonel Challoner; Mr. Cherry; Mr. Druce; Mr. John Ellman; Mr. Fuller, M.P.; Mr. Garrett; Mr. Brandreth Gibbs; Mr. Grantham; Mr. Fisher Hobbs; Mr. Hudson (of Castleacre); Mr. Hussey; Mr. Hyett; Rev. C. E. Keene; Mr. Kinder; Mr. Markham; Mr. Milburn; Mr. Munn; Mr. Pellatt; Mr. Pusey, M.P.; Professor Sewell; Mr. Shaw; Mr. Shaw, jun.;

Mr. Robert Smith; Mr. S. Solly; Mr. S. Reynolds Solly; Mr. Crompton Stansfield, M.P.; Mr. George Turner; Mr. Thomas Turner; Mr. T. R. Tweed; and Mr. Thomas Umbers.

*Prize Essays.*—Mr. PUSEY, M.P., Chairman of the Journal Committee, reported the following awards of prizes for Essays:—

1. To Thomas L. Colbeck, of East Denton Cottage, Newcastle-upon-Tyne, the Society's prize of 50*l.*, for the best Report on the Farming of the County of Northumberland.
2. To Hugh Raynbird, of Hengrave, Bury St. Edmunds, and the Royal Agricultural College, Cirencester, the Society's prize of 50*l.*, for the best Report on the Farming of the County of Suffolk.
3. To Edward Roberts, jun., of Kingswood, Baldock,

Hertfordshire, the Society's prize of 20*l.*, for the best Essay on the Management of Wheat.

4. To Edward Jarman Lance, of Blackwater, Bagshot, Surrey, the prize of 10*l.*, offered by Major Curteis, M.P., one of the Governors of the Society, for the best Account of the Hop-fly, and of the means for effecting its destruction or preventing its ravages.

The Duke of Richmond expressed the gratification it gave him to hear, from the report just made to the Council from the Journal Committee, that another prize, being the third within the last twelve months, had been adjudged to Mr. Raynbird, who had thus, at the early age of nineteen, carried off one of the highest premiums of the Society in the class of Reports and Essays; a fact which his Grace regarded as alike honourable to Mr. Raynbird himself, and to the Royal Agricultural College at Cirencester, with which he was connected.

*Cattle Distemper.*—The President laid before the Council a letter addressed to him by Viscount Hill, of Hawkstone, near Shrewsbury, inclosing the results of experience obtained by Mr. Thomas Casewell, a cow-leech residing at Peplow, in the parish of Hodnel, in that county, in his administration of a remedy for the "distemper in the lungs of cattle now called pleuro-pneumonia," communicated in the year 1749 to the *Gentleman's Magazine*, and published in vol. ix., p. 459, of that periodical work, where the recipe is thus given:—

"*A Receipt for the Distemper among the Cattle.*—Upon the first symptom (being generally loss of appetite, shut the beast up in a warm place, and give it three (and if violently seized, four) of the following drinks a day:—A pint of gin and a pint of old verjuice, in a quart of boiling water, to be given warm. When the beast begins to purge, give three or four spoonfuls of bole-armoniac, and a handful of cork to be burnt to powder, in a hornful of gin-punch, and afterwards washed down with a hornful of the same liquor. If this does not take effect, repeat the medicine of bole-armoniac and burnt cork in four or five hours, and so on till the purging is stopt, when the beast will return to its food. N.B.—You are to give water-gruel to the beast for a day or two. This has cured fifty-four out of fifty-six."

Mr. Casewell had been acquainted with the disorder for five years. It had done great mischief in Shropshire, and he supposed it to have come from Lancashire or Cheshire. In his first cases he had tried bleeding and purging without effect; afterwards, blistering on the sides and setons in the dewlap, but with no better result; and subsequently, the administration of calomel in large doses, with emetic tartar and foxglove, with only a very partial success. In September, last year, the recipe in the *Gentleman's Magazine* was pointed out to him by Mr. A. Ford; and as he had exhausted the ordinary stock of recommendations, he determined to try the one thus suggested. He first tried it on an incalf heifer belonging to Mrs. Churton, of Northwood, near Hawkstone. "As soon as the ingredients could be got, we administered the gin and verjuice as pointed out—that is, three doses, at intervals of four hours. The next day I saw the heifer again, and she appeared to be

better. A few days after I gave some opening physic, and the heifer recovered her flesh, and is now quite well." Two other cows belonging to Mrs. Churton were cured in the same way. Mr. Casewell feels quite assured that all these were decided cases of pleuro-pneumonia, and is confirmed in this assurance by the opinion of Mr. Robinson, an occupier in the same neighbourhood, who had lost 15 head of his cattle affected with similar symptoms a few months previously, which Mr. Casewell has no doubt would have been saved by the treatment proposed in the *Gentleman's Magazine*, and by that only. An incalf heifer belonging to Mrs. Healby, exhibiting symptoms similar to those already cured, but too far gone to recover, was killed and examined; one lung was found to be affected to a very great extent, being swollen so as to fill almost the entire cavity of the chest, and was quite hard and solid. Another incalf heifer, the property of Mrs. Healby, more recently affected, was cured by means of the gin and verjuice. Finding the animals in the three last cases constipated and feverish, Mr. Casewell had given them from 1 lb. to 1½ lb. of salts four hours previously to the administration of the gin and verjuice, without finding them become too much relaxed in consequence. Before trying the recipe in question, Mr. Casewell had not seen more than five or six animals recover out of from 60 to 70 affected, although these cases consisted of trifling attacks only. Since he had employed the treatment recommended in the *Gentleman's Magazine* all had recovered. He thinks that the bole and burnt cork might be omitted with advantage. He recommends that animals affected with the complaint should be kept from hay for at least nine days, and that bran, either dry or in mashes, with oatmeal and linseed gruel, should be given instead. The statement of Mr. Casewell was fully confirmed by Mr. William Churton.

On the motion of Mr. Fisher Hobbs, seconded by Mr. Umbers, the best thanks of the Council were voted to Lord Hill for the favour of these communications.

Professor Sewell remarked that it would be desirable to have it ascertained, by some professional authority, whether the cases adduced belonged to that class of disease known as the pleuro-pneumonia, or to the other mild form, which usually terminates in a transfer of inflammatory action to the legs and feet, by which effort of nature a spontaneous cure is generally effected without the intervention of medicinal treatment. He observed that the gin would act as a stimulant, anti-spasmodic, and diuretic, neutralizing the effects of the verjuice, which alone, as an astringent, would produce spasms of the stomach and bowels; while, on the other hand, the gin given alone would be hazardous where inflammatory symptoms were present. He was fully confirmed, by the sanction of the best cattle practitioners, in the opinion he had so long ago and so often given, that nothing but copious bleeding and powerful external stimulants, in the first stage of the disease, would ever avail; the fatal consequences ensuing in most cases having arisen from the neglect of these remedial measures, to which he considered all others to be merely secondary.

He did not consider the disease to be confined to country or climate. A veterinary surgeon who had practised for some time in Egypt, and arrived lately in England, had informed him that three-fourths of the cattle had been carried off in the fine climate of that country, by a similar disease, but which could not accordingly be supposed to result from vicissitude of temperature or change of wind. Professor Sewell repeated his former opinion, that the disease has its origin in noxious terrestrial exhalations inhaled by ruminants with a less dilution of common atmospheric air, while feeding and sleeping near the surface of the ground, than in the case of other animals which feed and breathe under different circumstances.—Colonel Challoner informed the Council that, agreeably with the advice of the late lamented Earl Spencer, he had allowed all the animals on his farm to have free access to large pieces of common rock-salt, which they eagerly sought, and entirely licked away in the course of two months. In consequence of this simple antiseptic, not a single animal of his had been attacked with the slightest disease of any kind.—Mr. Cherry fully corroborated the value of salt placed at the free use of animals on a farm. He had been in the habit of placing a lump of salt in the manger of each of his horses, and had found it decidedly beneficial. It acted not only as a general stimulant, giving tone to the functions of the body, but locally created a thirst which induced the animals to drink large quantities of common water, which acted as a most favourable diluent.—Mr. Umbers had also experienced its good effects; and in Warwickshire such rock-salt was to be had at the moderate price of 1s. 6d. per cwt.—Mr. Cherry and Mr. Turner each favoured the Council with their views on the nature of the disorder at present affecting cattle, and the importance of a strict attention to the premonitory symptoms: they agreed that in cases of altered structure in the lungs, the administration of gin and verjuice could have no influence in averting the fatal result, although the gin alone might in cases of exhaustion and debility produce a re-action.—Mr. Shaw doubted whether the cases adduced by Mr. Casewell were those of the pleuro-pneumonia. Professors Sewell and Simmonds would make inquiry, and report on this point.

*Miscellaneous Communications.*—Mr. Culverhouse's offer to communicate to the Council his mode of manufacturing manures was accepted. Mr. Charles Barclay transmitted a report on the trial of special manures, which was received with thanks, and referred to the Journal Committee. Prince Gagarine transmitted, on the part of the Imperial Society of Rural Economy, at Moscow, a copy of the report of the proceedings at the recent Jubilee Fête of that Society, along with one of the medals struck in honour of the occasion, for which, on the motion of the Duke of Richmond, seconded by Mr. George Turner, the best thanks of the Council were ordered.

*Stoves for Peasantry.*—The Belgian stove, received from Mr. Salvin, was placed in the library and inspected by the Members.—Mr. Cherry exhibited a French oven, which he regarded as admirably adapted to the purposes of cottagers; and he explained in what points the stove then presented by Mr. Salvin differed from the one with

which he had been acquainted while on the continent, and he considered that complexity, occupation of much space, and high price were to be avoided.—Mr. Pellatt thought that the close burnt atmosphere, which in some cases resulted from the use of the Belgian stove, was occasioned by having the sheet-iron either too thin or in a damp state.—The Duke of Richmond considered it to be a subject of great importance, but that moderate price was an indispensable condition in all stoves intended to be extensively adopted by cottagers.—Mr. Pusey expressed his intention of exhibiting to the Council at their next monthly meeting, on the 5th of May, the American Stove and cooking apparatus to which he had referred on a former occasion; and in order that the operation of the stove might be seen practically at work, he invited the Council to a hot luncheon prepared in the library on that day by the simple apparatus of the stove in question; an offer which, on the motion of the Duke of Richmond, the Council unanimously accepted.

#### SPECIAL COUNCIL.

The Council then proceeded to the special monthly business of the Society.

*Finances.*—Colonel Challoner reported on the part of the Finance Committee the state of the accounts and funds of the Society at the end of the previous month, from which it appeared that on the 31st of March last the funded property of the Society stood at £8,200 Stock, and that the current cash-balance in the hands of the bankers was £3,123. He explained that this balance was made up as follows:—Arrear Subscriptions, £123; Life Compositions, £703; Northampton balance, £1,152; and available balance for general purposes, £1,145. Colonel Challoner then laid before the Council the final Balance-Sheet on the Newcastle Meeting Account, showing an excess of payments over receipts on that occasion to be £747. He reported the recommendation of the Finance Committee that £703, as the balance in hand on account of Life Compositions, should be invested in the purchase of Stock, a proposition which was unanimously adopted by the Council.

*Yorkshire Meeting.*—Sir John Johnstone, Bart., M.P., and Mr. Stansfield, M.P., accompanied by Mr. Milburn, appeared before the Council as a deputation from the Yorkshire Agricultural Society, for the purpose of conveying on the part of that Society a desire to contribute the sum of £450 from its funds of the year 1848 towards the expenses of the Country Meeting of the Royal Agricultural Society of England to be held within that district in that year. On the motion of Colonel Challoner, this liberal offer was cordially accepted by the Council.

The various memorials and other documents from places within the Yorkshire District, soliciting the Council to hold the Country Meeting of 1848 at one of their respective localities, having been laid before the Council and taken into consideration, the places were selected for the personal visit of a Committee of Inspection, composed of Mr. Brandreth, Mr. Miles, Mr. Shaw, Mr. Kinder, Mr. Shelley, Mr. R. Smith, Mr. Brown, and Mr. Brandreth Gibbs. On the motion of the Duke of





speak thereon. Mr. Cave then entered into a lengthened and most instructive detail of the various methods to be adopted for the preservation of the farm-yard. After an interesting discussion the following resolution was carried unanimously—"That all litter should be cut into chaff before being put under cattle, because it thereby absorbs a greater quantity of liquid manure. That farm-yard dung is best kept under cover, where it should be saturated often with the liquid from the tanks, but where this is

impracticable it should be kept as much as possible from the injurious action of the sun and air, in dissipating its ammonia, and from the rain, which often washes away some of its valuable properties. That, when dung cannot be advantageously managed in the farm-yard, it should be carried at once to the fields, and either mixed with earth in compost heaps, or ploughed down immediately." A vote of thanks was then given to the chairman, and the meeting separated.

#### BURTON-ON-TRENT FARMERS' CLUB.

At the monthly meeting held on the 25th March, the president took the chair, and Mr. Wagstaff being unable, through illness, to attend and introduce the subject appointed for discussion, the following remarks transmitted by him to the secretary, were read:—

##### ON AGRICULTURAL IMPLEMENTS AND CARRIAGES.

The subject fixed upon for this evening's discussion does not, as I understand it, extend to the question of "machinery as it affects the industrial classes," but is confined to the simple inquiry, "Which are at once the most effective and the most economical implements and carriages for agricultural purposes?"—economical because, next to efficiency, economy in implements is to be desired. Taking this view of the subject, I will proceed, without further preface, begging only for your indulgence to a young and comparatively inexperienced farmer, who, when he undertook to bring the proposed subject before the club, did so more with the view of eliciting the opinions of others than with an idea that he was capable of imparting useful information to any of its members. First, then,

*Of the Plough.*—On the comparative merits of wheel and swing ploughs, so much has been said and written by Mr. Pusey and others, that I approach the subject with hesitation, more particularly as my experience in the use of wheel-ploughs has been but trifling. I must confess, having been accustomed to use the swing-plough, I have had a predilection in its favour but wishing fairly to test the merit of the two, I determined to make some experiments as to their different draught, this being, as I conceive, the matter chiefly at issue; for this purpose it is necessary to use a dynamometer (an instrument fully described by Mr. Handley in the Royal Agricultural Society's Journal). My first trial was on clover roots, where the draught of the swing-plough was 3½ cwt., and of the wheel 3½ cwt. I then tried upon a wheat stubble or fallow, where the swing-plough had the advantage of ½ a cwt.—its draught being

the same as upon clover roots—whereas that of the wheel-plough was 4 cwt. That there is a difference between the result of this experiment and those made by Mr. Handley and others, I am aware—a difference for which I cannot account. However, granting them to be correct, I consider the slight advantage in draught of wheel-ploughs is more than counterbalanced by the superiority of swing-ploughs in setting ridges and finishing furrows, because it is difficult to set out a perfectly straight ridge with a wheel-plough, and because when approaching a furrow, if the land be wider at one end than the other (a circumstance which on my farm, at least, very frequently occurs) it is difficult, nay, almost impossible, to straighten it—two operations, and important ones too, which with a swing-plough are of easy performance. As regards the economy of the two, I can see no difference, as I consider a pair of horses quite capable of drawing either, provided it is not required to plough an unusual depth. That this is contrary to the opinion of most farmers in this neighbourhood I am aware, but can assure them that in the North Clay district of Nottinghamshire, for instance, a pair of horses only are yoked to a plough. I mention Nottinghamshire, because with that county I am better acquainted than with any other; a county composed of two soils directly opposite in texture—the strongest clay and the lightest sand; nevertheless the pair-horse plough is used upon the strongest as upon the lightest part of it, and with perfect success. One of the reasons which I gave for preferring the swing-plough, was the great advantage it possessed over the wheel-plough in setting out or drawing ridges. This advantage is more particularly striking in the double-mould plough, because it is used almost entirely for that purpose. This implement is very far preferable to the common or single-mould plough for ridging up land for turnips or other roots. The reason is obvious. Instead of throwing up the bulk of the soil on one side, it divides it equally; in earthing potatoes it diminishes the labour one-half, as to pass over between the rows is sufficient; whereas, with the

single-mould plough, it is necessary to do so twice. The subsoil plough is required in particular districts only. The great advantage to be derived from its use has lately been set at rest: indeed, land with a hard solid subsoil, and which consequently retains for a length of time top or rain water, cannot be brought into perfect cultivation without its use. I believe three shares are considered preferable to one; for each share preceding its follower lessens its work by breaking up the upper crust of the soil.

*Of Cultivators.*—There have been so many different descriptions of cultivators, or scarifiers, lately invented, that it is impossible to give an opinion founded on experience as to their comparative merit. But I think I may venture to say that the kind in general use in Yorkshire and Lincolnshire is a most effective implement; it is an improvement upon Lord Ducie's drag, possessing two sets of shares—chisel and duck. When the soil is hard the former should be first used, followed by the latter; it has also a lever, which, should any impediment offer (such, for instance, as a tree-root), will at once raise the shares from the soil. This lever should be used in turning, so as to prevent the possibility of a sudden jerk or too abrupt a turn breaking the shares.

*Of Drags.*—For common use little more can be said than that they should be suited in strength and weight to the description of land upon which they are required. The same remark applies to harrows. I would only suppose that the teeth be made to screw in, because, in case of breakage, they are much easier to repair.

*Of Rollers.*—Whether the newly invented clod-crusher of Messrs. Barrett or Crosskill's patent is the best for the purpose, I am unable to judge, not having had an opportunity of seeing the former at work. Of the latter implement, however, I can speak in the highest terms. Its advantage as a clod-crusher is evident, and too generally known to need comment; but the greatest benefit to be derived from it is when used upon wheat on light or peaty land—land upon which the frost and wind of winter frequently leave the plant almost bare. Its effect is to render the soil about the roots perfectly firm, while it leaves the surface light and porous, consequently accessible to the action of the air. As a roller for general purposes, I think the double-cylinder cast-metal as good as any. It has been urged as an objection that the metal is liable to break, but this need not be feared when the casting is perfect. The advantage of the double cylinder is the ease with which it may be turned upon young barley or other corn without doing the slightest damage; whereas, where the single cylinder has been used it is not unusual to see a great part of the plants upon the headlands very con-

siderably injured, and in some cases wholly destroyed.

*Of Drills.*—Garrett's, or "The Improving Suffolk," I consider the best corn drill at present in use; for it not only possesses every advantage claimed by similar implements, but adds, amongst others, that very great one—the independent power of steerage. But I cannot explain it better than in the words of Mr. Garrett himself:—"The merits and form of the Suffolk corn drills are familiar to agriculturists generally; it remains, therefore, but to point out the latest improvements which have brought it to its present state of perfection, and classed it among the most complete implements of agriculture. Among these may be enumerated the simple apparatus provided to ensure a regular delivery of the seed when going up or down hill; in descending, a drill has a peculiar tremor and tendency to go faster than when ascending, giving greater velocity to the delivering cups, and, consequently, throwing more seed down the conductors. To remedy this, and render the delivery from the barrel as uniform as possible, two cog-wheels of different speed are placed, one on each end of the barrel; either of which may easily be put in and out of gear as required, and worked from alternate ends—the small wheel when going up hill, and the large wheel when going down." This power of increasing or diminishing the quantity of seed is certainly a great advantage, but not greater, I think, than the power of steerage, which Mr. Garrett describes in the following words:—"By the new steerage machinery, which acts as a fore-carriage to the implement, a man may keep the rows of corn perfectly parallel. This is done by holding the steerage handle, and keeping the small fore-wheel in the track of the former large one." My reason for laying so much stress upon the power of steerage of this implement, is the opportunity which straight drilling gives for the use of the horse-hoe, of which implement so much has been said in praise: for not only does it destroy the weeds more effectually than the hand-hoe, but it has the advantage of great economy in labour.

*Of Turnip Drills,* I can say little more than that I consider the common burrow drill answers every purpose which ought to be required of it—viz., when properly constructed, it will deposit the seed with regularity and with uniformity of depth. If artificial manure—such as guano or rape-dust—is used, it should either be sown broadcast, or applied by a separate drill after the ridges are opened, and before they are split. The drill for this purpose (as made by Messrs. White and Leith, of Worksop), is a very simple implement, and drops the manure from three spouts, consequently into three furrows at once. By the use of this imple-

ment a very great evil to the turnip crop is obviated—the too great proximity of the seed to the manure.

*Of Thrashing Machines.*—That by water-power is the most economical mode of thrashing corn must be admitted by all; but as few situations afford facility for its application, the steam-engine must be more generally used. The expense of erecting a steam-engine is, no doubt, the greatest obstacle to its general application; but when we consider for how many purposes besides thrashing it may be used, we shall feel disposed to forget the original cost in the prospect of eventual economy. The substitution of steam for horse-power has many advantages; but the principal one, in my opinion, is the opportunity which it gives for the application of the whole of a farmer's horse-power to other operations on his land. A large holder of land thrashing the whole of his corn by horse-power must rob his farm of a considerable amount of labour; it is in the prevention of this robbery that the chief merit of steam-power, as applied to the thrashing-machine, consists.

Consider, again, to how many other purposes than thrashing steam-power may be applied; and it is on this account that fixed machinery is so far preferable to locomotive. Thrashing is the only operation which can be performed with the latter; whereas with fixed power the corn may be winnowed as well as thrashed; chaff or chop may be cut; corn, crushed or ground; indeed, the power may be applied to any kind of machinery. What may be the expense per qr. of thrashing by steam engine I am unable to give an experienced opinion; but, according to the calculation of Mr. Morton, about 1s. 3½d. per qr.

*Of Carts and Waggon.*—Having mentioned the principal implements, I will not trespass upon your time by remarking upon those of minor importance, but at once proceed to the question—"Which are the best carriages for agricultural purposes?" As regards my own opinion upon this subject, I need say no more than that I do not possess a single waggon. My reasons for preferring carts are as follow:—The saving of capital in entering a farm in the cost of carts as compared with waggons; the great saving of time, because when a cart is filled there is no delay in attaching the trace horses; and in carrying corn or hay, if proper harvest frames are used, there is no necessity to bind with ropes. My actual experience is, that three carts will convey as much hay or corn in straw as two waggons; they are easier to pitch, and not more difficult to unload. They are also easily and safely turned or backed, operations which, with an unwieldy waggon, occupy no little time, and involve some hazard. It has been objected to the cart system, that in hay or corn

harvest so many extra hands are required. This objection is groundless; indeed, so far from such being the case, a saving is effected, that is, if the system is judiciously carried into effect. Two men only are required, one to pitch, the other to fulfil the several duties of loading, unloading, and driving. When a number of carts are employed, it is best to have two ricks in progress at the same time; so that, when a loaded cart arrives, it may be drawn up to, and discharge its load upon, the nearest. There are some who advocate the use of one-horse waggons for harvest, and I am willing to admit that for that particular purpose they may be equal to carts. My objection is, that, although they cost as much, they are not available for any other purpose. There is a pretty general impression that carts will not answer in billy situations; we find, however, they are employed to the exclusion of waggons in some of the most hill counties of England—in Cumberland, for instance. As regards the different construction of carts, a variety of opinion exists; but I believe it is generally admitted that the Scotch carts are the best for general purposes. And now, before concluding the subject, let me summon to my aid the evidence of my labourers at Lullington. No set of men could possibly be more prejudiced in favour of waggons than they were; but, at the conclusion of harvest, they all freely confessed that with carts they could not only carry twice as much corn, but with much greater ease, both to themselves and the horses. I set no trifling value upon this evidence; for, as prejudice is a most stubborn feeling, so facts must be still more stubborn to overcome it.

The PRESIDENT and Mr. DANIEL both remarked that for harvest purposes, and on hilly farms, carts were liable to objection. Mr. Daniel preferred swing ploughs, thought them more effective in the hands of a good workman, and always used them on his own farm.

Mr. W. GREAVES agreed with Mr. Wagstaff, that carts were generally preferable to waggons for all purposes. With the same amount of horse and man's labour, a greater amount of harvest work could be done than with waggons; and he thought it well to use them, and keep two ricks building at the same time. The only just objection to carts was, in his opinion, in carrying the harvest considerable distances: in that case they effected no saving of time or expense. He quite disagreed with Mr. Wagstaff on the question as to the choice of ploughs. There was no doubt that wheel ploughs were of lighter draught; and while swing ploughs required a first-rate ploughman to make good work with them, an ordinary man could not well go wrong with the wheel. He could not quite

agree that the double-mould board plough was better than the single; for earthing up the roots it was the best, but it hardly stirred enough soil for drawing up ridges well.

Mr. LYON very much preferred wheel ploughs, because he found them so much more effective in deep ploughing; and deep ploughing was the foundation of all good tillage. He had remarked that swing ploughs were usually most in favour where shallow ploughing was the common practice. The burrow turnip-drill he thought a very inferior implement when compared with one he used, and which was procured from a Perth maker. It was made for two drills. A roller, concave in the centre, preceded each delivering pipe, and laid the drills in a beautiful form, and ensured the whole seed being placed at the right depth; while the horse walking in the furrow, made it difficult not to keep the implement straight. On many accounts he thought a moveable steam engine better than a fixed one. He possessed a portable engine and thrashing machine, and found it a great advantage to be able to shift it from one part of the premises to another; he was thus often able to save the cost of moving the rick into the barn. When not in use at home, it could be profitably employed among his neighbours. On small farms, which only required a few days' work of a machine, a portable one was the only kind that would answer. He had found great benefit on much of his land from the use of the subsoil plough. From long continued practice of ploughing to one stated depth, the upper soil had become separated from the subsoil by a hard pan, as impervious to the roots of plants as a road. The subsoil of much of his land was a fine marl; and when the plough had opened a way for the roots to penetrate into it, his crops were healthier, more hardy in resisting adverse seasons, and more abundant. He was inclined to think that more work could be done with carts than with waggons, when once men were accustomed to them; but while men had a prejudice against them, you could scarcely judge between the two systems. He thought it would not often be safe to keep two corn ricks open at the same time; the weather must be very tempting indeed to make that a prudent proceeding.

Mr. G. GREAVES said that experiment had incontrovertibly demonstrated that the wheel plough was of lighter draught than the swing; but he thought this far from being its chief advantage. He doubted whether a straight ridge could not be drawn as easily with it, and in everything else which constituted good ploughing it was certainly superior. A common hand with a wheel plough could give more regularity to the furrow slice, both as to depth and breadth, than a superior plough-

man could with the swing. Everybody knew how difficult it was to get men to plough deep enough. Now with a swing plough the depth depended on the man, but with the wheel plough it depended on the master. He had only to set the plough to the right depth and breadth of furrow, and as long as its trim remained unchanged the furrow slice would be the same. In ploughing for a seed furrow the regular depth and breadth was of great importance, as the proper depth of the seed wholly depended on its regularity. An implement which he thought almost, perhaps quite, the most useful of modern inventions was the presser. In pressing turf on light lands it was invaluable, and he had little experience of its use for any other purpose. It was useful either for wheat or for barley. He did not think it acted by condensing the soil, for the land harrowed lighter after its use. In ploughing turf, of course there were large hollows left at the bottom of the furrow, and the roots of the corn sickened when they reached the air in them. The presser filled up these hollows; it also united the furrow slices closer, and prevented weeds growing up from the interstices, and saved much seed from falling into them. With good pressing too the rows were as regular as a drilled crop, and would be hoed with equal ease. All the labour in pressing was more than repaid by the saving in the cost of harrowing. There was considerable saving of seed, the plants were stronger, and the ravages of wire-worm in great measure prevented. The best implement he had seen and used was that made by his own townsman, Mr. Robert Thornewill. The Perthshire turnip drill had every advantage in laying the seed in straight lines and at regular depth, and in addition pulverized the soil in the immediate vicinity of the seed. He preferred the old Norfolk corn drill to any newer invention, on account of its delivering the seed in a broader stream, and thus leaving more room in the rows for each plant. As to the use of carts, he did not concur in the objection that had been made against them; he thought they would be more particularly suited for hilly land. As to thrashing machines, he doubted whether hand labour was not preferable on every account, except that machines gave the means of taking advantage of a favourable market.

Mr. HARDING had many opportunities of satisfying himself that Mr. Wagstaff's choice of implements was very judicious. As to one-horse carts he was of opinion that they were more efficient in use both for harvesting as well as other purposes, and it was certain that they required less capital in the first instance than waggons. Mr. Wagstaff's carts were so well contrived that a harvest load would not require binding on hilly land. He had made many inquiries when in Scotland on the com-

parative economy of carts and waggons, and felt pressure that as the prejudice against the innovation becomes less, the superior advantages of carts would become more manifest. Waggons were only wanted at particular seasons of the year. Their first cost was large, then there was the cost of buildings in which to lay them up in store, and he thought the extra capital employed in this useless manner might be profitably expended in manures, or some other kind of improvement.

The club resolved that wheel ploughs were preferable to the Scotch swing; that the Perthshire drill for turnips, and the Norfolk for corn, were the best; that one-horse carts are more convenient and economical than other carriages for the general purposes of the farm; that where water power could not be had, a portable engine and thrashing machine were advisable.

After a vote of thanks to Mr. Wagstaff for his excellent paper, the meeting separated.

## ON THE INTRODUCTION OF BONES, AND THEIR SUBSEQUENT PROGRESS AS APPLIED TO TURNIP HUSBANDRY.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

SIR,—You, I dare say, are aware that the introduction of bones as a manure, some thirty years ago, into our turnip husbandry has done much for the improvement of our agriculture generally, but more particularly that description of land suitable for the growth of turnips, and when tillage for that purpose could not be had. Whole tracts of land in many counties has, by the use of crushed bones, been made to produce most valuable crops of turnips, thereby assisting to produce a greater quantity of mutton to supply our daily increasing population, as well as a fair average crop of corn, and an improved depasturage for the rearing of our sheep stock. It is some thirty years ago since I saw the first rough bones used for turnips, and, strange as it may appear at this day, it was the general opinion that the green bones would attract the notice of all the dogs in the country, which would scratch them out of the drills and carry them off; these three acres of turnips were watched with no little anxiety; I need hardly say the dogs never made their appearance, the turnips were an excellent crop, and so was the wheat after them—Talavera, I think.

After bones got into general use in turnip husbandry, the quantity used first was twenty-five, and down to twenty bushels per acre; soon after sixteen was thought a fair dose, but eventually twelve was found to be quite sufficient to produce an average crop of turnips, with the addition of twenty or twenty-five bushels of ashes. Now, sir, in these enlightened days of agriculture, and with the assistance of chemistry, we have been taught to make the small quantum of two or three bushels dissolved with acid produce as good and much more luxuriant crops than any of the former quantities of dry bones I think ever did in my day.

When the dissolved bones were first introduced it was recommended to be used in a liquid state; this, of course, checked its introduction, and hun-

dreds would not even condescend to give it a trial from its impracticability to use it to any extent. Science was again set to work, when it was soon found that after being dissolved, dried, and pulverized, with an admixture of soil, ashes, &c., it would then pass through a drill; it was then viewed in a more favourable light by those who were most likely to give it a trial, and so gained it an introduction; but even here its introduction was checked again by its numerous and expensive attendants in the shape of metal tubs, stone troughs, lead troughs, barrels, ladles, &c., all for the slow process of dissolving a few bushels per day; this, to the farmer who had a large extent of turnips to put in, required a long and tedious process to provide himself with a sufficient supply before the required time. Next came the more simple plan of forming a cone with ashes, depositing the bones in a vacuum formed at the top, and so applying the acid; this plan I found not satisfactory, because the bone could not immediately absorb the acid, a great part escaped and was absorbed by the ashes, thereby requiring a greater amount of acid to be used than necessary, and of course increasing the expense per acre. Now, my object is to show that my plan, simple enough, requires no outlay except the ingredients themselves; every farmer, great or small, has within himself the only implement required for this process, viz., a good flagged barn-floor, and where, with the assistance of some well-screened ashes, he may dissolve any quantity in a few days. My brother farmers know well that simplicity, combined with efficiency, is the great desideratum we have to aim at to put the foreigner out of our market. First, I sift all the dust out of the bones, and put it aside, for this reason—the dust absorbs a great quantity of the acid, besides preventing its acting upon the bone so quickly as it does when taken out. After having formed a circle, or nearly so, with ashes, a good thickness, and well pressed

round the outside with the foot, the bones are then measured, say three bushels, put upon the floor, watered with a watering-pan, and turned over with a shovel until properly wet, as you do seed wheat; then they are put into the pit prepared for them, and so you proceed, each having its three bushels, say five or six pits; you then put the acid into a tin can, and weigh 80 lbs., the quantity for three bushels; you must then mark the can, which will save the trouble of weighing for the others; this quantity should be divided betwixt two lots, and put on with a common glazed jug; after giving each lot its 40 lbs., you must take your watering-pan and give each a little water before applying the other 40 lbs. of acid; this very materially assists in dissolving the bones to a fine pulp; then apply the remaining acid, and push the undissolved bones gently down into the mass with a stick; and while in a boiling state put a slight coating of ashes over the top, which forces down the heat, and assists in

reducing the bones; after they begin to lose heat turn them up into a heap, breaking in pieces the mass as you go on, adding ashes at the same time, but not too many, as your object must be to get them to heat, so as to reduce them into a fine powder fit for your drill, when you may add the dust bone you sifted out and what quantity of ashes you wish to drill (my quantity is 25 bushels), and I prefer wood ashes or a part, if I can get them.

My brother farmers will perceive that by buying the half-inch bones, and dissolving them at home, there is no fear of being imposed upon by persons vending what they call *prepared bones*. A ton weight of bones is about fifty bushels, which quantity will do sixteen acres at no great cost per acre. This simple process I strongly recommend to my brother agriculturists, fully confident, Mr. Editor, that I hear them say we are greatly indebted to the

NORTHUMBRIAN IN THE WEST RIDING.

### “TENANT-RIGHT.”

#### ADDRESS FROM THE COMMITTEE OF THE LONDON FARMERS' CLUB.

Since the discussion of the subject of “Tenant Right” by this club in December, 1845, it has occupied the attention, not only of the members of the club generally, but also of very many persons practically engaged in agriculture throughout the kingdom. Numbers of the local farmers' clubs, after duly considering its merits, have given it their unanimous and uncompromising approval: in fact, wherever introduced, the justice on which it is based and the necessity for its adoption is almost universally acknowledged. The attention of the friends of agriculture being thus directed to the subject, has resulted in Mr. Pusey bringing in a bill to the House of Commons for the establishment of an agricultural tenant-right. Having been read a second time, this bill was referred to a select committee; and in the next stage will come under the consideration of a committee of the whole house, preparatory to the third reading. Both the original bill, and that altered by the select committee of the House of Commons, have been carefully examined by a sub-committee appointed for that especial purpose, by the general committee of this club. Several alterations and amendments were recommended by the sub-committee, and a report to that effect having been laid before the general committee on Monday, April 12, was discussed and adopted. As it was, moreover, considered of the utmost importance that the opinions formed by the members of this club, and of the local farmers' clubs on the principle of tenant-right should be made known and communicated to the members of the House of Commons, the following resolution was proposed and passed:—

“That an address be prepared for circulation amongst the members of the club and the local farmers' clubs throughout

the kingdom, requesting them to take immediate steps to secure the support of their representatives in parliament, to carry out the principles of the Tenant Right Bill.”

In pursuance of this resolution the following, amongst many other reasons, are submitted in support of the great and a just principle involved in Tenant Right:—

1st. Because occupiers of land having a very large amount of capital engaged in the cultivation of the soil, bearing a considerable proportion to the fee simple of the land, have a right to as full security for their capital as all the other industrious classes of the community.

2nd. Because the nature of the tenant farmer's occupation is such as to render it impossible to carry it on advantageously without investing capital to be reimbursed at a future period; and hence security of tenure with compensation for unexhausted improvement is absolutely necessary.

3rd. Because at present security of tenure is the exception, not the rule, in England and Wales; the greater part of the land being held on yearly tenancy.

4th. Because compensation for unexhausted improvements would, by affording security to the investment of capital, induce a far more extended application of it to the cultivation of the soil.

5th. Because security to capital would stimulate the cultivators of the soil generally to adopt a better and more improved system of husbandry, thereby greatly increasing the gross produce of the soil—a matter in which the public at large is deeply interested.

6th. Because the gradual increase of population, and enlarged demand for produce, render all available improvements in agriculture no less acts of private duty than public policy.

7th. Because where land is held for a term of years, either under lease or by agreement, compensation for unexhausted improvements at the end of the term would put an end to the

system of injuring the land, now necessarily adopted by occupiers in self-defence.

8th. Because the forced and ungrateful system of so exhausting land is a bar to permanent advancement, and a loss equally great to the owner and the public.

9th. Because every measure which may render the occupation of land generally more beneficial to the tenant farmer must be productive of proportionate benefit to the owner.

10th. Because a more extended application of capital in the cultivation of the soil would afford increased employment to the labouring classes.

11th. Because increase of labour would be accompanied with decrease of poor-rate, and consequently that land being less taxed would be more profitable.

12th. Because in some districts a custom exists of giving compensation for unexhausted improvements to tenants on the termination of their tenure; the beneficial effect of which is shewn in the highly-cultivated state of the land in those districts.

13th. Because the making such a custom general, instead of suffering its advantages to be partial only, would increase and confirm the mutual confidence that should ever exist between landlord and tenant, by doing away with all cause for doubt, distrust, or dispute.

14th. Because uncertainty must always impede energy; and justice made subservient to caprice is no justice at all, as it assumes the charity of might rather than the claim of right.

15th. Because in letting every other description of property, advantages and improvements are so recognized as to become a marketable investment; whereas land improvement is not recognized, and consequently is of no marketable value.

16th. Because the tenant-farmer being now exposed to foreign competition, justice demands that every impediment to the unfettered application of his capital and skill should be removed.

Let every practical man test, by his own experience, the soundness of the reasons here offered; and then if (as it is believed he must be) convinced of the justice of tenant-right, let him at once take the only step now needed to secure it. LET HIM ASK OPENLY AND FIRMLY THE SUPPORT OF HIS REPRESENTATIVES FOR THE PRINCIPLE OF THE "TENANT RIGHT BILL;" AND LET "THE FARMER'S FRIENDS" BE KNOWN AND NUMBERED BY THIS QUESTION, PERHAPS THE GREATEST, AND CERTAINLY THE MOST DIRECTLY AFFECTING THE TENANT-FARMER'S INTEREST.

On the part, and by Order of the Committee,

HENRY CORBET, Secretary.

Farmers' Club House,

39, New Bridge-street, Blackfriars, London.

**EAST KENT FARMERS' CLUB.**—On Saturday April 17, a meeting was held at the Fleur-de-Lis, Canterbury, to establish a central farmers' club for the eastern division of Kent. Mr. Peter Martin was unanimously called to the chair; and various resolutions were passed preliminary to the commencement of operations. Mr. Thomas Slater proposed the establishment of the club, and made some observations showing the advantages to be derived therefrom. East Kent had formerly stood foremost in every undertaking to improve the interests of the agriculturist, and had taken the leading rank amongst agricultural counties, whether for superiority of

culture or superiority of produce. Essex had been allowed to place itself in the van, and in this vital consideration Kent, instead of leading, was called upon to follow. The benefits which had accrued to the agricultural community by the formation of societies were acknowledged on all hands; the Royal Agricultural, the Dublin and Irish, the Scotch societies, had succeeded in their respective pursuits beyond all expectation. The district farmers' clubs had proved very beneficial to the farmer and the labouring classes also. It was desirable that the improvement of both should be an object of attainment, and he was satisfied that at this crisis a central East Kent club would be of incalculable advantage. Mr. Martin, in seconding the proposition, supported the opinions and views expressed by Mr. Slater; and on the question being put, the establishment of the club was carried unanimously. Mr. T. W. Collard was chosen honorary secretary; and after some other matters of detail had been disposed of, the meeting broke up.

**WASTE OF MANURE.**—"I shall say nothing of the liquid manure which, as I have been given to understand, is suffered to drain away into the ditches, thence into the rivers, and from them into the sea, from fully one-half of all the homesteads of England; I will speak merely of the unappropriated refuse of large towns. In Flanders, where manure is carefully collected, instead of being, as here, suffered to run to waste, the *excreta* of an adult is valued at £1 19s.; considering the enormous additions made to this manure in our towns, it will not be thought unreasonable to estimate the value of that part of the refuse which now runs to waste at £2 per head of the population, and supposing that in England or in Wales, the towns which are guilty of this extravagance contain in all only 5,000,000 inhabitants, we shall have an annual waste of at least ten millions of money." Mr. Smith, of Deanston, also expressed his opinion that, "taking a general view of the subject, we may assume a clear revenue of the sewer water of all towns of £1 for each inhabitant." Dr. Arnott said that "the value of town manure might be estimated by the fact that a portion of the drainage of Edinburgh has increased the value of these lands by more than £5,000 a-year, and that if the whole drainage of London could be saved, at a sufficient distance from the town, the value would exceed £500,000 a-year." Dr. Arnott observed that Milan had benefited to a great extent by the adoption of such measures as he suggested; and he then went on to say that "it has been calculated that, whereas the cesspools cannot be emptied by nightmen for less than 17s. a-year, and whereas water-carriers get ½d. for a pailful of water at the door, an addition of 2d. to the rent per week will suffice for the expence of water-closets and of an unlimited supply of water for every house; and that the entire sanitary purposes contemplated under all the recommendations of the Health of Towns Commissioners, may be procured for 3½d. a week per house." These calculations might be looked upon as sanguine, but those persons who were best acquainted with the subject knew that much was to be done with regard to economy by adopting efficient sanitary regulations.—*Lord Morpeth's Speech.*



## TWO ESSAYS ON THE POTATO.\*

BY JASPER W. ROGERS, C.E., DUBLIN.

## No. I.

## ESSAY ON THE BEST REMEDY FOR THE POTATO DISEASE, AND ON THE TREATMENT OF THE POTATO IN THE VARIOUS STAGES OF ITS PLANTING, GROWTH, AND PRESERVATION.

In attempting to meet the wishes of "The Royal Agricultural Society of England" by suggesting "a remedy for the potato disease, and the treatment of the potato in its various stages of planting, growth, and preservation," I beg to premise that I shall seek to use such terms and expressions as may be understood equally by all classes.

"An account of the growth of the potato during the last year, with reference to the nature of the season," is the first section desired to be answered.

Upon this point, I believe it may be said that the same appearances presented themselves almost universally over England and Ireland.

At the commencement of the season the crops presented no unusual appearance, being in many places more luxuriant than otherwise; in fact, no indication of disease appeared, nor were there many complaints of "misses" (the term generally given to the failure of germination in the set or seed), which had for some years been very prevalent, particularly in Ireland; and this apparent health continued until about the middle of July, up to which time the weather was genial and natural. At this period, however, a very sudden change took place. The atmosphere became heavy and continuously clouded, intercepting, almost totally, the action of the sun upon the earth; and it was generally observed, that in the evenings and mornings a dense and peculiarly cold mist lay upon, or close to, the ground, frequently continuing until mid-day. This was the natural result of the interception of the sun's rays, and the consequence was, a *blighting check to vegetation*, then requiring increased heat to bring it to perfection; but, instead, being subjected to the action of a cold and humid mist, enveloping the plant almost continuously for a period of at least a fortnight.

Immediately subsequent to this, the appearance presented by the potato crop, particularly in low situations, was the parched and brownish hue

usually given to the plant by the action of an early frost; and in many instances where this was seen, the crop became almost useless.

This was deemed to be the setting in, or commencement of the "murrain of the potato;" the belief being, that an epidemic disease then arose, wafted to us from other parts of Europe; and that the contagion was spread by infection, like that of the cholera in mankind or the murrain in cattle.

Such is a concise statement of the *apparent* "history of the growth of the potato during the last year," and of the general impression which I believe exists; but with which I so completely differ, that I do not consider it necessary, as regards my view of the case, to go into any further particulars regarding "the season, or seasonal variations," the general and well authenticated facts, before stated, as to the state of the atmosphere, &c., at the period immediately preceding the *apparent* commencement of the disease, being all that is necessary for the support of my position. To this fact, therefore, I would draw attention, and shall now proceed; premising, however, that a full and accurate examination of facts, which may at first sight appear wide of the merits, becomes necessary—and on this score I seek excuse and consideration.

If we would learn the best method to preserve and cultivate the potato, we must first discover the causes which have led to the present calamity. A remedy, to ensure success, must proceed from a positive knowledge of the evil existing. If otherwise, the cure must, at least, be doubtful—probably worse. Therefore, let our first inquiry be, *what causes the disease?*

A very accurate description of the potato, and its minute component parts, is not here essential. Its principal constituent is "fecula" or starch; varying, in its ripe state, from 16 to 18 per cent; fibre, 8 to 10 per cent; water, 72 to 76 per cent. The fecula and fibre, divested of all aqueous matter, may be divided again, into three parts, viz.:

Starch and sugar . . . . .	84·8	per cen
Gluten, or animal matter . . . . .	14·82	"
Fatty matter, or oil . . . . .	1·1	"

The product of the aqueous portion is of no

\* The facts set forth in these essays were submitted to the late Irish Government in November, 1845, to the Dublin Society in February, 1846, and to the Royal Agricultural Society of England in May, 1846.

consequence to this part of the subject; but it is desirable that the structure of the tuber may be well understood. It is indeed beautiful in its arrangement, and exquisite for "the aim and end" of all God's works of life—*reproduction*.

Its vital part, the *fecula*, is contained in cells of admirable arrangement, divided by a tissue, formed almost wholly of veins and arteries, running in close connexion throughout the entire, and terminating invariably at each eye. The *fecula* is conveyed, during growth, from the stem through the fibrous roots, and deposited within; to be drawn forth again, through the same eye, to give new life to a future generation.

Commencing with the process of germination, the stem is dependent on the seed from which it springs, for all its vital principle, arising entirely from the *fecula* contained therein. The growth proceeds until the stem is matured: when the upward circulation of the fluids commence to take a downward course, checking the further upward growth, in order to supply the fibrous root with material for developing the tuber; thus, reconveying to it the vital principle, *fecula*, renewed and increased, which had been first supplied to perfect the stem, in order that its perfection should give power to produce the tuber from which new life springs again. How simple and beautiful the process! Hence, it is plain, that upon the vigour of the *seed* must mainly depend the health and vigour of the plant; for if the seed have not its proper stamina its offspring must be weak in a similar ratio. And this is not the law of man, it is the law of unerring nature, unchanged and unchangeable. "The evil tree cannot yield good fruit;" the strong cannot issue from the weak; health and vigour cannot be the production of *degenerated parentage*! But it is needless to dwell upon facts pronounced by the word of God! and proved by nature daily.

To the use, therefore, of *degenerated and impoverished* seed the present calamity may be ascribed; but in order to trace this fact to its source, a little patience will be necessary.

In the years 1834-5 my attention was first attracted to the disease of the potato; having then had several hundred tons in store, which became affected. The symptoms were similar to those of the present day, and at first all my care and efforts to cure the evil were unavailing; as I found in every instance, when the unsound came in contact with the sound, the plague spread; the only check at all effectual having been intermixture with perfectly dry coal-ashes and cinders. Being thus much interested in the matter, I gave it some consideration; particularly as great fears existed from the loss by "misses"—as technically denominated by the farmers; in other words, failure of

the seed in the ground. What produced those "misses" was the question.

Thought and experience pointed out to me the fact, that even in the months of December and January the tuber had commenced to show its shoots—no matter how stored; and I then took frequent opportunities of examining the potato-boats discharging at the quays of Dublin, constantly finding the shoots some six inches long even thus early in the season, increasing in length and vigour, until in April, the general planting time, the whole cargo presented a mass of shoots, *three to five* feet in length, matted and woven together, until with difficulty the tuber could be shovelled in the hold. Yet I have seen such as these generally bought for seed round Dublin.

That seed like this was unfit for use became at once apparent to me, and I immediately sought to ascertain whether, generally, potatoes in *pits* presented a similar appearance. The result of my inquiry then and since has fully proved that, generally speaking, growth to a considerable extent takes place; and the evil of this growth is not understood, nor any means attempted for its stoppage, although it extends throughout the kingdom, nay, the world—wherever potatoes are cultivated.

Shortly after the period I speak of, my attention was otherwise occupied, but from year to year the "misses" were more or less complained of; invariably, at least so far as my experience went, *being worse after a winter without frost*. Now, the cause of this is plain. The temperature having been mild and genial, permitted, nay, fostered, growth in all situations, and under every circumstance, in pits as well as otherwise; and the premature germination being thus general, so was its attendant decay and loss of the seed when planted; *because the tuber had exhausted its germinating power in the pit or store*. Still this evil was not sought to be checked, nor was it even noticed. Favourable seasons sometimes aided the production of crops from this weakened seed, which would have withered under a blighting season or unexpected frost; and thus hope was kept alive, although the evil still extended.

Now, experience has taught me that in the exact ratio of the incipient growth of the potato is the diminution in starch or *fecula*; hence it is evident that with such growth issuing uselessly in the pit or otherwise, *departs* the vital principle of the seed; its life and reproducing power becomes less and less as vegetation spends itself unfruitfully, until either all its vigour is gone, or just as much remains as gives it simply reproducing power. All farina makers so well know this fact, that from the period germination commences in the potato, they either lessen their prices or cease to work; and those who

really understand their business rarely manufacture beyond six months in the year. This is sufficient to prove to demonstration the great loss of starch—pure fecula—for previous to growth the profit is considerable; after, the trade is not worth continuing. But the following experiment, showing the loss by one month's growth, in the present season, will be conclusive; and it is of such a nature that any one can try a similar.

*Experiment.*—One stone of sound potatoes, grated on the 15th February, yielded the following produce:—

	lbs. oz.
Starch .....	2 4
Fibre .....	1 11
<hr/>	
Gross weight....	3 15

One stone of potatoes, exactly similar, left to germinate in a dry room, without a fire, until the 15th March (one month), produced—

	lbs. oz.
Starch .....	1 12½
Fibre .....	1 0½
<hr/>	
Gross weight....	2 13

The loss in one month being 1 2

This, then, proves the fact incontestably, that every hour's germination takes from the seed its vital principle. It also tells us plainly why the "misses" become so general.

*The reproducing power of the seed was gone!* and the well known truth, that only portions of a field were visited, proves this position. The seed in such places had been totally spent, while in others life still existed; which can be well understood by any one who has examined a heap of potatoes in vegetation. One tuber will have a shoot a foot in length, while its immediate neighbour scarcely shews signs of vegetation.

But what followed the "misses" in the seed? This fell disease. And how can its cause be better described than thus?—*Degenerated parentage*, which imparted first its own evil, *weakness*, to the offspring, and extended that again and again until delicacy turned to fixed disease; for it is idle to say that this is a plague commencing in the past year.

How many a fair and beauteous flower tells in human life a similar tale! How bright may be the bloom, how good the promise; yet the canker, weakness, delicacy, blights it to its death! Care and climate may stay or check the evil; seasons of sunshine may keep it back; but if wintry blasts and hardships come, that which might otherwise have lived and reproduced will die.

Such is the cause of this disease superinduced by others which I shall now detail.

A considerable change has taken place in the

seasonal temperature of Europe, which has largely lent its aid towards the present evil! Meteorological observations have proved that for the last ten to fifteen years, although the average temperature has, upon the year, varied but little; the winter quarter has been particularly mild. December and January, which in former years always brought snow and frost, have been found to average in temperature equal to March. But it is almost unnecessary to detail what our own experiences prove. We know that for many late years flowers bloom at Christmas, and winter assumes in many things the garb of spring. Here, then, is one of the superinducing causes for that early germination in the potato, which has worked so great a change. Formerly, life in the tuber lay almost dormant until the temperature of spring called it into action; but now that temperature precedes its usual time, and acting with the same effect, forces growth at least three to four months before the general period for planting, thus robbing the root of almost all its powers before it is given to the ground. *Had change in the period of planting* been kept coeval with the change in the climate, the damage would perhaps have been avoided—of this, however, more hereafter.

Another cause also exists. The description of potatoes now very generally planted, particularly in Ireland, is that which germinates at an early period. White potatoes are, it may be said, now the poor man's crop; no doubt arising from their greater power of production; and all varieties of white potatoes germinate naturally at an early period. Thus, increase of temperature and change of seed have lent their aid to produce consequences which we have taken no steps to counterbalance, but which, there is no doubt, can be obviated when properly understood.

*"The remedies for the disease, explaining the principles on which the remedy is founded,"* and *"The treatment of the potato in planting, &c., &c.,"* being subjects mainly dependent on each other, shall be treated of together.

One of the most apparent evils arising from the present disease, is the superabundance of moisture contained in the tuber, which I conceive may be partly accounted for thus:—I have shewn that the seed, as now used, is divested of its fecula or vital principle, to an extent which it is impossible to calculate; sometimes totally failing to vegetate; again, barely reproducing. In exact proportion to the power thus taken away (if the seed do vegetate), a natural demand arises to fill the vacuum, in order to supply the vessels giving nutriment to the plant. These vessels obtain that nutriment principally from and through the seed; and according as the vacuum is formed, aqueous matter rushes in, sup-

plied by all the moisture round, and drawn thither by the innate power of the plant, which sucks up, like the action of a pump, the moisture at its base. Thus, one cause for the over quantity of water; which is a substitute for the fecula previously lost by incipient growth, of the plant, and when given back to the tuber, brings with it, in solution, the material and principle for the re-formation of the fecula, but in equal deficiency as originally in the seed. Hence the weakness and delicacy, tending to subsequent disease; and, it can scarcely be doubted, so will that delicacy continue until due and proper precaution be taken to do away the cause? That this can scarcely be hoped for in the coming season is, perhaps, too true; and therefore care in *pitting* becomes doubly essential, and is perhaps one of the first steps (after early planting) to check the disease.

The next remedy is, I conceive, the proper selection of the seed. The tubers should be selected from amongst the smallest that are perfectly ripe, which can be known by the eye being well shewn, and the intermediate parts full and prominent. Such are quite matured, though small, and contain in proportion to their size, a superior quantity of fecula; they are therefore the most desirable for seed. As I believe that a sufficiency of small sound potatoes can usually be had, I shall not suggest any thing upon the subject of cutting sets, &c.; but I would impress upon all the danger of planting diseased seed; the evil must be more or less, and although in some instances it may be necessary, it should be as little done as possible.

But, in addition to the mode of storing or pitting hereafter described, and which I recommend, it is essential to draw particular attention to the great advantage of fully enveloping the seed-potato in *charcoal*! the effect of which I detail hereafter.

It may not be convenient for all classes to obtain *wood or peat charcoal* for the general pitting of their crops; but, under existing circumstances, no exertion should be spared to procure at least as much as will suffice for the seed-pit: and if it cannot be obtained of *wood* or *peat*, let that of coal (very finely pulverized) be used—thus:—

According as the tubers are laid in the store-heap or pit, in layers, fill in fully amongst them pulverized charcoal; so that each tuber shall be, if possible, entirely surrounded, or that a portion of each will be in actual contact with the charcoal; too much cannot be used. The result will be found to be almost a perfect check to decomposition; and if such actually take place, the infection will be at once neutralized and prevented from extending.

I beg to impress the absolute necessity for the general and abundant use of charcoal for the pre-

servation of the seed-potato; which I would further recommend, should be pitted by themselves.

By using this precaution there will be still greater assurance of protection from disease; and if the tubers for seed be well and carefully selected, according to the directions given, there must be almost a certainty of their continuing sound and good, as will be better understood after consideration of the following:—

Assuming that the causes of failure which I have pointed out are fact, it must be plain that in place of waiting to plant, as now, until spring, that this should be done at another period; and, taking all facts into consideration, I have no fears in recommending that, in all dry ground at least, potatoes shall be planted in October or November.

I am aware that so great a change from present practice will meet a host of opponents; but I feel armed by nature to uphold my proposition, and I urge a general trial of a portion at least of each cultivator's ground.

At what period has the Almighty willed that seed be sown? When autumn's winds can shed and scatter it over the surface; when coming rain will saturate, and settle it in the ground, and let it lie there, fearless of the winter? Such should be man's aim to follow; and not change, as now he seeks to do, the ways of nature.

It is feared that potatoes, if planted in October or November, will suffer by frost; but this is an idle fear. Why do not all the variety of bulbous roots, infinitely more tender, which every gardener plants in open ground in October, and leaves exposed to all the frost of winter, suffer? And why not the potato which is left when digging? The experience of all who know the country will admit the latter yields fruitful produce. But this is one of the prejudices of long-contracted habit, and time will be required to effect a change.

The mode I propose is to plant, either in drills or ridges, during the driest period of October or November, the small potato *whole*; covered by well pulverized soil, about eight to ten inches deep. If in low ground to be in beds, with deep trenches to keep the seed from resting in water. Thus protected, nothing else need be feared: the frost will, or may penetrate that depth in the ground; but if it do, it will not then injure the tuber, because frost loses its destructive power, unless aided by exposure to the atmosphere. The seed being properly covered, no injury can take place. But let it be further considered what are the advantages of this method of planting.

The seed, taken fresh from the earth, is at once deposited again to yield its fruit. By nature's will, it is dormant then and so continues until she re-asserts her right to vegetation. The shoot springs

and flourishes, or is partially checked and held back, as the Almighty wills; but all the while there is nothing lost, and by degrees, as spring comes really on, the plant gives out its powers fully and effectually: all it ever had is there to aid in the fulfilment of its functions. Why then should we have so long departed from what appears "so simply right?" and why not, now at least, seek to gain the proper path again?

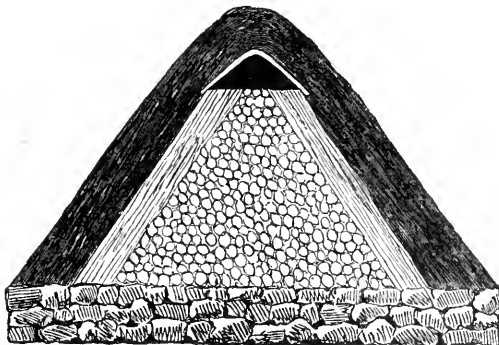
That this method of preserving and planting the seed offers the best "remedy for the disease," I cannot doubt; because it is but carrying out nature's law, which we have departed from, and therefore suffered by. It is idle for man to seek to reverse the ordinances of nature; and disease in all things arises from departure from natural principles.

"The mode of pitting and preserving potatoes in an ordinary season, with the principles upon which the improved plans may be founded," is the next question for consideration. The pit should be thus made—

A base, say of seven feet in breadth and one foot high, extending whatever length the pit or store-heap may be desired, should be formed in the driest and coldest part of the field, of stones of any kind, large and small; and on this the potatoes should be piled in the usual way—the base of the potato pile being only four feet across, so that eighteen inches shall remain at each side for the covering straw and clay. The heap will of necessity be formed tapering to the top, at such an angle as may be convenient; and, according as raised, about six inches in depth of straw, running upwards from the base to the apex, should be laid between the potato and the covering earth: care being taken that the latter shall not extend beyond the stone basement. When the heap has thus been carried up until it becomes reduced at top to about six inches, a horizontal funnel, to be composed of two boards placed in the shape of an A, running the whole length of the heap, and projecting about twenty-four inches at each end, should be formed; extending beyond the straw and beyond the covering clay. If boards should not be within reach, ridge tiles, draining tiles, slates, or even flat stones may be used to form this funnel; and when so formed, the whole is to be covered with a body of clay, of about one foot in thickness, and stanchied or thatched in the usual manner.

The store-heap thus formed will present the appearance of the common potato-clamp; except that it will stand raised on a stone basement one foot above the ground, and that at each end an A-shaped opening will appear—thus—

TRANSVERSE SECTION OF POTATO PIT.



Scale, three-eighths of an inch to a foot.

The effect upon the potato by thus storing will be found to be as follows:—

The stone basement will protect the tuber from under-water or damp, and allow sufficient circulation of air to correct the evil of superabundant moisture or putrescence arising from disease. The straw covering, being placed upwards from the base to the apex, will act as conductors of all heated and humid matter which may be produced from any part of the heap. These will ascend vertically from the point where generated, until they meet the straw; and through its interstices they will be conducted until met and carried off by the A-shaped funnel. Thus there will be a sufficiently free circulation of atmospheric air to prevent increased temperature, and full egress from every part of the pit for all heated and injurious exhalations.

The funnel being open at each end will, from that reason, always have a draught sufficient to quickly carry off the moisture; and lying horizontally, no evil can arise from the frost, the action of which is innocuous in that direction; but if fears be felt on this score, one end may be closed in severe weather. And in order to preserve as much as possible an equal temperature, it will be desirable that the store-heap shall be placed so as to be entirely shaded from the sun, where practicable.

This arrangement will be found to correct the evils of the present "pit," and can be adopted by even the lowest grade of the peasantry; but if there be added the adjunct of charcoal, as before suggested, almost perfect safety of the tuber, even in disease, may be anticipated.

The action of the charcoal is thus:—Surrounding the tuber, it receives and absorbs at once all moisture and putrescence; immediately correcting or decomposing the latter, while it assists to carry off by evaporation the former, thus at once killing that putrescence, which, if allowed to rise

through the heap, will carry to uninfected parts its infection.

This property of charcoal has long been known and used for other purposes; but it has been unaccountably forgotten or passed over in agriculture. However, its value has been so amply proved to me by experience, that I cannot too strongly dwell upon it here.

From the experiments I have made, there cannot be a question that potatoes, entirely plunged in charcoal, will not infect each other, and that its action upon them is not alone not injurious, but is highly beneficial. Whatever moisture be given out, as before stated, is at once absorbed; if putrescent, that putrescence is immediately decomposed: these, the leading evils of the disease, are therefore perfectly corrected; while equality of temperature is at the same time preserved in the pit. It can scarcely be necessary to say more on a subject which any inquiring mind will at once see is incontestible.

I annex hereto an extract from a pamphlet\* upon the subject of *peat-charcoal*, published by me, which will point out its advantages as a *fertilizer*; and as regards the *disease of the potato*, also its particular benefits, proved by my experiments on that question. As overabundant moisture and putrescence are universally admitted to be the symptoms of the present disease, the main solid constituent of the potato (*carbon*) must be absent in proportion to this overplus; and therefore whatever will most readily give back to the plant that which it now wants, must be the best remedy.

From the facts set forth in the publication named at foot, it will be evident that charcoal (almost pure carbon) is a fertilizer of the highest value; and it will be plain that it contains in itself the actual property which is now absent from the potato: therefore to use it as a *manure* for the potato must be most desirable, not alone as a fertilizer, but because, as I have before stated, one of its admirable properties, unknown in all other fertilizers, is *the correction of putrescence* and the absorption of *superabundant aqueous matter*.

The manner in which I recommend it to be applied is as follows:—The ground being prepared and manured, and the seed tubers placed in the customary manner, around each seed should be thrown a handful of charcoal, of peat or wood if possible, if not, of coal (very finely powdered); the covering and earthing to be as already recommended.

The result of this mode must be apparent. If the seed be infected, the evil will be met by the presence of the charcoal, at least so far as to pre-

vent extension, perhaps to effect a cure; and when vegetation takes place, the charcoal immediately round will yield pure carbon to the plant, and supply, perhaps amply, the deficiency which otherwise would but still impart weakness and extend the disease.

Such is "the mode of pitting" and of "planting the potato," which I recommend at present and for the future; and I conclude by stating that my recommendations are all based upon the results of proof by experience and practice.

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## No. II.

ESSAY ON THE HISTORY OF THE DISEASE IN THE POTATO; ON THE METHODS FOR RETARDING THE DISEASE, AND FOR EXTRACTING THE NUTRITIVE INGREDIENTS OF DISEASED POTATOES, ETC.

"The history of the disease in the potato in Great Britain, with particular reference to the authentic returns regarding any particular season, or seasonal variation," is the first point of information required by the Royal Agricultural Society of England in the second essay.

That history, I believe, will be found to be one very simply given, but not, as has been generally assumed, of recent commencement. As I have already stated in my first essay, I conceive the disease to have commenced at least as far back as 1834. At that period I first perceived it in a large quantity of potatoes which I had stored for the manufacture of farina; and what assures me that it was the same disease as the present is the fact that perfectly dry coal-ashes and cinders, which I then applied to check the rot, acted almost in the same manner as the remedy which I have since so amply proved—*charcoal*. An over-quantity of moisture was, therefore, evidently the result of disease then, as there can be no doubt it is now.

Subsequently to this period the "misses," or failure of the seed in the ground, gradually increased, and much dismay arose on the subject. It will be recollected that about the same time we almost ceased to have winter. Therefore, as I have stated elsewhere, a premature growth took place in the potato, pitted or otherwise stored, which growth robbed the tuber of a large portion, if not of all, its vital or reproducing power, before the usual time for planting came; and consequently, in many instances, the set when placed in the ground was actually lifeless; in others, so weakened that subsequent check or evil from severity of weather made the offspring of the degenerated parent weakly and diseased.

In my first essay I have shown what cannot be denied—that *the fecula is the vital principle of the*

\* Republished, with further experiments, in "An Appeal for the Irish Peasantry." Effingham Wilson, London

*potato*. From the moment growth commences in the pit or store, that vitality which nature intended should be imparted *solely* for the reproduction of its species (and, consequently, could not be more than sufficient; for she "tempers all things truly") becomes less and less until, according to the circumstances of temperature, period of planting, &c., the seed is either too much weakened to produce a healthy crop, or is so completely exhausted as to have no power of reproducing.

I have also shown from actual experiment, which all have it in their power to test, that the loss of the vital principle by one month's growth was, after deducting aqueous matter, about 38 per cent. of the material of the potato. Than this, surely there can be no more positive or convincing proof—first, that nature is robbed of her power by our supineness or inattention to the changes in temperature, &c., which it is God's will, for his own wise purposes, to produce; secondly, that, being so, it is impossible but that disease must follow reproduction from this weakened seed.

Who will venture to gainsay the words of holy writ? And in it they are as strong as holy writ itself—"An evil tree cannot produce good fruit."

The simple "history of the disease of the potato," then, is —

1. That improper storage and change of temperature have induced premature growth of the tuber in the store or pit.

2. That that growth commencing even so early as December (I have seen it earlier), continues uninterrupted usually until March or April, when the seed is committed to the ground, forsooth, to *reproduce in health*, and give its offspring that vitality of which it has been itself previously deprived. How monstrous the expectation!

3. That, if the seed have life, it is but partial. Its produce, therefore, has but partial strength; and, when the blasts and cutting winds which now usually visit us in spring, assail this weakened *child*, it lives perhaps, but in weakness still, to die at maturity in disease.

I shall not go farther upon this point, having gone into it fully in my other essay; but I cannot feel hesitation in assuming that what I have stated is the real "history and cause of the disease," and I shall now shortly point out what I conceive to be

*The "Methods for retarding the Progress of the Disease."*

I have already done so, fully, and given my reasons in my first essay. In this, therefore, I shall only shortly state what I conceive essential to be followed, referring to it, for my arguments in support.

1. The seed to be selected should be the small, heavy, and perfectly ripe tuber; the eye sunk, and the intermediate parts full and well developed.

2. This seed should be planted in October or November, covered by well-pulverized soil eight to nine inches deep. The ground to be, of course, properly drained. And, until the present disease has entirely disappeared, upon each seed should be thrown a handful of either peat or wood-charcoal, if possible; if not, of very finely-pulverized coke or charcoal of coal. The effect of this I have already described, as also the cause of the necessity for planting in autumn in place of spring.

3. Planting in October or November allows nature to take her own unerring way. She imparts life, brings it forth, checks it, as she wills, and cannot err. All the vital power is retained and given to the plant, to come whenever it may be her august will to bring it—not to be lost, robbed from her, and thrown aside, as now. Pits opened to supply seed to be planted in spring show the *life* of the plant matted and entwined round the tuber from the base to the apex, a living mass of uselessness.

But it cannot, surely, be necessary to go further on this point. The cause of the disease is plain. The remedy equally plain.

I shall now proceed to describe the means which long experience and practice has taught and proved to me as best for "extracting the nutritious ingredients both from diseased as well as sound potatoes;" and I shall also submit facts bearing upon the question generally, which I believe to be of paramount consequence, and which will therefore, I feel convinced, command the attention of those whom I have the honour to address.

The preparation of meal, flour, starch, &c., either from diseased or sound potatoes, which I am about to recommend, if done by machinery, involves complexity and cost, and would not be, I conceive, at all suitable for the object which I believe is intended—namely, the conversion of potato into a wholesome food, so as to preserve it under all circumstances; this to be done as well by the cottier as by the extensive farmer.

I shall endeavour to describe a very simple mode of operation, which is not a theory, but has been, and is now, in practice. And it is desirable at once to point out, in order to fully distinguish it from "farina-making," that in the present instance the entire produce of the potato is preserved, the fibre now thrown away being, to use the words of one, eminent as a chemist, is "rich in nitrogen, and, in fact, analogous to animal substances in composition," therefore containing the proper elements of nutrition—a fact proved, to my knowledge, so far back as the year

1814, and practically tested by my own experience up to the present day. I therefore cannot feel an instant's hesitation in recommending and urging the adoption of a preparation which I feel convinced will confer a blessing upon the poor of this country generally, and which I trust, ere this paper concludes, to prove is one of the utmost importance in a national point of view.

*Directions for making Flour, Meal, &c., from Potatoes.*

*Washing.*—The potato can be washed by means of the "Farmer's Potato Washer," or a more desirable description of machine, namely—a cylinder about 8 feet long and 2½ diameter, formed of wooden or iron bars, one inch asunder, fed from a hopper at one end, and discharging itself at the other, the whole working under a heavy pour of water; but both these machines involve not a little expense, and require a considerable quantity of water, as well as power, beyond the following method. Place about three quarters of a stone of potatoes in a strong common basket, say nine inches deep and 18 inches diameter, with two upright handles, the wicker-work of the bottom being open a quarter to half an inch; immerse this in a tub of water until the potatoes are covered, shaking and working it from right to left, and lifting it frequently entirely out. Each time that this is done, the grit or clay will be drawn off, and sink; and in two or three minutes the potato will become perfectly clean. By tossing them in the basket with a jerk of the hand, it will be seen if soil, &c., remain in the eye. In this manner, one man will wash with ease what six or eight can grate.

*Grating.*—This operation I recommend to be done *by hand*—first, because a machine, to do a quantity, requires to be driven at a speed infinitely beyond what manual power can with economy effect, involving complexity of parts and considerable expense; and next, because a moderate daily operation, allowing the whole process to proceed equally, will produce a better article of food.

The operator should hold the grater\* over a tub half full of water—in the left hand, by the bar or tube inside, placing the circular rest attached to the grater on a lath across the tub, or on its edge, as convenient; and taking the potato into the palm of the right hand—not catching it by the ends of the fingers, which will cause it to slip, and subject the hand to be scraped—he can with ease grate the whole potato.

The tubs most convenient for the purpose contain 12 to 16 gallons. Into these may be grated 2 to 4 stones of potatoes; they should then be filled to the top with water, and *the whole pulp or pro-*

\* The common bread grater.

*duce*, after being well stirred up, allowed to settle. When settled, the "red water," which will then appear, is to be poured off, retaining the pulp, and the tub again filled, stirring the whole as before. Two washings for sound potatoes, and three or four at the utmost for unsound, will be sufficient. A moderately strong adult will be able, by common diligence, to grate two stone of potatoes per hour, the labour of which is, as to other work, comparatively trifling. When thus accomplished, the next operation is

*Pressing.*—The construction of the pressing lever, which I recommend for farmers' use, is similar to the cider-press; that for the peasantry will be described hereafter, and involves *no* expense. To accomplish this operation well and simply is of much consequence, as by so doing the difficulty of drying is considerably lessened.

A sufficient number of cloths, made of coarse canvas or sacking, about 14 inches square, will be required. The last water being poured from the pulp, as before described, it should be lifted either by the hand or a scoop in such quantity as the cloth will easily contain, making it up into the shape of a small parcel, which can be done by a boy or a girl. Two of these parcels should be then placed one above the other on either of the pressure blocks, and a man stationed at one end of the lever will, by drawing it down and resting his whole weight upon it for about one minute, press the greater portion of the water out. While this operation is performing at one side, another boy prepares and places two parcels of pulp under the opposite lever, and the second man performs the same operation as the first; thus the pressing will proceed with certainty, and effect, when required to be done by a farmer or others on an extensive scale, or the lever may be used by one only, and it will be found to be a useful adjunct in any country establishment as an apple press, &c.

In this process a quantity of pure fecula, possessing all the component parts of the best Indian arrow-root, will force itself with the water through the cloth. To catch this, two small pails lie under the pressure blocks; and when this has been submitted to one or two additional washings, it can be dried either for use similar to arrow-root or as a most desirable household starch.

On the cloths being taken from under the presser, compact cakes of pulp will be had ready for

*Drying.*—For this operation I recommend to the general class of farmers either a kiln constructed on the principle commonly used throughout the country, or a portable kiln such as is now in use at the South Dublin Union, which is capable of drying all kinds of grain, as well as the produce of the potato.



A canvas covering being placed over the kiln floor, the cake of pulp is to be broken up, either by the hand or through a coarse hand-riddle, and spread about four to five inches in depth, a fire being previously made, and divested of smoke, in the usual way. During the drying, the pulp is to be frequently turned by a common wooden rake, and when divested of all moisture it should be thrown in a heap for about an hour, and then spread on a floor to cool.

If farmers who may manufacture on a moderate scale object to have their own kiln, that of the nearest country maltster can be sometimes made available by using on it a canvas cloth, as before described. Or he may dry the pulp by placing it on boards or cloths round a brisk fire in his kitchen or an out-house; or in linen, canvas, or cotton bags, and hanging them on the walls in the immediate neighbourhood of the fire. To dry in this way will be most convenient and desirable for the peasantry, and is the mode I propose for them. No additional fire will be required, and the bags can be hung up inside the chimney, if large, as well as outside; anywhere, in fact, out of the direct action of the smoke, the only precaution necessary being to empty the bag or open and stir up the contents once a day, allowing the action of the atmosphere upon the contents for an hour (say every twenty-four) until dry.

Dried in this way, and rubbed through the hands during the operation, the pulp can be made sufficiently fine for being used for coarse bread or stir-about. But its preparation shall be now described, both as

*Meal and Flour.*—The dry pulp may be ground at a common country mill or by a hand wheat or coffee-mill; the price of the latter varying from 3s. or 4s. upwards, the former from £2 to £3. When thus ground, the wholemeal of potato differs little in appearance from that of wheat wholemeal, and may be used for making wholemeal bread of a most desirable description, by merely adding a fourth to a half of wheaten meal. It is also desirable for other purposes hereinafter described.

To make it into flour only requires the coarse part to be separated by means of a common flour sieve, and the meal left produces most capital stir-about by being mixed with a fourth to a half of oatmeal; but the value and use of these products are fully described hereafter. The process of preparation, it will be seen, is simple and inexpensive. The samples submitted will speak for themselves. Thus prepared, the produce will keep uninjured for any length of time necessary, by being simply treated in the manner usual for flour or meal, over which, in this respect, it possesses the highest advantages.

Experiments, of which I possess particulars, have proved that ship biscuits made of half wheaten flour and half potato flour entirely resisted the effect of weevil in the tropics, while that composed of wheaten flour only, suffered considerably; and it was found at the same time that potato flour and pure potato facula returned after a two years' cruise without any injury. My personal experience has ascertained that both can be kept for years with perfect safety, singularly resisting, or at least being free from the usual attacks of vermin—a fact which I vouch, but for which I cannot satisfactorily account.

The preparation of *Starch and Arrowroot*, samples of which are also submitted, differs from the foregoing only by separating the fecula from the fibre, when wet, by means of a fine hair or wire sieve kept in agitation on the surface of the water, through which the former passes, and settles in a hard mass at the bottom of the tub. The drying into chrysalts for starch is accomplished by regulation of the temperature, increasing by degrees almost to a baking heat; while that for arrowroot should be either dried in the sun, or to imitate its effects, viz., by an absorbing heat acting on the upper surface, over and upon which (not under) the heat should be thrown. These different methods produce the different results, and trial will prove that both articles possess the capabilities of that which they represent. I have had an opportunity of proving to “the potato commissioners,” when referred to upon the subject by the late Lord Lieutenant of Ireland, as well as many other scientific persons, that the operation which I recommend, perfectly separates the sound from the unsound portion of the potato, the mode is therefore equally fitted for the diseased as well as the sound tuber, and is equally recommended for each.

The operations which I have now described, act thus, in separating the sound from the unsound part of the tuber. When grated into water, the infected part rises from the sound, and remains in suspension; on the water being poured off, as described, this passes with it, and the only additional precaution necessary, is to subject the unsound potato to a greater number of washings in proportion to its unsoundness, the simple governing rule being to continue the operation until the water passes off pure, which will usually be the case in three or four washings.

This, as I have before stated, has been proved incontestably; and without meaning at all to lessen the value of propositions made by parties for saving the potato by boiling, baking, &c., I submit the question to a calm consideration. Can any of these means divest the tuber of the disease existing in its heart's core? Can anything, less than actual and

thorough breaking up of its structure, remove that which circulates in every vein? But on this point it is not my province to enlarge.

The best methods for using the produce of potatoes in meal or flour prepared, as I have recommended, are, I conceive, as follow, each of which have been practically tested:—

3 parts wholemeal of potato,  
1 part wholemeal of wheat,

make excellent griddle or oven bread, either with or without soda or barm.

Meal of potato. } equal parts to  $\frac{1}{4}$  oatmeal,  
Oatmeal. . . . . }

produce a sweet and thick mucilaginous stir-about or porridge, infinitely less heating to the blood than oatmeal alone.

Similar proportions as the foregoing make bread equal to oaten bread, but possessing additional sweetness of flavour.

Potato wholemeal, or meal alone, boiled in milk is a highly nutritious and desirable food, particularly for youth; the milk used may be either sweet or buttermilk.

In fact, potato wholemeal and flour, prepared according to the principles, &c., which I submit, may be used with equally beneficial effect for all purposes to which wheaten meal or oaten meal are now applied, by merely adding as much of the latter as will make up the deficiency in the quantum of gluten, which is about  $2\frac{3}{4}$  per cent.; as will be more particularly alluded to in the concluding part of this paper.

Baker's bread made in the usual manner, with the following proportions of wheaten flour and potato flour, so far back as the year 1815, produced the following results, showing that the weight of the bread from the mixture of both was always superior to that made from wheaten flour alone, which may be accounted for by the greater power of potato flour to retain moisture when baked, although possessing in its state as flour so decided an inclination to resist it.

BREAD MADE FROM POTATO AND WHEATEN FLOUR.

15th March, 1815.— $3\frac{1}{2}$  lbs. seconds wheaten flour produced 4 lbs. bread.

Do.  $3\frac{1}{2}$  lbs. seconds wheaten flour and potato flour, equal parts, produced  $4\frac{1}{2}$  lbs. bread.

28th May, 1815.—9 lbs. wheaten and potato flour, equal parts, produced 13 lbs. bread.

Bread baked at the South Dublin Union, 23rd May, 1846.—Similar proportions, similar results.

It may be correct to say here that the experiments in 1815 were made by order of government, under direction of the late Mr. Thomas Rogers, C.E., Inspector-General of the light-houses of Ireland, with

the intention of supplying bread made in such proportions, to the French prisoners at Dartmoor, but peace prevented the measure being carried into effect; the nutritive value of the bread, &c., having been, however, submitted to the medical officers of the Crown, and fully proved by analysis. The bread made *this month* at the South Union, Dublin, has been also, by order of government, under my direction.

The uses to which fecula of potato can be applied are numerous; for all culinary purposes, such as the preparation of soups, made dishes, &c., in which the finest description of wheaten flour is now used, it will be found to be *much superior*. To its use thus in France is to be ascribed the great superiority of the cookery in these instances, particularly in soups.

The effect produced in the latter, as also in sauces, &c., is an almost perfect transparency, while highly mucilaginous, and receiving most readily any flavour desired to be imparted.

For pastry, also, a mixture of one-half is the utmost advantage both to the appearance and crispness. In short, a French *cuisine* would be divested of one of its most useful adjuncts if left without fecula of potato.

How singular that a country where potatoes are cultivated so largely should be generally ignorant of such advantages.

Fecula, also, when dried as starch, is equally valuable for household purposes as wheaten starch, a proper mode of drying producing all the requisite properties. At present it is prepared and sold as "Patent Soluble Starch" at an advanced price, but it is not known to be the production of the potato, and commands an extensive sale.

As a substitute for arrowroot it is equally valuable, as analysis proves the component parts to be the same; and surely if our invalids and children can be supplied by our own means at a tenth of the cost, with an equally desirable nutriment now so largely imported from abroad, we are culpable in neglecting so great a good.

It is desirable to add here, that the *red-water* which comes off in the first washing of the potato, is an admirable "scourer" for woollens of all kinds, coarse linens, calicoes, &c., &c., and also for scouring common furniture. If used precisely as a washerwoman uses a strong *lather*, it accomplishes the same purpose, totally without soap: the article to be afterwards washed out in pure water. For such purpose, it is well to add, it should be used cold; the second washing being in hot water if desired.

But I now wish to draw particular attention to the use of *potato-meal* for preparing a most desirable soup, which, as a nutritious stimulant. I be-

lieve, would become of inestimable value to the peasantry of this country generally, if but properly made known.

The value of such food, to those who suffer from cold and privation, can be well understood; and its use amongst the peasantry of France points out how much it is fitted for a similar class here. By using *potato-meal* as the ground-work of a soup, the receipt for making which is stated hereafter, less than half an hour will prepare a palatable, nutritious, and stimulating adjunct, either to the boiled potato or bread.

The cost of about *one penny* will yield five or six pints of thick, good soup, similar, in all respects, to that which I have had the pleasure to see partaken of with zest and satisfaction by "the potato commissioners" at my residence, when investigating the potato disease, and subsequently by a large assemblage of scientific and medical men, the particulars of which appear in detail in the *Irish Farmer's Journal*, of the 27th May, 1846, and immediately after in the *Mark Lane Express*.

The soup may be prepared as follows:—1½ oz. of bacon, or salt meat; 1 large onion (and any vegetables) cut into very small pieces. This is to be boiled for an hour, in five or six pints of water, adding by degrees after, a handful or two of potato-meal, in the same manner as making "stir-about." The produce will be a thick mucilaginous and stimulating soup. Less than one farthing's worth of black pepper, a little salt, and about one half-penny's worth of bacon, &c., &c., will be the cost in addition to the meal.

In addition to other advantages, the farmer preparing his own meal has the benefit of the *starch*, and also the *red-water*, which will save the cost of soap. But I shall hereafter show a fact of the utmost importance as to the true value of the potato, which should command anxious attention.

I cannot conclude this part of the subject without alluding to a simple mode of pressing the water from the pulp of the potato, suitable to the poorest class of peasantry; also a simple method for drying. The mode of pressing, for the peasant, I suggest to be, by using a long handled spade, in place of the regularly made presser. A notch cut in a tree will serve as the fulcrum, and a stone, for the pressing block, that the water can be simply expelled.

The mode of *drying* should be in bags, or before the fire, as already particularly described under that head. Any kind of vessels will answer in place of tubs, and a "grater" can be had for sixpence or a shilling.

Having now met, so far as in my judgment lies, the points proposed on these momentous questions, I would beg to call serious attention to other mat-

ter bearing most weightily upon the proper development and value of the potato.

Singular to say, it has been the object of almost unceasing attack, from its introduction into Europe, until the present day; so much so, that crowned heads thought well to wear its blossom as a badge "to bring it into fashion." Ministers entertained the highest in the land, with dishes prepared from it alone, to prove its value. Yet, notwithstanding all, it still has been assailed, reviled, libelled, even to the present moment.

Authors have launched their shafts against it unsparingly. One assails in "truthful semblance"; another, in irony. It is called "the root of evil"—"the Irish plum," and has been pronounced by those who have written to instruct the nation, as containing "little or no nutriment," and "the curse of Ireland."

Excuses may readily be made for any whose occupations debar them from inquiries upon such subjects, if they assume to be fact statements promulgated by those who profess to lead the uninformed. But he who dares to publish, in ignorance, that which misleads a nation incurs a fearful responsibility.

I shall not ascribe to any who have thus erred intentional evil; but I would say *beware in future*, for it is impossible to know where the consequences of such misrepresentations may fall; already they have produced a feeling that the potato should not be cultivated, a fallacy which time will prove to be most mischievous.

It is almost unnecessary to show that medical men and chymists agree, and have published repeated facts to prove, that animals cannot live solely upon any one of the main substances usually denominated "food for animals," beyond a certain period. An animal solely fed on gelatine, the strongest nutriment, soon ceases to live. A dog fed on bread only, made from pure wheat flour, dies in fifty days. Rabbits and guinea-pigs fed solely on oats, solely on barley, solely on cabbages, solely on carrots, die in fifteen days. Yet the poor Irish peasant has lived, though fed almost (only) on potatoes.

I need scarcely say that we need not question the undoubted authorities from whom I take the preceding facts as to other substances; but I submit them in juxtaposition to that which millions prove as to the potato; namely, that millions live and have lived upon it only.

I may, perhaps, assume that this is an answer conclusive to all the fallacies published against the potato; for if those articles of nutriment deemed fittest for man, will not continue life if used alone, how can the potato be considered to contain "little

or no nutriment," when *millions* have existed so long upon it?

But let me not be considered to advocate that a people should be permitted to live upon one food alone. *Such should not be.* Yet I have not words to express my regret that they, who have not power to change that food, and who prove they have no knowledge of its real capabilities, should in ignorance assert it has no nutriment, while they cannot point out what should be its substitute. But upon this point I have done, and pray attention to the following facts.

Medical authors of the highest repute have reduced the principal component parts of nourishment to three classes, viz. :—1st, Starch, sugar, gum 2nd, Oily substances. 3rd, Albuminous (proximate principle of animal—gluten); and upon such man may live in health and reproduce his species. These three classes I have already shown exist in the potato; and also, that there is but little difference in the quantum of each, as compared with wheat.

It is unnecessary to quote authorities, eminent and beyond question, who give the following results; but as one of much repute publishes a table *compiled from the entire*, I copy it from his work, "The Industrial Resources of Ireland."

One acre of ground yields on an average, *matter totally divested of water*—

From POTATOES, in pounds, 4076 containing	
Starch, sugar, &c.	3427 lbs.
Gluten .....	604 "
Oil .....	45 "
	—
Total.....	4076 "

From WHEAT, in pounds, 1055 containing	
Starch, sugar, &c.	825 lbs.
Gluten .....	185 "
Oil .....	45 "
	—
Total.....	1055 "

From OATS, in pounds, 1175 containing	
Starch and sugar..	850 lbs.
Gluten .....	230 "
Oil .....	95 "
	—
Total.....	1175 "

From PEAS, in pounds, 1225, containing	
Starch and sugar..	800 lbs.
Gluten .....	380 "
Oil .....	45 "
	—
Total.....	1225 "

The per centage of the component parts is as follows :—

POTATOES .....	Starch, &c.	84°077
	Gluten....	14°818
	Oil .....	1°105
		—
		100

WHEAT .....	Starch, &c.	78°199
	Gluten....	17°536
	Oil .....	4°265
		—
		100
OATS .....	Starch, &c.	72°740
	Gluten....	19°575
	Oil .....	8°685
		—
		100
PEAS .....	Starch, &c.	65°306
	Gluten....	31°020
	Oil .....	3°674
		—
		100

Now it is evident, from the foregoing table, that potatoes in reality contain all the component parts necessary for the nutriment of animals, possessing, in a higher degree than any, those of starch or sugar, which it need be scarcely necessary to state are eminently nutritive. Animal matter, upon the absence of which so much has been said and written, is but 2°718 per cent. less than in wheat; while oil, or fatty matter, the overabundance of which it is supposed gives to oatmeal its heating and injurious quality, is less.

With facts such as these, incontrovertible, why should the potato be declared to have "little or no nutriment?" But there is another fact still more striking, deducible from the same tables, which stamps it as being paramouly *eminent in its advantages* as an agricultural product, although now recommended to be replaced by grain.

THE QUANTITY OF DRY MATTER, OTHERWISE MEAL, PRODUCED FROM WHEAT PLANTED IN ONE ACRE OF GROUND IS SHOWN, BY THESE TABLES, TO BE AVERAGED AT 1005 LBS.; WHILE THE QUANTITY OF DRY MATTER (MEAL) PRODUCED FROM POTATOES PLANTED IN THE SAME QUANTITY OF GROUND IS 4076 LBS.!

THUS, POTATOES NOT ONLY POSSESS WITHIN 2°718 PER CENT. OF THE QUANTITY OF ANIMAL MATTER IN WHEAT, BUT CONSIDERABLY MORE OF SUGAR; WHILE THE SAME EXTENT OF GROUND YIELDS NEARLY FOUR TIMES AS MUCH PURE AND WHOLESOME MEAL!

It cannot be requisite to enlarge upon facts so self-evident and incontestable, yet it is impossible not to express surprise that such have not been impressed upon the public mind in place of the mis-statements which have been so frequently published; and it should be here observed, that in the foregoing calculations, *grain* has had every advantage. It is impracticable to store it without artificial drying to a certain extent, while potatoes *cannot* be dried; therefore, if each were tested precisely as they came from the ground, the result would be still more in favour of the potato, which,

from experience, I can vouch; and the labour and manure for each are about the same cost. In place of this "well abused" esculent being called "the root of evil" it should be pronounced "THE FRUIT OF GOOD."

*Nottingham-street, Dublin, May, 29, 1846.*

In November, 1845, I laid the foregoing facts before the late Irish government. In February following I submitted them to the Dublin Society. In May, the essays I now publish were forwarded to the Royal Agricultural Society of England. Afterwards I published the leading facts in the *Mark Lane Express*; and since then, thank Goodness, the necessity for "Autumn planting" has been incontestably proved by numerous authorities. The value of charcoal, as a cure and preventive of the disease, has been admitted and recommended even by its opposers, also by those who would not previously acknowledge the fact; and publications from men of high repute give conclusive testimony upon the question: while the "thousand and one" theories of "Fungi," "Fly," &c., &c., which have so long occupied public attention, have been one and all *disproved*. Still there seems to be a happy oblivion of the fact that all now proved was pointed out eighteen months ago, and was then disregarded. It is to be regretted, and deeply, that those who profess to *lead* should *mislead*; and doubly to be regretted that authorities who assume to be capable of judging, and under the sunshine of high station dazzle the less assuming, should be incapable of discriminating between right and wrong.

It remains now for the scientific world to over-set the facts I have submitted as to the productive value of the potato, and its capability of yielding food in such singular variety of form, suited to almost all the wants of man: or to point out *any substitute* equally advantageous! *I seek investigation, and challenge the disproof of my statements.*

Then, if correct, I ask upon what principle has the potato been cried down? *Was it because man enjoyed it without trouble, and hence, in his ingratitude, lost sight of its value?*

JASPER W. ROGERS.

*Nottingham-street, Dublin, April, 1847.*

Potatoes linger still,  
For heaven ordains the good;  
Though man, had *he* his will,  
Would banish nature's food.

Science, telling of all  
The evils they have given,  
Like woman at the fall,  
Forgets the good from heaven.

She flaunts of searches made  
'Midst "fibre" and 'midst "cell,"  
"Overseeking!" It is said  
'Twas thus that woman fell.

She searches for a cause  
To ground some theory on;  
Forgets all other laws,  
To *simply* prove the one.

She cries—"Man must be giv'n  
A better, nobler food!"  
Despising gifts from heaven,  
Which cannot be but good.

The cry is echoed o'er  
The land, from end to end—  
"Abolish the poor man's store;  
It's *not* the poor man's friend."

Thus, erring men assume  
A blessing but a curse.  
Alas! the after doom!  
But—might it not be worse?

Then came the blighting blast,  
And swept the root away;  
That humbled man should "fast,"  
And stricken man should "pray."

O God! how short our sight—  
How little do we know—  
How may we dread thy might—  
How merciful thy blow!

That we, in futile pride,  
Should scoff at what thou'st given—  
In ignorance deride  
A noble gift from heaven.

That, passing by thy law!  
So plain before our eyes,  
We life from nature draw;  
Then wonder that it dies.

That, seeking our own way,  
We thine, Supreme, forget:  
Stay, gracious God! Oh, stay  
Thy righteous judgment yet!

'Twas "proudful man" who err'd,  
He thought that he was right;  
If vengeance be deferred,  
He'll tremble in thy sight.

Oh! stay thy mighty hand;  
Forgive his pride; and take  
Thy vengeance off the land,  
For our Redeemer's sake.

J. W. R.

## LECTURES ON AGRICULTURAL CHEMISTRY, INCLUDING THE PHYSIOLOGY OF VEGETATION.

BY PH. B. AYRES, M.D.

## LECTURE I.

Agriculture, as the prime source of the food of man, has occupied his attention and directed his energies from the moment he was first placed on the earth he inhabits. The soil from which he draws his nourishment yields a bare and scanty produce when in its natural state; it demands the care and labour of man to render to him a remunerative return; and if such attention be not bestowed, the most trivial circumstances—mere variations of atmospheric phenomena, for example—may at once annihilate his hopes, and threaten him with absolute starvation. Agriculture is eminently an art of civilized life; its cultivation follows in the wake of civilization; as the condition of civilized nations improves, the amount of population increases, causing the aggregation of human beings into villages, towns, and cities, and division of labour ensues. The savage is compelled to supply every individual want that may arise. He not only cultivates some small portion of the ample soil around him, but he is compelled to frame his rude implements of husbandry; he is his own architect, the manufacturer of his misshapen household vessels, and, among many other matters which might be enumerated, his weapons for defence and the destruction of his enemies. A totally different scene is exhibited by civilized communities: in them division of labour is carried to a greater or less extent; each want is supplied by distinct men, or sets of men, each of whom necessarily acquires a high degree of perfection in his own department. The producer of food, after having supplied his own immediate wants out of the surplus produce, gives to the artisan that which he requires in return for the neatly-framed instruments equally necessary for the pursuit of agriculture, each receiving in addition articles which conduce to the comforts and conveniences of life. Thus a mutual bond is produced between the husbandman and the artisan, and a system of barter is established equally advantageous to both. Writing, as I am, for the agriculturist, I cannot allow the opportunity afforded by these introductory remarks to pass without endeavouring to imprint on his mind a mutual dependence, so obvious in itself, and so important in its consequences. Bearing in his recollection this *mutual dependence*, he must see that whatever is injurious to the vast *manufacturing interests* of this mighty empire will be equally felt by the *cultivators*

*of the land.* So linked are these two great parties by the bond of mutual convenience and necessity, that we cannot but feel astonishment when we reflect on the jealousies which have at all times subsisted between them. On the common principle of the relation between the demand and supply for any article, I may demonstrate the statements I have made. It is clear that when the manufacturing portion of the community is in a depressed state, when multitudes of our artisans are deprived of the means of earning their subsistence, and approximating to a state of starvation, the demand for agricultural produce will necessarily diminish; the supply, which under ordinary circumstances equals the demand, will now exceed it; and a glutted market and a fall of prices injurious to the agriculturist will necessarily follow. Instead, then, of manufacture being opposed to agriculture, each forms the support of the other, and each profits by the prosperity of what is too commonly considered its opponent. My reader will, I am sure, excuse this short digression from my proper limits in noticing a theme of such vast importance, and the subject of such great and grievous errors.

The cultivation of the soil must precede the exercise of arts and manufactures; food is the first and earliest necessity of man; and food is essentially the produce of the soil. The great importance of this branch of labour has been felt and estimated from the earliest ages. The exercise of this art has been in all ages considered as one of the most noble that could occupy the attention of man. Kings, emperors, philosophers, poets, politicians — all classes of men have given more or less of their leisure to its cultivation, and have drawn from it health and amusement.

Thus we find the invention of agriculture ascribed by the Egyptians to their god Osiris, and the goddess Ceres represented by the Greeks and Romans as the presiding genius of rural affairs. So high was the estimation in which the agriculturist was held by the ancient Romans, that, during the purer ages of the republic, before luxury had enervated their morals, the greatest praise that could be awarded to a citizen was that he had well cultivated his piece of land. The most illustrious senators and the greatest generals thought it no disgrace to retire from the senate or the battle-field to their farms, and follow the plough. The Empe-

ror of China, in our own day, drives the plough once in the year as an example to his subjects.

Neither was the literature of agriculture neglected by the ancients. Most of the treatises are now lost; but among the names of eminent men among them, who have written on the art of farming, may be mentioned Hesiod, Democritus, Socraticus, Xenophon, and the great Aristotle, and Theophrastus. Nor must we forget that the celebrated poet Virgil did not disdain to write a long poem on the management of the farm.

In all the pursuits of life, practical knowledge is absolutely essential to perfection. It is quite a different thing to understand principles and to work them out; and he who is a good theoretical agriculturist may be a very bad practical farmer. The two kinds of knowledge, theoretical and practical, require to a certain extent a different order of mind; but surely the excellent practical farmer may be enabled to understand the principles on which his practice is founded, without injury—nay, with advantage to his practical efforts. A knowledge of the principles of agriculture, although not absolutely indispensable to the cultivation of the land, cannot fail to be advantageous. A purely practical agriculturist repeats certain acts, and necessarily follows the plans which have been handed down to him by his forefathers; he tills his land at a certain season, he sows his seed, fallows his land, rotates his crops, uses manures in the same manner as his father or grandfather; and, provided he remains on the same farm and soil, he succeeds to the same extent. If you ask him *why* he does certain things, he answers, that he had seen his father do so; but he can assign no better reason. Transport this excellent *practical* man to a different locality, let him be placed on a different soil, and watch the result. Suppose, for example, such a man removes from a farm, the soil of which is a strong loam or clay, to one of the chalky downs, covered with a thin layer of light soil intermixed with flints, and not being acquainted with the differences of working of such soils, he may, perchance, instead of looking around him, and observing what treatment is used by his new neighbours, at once go on in his beaten track. Such a procedure would inevitably destroy the fertility of his new farm; he would be bitterly disappointed, and have to recommence his education. Here the purely practical man would be at fault; he would feel that mere practice, although excellent as regards one locality, will utterly fail in another; so that the necessity for some general principles will be forced on his mind. Hence the utility of such principles, and the necessity of such an education as will enable the farmer to comprehend and embrace principles, as well as mere practice, may be considered as demonstrated.

The study and knowledge of principles, and their application, constitutes *science*, properly so called; the mechanical working out of these principles constitutes the *art*. I have already demonstrated the necessity of principles when improvement is contemplated. Practice or art cannot be improved, except in some minor particulars, without science. Science, on the other hand, may confer, and has conferred, vast improvements on the arts of life. In a complicated art like that of agriculture, numerous principles derived from several of the sciences must be brought into play.

A certain amount of knowledge of these sciences is necessary to the study of agriculture. The principles which govern the dead or inorganic as well as the living or organic parts of the creation are both intimately connected with the science of farming. The mutual influences of the substances which form the soil, the air, animals and plants, are of immense importance. Chemistry, which essentially consists in the study of the mutual actions of all terrestrial substances, will therefore largely contribute to this study, and take the first rank in importance. The investigation of the structure and functions of plants and animals, which is called physiology, stands next in the scale. Atmospheric variations, or meteorology, furnishes a large amount of important facts and conclusions. Geology, or the structure and formation of the earth, is of equal importance. Chemistry, botany, physiology, geology, and meteorology, then, form the basis on which agricultural science must rest. My readers must not take alarm at the large amount of knowledge included in the sciences I have mentioned as conducive to the principles and practice of agriculture. A minute acquaintance with these sciences would more than suffice to occupy the entire life of man. But this extensive knowledge can neither be desirable nor advantageous to the agriculturist. A comparatively small portion of each will fully answer his purpose, and enable him to improve the processes he at present employs for the cultivation of the soil.

Hitherto I have considered agriculture as an art, but I must now turn to it as a science. Science essentially consists of facts, and the deductions to be drawn from these facts. Facts or observations would be of little force, and would conduce little to improvement, without combination. It is the province of the mind of man to combine and arrange the facts presented to it, to perceive their similarity or disagreement, and to draw principles from such observations. Such acts of the human mind we call *induction*, and the principles thus brought out we call *laws of nature*. These laws are of the highest importance in relation to the improvement and progress of the especial subject to which they

relate, and are capable of producing other, and unlooked-for, and most valuable observations.

It is the province of science, as I have said, to observe facts and to draw deductions or general laws from a comparison of those facts. The laws which we draw from the examination of a series of facts may not be confined to the facts themselves from which they were derived, but may govern other circumstances of which we had no previous knowledge. Thus we are led to further and more extensive questionings of nature, which bring out other facts often of great importance. That the scientific prosecution of agriculture has already brought out many important and useful inferences, and that it will present us with many more, there can be no reasonable doubt. An example will suffice to show the important bearings of science. It was observed that in the burning of wood, and also in the analyses of various plants, ashes or mineral substances were always obtained, and that these ashes were different in composition in different plants. All plants contain potass or soda, lime, silica, and other matters; but some contain a larger quantity of potass, silica, sulphate of lime, or one of the other substances, than other plants. It was found, by experience, that these substances were favourable to the growth of the particular plants in whose ashes they were discovered. Now, the inference, and a strictly scientific one, to be drawn from the constitution of the ashes and the influence of their predominant substance on the growth of the particular plant is, that these substances may be employed with great benefit as manures, and further experience will undoubtedly bear out the inference. I cannot go so far as some chemists have done in making the broad statement that the whole food of plants is of an inorganic or mineral nature, although it is evident that mineral substances must have existed before plants appeared on the earth. My reasons for not adhering to this statement, which has been made by one of the most gifted chemists of the present day, will appear in the sequel. There is a strong tendency in the mind of man to run from one extreme to another. We formerly believed that the whole food of plants was of an organic nature, and that the ashes or mineral constituents were accidental constituents, not absolutely essential to the growth of the plant. We are now in danger of running into the belief that mineral or inorganic matters form the sole nutriment of vegetation. My belief is, that both are essential to the well-being of plants. I cannot believe that all the organic matters deposited as manure in our fields are reduced to the state of carbonic acid, ammonia, and salts, before they are available for the purposes of vegetation. There can be no rational doubt that during the process of putrefaction many insoluble matters are converted into others which readily dissolve in water, and penetrate the roots of plants without being reduced to the last stage of

putrefactive fermentation, the formation of carbonic acid, ammonia, and a few other inorganic compounds.

It is my intention to conclude this introductory and, therefore, miscellaneous lecture with the enunciation of one of these inductions or laws, which is of the highest importance to agricultural progress, and thus to show the practical value of such laws. *The constituents or substances which enter into the formation of a fertile soil and the atmosphere of plants, and of animals, are the same;* that is to say, the bodies of animals, the substances of plants, and the ordinary soil and atmosphere, are formed of the same materials. I shall revert to this statement at a future and more appropriate opportunity, and shall then demonstrate its truth.

The practical inference to be drawn from such a proposition is this, that in order to obtain as large an amount of produce as possible, it is necessary that all the constituents of plants and animals should be present, either in the soil, or atmosphere, or both. We are not able to alter the composition of the atmosphere, because certain of the laws which govern it cause a very equal mixture of its constituents throughout its whole extent. We must, therefore, turn our attention to the soil, ascertain its composition, and so change it, if necessary, as to present to the roots of plants *all* the substances which are requisite for their growth and perfection. When this is done, the farmer will have brought his land into the highest degree of cultivation, and will obtain the largest produce, under ordinary and favourable circumstances. He is not, however, to expect that at all times and in all seasons he will be equally successful, for other influences are at work capable of either assisting or thwarting his exertions, and over which he cannot exert a like control. The variations of heat and cold, of moisture and dryness, conjoined with the almost unknown and unexamined variations of electricity, will then be among his chief adversaries or assistants.

In the following lectures it will be my constant endeavour to employ the most simple language to convey information, and this will constitute one of the chief difficulties that will beset my path. My task would be executed with far greater facility were I permitted, by the nature of the subject and the intention of these lectures, to use scientific terms without affording to you a proper explanation of them. The difficulty of writing on scientific matters in a popular and easily intelligible manner arises from the fact that the author must presuppose his readers ignorant of the principles and facts that he is about to enumerate. Every science possesses a peculiar language, which must be learned before the student is fully capable of understanding and appreciating the phenomena and laws of the science. Hence the difficulty which meets the student at the onset of his career. With what success I shall be able to divest my lectures of this technical or scientific language I must leave my readers to judge. At the same time I shall crave their indulgence in estimating the style; for it is almost impossible, in seeking for the most simple words and expressions, to avoid a somewhat inelegant form of expression.—Pharmaceutical Times.



## NORTH WALSHAM FARMERS' CLUB.

## PROPRIETY OF USING ARTIFICIAL MANURES FOR ROOTS, ON THE BEST SOILS IN THE DISTRICT.

We make the following extracts from a voluminous report of the discussion, with which we have been favoured by the secretary. The following are some of the remarks made by Mr. Cubitt, of Barton Abbey, who introduced the subject:—

Every farmer desirous of improving his farm is sensible of the value of a good turnip-crop: it is, in truth, the very foundation of superior farming; and he who introduced that invaluable auxiliary to the British farmer, opened a source of unfathomable wealth to the country. It was principally owing to the early introduction of the turnip that Norfolk became so pre-eminent as an agricultural county. Though however prejudiced I may feel in favour of my native land, I cannot believe that we are still deserving of that high character to which we have so long aspired. Generally speaking, we are placed upon a soil easy of cultivation, and admirably adapted to the growth of all descriptions of roots; but do we raise them to any great degree of perfection? What may I state the average acreable produce to be during the last seven years? Certainly not more than fourteen tons per acre. Now, I am very sanguine that a great improvement may be effected, with judicious management, in the cultivation of turnips, especially of that more valuable variety, the Swede; and I believe it to be no difficult task, without extravagant expenditure, to render the eastern division of this county capable of producing, for an average of seven years to come, a quantity exceeding twenty tons per acre; and I do make this statement under the strong conviction that, if some fifty or sixty years hence it should meet the eye of some enterprising agriculturist, it will be republished as a remarkable sign of the times in which their forefathers lived. But I will come to the practical part of my subject. Do we not occasionally hear of farmers, in some counties, producing prodigious crops of roots—statements which rather strike us—and we cannot believe them? No; it would be too humiliating to our pride as Norfolk farmers. But how readily we console ourselves with such excuses as our soil having been so long under cultivation with turnips, that it cannot be expected we should compete with those districts where they have been of such recent introduction! But I look upon this as mere theory; and let us see how it bears investigation. Why did not our predecessors excel us in the ear-

liest stages of root-culture? And why can we not compete with the Scotch farmers, where the turnip has been grown for as long a period as in Norfolk? But, granting that new soils will produce better roots than those which have been long in cultivation, have we not the means in our power of artificially producing a new soil by deeper ploughing, subsoiling, and trenching? and could not such a rotation be introduced that we might continue to sow a fourth of our farms with roots, and yet the same plant should be introduced but once upon the same soils in twelve or sixteen years, by growing a greater proportion of mangold-wurtzel and the white Belgian carrot roots—as valuable, and even more so, than the Swede or common turnip? And I cannot but feel surprised that they should not be more generally cultivated. But, as my object this evening is to endeavour to point out that system of cultivation which will secure the best crop of roots, I shall commence with the tillage required. You are, gentlemen, aware that I have, for some time past, been an advocate of deep ploughing, followed up by subsoil ploughing; and, as far as my own experience goes, I am perfectly satisfied with the results of it. I know that a deep-rooted prejudice exists in this county in favour of shallow ploughing, and I am aware that there are some descriptions of soil which would be injured by a too hasty and unskilful system of deep tillage; but if a farmer, without ascertaining the nature of his subsoil, incautiously bring up at one time too great a proportion, and mix it with the surface, and he then tells me it is poison to his plants, am I to condemn the system, or the ignorant and careless manner in which it was developed? I would suggest that all lands coming in rotation for roots (save those intended to be cropped with rye or tares for early spring-food) should, immediately after harvest, receive a partial and shallow ploughing—what may be termed “ribbing”—viz., turning half the surface to cover that remaining, and to rest in this state till the sowing of wheat and the storing of roots is completed. By this system a gradual preparation of the soil is going on, all vegetable matter decays, and the surface of the land, when harrowed down, becomes well pulverized. This should be followed by deep ploughing and subsoiling, the depth of the former to be regulated by the strength of your cattle and the

thickness of the upper stratum, or the extent of vegetable matter in your soil. But on the deep loams in this county there need not be any fear, with but two horses in each plough, that we can break the subsoil or turn the surface beyond its required depth; but on soils of a shallow nature I would not recommend the turning up at one time more than half an inch of virgin earth, in addition to the subsoiling. And I may here state that in those situations where the under-soil is very loose and sandy the operation of subsoiling is useless. This description of cultivation may be thought very expensive; but let me remind you that it saves much extra tillage in the spring; and where land has been thus treated, and the surface harrowed fine as soon as sufficiently dry at this season of the year, it will seldom require more than another deep ploughing previously to being formed into ridges or drills. Having thus briefly given you my ideas as to the requisite tillage for root crops, I will say a few words in reference to the management and application of our farm-yard manure. I need not tell you how to make it rich and good; but there is an idea existing in the minds of some farmers that the manure made in boxes is far superior to that which is made in yards, but which depends on circumstances. If yards are well formed, well situated, with ample shed-room, and all superfluous water from the surrounding buildings taken away by troughs, then I would prefer the manure which is made in yards: first, because it can be more evenly made; and secondly, that it can be kept in a more solid mass, and to which I attach considerable importance. The farm-yard manure is always best preserved when it is continually pressed and trodden down; it then undergoes a gradual and slow process of fermentation, and when it accumulates to a great depth, the mass daily absorbs the excrements of the cattle. But I would here observe that I am not condemning that excellent system of box-feeding; for undoubtedly beasts will fatten faster in boxes than in open yards; but the manure made in boxes requires to be carted out more frequently, and perhaps at inconvenient seasons; and where it cannot be immediately ploughed into the land, great care should be taken that it does not ferment too much. But, with every precaution, waste must ensue where manure is carried to the field a considerable time before it is required. I always think it a good plan to keep the manure (made during the winter) in the yards till after the sowing of spring grain; it will then be short, rich, and compact, and not like the strawy material which is carried to the land at improper seasons, dangling about your cart-wheels, and drying white after exposure to the first shower. This is not the system for insuring twenty

tons per acre, and yet I observe it is frequently pursued in this neighbourhood, and for what reason I cannot tell, except that during wet days in winter some farmers can find nothing better to do; but I always sympathise with those poor farmers who are at a loss at such periods to find a more profitable source of employment. I differ from many as to the quantity of manure which ought to be applied to the root-crop. Some will reserve one-third of that which is made during the winter season for their corn-crops; but my opinion is, that, where land is farmed on the four-years course, the whole of the manure which can be made from the cattle on the farm up to the month of April should be applied to the root-crops. A month's preparation, after being carted out, will be sufficient. Let it be well turned and mixed two or three times at proper intervals during that period; and if your land is in a highly-pulverized state, and the manure well covered in while it is yet steaming, along the straight and newly-formed drills, there is then a prospect of your getting, with good after-cultivation, such as deep horse-hoeing and well hand-hoeing, a crop exceeding twenty tons per acre. On those operations too much attention can scarcely be paid: tons an acre are sometimes lost from careless and imperfect hoeing. I should never recommend the system of putting out turnip hoeing at a certain price per acre—generally far below its real value, considering the importance of the labour; consequently the labourers, to earn fair wages, are compelled not only to work a great many hours, but they slash and chop away at a most furious rate. Is it thus reasonable to expect that your best and most healthy plants would be left for a crop, and at the proper distance from each other? I do not wish to deprive the poor man of earning extra wages during the long days of summer; but could you not pay him by the hour? For, as hoeing is not very laborious work, he would be enabled to stand a few hours per day extra and make better earnings. I am aware it may cause you a few additional shillings per acre; but what if it does? For I am persuaded you will be considerable gainers in the end. Having thus briefly stated my views on this part of the subject, I shall now allude to the propriety of using artificial manures for roots. This is a question which, some few years ago, I put to the members of this club: "Farming upon a soil which neither requires nor allows of turnips being fed off, and growing annually one-fourth of my land with such plants, and consuming them in my yards in addition to artificial food, am I justified in applying artificial manures to my roots, besides a liberal dressing of dung made from the above resources?" I have been answered in the negative; but as regards my own

opinion, and from the little experience which I have had, I am inclined to differ from such an answer. In 1845 we had a remarkably fine season for turnips, and I grew what I considered rather an extraordinary crop, from the system of tillage which I have just described, and from the resources of my farm, that is, without the aid of artificial manures. My best field of Swedes averaged 24 tons per acre, my best field of common turnips 32 tons per acre, the mangold-wurtzel 27 tons per acre, and the white carrots about 20 tons per acre; and although there were some few individuals in this district who exceeded those crops, yet I could not but flatter myself that I had achieved an object of importance. It was the first year of my commencing a system of deep tillage, and to exceed an average of 20 tons per acre I could not but consider as a triumph in its favour. I then expressed an opinion at this club that I should be able for the future, taking an average of years, to produce that weight; and our worthy chairman (Mr. John Postle) offered to present me with ten pounds if I could for the next seven years accomplish my object. Now, gentlemen, although I have had a bad year to commence with, I have by no means lost sight of this ten pounds; and if I get it, which I expect I shall, for there are six more years to make up for the deficiency of this, we will (should our lives be spared) celebrate the occasion by drinking the donor's health in a few dozen of good old wine. But this is irrelevant to the subject. Well, I pondered the matter over in my own mind as to how I could get possession of this ten pounds with profit to myself. I had seen and read of the good effects of guano on poor soils, had also heard much in favour of sulphuric acid and bones, but had seen neither tried upon the best soils in this district; and I determined at once to try the merits of both. Accordingly I purchased a quantity of Ichaboe guano, and 100 bushels of fine bones, with acid sufficient to dissolve the latter. This I accomplished in large, shallow tubs; the same which I use for steeping my cattle-food with boiled linseed: the proportions were 4 bushels of bones and about 70lbs. acid. After the bones became thoroughly dissolved, I mixed them with ashes at the rate of 10 bushels to every 4 bushels of bones—the quantity I intended to apply per acre. In sowing my turnips I used about the same amount of well-prepared dung as in former years; and previous to ploughing it in, I sowed by hand the bones and ashes, each ridge separately. The guano was managed the same, at the rate of 2½ cwt. per acre, mixed with a little sea-sand. The expense of each, including labour, was about 25s. per acre. Now, unfortunately for the success of my first experiment in artificial manures, the period of sowing was piercingly dry, and very

unfavourable for a proper and regular germination of the seed; and, to make matters worse, the strongest fields upon my farm came in rotation for turnips; and during the time I was sowing, the drought was so severe that the ridges were speedily dried through to a perfect state of powder, and for a very long interval there appeared no signs of vegetation, save here and there a solitary thistle, which had escaped the share of the subsoil plough. Some of my more prudent neighbours, taking advantage of the season, drilled their turnips on the flat: the seed immediately vegetated, and while they came to market and congratulated themselves upon the thrifty appearance and rapid growth of their young plants, I was labouring under severe mortification at my hopeless predicament. But at last the rain came, and such a deluge! and never did a mother look upon her newly-born babe with more satisfaction than I first beheld the dawning birth of my embryo plants. But it was a miserable starting they had; for over the hedge my neighbours' were growing away at a rapid pace, while for the first month or five weeks mine made but slow progress. At this stage of their growth I joined a few companions on their journey to the Newcastle Meeting, leaving strict orders at home to keep the horse-hoes constantly at work during dry weather. Arrived at Newcastle, I quite forgot, amid the novelties of the scene, even to indulge in a single thought respecting the welfare of my turnips. A fortnight after I again visited the same fields; and words would not express to you the pleasure I experienced on beholding such an agreeable change. My poor, starveling, little plants had, I supposed, been pushing their tiny roots amongst the guano and bones, and in lieu of their hitherto blue and livid appearance their leaves had assumed a most beautiful green; they were growing into lusty plants, and bidding fair to rival with any crop of former years, and I had almost imagined in my more sanguine moments that the ten pounds was fairly within my grasp. Thus they continued to flourish on, till another terrible drought set in, even while yet in the hey-day of youth: blight and mildew succeeded, and their race was run. But now let me tell you the result of my experiments. In the midst of a large field of Skirving Swedes six ridges were left, where no artificial manure had been applied; but the same quantity of dung had been laid on as in other parts of the field: bones and guano had been used on either side. The six ridges presented a hollow space from one end of the field to the other, owing to the turnips being overtopped from the more luxuriant foliage of their neighbours. Many of my friends saw them previously to weighing, and a material difference was discernible. In the month of December, after the

first frost had taken away a part of their leaves, I weighed a few rods from the six ridges; and their produce was 14 tons 5 cwt. per acre. I then weighed an equal space adjoining, and where the bones and acid had been applied, and they produced exactly 20 tons per acre. The turnips from the guano appeared upon such a perfect equality with the latter, that I did not trouble myself to weigh them. I thus obtained an increase of 5 tons 15 cwt. per acre from an expenditure of above 25s. Before I speak of the value of this extra quantity of roots, I must tell you that while I was about to dissolve the bones, no less a person than Mr. Morton (who farms the celebrated Whitfield farm) paid me a visit; and while he gave me very good advice, as regards pulling down my useless and rotten banks, converting a part of my barns into cattle-boxes, &c., yet he rather damped my youthful ardour as to the use of artificial manures. But I knew the old folks in my own neighbourhood were not yet quite up to the dodge in farming matters, and I consoled myself with the idea that such might be the case even in Gloucestershire; and so, with all due deference to Mr. Morton's superior judgment, I must now beg to differ from him as regards the application of artificial manures; for he gave me to understand that, upon the description of soil which I farmed, the money I had expended in bones and guano was wasted, and that I required no better manure than that which he saw in my bullock-yards. Now I will ask him whether 5 tons of turnips (deducting the 15 cwt. as waste) is not a bargain at the cost of 25s.? But let us now inquire into the value of this extra 5 tons of roots for grazing purposes. I have had many arguments with my friend on my right respecting the value of a ton of Swedes to be consumed on the farm. He contends that a ton of Swedes will only raise a stone of beef, and which is worth about 7s.; consequently the value of the turnips will be to that amount. Well, for argument sake, let us assume a ton of turnips to be worth only 7s. per ton, 5 times 7 are 35. Now let us enter into a calculation of the indirect value of these 5 tons of turnips to be consumed upon our farms. A full-grown animal in eating a ton of turnips voids in liquid and solid excrements about one-half the weight consumed; therefore, supposing I get 2½ tons of such manure (will any member present give me its value?), shall I say 4s. per ton, if so, I get 10s. worth of manure, which makes my turnips worth 45s. But then you must allow me a trifle for the unexhausted effects of my bones; if I say one-fifth, it will leave me 5s., which must be but a moderate calculation. Therefore it appears that my extra expenditure of 25s. produces me an amount of food of 50s. value, leaving the small profit of

100 per cent. I scarcely need prolong the subject; but, so far, this experiment has led me to conclude that we are justified, even upon our best soils, in applying artificial manures in the production of roots; but to what extent it remains for future experiments to prove. But I trust I have also shown you that there is a possibility of profitably rendering this district capable of producing, for a period of years, an acreable average of more than 20 tons per acre. But this cannot be accomplished without skill and labour, and the last item is a very important one; for no other crop during its cultivation is so much indebted, nor leaves such a profit for a supply of well-directed labour, and, when once obtained, continues to prove a source of future employment, and without which no man, let him be ever so skilful, can profitably conduct his farm. I will, if you allow me, conclude with reading a few remarks on this subject from that good and excellent man Mr. Huxtable. At the Sturminster Agricultural Meeting, in alluding to his labour costing £3 per acre, he says, "This is the item which gives me most satisfaction; I honestly avow that this is the joy and delight and mainspring of all my agricultural pursuits. It is this which to me exalts agriculture far above a mere mercenary speculation; and let us ever bear in mind that no money spent on farms is so productive as that which goes in well-directed, well-paid labour. I believe God's blessing goes with it." "Again," he says, in reference to his experiment of growing the turnip weighing 2lbs. from a hole in the oak plank, "here is a great principle involved; does it not tell us that no land can be so sterile, no rocks so barren, no acclivity so steep, but the strong sinews of our noble labourers, when directed by science and adequate skill, will render them productive, and capable of sustaining human life. I rejoice in the desert spots of my country. They may be hopeless to the plough; but the pickaxe and the spade, these can till them; and they will afford employment and sustentation for millions yet unborn. Let the labourers be well paid and housed and fed, and, with God's blessing, I fear nothing for our country." Gentlemen, I will detain you but a few moments longer. I fear I have already wandered from my subject, but who is there amongst you whose heart does not expand at the recital of such truthful and noble expressions? It is to the exertions of such men, and not to the rude cultivators of distinct lands, that the increasing population of this country must, for the future, depend for a bountiful supply of food. May the present period be to us a lesson for the future; and may those who are at this moment dying from starvation, stimulate us to greater exertions! Let us cultivate our fields and our farms till our coun-

try represents a vast garden; and when the day arrives that her poor are too highly fed, then, and not till then, may we cease to regard the application of capital to be a safe and profitable investment in the land.

MR. BLAKE.—The eloquent manner in which my friend Mr. Cubitt has addressed you, and the weight of turnips which he has grown this season, make me feel somewhat abashed in bringing before you the results of some few experiments which I tried last year on my turnip crop. But I would have you remember that Mr. Cubitt's turnips were weighed much earlier in the season, when they had lost only a part of their leaves; whereas mine were only weighed yesterday (the 24th of February), when the tops had been quite eaten off; and many turnips were rotten, which I did not weigh. The field which I am about to bring before your notice was subsoiled in November, 1845, and the muck-heap drawn out in April. After the land was made clean and in good order for sowing, I commenced putting in Swede turnips, with the following different artificial manures, on the 9th of June, and three following days:—

- 1.—One acre; 2 cwts. guano (cost 16s.) with 10 loads of dung; weight, 16 tons.
- 2.—One acre; 4 cwts. guano (cost 32s.), no dung; weight, 10 tons 16 cwts.
- 3.—One acre; 4 cwts. acid and bones, or superphosphate, mixed by Mr. Brown, of Norwich (cost 28s.), no dung; weight, 12 tons 8 cwts.
- 4.—One acre; 2 cwts. acid and bones, or superphosphate, mixed by Mr. Brown, of Norwich (cost 14s.), with 10 loads of dung; weight, 14 tons 12 cwts.
- 5.—One acre; 3 cwts. Lawes's patent (cost 24s.), no dung; weight, 12 tons 4 cwts.
- 6.—One acre; 3 cwts. Lawes's patent (cost 24s.) with 10 loads of dung; weight, 16 tons 1 cwt.
- 7.—One acre; 20 loads of dung alone; weight, 12 tons.

The whole were drilled on ridges 22 inches apart. The guano turnips came quicker to the hoe, and those where only farm-yard manure was used appeared to suffer much from the drought. With the exception of guano, the other artificial manures were new to me. I have used guano for wheat at the rate of 5 cwt. to 1½ acres. The yield was 4 quarters and 6 bushels per acre; while from a dressing of yard manure, in the same field, the produce was 5 quarters per acre. But the guano was sown next a fence, where many oaks were growing. I also used guano with a portion of farm-yard manure for a field of turnips, the season before last; I had a most excellent crop: the whole of which was drawn from the land, and not fed off. I

sowed it on the 8th of April, last year, with barley; and, although we have had a bad season for barley, the yield was more than 5 quarters per acre. I have, therefore, more faith at present in the use of guano than any other artificial manure.

MR. MOTT observed that it appeared to him the very interesting discussion they had heard, particularly the experiments made by Mr. Blake, had enabled them to come to this conclusion, namely, that artificial manures were not alone sufficient to bring the turnip to maturity, notwithstanding all the glowing statements they had read in agricultural journals; and that their chemical preparations are very useful in forcing the plant in its early stages, and bringing it quicker to the hoe (a very great desideratum in dry seasons), but that there must be a good proportion of farm-yard manure to bring the plant to maturity and increase its weight. As a further proof of the truth of this position, he would refer to a manure well known to many practical farmers as very efficacious—"Lawes's Patent." Mr. Case, of Hovingham, one of the best and most intelligent farmers in this neighbourhood, has tried it for three successive years, and has never failed of a crop of turnips. It is sold in three-bushel bags, at 5s. per bushel: the only agent here is Mr. Finch, of Swaffham. The proportion per acre found to answer best had been, to about 6 loads of good farm-yard muck (the loads alluded to are such, I suppose, as are drawn here by 3 horses) to add 4 bushels of Lawes's Patent, drilled in with equal quantities of wood ashes. The seed is not injured by coming into immediate contact with this manure. On one occasion, when used *alone*, 8 bushels were applied per acre (cost 40s.), which produced nearly as good a crop as 12 loads of yard muck. He (Mr. Mott), from his own experience, should say that the superphosphate of lime is better suited for Swedes than white turnips, which result corresponds with the comparative analysis of the ashes of Swedes and white turnips; the former containing in 100,000lbs. of each 408lbs., and the latter but 73lbs. Whereas "Lawes's manure" has been found by Mr. Case of equal benefit to both, and as well on light as on heavy lands; and 30s. worth of this manure has proved more efficacious than 40s. worth of herring scales. With these undoubted facts he (Mr. Mott) would recommend it to the attention of practical farmers.

MR. GOWER said, in reference to his having valued his turnips at 7s. per ton, that he was quite willing to sell them to Mr. Cubitt or any other gentleman at that rate for the next 7 years to come—of course to be consumed upon the farm. He also advocated the system of tillage recommended by Mr. Cubitt; and although much credit was due to him for the

manner in which he had introduced this interesting discussion, yet he much doubted if he would obtain for an average of years such crops as he anticipated; indeed, he had failed in his first attempt. He (Mr. G.) had been able to obtain a greater weight of turnips from short than from long manure; and he could not but think that Mr. Blake's statements would be extremely useful, and considering the season, Mr. B. need not have felt any diffidence in making known the weight of his crops, believing that his turnips had considerably wasted from the month of December, and had they been weighed earlier in the season would probably have reached twenty tons per acre.

Mr. WORTLEY, in offering a few remarks, must beg to differ from Mr. Cubitt on some points, but more especially on the subject of box manure, for he considered three loads made in boxes superior to four made in the open yards. He could not conceive how a farmer could reconcile himself to the system of making his manure in open yards, subject to being drenched by heavy rains, and the liquid parts escaping into some ditch or pond. Although his boxes were well littered with straw, yet he found a considerable quantity of the urine passing off into the tanks, and which he considered the most valuable part. From the use of box manure he had increased the growth of his wheat from five to six quarters per acre, on land which formerly produced but two and three quarters per acre; and, admitting that the expense of making boxes is a consideration, he for one would agree to take a farm on a twenty-one years' lease, and be two-thirds of the expense in building boxes. He (Mr. W.) must therefore beg to differ from Mr. Cubitt on this point.

Mr. WORTLEY had forgotten to state that in clearing out his boxes, the fumes from the ammonia were frequently so powerful, that his men were sometimes compelled to get fresh air.

Mr. W. CUBITT felt much interested in hearing the experiments of Mr. Blake detailed to the meeting: it went thus far to prove that the opinion he had formed on the subject was not groundless, but that artificial substances may be profitably applied even to the most fertile soils in this district, saving a greater portion of the farm-yard manure for the pulse and green crops: he would never apply manure to his corn crops—at least, not upon good land. He would caution his friends to be on their guard as to the purchase of artificial manures. Mr. Blake had alluded in his statement to having employed a Mr. Brown to furnish him with the superphosphate of lime. Now Mr. Brown might be a highly respectable man, but he had lately heard of farmers being done *brown* in

buying these chemical mixtures: and at all events, where they could get the materials, it would be better for them not to have anything to do with the Browns. He agreed with Mr. Mott, in reference to the superphosphate being more adapted to the production of the Swede than the white turnip; and he felt himself bound to state before the meeting, that where he applied the acid and bones to the white turnips, it appeared to have no other effect but to increase their leaves instead of the bulbs. And he must beg to say, in answer to Mr. Wortley, that however he might value the system of box-feeding, yet he did not feel disposed to go the length with him as to the great advantages of box over yard manure. Mr. Wortley had spoken of the liquid manure being allowed to drain away to the horse ponds, forgetting that all careful farmers now put up spouts round their buildings, and also availed themselves of the use of tanks; but in well-formed and well-sheltered yards, regularly supplied with litter, there will be but little drainage. He would quote some experiments tried in the neighbourhood with box *versus* yard manure, by two of the most business-like and money-getting farmers in the district; and he had heard them repeatedly declare, that although equal portions of each were applied to the land, yet no difference was ever perceived either in the turnip, corn, or grass crops. Mr. Wortley alluded to his men being scarcely able to clear his boxes, from the powerful fumes of the ammonia; while in clearing the yards scarcely any inconvenience was experienced. But he (Mr. C.) took a very different view of the matter. In clearing the boxes a rapid escape of the ammonia was taking place, which did not again fall in the boxes, but floated about in the atmosphere, to be brought again to the surrounding lands by the first shower. On the same principle, may we not assume that a moderate supply of rain water (which is slightly capable of fixing ammonia) has a tendency to preserve the qualities of yard manure, and prevent, on its being disturbed, those powerful effects of which Mr. Wortley complains?

Mr. T. CUBITT, of Witton, said the experiment was not conducted fairly by one of the parties alluded to, for to his knowledge a portion of stable manure had been applied with that from the yard; and all farmers were aware of the superiority of the former. He had had some experience in the matter, and he believed the manure made in boxes to be superior to that made in open yards.

The evening having far advanced, and parties not being desirous that the discussion should terminate, it was proposed the subject should be adjourned to the next meeting, which being carried, the business of the evening closed.

## NEWCASTLE-UPON-TYNE FARMERS' CLUB.—EDUCATION OF FARMERS' SONS.

At the February monthly meeting, William Anderson, Esq., Vice-President, took the chair; Mr. R. M. Weeks, of Ryton Park, read the following paper on the education of farmers' sons:—

The subject of this day's paper is the "Education of Farmers' Sons," or rather, the education of such young people as intend to follow the ancient independent occupation of an agriculturist. We are met, then, not to make known how well we ourselves have done, but to suggest how we may enable the sons of our country to do better.

I shall not trespass on your time with dilating on the importance or the necessity of the matter, but content myself with repeating the opinion of Viscount Morpeth on the subject:—"Whilst the best and most approved methods of education," said the noble lord, at a late meeting in Yorkshire, when speaking of an Agricultural School about to be formed at York, "are at the service of the wealthier classes, and the mercantile and commercial classes in our large towns; and while, on the other hand, there is a multitude of schools now open in our country parishes and villages, where the children of the agricultural labourer, and the working classes generally, may receive a daily improving system of education; it has seemed to me, and to others far more competent to form a sound opinion, that there is a deficiency in the specific and appropriate modes of education best fitted for the sons of the farmer."

Neither shall I trouble you with the history of farming. We all know that Adam was a gardener, Abel a shepherd, and Cain a tiller of the ground, and that the practice of agriculture has been followed in almost every age by the most distinguished individuals. Neither shall I refer to what may aptly be called the dark ages of husbandry, when the farmer knew no rule but one—to do just what his fathers before him had done. The fact is evident to every one, that the farmers of England, at the present time, are, as a body, the worst and most inefficiently educated of her whole community.

A new and a brighter era is dawning, and it is now necessary that we should all study science. We husbandmen know, we need be a scholar to follow the plough, and when we find landlords and stewards, having such inadequate farm buildings, letting farms without any certainty of tenure, not even allowing the tenants to think for themselves as to the best and most profitable way of cultivating their land, binding them down to the same obsolete, absurd, and in many cases, inappropriate systems of cropping on every description of soil, it is time that

they, when sent to college, should be crammed with knowledge, taught the wherefore, the why, and the how. On the present occasion, however, I have to do with the sons of farmers, and shall class their education under three periods:—

1st. From the child's birth to the age of seven; 2nd, from seven to fourteen; and, 3rdly, from fourteen upwards. I shall say nothing on the first period; but confine myself for a short time to the second, and more particularly call your attention to what I shall submit to your notice, as to what ought to be the education of the young farmer for many years after fourteen.

Now, first, from seven to fourteen, a boy goes to school and learns a little miserable reading, writing, and arithmetic, which, by the way, is no education at all, but only the means of obtaining it. But I think I had better not say what is done, but what ought to be done, and attempt to show that a farmer requires not only a good education, but the very best education. Take a case. Two boys: one is intended for a merchant, the other a farmer. Now, can you tell me any branch of study the may-be merchant requires that the would-be farmer does not? Not, surely, book-keeping? Well do I remember Professor Johnston lamenting, whilst lecturing in the adjoining room, the difficulty he had in getting farmers to understand many of his arguments respecting draining, liming, applying artificial manures, &c., from a want of knowledge of accounts. "I am glad," said the learned Professor, "that I am addressing many who are merchants; you know what I mean when I tell you by spending so much money, and getting so much in return, often cent. per cent., that I am the richer man. I cannot get farmers to understand this." Our merchants have their systems of book-keeping; they know the Cr. and Dr. and profit and loss on their transactions. The shop-keeper has his books; he knows for how much he buys and sells his goods, and avoids dealing in articles that would leave him minus. Not so the farmer. He has no books, comparatively speaking—posting his ledger, and taking stock are things that he has nothing to do with. He cannot tell whether his stock or his crop pays him best. The council of the Royal Agricultural Society of England offered a prize for the best system of keeping farming accounts. The judges reported that out of the number offered, none were worthy of the prize. They, however, have not let the matter drop, but have 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.

The merchant requires geography, that he may know to what part of the world he has consigned, and whence he expects his cargo. The farmer should study geography, that he may know something of the whereabouts of the people, and the crops they produce, that may lessen his profits in the home market; or where, and to whom, he may perchance send his overplus.

Again, take a professional man, a surgeon, for instance; the farmer needs more than the physician. Ought the one to know anatomy? so ought the other; ought one to know pharmacy? so ought the other; does one need to understand physiology? so does the other, both animal and vegetable; the farmer must be a botanist too, and like another Stephenson, he should study mechanics. The farmer must also be a philosopher, not to make almanacks or foretell snow or sunshine, wind or rain; the decision of M. Arago, on that subject, ought to set weather prophets at rest. "The study of natural philosophy," says an author in the introduction to his work, "has of late years been so generally applied to the practical concerns of life, that it is now considered as an essential branch of education. Besides the advantages derived from a knowledge of the many interesting facts connected with its practical application, it has still greater advantages of being the means of disciplining the mental faculties by creating habits of attention and correctness, and by combining an exercise of the understanding with that of the memory." Now I submit, Mr. Chairman, to you and to this company, that no class of men requires more than the farmer, habits of attention and correctness, and combining an exercise of the understanding with the memory. The contrary is too often the case; the motto being "We'll do as our fathers have done."

I cannot conclude this part of my subject without recommending most earnestly the study of Latin, not so much for the purpose of enabling the pupil to read of Cincinnatus being taken from the plough to be Dictator of Rome, to study Cato, Varro, and Columella, or to revel in the beauties of Virgil; but to learn him to think; and if he proceeds no further than his rudiments, and more especially if these are coupled with the excellent book of Arnold's, he will begin to think and work for himself in a way he never did before.

The boys, 600 in number, of the city of London school (of which Dr. Mortimer, late of this town, is the much respected head master), have each been presented with a copy of a course of lectures on the advantages of combining a classical with a commercial education, to combat the feelings that are generally entertained against this branch of study.

These, then, are some of the things he needs in common with others; there are other subjects that I shall enumerate hereafter, that ought to be studied by the farmer, more especially by the English farmer, to enable him to obtain the greatest quantity of the most valuable produce at the least expense.

It appears, then, that the farmer requires not only a good education, but a better education than most of men; and I hesitate not to say that he should have the very best, to enable him to be an intelligent and enlightened member of his profession, and to compete, as he has now to do, in the market of the world.

The rudiments of these subjects might be acquired by the age of fourteen; and when so much exertion is making among the working and middle classes of society to obtain the requisite information to carry on their respective business with success,—when the other classes of the community are wide-awake to the progress of science, as shown in the establishment of superior schools, schools of design, and a general improving system of education, suited to their different wants, will the farmers alone remain stationary and neglect scientific improvement?

Such a course of instruction as I am advocating, is in existence in some parts of England.

In Scotland, the schoolmasters have stepped boldly forward, and seem determined to leave their mark on the rising generation of farmers, as they have already done on the other members of their countrymen, and the farmers of Scotland will acquire the pre-eminence in scientific as well as practical agriculture, and maintain their high position as husbandmen.

I am now come to speak of the education of a young farmer after the age of fourteen, the most important and too much neglected portion of every one's studies. About fourteen, the boy of ordinary capacity, if he has been under any sort of training, begins more decidedly to think for himself. He has, as it were, put forth his blossom, and is about to perfect his fruit; when there comes a nipping frost, and then he falls never to rise again. He is taken from school, to do what?—excuse me, perhaps to sweep an office, run errands, or, in case of the young farmer, to do the work of a labourer, loiter about the kitchen or stable—be a pest to the village, or as Stephens, in his excellent book of the Farm, has it,—“To follow his father, as idly as his shadow,” forgetting the Roman proverb, *multa mala otium adolescentes docet*.

Hear what Locke says—“The most dangerous step in human life is the passage from the boy to the man; and it is to smoothe this passage and make it easy that the tutor is most valuable.” I shall here define the term education, which, perhaps, I might have done before.



An American author of eminence observes, "that the object of the science of education is to render the mind the fittest possible instrument for discovering, applying, or obeying the laws under which God has placed the universe." And here, again, allow me to remind you, that farmers more than any class of men I know, require that sort of education that will enable them to do what I have just named. I am quite aware, sir, that England has many farmers, and this club many members, who, although they may not have had the training that I am recommending, who are farmers renowned for their intelligence and agricultural knowledge, who carry out to the letter the motto of the Royal Society, practice with science, or rather, practice and science with profit. But allow me to suggest, that if they had cultivated their minds as they have their fields, the chances are they would have rivalled, if not surpassed, De Candolle, Davy, Playfair, Liebig, and others, in agricultural requirements.

"Full many a flower is born to blush unseen,  
And waste its fragrance in the desert air."

According to the definition of education that I have taken, what are the subjects, then, that ought to be attended to by the farmer, to enable him to discover, apply, or obey the laws under which God has placed the earth, in the cultivation of the soil, the breeding and feeding of cattle? He must know something of the land he cultivates, the manure he uses, and the crops he wishes to produce. The earth, the air, and the water are the agents by which he works. He must know something of the soil. Geology and chemistry are the sciences that will assist him here. Geology will direct him as to the formation, position, &c., of the soil and subsoil; chemistry will explain to him the elements which compose the earth, the air, and the water. Carbon, oxygen, acids, and alkalies will not be uncouth and unmeaning words, nor "Morton on Soils," nor "Thompson on the Food of Animals"), sealed books, but read and understood. As mathematical analysis has done much for astronomy, so will chemical analysis do much for husbandry; as the one has enabled the mathematician to tell the size, &c., of a planet far beyond the ken of mortal vision, so has and will the other enable the farmer to do and put into his land what is necessary to produce any crop he pleases, even to the growing of turnips on a table. That which used to be beset with innumerable difficulties and impossibilities, when combatted only with untaught manual labour, vanishes as soon as chemical and mechanical skill is applied. The barren heath, the stubborn clay, and the bog, are taught equal luxuriance with the meadow and the garden. Mechanics are as necessary to the farmer as the mechanist, that the farmer may know how to manage

what the latter makes, and, in many cases, afford valuable practical hints what kind of implements, and how they should be constructed to suit his varied wants—need I name Mr. Burnett and his turnip drill, and Mr. Johnson and his subsoiler, as examples? The different states of the air, and the seasons, as they run their appointed courses, are not overlooked by the intelligent man. Pneumatics, with electricity and magnetism, will enable him, if not exactly, to account for the late lamentable loss of the potato crop, which is so sadly pressing upon our fellow-men in the sister isle; will explain the causes of the phenomena which are constantly taking place in our atmosphere. A knowledge of the meteors also, whether luminous, airy, or aqueous, which act either beneficially or otherwise, will not be without their uses. The laws by which the watery portion of our globe is governed, along with those previously named, will settle in his mind the just principles of subsoil ploughing and deep draining, amend his practice as to the contrary procedure, and the filling in with thorns and stones. Botany, and vegetable physiology especially, should be better known than they are. Zoology, too, would not be without its uses, particularly to extensive breeders, and to every one in the investigation of the countless tribes of the insect creation, that swarm in our fields for good or for evil.

I have now to speak of a branch of study very much neglected among the very best of our practical men—Anatomy, and a knowledge of the diseases of animals. I will simply quote Youatt, on the treatment of the splint, in confirmation of the assertion. Brusng the splint with a hammer, boring it with a gimlet, chipping it off with a mallet, sawing it off, slitting it down the skin and periosteum over it, sweating it down with hot oil, and passing setons over it, the voice of humanity and progress of science will consign to speedy oblivion such treatment as this and others, which it would be easy to produce, should no longer be heard of. Our animals, like ourselves, should be treated agreeably to the advanced knowledge of the middle of the nineteenth century. I need scarcely say, that mensuration, both superficial and solid, must be essentially necessary to every cultivator of the soil, whether he buys or sells, either for the purpose of measuring, without the assistance of others, an acre of turnips, or computing the bulk of his manure heap, his bullocks, or his haystack, as well as in the various calculations daily necessary in the several works required on a farm. As a relaxation from these severe studies I would recommend drawing, not only as affording pleasure to a well cultivated mind, but as being really useful in the way of his profession. He would have a more correct notion of just and beautiful proportions, and be enabled to

explain, with more correctness, his ideas about anything in the animal or vegetable kingdoms that he might wish to communicate, or give his designs for new and improved implements or harness; and, if required, to alter, add to, build, or re-arrange farm buildings, there are few that require none of these. Then his knowledge of drawing with mechanics will be of use, not simply as respects appearances, but economy and utility. In addition to all these, he should pursue an extensive course of judicious reading in history, general literature, and the laws and usages of his country; he will then be likely to do his duty with credit to himself and advantage to his parish, in filling the offices, not only of churchwarden, overseer, surveyor, guardian, or jurymen, but as an intelligent and communicative member of his club.

These, then, are the subjects that I think ought to be studied by an English farmer of the present time. I shall not say much more on the matter, but refer you to "Stephens' Book of the Farm," where you will find it treated of, both as regards necessity and expense.

I began to quote authorities, in addition to those I have named, as I proceeded, in support of these opinions, but found it an endless task, as every person who has either written or spoken on the matter, are unanimous in declaring that increased knowledge must be applied in the tillage of our lands, not only for our country's weal, but for every individual farmer's profit.

Colleges have been founded within the last few years, for the purpose of giving such instruction. We have now the Agricultural College at Cirencester, with its royal charter. There is another in Hertfordshire, and others are springing up in different localities. And Prussia, France, and even Russia, have similar establishments.

Why should not the farmers have colleges? The merchants' clerks of London have recently established a college for the better education of their sons. Will, then, the active, persevering farmers of the north of England be satisfied with their present standing in society? Have they no ambition to keep pace with the other members of the community, and to retain the fair name they already have?

If such an education as I have already proposed do not make them better farmers, it will at any rate make them wiser men, and more intelligent and useful members of society. And they will have, as it has been so eloquently expressed, "Food for their reason, and an impulse, upwards and onwards, to all the best and highest tendencies of our nature." *Felix, qui potuit rerum cognoscere causas.* But knowledge is power, not only to fight the battles of our country on the banks of the Indus—to manufacture our cotton, but also to cultivate our soil.

The difference of individuals having and not having this knowledge, I can fancy to be this: To one—

"A primrose, by the river's brim,  
A simple primrose is to him—  
And it is nothing more."

The other will find—

"Tongues in trees, books in the running brooks;  
Sermons in stones, and good in every thing."

Then, sir, our monthly meetings would be better attended, and the books in our library read and appreciated. And such knowledge, combined with the energy and practical skill of his fathers, would enable the British farmer, like the British sailor, the lordly manufacturer, and the merchant princes of our land, to nail his flag to the mast, and bid defiance to the world in the raising of crops and the feeding of cattle; or, as our excellent vice-president, Mr Ramsay, said in his opening speech of this club twelve months ago, "render our common country the garden of the earth."

The CHAIRMAN observed, that no doubt the subject so ably introduced to the meeting by Mr. Weeks, was an important one to the rising generation of farmers, and that it must be confessed, in the "olden time," the advantages of a scientific education had not been so much attended to as it most undoubtedly required. Indeed, formerly, many were so negligent as scarcely to think it necessary to keep accounts of the profit or loss made by their farms during the current year: it is to be hoped this is now otherwise. It is certainly desirable that the knowledge of those practical sciences, more immediately bearing upon agriculture, should be generally cultivated, more especially chemistry, with the analysis of soils and manures, and botany, as embracing the whole subject of the structure and food of plants. These and other kindred sciences, pursued especially in the country, where nature in such a variety of aspects is continually offering herself for examination, give a great vigour and elasticity of mind. The more a farmer is enabled to increase the products of the earth, the more the whole community is benefited. After all, the business of the agriculturist cannot be guided by the strict rules that regulate mechanical labour, where frequently the same operation is perpetually repeated; whereas, the operations of agriculture return only at distant periods, once, perhaps, in each season, land being subjected to the ever varying changes of the seasons, and must be guided by judgment and experience; so that the farmer may be said to be acquiring knowledge all his life—from the cradle to the grave. I beg to mention that I visited the Model Farm at Glasnevin,

in Ireland, in company with Mr. Cobnan, the author of "European Agriculture." The establishment is connected with, and under the superintendence of, the Irish Board of Education, for the purpose of training young men to become teachers of other schools, and has already qualified and sent out 700 teachers, and seems destined to confer the greatest benefit upon that unhappy country. The education is partly of a practical and partly of a scientific

character. A portion of the day they work on the farm. They are taught the common and most useful branches of education; in addition to which, they have daily lectures on chemistry, natural philosophy, &c. I had the gratification of listening to an examination of fourteen of these young men, brought off the field from their labour, and must say, that it was eminently successful, and in the highest degree creditable to master and pupil.

## MEADOW IRRIGATION IN SAXONY

AS PRACTISED ON THE MANORS OF JANNOWITZ AND HERMSDORF, THE PROPERTY OF THE COUNT DE GERSDORF.

(Communicated by J. Stanley Carr, Esq., Hon. M. of the R. A. S. of England.)

Amid the various and important improvements which science has brought in aid of agriculture, few have excited more general and lively interest than meadow irrigation, so that not only the attention of enlightened farmers of all countries has been awakened to a due appreciation of a treasure so long left inert and useless, but vast efforts have been employed to enlist into the service of farming an element of fructification, which in bygone times was suffered not merely to "waste its treasures on the desert air," but to become an instrument of positive injury to both animal and vegetable life. The beneficent effects of water, when properly applied, are indeed at once so palpably immediate and so enduring, that no one, who has ever watched with an unprejudiced eye the result of judicious irrigation, can for a moment doubt its affording the most effectual aid to the improving farmer, in the acquisition of the two chiefest sources of agricultural prosperity, viz., improved food for his stock, and increased manure for his land. Yet plain and indisputable as such results might be supposed, the experience of many enlightened irrigators has lamentably proved that ignorance and prejudice, based on and stimulated by imagined self interest, can remain proof against even the proverbial axiom which identifies "seeing with believing." Seldom have both positions (viz., the marvellous benefits of irrigation, and the obstacles which ignorant obstinacy will try to lay in the way of their accomplishment,) been more strikingly manifested than in the case of the Count de Gersdorf, whose patient, persevering, and courageous prosecution of a gigantic undertaking has recently been crowned with a success which affords the strongest encouragement to other proprietors to "go and do likewise," assured that, however selfish prejudice may cavil against and protract, it cannot, in the nineteenth century, long check, far less nullify, plans of scientific improvement. We believe we shall gratify many readers by giving a slight sketch of one of the most complete, extensive, and successful systems of irrigation of which Germany can boast, as exhibited on the estates of the above enterprising nobleman. A glance at the original state of the

soil, to ameliorate which the Count's efforts were directed, may serve to impart higher interest to the description of its present state of luxuriant verdure; while the history of the battle he has so courageously and successfully fought, may stimulate others to disregard the threats of pugnacious neighbours, and to maintain the cause of scientific improvement through all the vexations and proverbial obliquities of courts of law.

The manors of Hermsdorf and Jannowitz, situated near Ruland, in the least fruitful portion of the Lausitz, and consisting (independent of forest land) of 3,450 morgen (2,176 English acres), had been, in 1824, disencumbered of the previously existing arrangement of peasant cultivation, under the guise of *duty work*, and required, therefore, entire re-organization. To create anything like a remunerative system of management, on so extensive an area of, principally, very light sandy soil, hitherto worked on the antediluvian system of nine and even twelve years' rotation—that is, manuring once in nine or twelve years, and sowing successive grain crops so long (or longer) as any could be reaped—and including 250 morgen (157 acres) of sterile moorland meadow, was assuredly in itself no easy task; especially in a district in which land capable of bearing clover was rarely found, where potato-growing on a large scale was rendered nearly impossible by the great inequality in the nature of the soil and diversity of previous cultivation, and where the very scanty population rendered the substitution of free, for compulsory duty-labour, a matter of extreme difficulty. One thing was, however, plain to the intelligent landlord, viz., that the mode of management which, in direct opposition to every principle of rational farming, had been persevered in for centuries, must be discontinued.

The proprietor's first idea of taking a portion into his own hands, and leasing the remainder of the estates in small farms on a term of years, proved impracticable, simply because no candidate, even for a single acre, presented himself, without stipulating for a renewal of the old accustomed privilege of cutting grass for bedding, &c., &c., in the forests, which would have essentially

interfered with the improvements projected in that department, to accomplish which these said privileges had been bought up at no inconsiderable sacrifice. There remained therefore nothing for the Count but to take both manors into his own management; and having, by a long residence in England, and connection by marriage with two noble families in that country (those of the Lords Say and Sele, and Huntingfield), become familiarly acquainted with its agriculture, Count de Gersdorf formed the plan of greatly diminishing the unremunerative arable, and introducing an extensive grazing system, more particularly with a view to sheep breeding; and with the ultimate expectation that, under the combined effects of rest, the manure arising from the decaying roots of the grasses, and the treading and droppings of the flocks, the loose soil of the more sandy fields would in a course of years attain sufficient consistency and fertility to warrant their re-occupation by grain. In pursuance of the example set by the enterprising Mr. Plattner, of Camenz, it was determined that the old, unremunerative fishponds should be drained, and converted into meadow land; while, in order to supply not only those now exsiccated hollows with regular moisture, but to realize the still bolder conception of transmuting, through the same beneficent agent, sterile sandy wastes (whose chief product hitherto had been heather and goat's beard—*equisetum arvensus*) into fruitful meadows, canals were cut through all the higher-lying turf moors and swampy copses, all available springs in the neighbourhood sought out, the waters carefully collected into one leading canal, and, a gentle fall having been obtained, made thence to distribute themselves in various streamlets in the desired direction. These, in addition to a small river called the Black Water, which runs through both Hermsdorf and Jannowitz, furnished, especially in spring and autumn, ample supplies of the liquid treasure for carrying out the magnificent plan in all its extent. A scientific survey of the whole terram gave the most satisfactory levels; and, by the payment of a very considerable douceur, the inhabitants of some villages, whose swampy lands lay on a higher level than the Count's grounds, were induced to permit their bogs to be drained, and to pledge themselves, not indeed to any present outlay or future burden, but merely that the drainage by which their before useless soil was rendered capable of cultivation, should continue its unhindered flow into the Count's main canal.

All difficulties were thus overcome which either soil or natural position could have opposed to the undertaking, when all at once human ignorance and prejudice interposed what threatened to prove serious, if not insurmountable obstacles to its success. The proprietors of five mills, situated about five (English) miles below the Count's irrigations, united in laying a protest against their continuance. The grounds of complaint were twofold: First, that the Black Water could not legally be employed to irrigate, although it might and had long been used to form and feed fish-ponds, and that for the sage reason that meadows were not ponds! Secondly, that the draining of the Jannowitz peat-bog was illegal by prescription, inasmuch as, having been a sour unwholesome

swamp in all time past, it ought and must remain such in all time to come! To these wise grounds of opposition was added another protest against the right of the parish of Kolma to enter into an agreement with Count Gersdorf for the drainage of its own lands! This strangely senseless lawsuit (during the progress of which, however, the irrigation project was systematically and uninterruptedly carried forward) lasted for years. Surveys were instituted, legal opinions sought and obtained, statements and counter-statements followed in due succession, and much learning was displayed *pro et contra*, while to the eye of common sense the question lay in a very narrow compass, viz., in the fact whether or not the millers had been deprived of any portion of water previously possessed by them. The plaintiffs indeed asserted that the mills suffered great diminution of their former supply from the absorption and evaporation consequent on the Count's irrigations; while for the defence it was boldly maintained that the drainage, and numerous springs thus brought into one flow, had actually produced a greatly preponderating supply. Witnesses were at length summoned to speak to this point, and their testimony fully established the fact that treble the quantity of water flowed to the mills under the new, than under the old arrangement. Nevertheless the first legal decision was in favour of the millers, and decreed the refilling of the drains, the reopening of the dams, and the restoration, in fact, of the ancient rights of swampland! The defendant was, however, happily not of a character to be easily discouraged, and being moreover not wholly unacquainted with "the glorious uncertainty of the law," and how little, in some countries, a first sentence is to be regarded as decisive, firmly convinced too of the justice of his cause, and that truth must ultimately prevail, he redoubled his energies to complete his work, even while taking legal steps to obtain a re-examination of the grounds of dispute. Nor did his hopes prove delusive, for the next decision of the court overturned the first, and by declaring the protests frivolous and vexatious, put a final end to the annoying opposition. This first victory was followed in 1844 by a legal enactment, by which a most senseless provincial law (highly unfavourable to the due employment of water) which had existed for centuries, was happily abrogated; and from this period commences, in fact, the full availment of the irrigating medium, in accordance with Count de Gersdorf's original plan.

The produce has consequently rapidly increased within the two last years; and although the average return from the meadow as a whole does not yet exceed one ton per morgen (of 3,053 square yards) while that from the fully irrigated portion is two tons, the defalcation arises solely from the difficulties which the paucity of labourers (tenfold increased at present by the numerous railroads in progress) throws in the way, both of due attention to the irrigation, canals, &c., and to the mowing and saving of the hay. These hindrances alone prevent a third cut being obtained in the season, and have rendered the saving of even the second mow a matter of no small anxiety and effort during the two last years.

But great and incalculable as the benefit is which

Count Gersdorf's estates have derived from irrigation, in the ameliorated quality and increased quantity of grass and hay, it is by no means the sole source of wealth which it has collaterally bestowed on him. The large flocks of sheep of the purest Spanish blood, which with great expense and unwearied care Count de Gersdorf has been thus enabled to introduce and maintain on his estates, have deservedly attained to very high renown, and the Hermsdorf Merino flock has for years supplied rams to the largest sheep holders in his own neighbourhood, in Silesia, Prussia, and even Poland. Celebrated for a powerfulness of frame unusual in the purely Spanish sheep, they possess a fleece so closely compact, fine, and abundant, as to bear competition with any on the continent; whilst the extraordinary healthiness for which they

are distinguished speaks volumes for the nutritious qualities of their summer pasture and winter hay, and affords new confirmation to the acknowledged just principle, that an abundant supply of first-rate hay, while in stall, is an indispensable pre-requisite to successful sheep breeding; though assuredly the unwearied attention, and skilful observance of all the minutæ connected with the difficult science of sheep-breeding which are known to prevail in the management of the Hermsdorf flocks ought not to be left out of account. Accordingly, the fleeces, no less than the breeding ewes and rams produced there, are objects of competition to all whose knowledge enables them to appreciate the high state of perfection to which these animals have been brought.

### THE GIANT SAINFOIN.

SIR,—Having, through the observations of your reporter for Bedfordshire, received numerous communications from different parts of the kingdom, requesting further information concerning the Giant Sainfoin (as the introducer thereof has styled it), I avail myself of the opportunity which your journal affords of replying to them *en masse*, and in so doing I shall confine myself to what has passed beneath my own observation.

The introduction of the variety, as your reporter states, was purely accidental; it was clearly a foreign species, but although various purchases of foreign seed have subsequently been made, in hopes of obtaining the same variety, they have hitherto proved unsuccessful. It was not until the year 1812 that my father, who was the then tenant of the farm I occupy, sufficiently overcame his sceptical notions in reference to its peculiar properties as a distinct species, as to induce him to give it fair trial. Then, however, he procured of the introducer four bushels of seed, which cost him 80s. per bushel. This was dibbled between the rows of wheat sown upon a pea stubble; and, the seed being expensive, care was taken to drop only one seed in each hole, at intervals of from three to four inches, by which means nearly three acres were planted. The stubble was left upon the land for protection during the winter, but beat down, raked, and carted off in the spring. The crop was good for a thin plant, and would have cut more than thirty cwt. per acre; but my father, hoping to get two crops of seed, let it stand, which was injudicious; experience having proved that it is exceedingly tenacious of going to seed in a maiden crop; the second crop, although it went to seed again, was too late to be successful. In 1844 the entire piece was mown for hay, and produced from five to six tons; early in September it was mown again for seed, which produced about twenty bushels per acre. This was sown in 1845 upon a red loam with a chalk subsoil, after beans and peas, which had been well manured for the same, at the rate (by way of trial) of

two, two-and-a-half, and three bushels per acre, upon about 24½ acres of land, which has this season produced more than fifty tons of hay; the part sown the thickest answering the best. In August it was mown again for seed, and subsequently produced a good eddish for feed. The species has now been tested in this and the adjoining parish for fifteen years, and the price of the seed has varied during that period from 50s. to 80s. per bushel. It is quite clear that it will, like lucerne, produce three crops for hay or soiling in one season, and the food in either case is much more nutritious. I have twelve acres, drilled last spring upon pea-stubble wheat, at three bushels per acre; the wheat was very fine, and partially down, but the plant is good. I shall now introduce it in regular course, sowing about twelve acres in each season upon pea-stubble wheat, to remain three years, and then break up for wheat, by which method your agricultural readers will perceive that only the barley crop will be sacrificed in one round. In this way I shall obtain thirty-six acres for hay in each year, and thirty-six acres for seed, or for second and third crop, as may appear most advisable. This will furnish me with all the hay I shall require, leaving my closes wholly for sheep feed; but whether this will prove the more excellent mode of turning this peculiar variety to the best account experience alone can determine. I shall only add that I have still a very large portion of my crop of hay remaining, and a small quantity of the seed in an unthrashed state, with thirty-six acres in plant, and should any of your readers who are curious, or feel interested in the cultivation of the plant, pay me a visit, I shall be happy to see them, and will furnish them with any additional information I possess. I am, sir,

Your obedient servant,

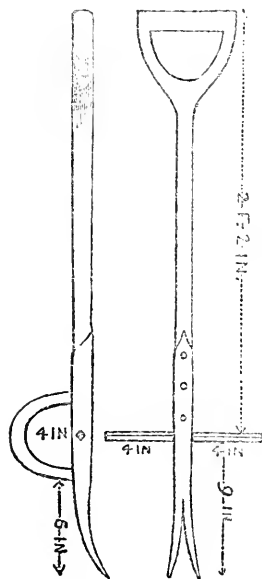
JOSEPH HINE.

Newnham, near Baldock, Feb. 19, 1847.

—Mark Lane Express.

## MEADOW v. GRASS LAND.

SIR,—Meadow land, in most parts of our country, pays nearly double the rent of arable land, although little or no attention is paid to its preservation and improvement; weeds of all kinds, in no way useful to cattle, are allowed to grow and propagate by their seeds, as if the removal of them would not repay the cost of the labour attending it, although it is very certain that many blades of grass will grow on the ground occupied by a single weed, and not exhaust the soil so much as the tap root of the weed. In strong land, the buttercup, hemlock, nettles, large thistles, wild parsnips, hogweed, &c., are left to grow, untouched by cattle, when the surrounding grass is eaten down; and on chalky land, the ground thistle, the broad-leafed plantain, the large thistle, a few buttercups, and other weeds, may be seen growing at the end of summer, when no grass is left; and all these weeds are allowed to run to seed and impoverish the land by their growth to maturity and by their tap roots. During the spring and autumn, and after the hay harvest, there are many hands unemployed who would be glad to work when there is little for them to do; and there is no difficulty in hiring women to eradicate the thistles and weeds with an instrument—a drawing of which accompanies this.



In the spring of the year, when the buttercups come into blossom, and the broad-leaf plantain puts forth its leaves, they are easily distinguished and removed, and two women or two boys will then be sufficient to weed 10 or 12 acres.

In the summer, after the grass is mown, the red flower of the ground thistle and other weeds left by the cattle come into blossom, as well as the large thistle, and may be removed in a similar way.

Some few farmers are contented with mowing down the large thistle before they come into blossom, and this is better than leaving them

to seed; but very few farmers give themselves the trouble to cut the thistles in the road-sides or in the hedges, and these are left to sow their seeds, with the aid of the wind, all over their farms. The thistles that are cut down with the scythe are left to sprout and throw out numerous branches with increased strength, and their roots, too, strike deeper into the earth, and impoverish the land,

and the only advantage derived from their being cut is the prevention of their seeding. Instead of cutting them down, I would recommend their being rooted out with the eradicator, not only in the meadows and corn fields, but also on the sides of the road and in the hedges, when, after a few years, these weeds, now so numerous, will disappear.

In addition to the system of weeding meadow and grass land, I would recommend the use of liquid manure, which is attended with little expense and trouble, and the increased produce from the watering will amply repay the expense of constructing masonry cisterns and water-carts. In my small establishment I have made the drains of the scullery, the wash-house, and the stable, to lead to a cistern constructed at the end of the building, capable of containing about 21 pipes or 504 gallons, which fill once a week, and is then removed to the meadow, and I find I have sufficient liquid to water about 15 acres of land. I always throw into the cistern the soot, the sweeping of the chimneys, and have occasionally mixed common salt. The cistern answers the purpose of dissolving saltpetre, the water of gas works, guano, or any other manure capable of being dissolved in water, and admits of all these ingredients being reduced to any strength required for use.

When the grass begins to grow in summer, I follow the continental system, and mow daily what I require for my cattle, and then water the part mown with liquid manure, which insures me two or three cuttings in the year.

I believe it is known that vegetables will not grow in our gardens without the ground is turned with the spade, and to give my meadows the benefit arising from admitting the air to the roots of the grass, and loosening the earth, I subsoil the ground, by using a scarifier with three tines, at the distance of  $1\frac{1}{2}$  foot, with knife edges, one foot in length, placed at an angle of  $45^\circ$ , and with this instrument I subsoil the meadow to the depth of 8 or 10 inches in the month of November, as soon as the ground becomes sufficiently moist with rain to admit the tine to penetrate the earth, and on the 1st of February, if there is no frost, I roll the meadow when it becomes smooth and no injury is done to the grass.

I am, sir, yours obediently,

Brighton, Feb. 11.

H. WARD.

COMMUTATION OF TITHES.—In Mr. Willich's little book, which contains his commutation tables, he states that the progress of commutation to January, 1846, has been as follows:

The number of tithed districts in which voluntary proceedings have commenced . . . . . 9,623

The number of agreements received .....	7,031
Ditto confirmed .....	6,704
The number of notices issued for making awards .....	5,489
The number of drafts of compulsory awards received .....	3,916
Ditto confirmed .....	3,376
The number of apportionments received .....	8,995
Ditto confirmed .....	8,660

From the return made to the House of Commons on 16th June, 1846, it appears that from the commencement of the commission up to 1st Jan., 1846—

The total amount of agreements for commutation of tithes, confirmed by the tithe commissioners, was .....	£	s.	d.
	2,462,139	10	6½
And the total amount of awards for commutation of tithes, confirmed by the tithe commissioners, was .....	1,149,478	9	3½
	<u>3,611,617</u>	<u>19</u>	<u>10</u>

**TITHE COMMUTATION AVERAGES.**

SIR,—As it may be interesting to your agricultural and clerical readers, I transmit the following explanation of the apparent inconsistency which, without investigation, appears to exist between the average prices of wheat, barley, and oats, for seven years to Christmas, 1835 (on the basis of which averages the Tithe Commutation was arranged), and the average prices for seven years to Christmas last.

**AVERAGE PRICES FOR SEVEN YEARS.**

	To Christmas, 1835.		To Christmas, 1846.	
	s.	d.	s.	d.
Wheat, per imp. bush., .....	7	0½	7	0½
Barley,     "     "     " .....	3	11½	4	0
Oats,       "     "     " .....	2	9	2	8½
	<u>13</u>	<u>8½</u>	<u>13</u>	<u>9</u>

It may be as well to remind your readers that the 57th clause of the Tithe Commutation Act (6 and 7 Wm. IV. c. 71) directs that the amount of rent charge shall be divided into three portions, and that every rent charge be deemed to be of the value of such number of imperial bushels and decimal parts of an imperial bushel of wheat, barley, and oats, as the same would have purchased at the average prices for seven years ending Thursday before Christmas, 1835, in case one-third part of such rent charge had been invested in the purchase of wheat, one-third part thereof in the purchase of barley, and the remaining one-third part thereof in the purchase of oats.

In conformity with the above we find that £100 expended in wheat, barley, and oats, would purchase the following quantities, viz.,

One-third, or £33 6 8 in wheat, at 7s. 0½d.	Imp. bush.
per imp. bush., is equivalent to .....	94,955,489
One-third, or £33 6 8 in barley, at 3s. 11½d.	
per imp. bush., is equivalent to .....	168,421,052
One-third, or £33 6 8 in oats, at 2s. 9d.	
per imp. bush, is equivalent to .....	242,424,242

It is evident, therefore, that the rent charge cannot be considered a money payment of £100, but only such a sum as the above quantities of wheat, barley, and oats, are equivalent to, according to the average prices for seven years to the preceding Christmas.

The average prices for seven years to Christmas last, as published in the *London Gazette* of Jan. 1, 1847, were as follows :

	s.	d.	per imp. bush.
Wheat.....	7	0½	
Barley.....	4	0	„
Oats.....	2	8½	„

It is not alone sufficient to compare the average prices, but also to value the number of bushels of each sort of grain as determined under the 57th clause, as follows:

	£	s.	d.
94,955,489 imp. bush. of wheat, at 7s. 0½d.,			
is equivalent to .....	33	8	7½
168,421,052 imp. bush. of barley, at 4s. 0d.,			
is equivalent to .....	33	13	8
242,424,242 imp. bush. of oats, at 9s. 8½d.,			
is equivalent to .....	32	16	6¾
Value of £100 of rent charge for 1847....	99	18	10½

Showing that the larger quantity of oats being at a lower average price than the basis average of 1835, more than counterbalances the excess in the price of wheat and barley.

I am, Sir,  
Your obedient servant,

CHARLES M. WILlich.

25, *Suffolk-street, Pall Mall, March 20, 1847.*

**EXTRAORDINARY CURE OF A PUERPERAL**

**FEVER IN A COW.**—The following case may prove interesting to our agricultural readers at this season: "On the 1st March one of my cows calved, and appeared afterwards to be quite well. On the following morning, to my surprise, she was down and unable to rise, with loss of appetite, and quite unconscious of everything; ears and muzzle quite cold, her head turned back to her side, and to every appearance a speedy death was inevitable. I sent for C. S. Green, veterinary surgeon at Pershore, who, on his arrival, pronounced it a hopeless case, but wished to try the effects of a compound of ether, with opothartics, which I agreed to, and by the repeated administering of those medicines, in 36 hours after its being first administered she got up and began feeding. On the eighth day she was pronounced to be quite well. Having lost a case four years ago, by the same disease, which was medically treated, and from knowing it to be a very fatal disease, in future I shall be enabled to have recourse to a preventive."—WILLIAM DOUGHTY, Kinnersley, near Severn. Stoke.

## PEAT-CHARCOAL AND AUTUMN PLANTING ANTIDOTES TO THE POTATO DISEASE.

SIR,—Allow me to state a fact highly creditable to the foresight and agricultural information, &c., of your journal, which may perhaps serve many parties hereafter in availing themselves of your usually leading and early suggestions; and this is the more desirable, as it is to be regretted that the farming class generally are averse to change from old habits, or to adopt new ideas; and hence, I believe, the cause of the very evil we are now suffering under as regards the potato.

About a month before the potato commissioners commenced their labours in Ireland (November 1845), I laid before the late Government facts to show that autumn planting was the natural prevention to the disease of the potato, and that the use of charcoal as a manure was the natural cure. The reason is, autumn is nature's time for planting, and seed then placed in the ground receives nature's protection; which, as events have proved, and will ever prove, is far beyond man's: while seed placed in a pit (man's protection), where the temperature is always above the natural temperature of the season, shoots forth and yields its vital principle uselessly in continuous growth until spring; and when then placed in the ground to produce fruit (all its shoots having been first struck off, it becomes the weak and powerless parent of a diseased offspring. Then, as to the "cure," charcoal contains that carbonaceous principle which the disease (caused by constitutional weakness) has taken from the plant; and if given plentifully to the root, will yield back the want, and give health in its place. Thus, my simple theory is—"To give to nature nature's due."

During the labours of the potato commissioners in Dublin, I had the pleasure of receiving them, on a reference from the Lord Lieutenant to me respecting the mode of producing some meal and flour from diseased potatoes, which I subsequently carried into effect at the South Union Workhouse, for Government; and I feel it is but justice to state that they in one of their reports recommended then autumn planting (unfortunately, however, without stating the theory for the recommendation); but I regret to add they did not include the use of charcoal.

Finding that no results arose from their recommendation, early in the following year I submitted the same theory and proofs to the "Royal Dublin Society" and the "Royal Agricultural Society of England" which I had previously done to the Irish Government; and subsequently I gave the leading points to your journal, conceiving that I would not be justified in withholding from the public facts which I had proved incontrovertibly.

It was your judgment only, permit me to say, which discovered then, what has since been borne out

by some of the most leading authorities of the day; and I believe that to your journal is due the first dissemination of means which I do not hesitate a moment to assert will, if carried out with integrity, protect the potato from the present disease. Therefore I feel it is but right to bear testimony to the fact; and had the recommendations you published been followed, we should have been spared all contests as to "fungi," "green fly," "miasma," and, though last not least, the "aphis vastator"—one and all being *effects* of the disease, not *causes*.

How slowly *truths* travel! In 1845 these facts were stated. It was July, 1846, when it first appeared that Baron Liebig declared *carbon* (soot) to be a remedy for the potato disease. October, 1846, brought out Mr. Johnson's pamphlet, recommending, and satisfactorily proving, the value and necessity for autumn planting. Proof upon proof subsequently multiplied in the public prints, from various quarters; and from the same source came corroborations of the value of charcoal as a manure, and as a preservative for the potato in pits. Then came Professor Lindley's opinion (one of the potato commissioners). He says, in the *Gardeners' Chronicle* (Nov. 21, 1846), in reply to a correspondent:—"Charcoal.—Use it to your onion and *potato crop in preference*; but it suits everything"! How unlucky he did not say so, when he was a potato commissioner! And from that period to the present corroboration after corroboration comes of its value as a manure; as Dr. Lindley properly says, "for *everything*."

After this we have the valuable publication of "Dr. Parkin" on the potato disease; and he gives directions so similar to what I have already published that I quote them:—"The layer of charcoal in the drills should not be less than half an inch in thickness; or if planted with a dibble, a handful may be placed in each hole." And Dr. Lindley in his critique states:—"His (Dr. Parkin's) recommendations are the most judicious we have seen."

But I need not go on, the fact has been proved; and your journal has, I believe, accomplished this great good; for it has brought out what would otherwise have perhaps remained a dead letter for a much longer time.

It might be deemed egotism if I allude to the fact that my publications in your paper were the first that appeared upon the subject; but as all writers have so carefully *forgotten* the circumstance, perhaps I had better do so, too. However, I send you the two essays written at the time I have named, which are at your service for the *Farmer's Magazine* of next month.

I have the honour to be, sir,  
*Nottingham-st., Dublin,* Your obedient servant,  
*April, 1847.* JASPER W. ROGERS.



## THE LONDON FARMERS' CLUB.—MONTHLY DISCUSSION.

## SUBJECT—"THE ACTION OF CHEMICAL MANURES, AND THE BEST METHOD OF MAKING FARM-YARD DUNG."

The Monthly Meeting of the London Farmers' Club took place at the Club-House, Blackfriars, on Monday, April 12, having been postponed from the previous week, on account of the Easter holidays. The subject appointed for discussion was "The action of Chemical Manures, and the best method of Making Farm-yard Dung."

The CHAIRMAN, in opening the proceedings, said: Gentlemen, before we enter on the discussion appointed for this evening, I must claim your indulgence while I address you on some matters relating to the general interests of the club. Since the last monthly meeting the Committee felt it their duty to summon the members to a meeting called for the purpose of discussing the question of Poor Law Settlement. Since that occasion some observations have appeared in the papers which have especial reference to me as your Chairman, and also to the decision at which we arrived. I did at first think it would be right for me to reply to the letter which appeared from our friend Mr. Baker in reference to that meeting; but upon mature reflection I considered that it would be much better for me to make the remarks which occur to me at this meeting. I think that that course will be most for the interests of the Club, and it will certainly be most in accordance with my own feelings (Hear, hear). The letter of our friend caused a short paragraph to appear in *Bell's Weekly Messenger*: and I regret exceedingly that our friend *Bell's Messenger* took the view which it did upon that subject (Hear, hear). I feel it my duty to state that the meeting which was held was not an unimportant one. Ever since I have been your Chairman I have taken care to number the parties who have attended your meetings, and when I tell you that the meeting in question consisted of forty individuals, and that we also had the signatures of upwards of sixty more; when I further tell you that the opinion expressed was that of one-fourth of the members of the Club, and ask you to take into consideration the feelings and opinions of those who could not attend but who have expressed to me their sentiments upon this subject, I must ask you to regard the resolution passed that evening as a resolution of the majority of the members of this Club (Hear, hear). I need not go any further into this question, for you are well aware that so long as I have the honour to be your Chairman I shall fairly and impartially maintain the duties of that office, and do what I consider conducive to the interests of the Club (cheers). The next subject I have to bring before you is that of the Tenant-right Committee. The Committee have been very active ever since their appointment, and they have this day reported to the General Committee their opi-

nion of the altered Bill of Mr. Pusey with regard to tenant-right. It is my duty to state that the General Committee have unanimously resolved that an address shall be prepared for circulation amongst the members of the Farmers' Club and of the local Clubs, requesting them to secure the support of the tenant-farmers throughout the country in carrying out the Tenant-right Bill (Hear, hear). That was the unanimous decision of the Committee this day. I need not say that all we ask as practical farmers is that the members of the Legislature should give us that which they have already obtained for themselves (cheers)—that the floating capital of the kingdom employed on the land, which certainly amounts to nearly one-third of the fixed capital (Hear, hear), should have the same consideration as is given to the property of landlords (Hear hear). This is a question which will bear the light of day; and the more the public go into the question, the more clearly will they see that we are only asking what we are fairly and justly entitled to (Hear hear). Another subject which I deem it my duty to bring before you is also one of great interest. The committee have made arrangements for the next monthly discussion being the removal of Smithfield market (Hear hear). That is a subject which deeply affects us as graziers: it affects the public, it affects this great metropolis, and I feel persuaded that on the occasion of the discussion you will meet in considerable numbers and express your views in a firm and decided manner (Hear hear). I shall now, gentlemen, make way for the discussion of this evening. It is one to which I am sure you will listen with very great attention—one of very great importance to the agriculturists of this country. I am happy, gentlemen, to introduce to you our friend Mr. Nesbit, who has certainly done good service in that particular branch of chemistry which applies to agricultural manures; and I feel persuaded, from the lectures which he has delivered, and which have met so much approval, that we shall have an interesting address from him this evening. The first portion of that address will relate to the action of chemical manures; and I am sure you will all agree with me that, as practical men, we need the aid of chemists and scientific men generally to instruct us in the proper application of those manures. Much money is being expended in connection with that subject in the present day; and a very large part of it is expended uselessly, and a considerable portion not in the most judicious manner. We are all anxious to be enlightened on that part of the subject. The other point is "The best method of making farm-yard dung." Most of us will be ready to admit that we are all guilty with regard to the management of our farm-yard dung. A

great number of the farmers of this kingdom waste a considerable portion of their manure by improper management; and while the first part of the subject will have reference to the scientific question, I feel sure the latter portion will lead to a practical and useful discussion (Hear hear).

MR. BAKER said, I have no knowledge of any paragraph like that referred to by the Chairman having appeared in *Bell's Messenger*: I saw nothing there myself but the letter in explanation of my own views. Let me impress on the meeting that I had no personal feeling in the course I took. I only explained my views on the subject because I was charged with having been a party to a decision in Committee differing from the opinion which I expressed in the general meeting (Hear hear). It happened that when the decision was come to in committee, I had left the meeting. Perhaps it was a pity I did so. I must say, however, I did think it rather inconsistent that a subject like that should be decided in committee, and that a general meeting should afterwards be called to consider it.

MR. NESBIT then rose and said: Mr. Chairman and Gentlemen, It is with very great pleasure that I rise this evening to bring under your notice a subject which you will all agree with me is one of the most important that can be brought under the consideration of the agricultural world. You will give me leave, however, to change the form of the notice, and instead of commencing with the action of chemical manures, to begin with farm-yard dung. Allow me to say, before I proceed, that the inquiry into this subject cannot be conducted properly by any scientific man by himself, or by any scientific men by themselves, or by any practical men acting alone; there is required a union of science and practice in order that the matter may be fully understood; scientific men and practical men must bring their knowledge to bear equally in order to get at the truth. Now, it has been known for ages that the refuse of vegetables and the excrements of animals, when applied to the land, have given it increased productive power; that is to say, that land which would only produce a certain limited crop in its existing state, would produce an increased amount of crop if certain vegetable substances or animal excrements were applied. Now, this is what is called manuring. The fact has been perfectly well known that these substances do act beneficially in the vegetable world. But the question is, why and how do they do so. I want to attempt, first to illustrate these points, and then afterwards to show what are the best means of preparing all these animal and vegetable substances for the reproduction of vegetable life. You will observe that all substances derived from the vegetable kingdom will, when exposed to moisture, decompose: a certain action takes place, and these bodies decompose and lessen in weight. This action goes on, not only in the case of moist hay and straw, but also in that of wood. While this action proceeds, which is caused by the union of the oxygen of the air with the carbon and hydrogen of the vegetable fibre, these substances are sent into the air in the form of carbonic acid and water. If you take a quantity of hay, you will find that by the slow and gradual action

of the air heat is generated, and if it be left in that state, the gradual increase of the heat will cause it to burst into a flame. Now, the making manures with vegetable matters differs not from this action, except that you never allow the action to rise so high as to cause inflammatory effects. You arrest the action by keeping out the air; and the substances thus produced will, weight for weight, be of greater value for manure than the vegetable substances of which they are made. I think I shall be able to show you that a similar effect is produced in a similar action in the case of the excrements of animals. In the case of animals which eat vegetable substances—for instance, sheep or oxen—a certain amount of vegetable matter is taken into the system. If it be a full grown animal, the chief action that takes place is that a portion of the food is consumed by the oxygen of the air taken in by the lungs, and this for the purpose of producing animal heat. You are aware that animals always have a temperature many degrees above that of the air in which they live. For many years it was a problem how this temperature was produced; but recent experiments have proved that it is by the consumption of food, that exactly as common wood consumed in a fire-grate produces heat, so a portion of the food taken by the animal produces that heat which is necessary for the proper performance of the animal functions. Now, you will observe that in the previous case which I have mentioned, the oxygen of the air acting on moist vegetable substances produces the same effect, carbonic acid (carbon and oxygen) and water (hydrogen and oxygen) being equally found in the exhalation from manure heaps, the air in the chimney, or the expired breath of an animal. It is not necessary for me to tell you all the variety of effects which are produced in the animal system by the digestion of the food; but the result is that the excrements contain the whole of the mineral elements, but a lessened amount of the nitrogen, carbon, and hydrogen, of the vegetable matter. There is in reality, then, very little difference between the ultimate results of the decomposition of vegetable matter in a heap by itself, and the passing of similar matter through the bodies of animals, and becoming their excrements both liquid and solid. Now these excrements of animals and this decomposed vegetable matter have ever been found beneficial to the land. Suppose we take a crop of tares or a crop of wheat: here is a crop which has grown in the land, which has seized hold of mineral matters, and has taken its potash, soda, lime, phosphoric acid, and other substances which it requires; it has taken from air and water its carbon and nitrogen, and its hydrogen and oxygen. This crop, when decomposed into a manure, will by the operation lose a portion of its organic matter; and if there be no washing away it will lose nothing else. The consequence is, that when you put this decomposed vegetable matter back on land from which you desire to grow new vegetable matter, you put back nearly the same substances which the vegetables had taken before, and had shown to be essential to their existence; and these you restore, in order to provide for the existence of new plants. It is the same with food given to animals.

When you give food to animals, the carbon and hydrogen are liberated by the action of the oxygen of the air in the system. The other matters, nearly the whole of the nitrogen, the rest of the carbon, and the hydrogen, and the whole of the mineral matters, are given out in the liquid and solid excrements—the soluble in the liquid, the insoluble in the solid excrements. If, indeed, the animals be fattening, a certain portion will be taken in that way; and you must deduct so much more on that account; but otherwise you would have nearly the whole given back again, after deducting the amount of carbon and hydrogen given out in the form of respiration. You will see at once, then, that it is from the vegetable kingdom itself that you derive all those manures which are so usefully applied to reproduce vegetable life. It is necessary now to consider the nature of those elementary substances of which vegetables are found to consist. We shall then know what elementary bodies are essential to vegetable life. The substances found in vegetables are divided into two varieties. If you take a quantity of any vegetable matter, and burn it, a certain portion will go into the air—that portion is called organic; while another portion, which is left, is called inorganic. The inorganic is that portion which is taken from the land; while the organic is that of which the chief part was taken from the air, either by the plant which you have burnt, or by a previous plant. It is well that we should clearly understand the terms “organic” and “inorganic.” I am lecturing to you as if you were schoolboys; and my reason for doing so is that all present may understand the matter; though, no doubt, many gentlemen in this room are well acquainted with this subject. I would say, then, that the inorganic matters are mineral matters, and that the organic are those which can be burnt out by red heat. Of the inorganic matters there are eight or ten. We have lime, with which everybody is familiar; we have soda, contained in salt; we have potash, found in wood ashes; we have sulphuric acid, or common oil of vitriol, which is found in the soil in the shape of gypsum; we have phosphoric acid, found in bones; we have muriatic acid, which is found in common salt; and we have silica, or sand, which is essential to all the straw plants. I think that one of the great requirements of the present day is to procure silica in sufficient strength to aid the stalk, so that it may be enabled to bear a good ear of wheat; and I am trying some experiments with that view. These mineral matters are sometimes supplied in sufficient quantity by the soil; but in many cases they have to be supplied by the farmer. The organic substances are carbon, nitrogen, oxygen, and hydrogen. The oxygen and hydrogen are always supplied by water; the carbon is, I believe, primarily supplied by the air; the nitrogen, though supplied in many cases by the air, yet is often required to be supplied by the farmer. I believe that some plants have the power of taking all they want from the air; I believe that others cannot, from the nature of their constitution, derive from the air all that they need. The various substances thus mentioned are those which plants require, and which ought to be used. Now in the preparation of

farm-yard dung there are two or three points worthy to be observed. The first is that many of these substances are soluble. Now the common way of preparing farm-yard dung everybody is acquainted with: a large mass of straw and excrement is allowed to rot in the midst of a quantity of water, where, instead of a genial heat being produced, it is washed by the water, which, saturated with soluble matter, is allowed to run to an adjoining brook; as if the farmer intended to wash his manure to make it look clean. Nay, more: I have, in some cases, seen the matter running into an adjoining horse-pond from which the poor animals are obliged to drink. Now, it so happens that everywhere those substances are most easily lost, which are the most valuable. A quantity of dung thus exposed to the action of water will lose its potash, its soda, the greater part of its ammonia, its soluble salts of lime, in fact, only the insoluble and comparatively worthless parts will be left behind. I have not the least hesitation in saying that parties who allow these things to waste, lose, if they have four or five hundred acres of land, from £300 or £400 per annum. I believe that by saving them they would have an increased crop, equal to much more than that amount per annum. There are many ways of making manure heaps. Perhaps the best way is to make layers of animal excrements with straw, on a mould bottom; to lay thereon a foot or so of manure, and strew a little gypsum over that, and sometimes a little mould; then another layer, and so on; covering the whole with six or eight inches of ditch stuff. Now, in that case—not turning it too often, for that does a great deal of damage, it allows too great an action to take place, and you lose too much of the ammonia—if it be not too heavy to allow of a *small* amount of heat, I believe that in a little time you will find the lower parts enough decomposed, with the loss of a very small amount of ammonia, or other organic matter. But it is necessary to have some means of retaining the urine which flows from the cattle. This will be best done by having tanks for it to run into, and the floors ought to be strewed with gypsum every morning to prevent any loss. Providence has so ordered it that nitrogenous matters do not come out in the form of ammonia which is of an acrid nature, but in the form of urea, which is quite mild in comparison, and which immediately it has been ejected from the body begins to turn into carbonate of ammonia. When the decomposed urea begins to turn into carbonate of ammonia, you have a substance produced which is exceedingly volatile; but by an admixture of gypsum, sulphate of ammonia, which is not volatile, is formed. It may be laid down as a rule that those gentlemen who do not take good care of their liquid manures do exceedingly wrong, and lose a great deal of money in the management of their farms. It has been computed by Liebig that a pound of good urine is perfectly equal to the production of a pound of good wheat, and I believe that experience bears out that calculation. Mr. Warnes, of Trimmingham, near Norwich, has for some years adopted the plan of box-feeding his cattle; and having seen it in operation, I think the

plan, for the purposes both of feeding the animals and making the manure, is an exceedingly good one. The boxes used by Mr. Warnes appear to answer the purpose extremely well, at a very cheap rate. There is a quantity of straw laid under the bullocks in the boxes; there is a regular gangway at the heads of the bullocks; and the bullocks are fed with linseed, turnips, and other things, which are boiled in order to prepare them properly for their use. Care is always taken to put sufficient straw to absorb the liquid manure, and gypsum is also occasionally added. Before I went there I thought the bullock must under such circumstances become mired, but such is not the case in the least. Mr. Warnes, by the plan which he adopts, retains everything which is useful, and allows nothing to be washed away which can be beneficially applied on his farm. I have no hesitation in saying that Mr. Warnes's method is the nearest approach to perfection in this matter that I have yet seen in practical operation. There is no loss of ammonia—the gypsum prevents that; and the consequence is that Mr. Warnes fattens a greater number of bullocks per acre than any other gentleman with whom I am acquainted. I am sure that if any of you were to call upon that gentleman at Trimmingham, near North Walsham, he would be happy to give you the fullest information. Another point with regard to farm-yard dung is that it will differ as the vegetables of which it is made differ. Let us take the case of one animal feeding on chopped straw, or anything of that kind, and another beast fed on beans; you will have a very different kind of manure produced from the beans to that from the straw. In short, according to the nature of the food will be that of the manure. Now it is a well-known fact, that seeds contain a greater quantity of mineral matter, and also of nitrogenous, that is to say, of ammoniacal matter, than any other part of a plant. It happens that in our agriculture we want chiefly to grow seeds, and that other crops are made comparatively subservient to that object. If you use oil-cake and other substances of that kind, you are merely increasing the value of your manure, because you are taking the seed of another farm, and using its constituents for the growth of your own. The value of dung will therefore be increased by the use of the seeds of plants. You are well aware of the use of rape-cake as a manure; that is merely used on account of its producing manure which is exceedingly beneficial to the land. One cause of difference between manures is connected with the age of the animals whose excrements are used for manure. The value of the manures depends greatly on whether the animal be old or young. If an animal be young, he must take out more from the food on which he subsists than he would if he were old. If you take a number of stock lambs which are growing, and have to procure from somewhere their bones and flesh, you will discover that they rob their food, not only of the organic constituents, but also of the mineral ingredients; and you will find, if you inquire, that the manure derived from young stock, or from cows giving milk, is far less valuable than that which is produced from the same quantity of food fed by old stock. I may mention a

singular instance which occurred near Maidstone. A gentleman applied some guano to his hops with the very best result; he obtained a great increase in his hops by the application of about five cwt. His next neighbour bought some of the very same kind of guano, and applied it to his hops, and with no result. The farms adjoined each other; the land was the same in quality; yet, while in the one case the guano did every thing that was wanting, in the other it did nothing at all. I was lecturing at Maidstone soon after, and I had this question put to me by the gentleman who had been successful: "How is this, Mr. Nesbit? I bought some guano, and put it on ten acres of my hop-ground, and got a very good result. I supplied my neighbour with some guano from the same bulk, and this was put on hops on land of the same quality, and yet obtained no result at all?" The first thing I said to him was, "Did he manure properly?" "We manured," was the reply, "in pretty nearly the same manner." "How?" I said. "By means of fatted dung," he replied. Well, it seemed quite inexplicable. "But," I said, "what kind of beasts do you keep?" "Oh," he said, "I keep cows." "And what," said I, "does your neighbour do?" "Why, he fats bullocks," was the answer. Everything was explained at once. I happened to have suspended from the wall two diagrams containing an analysis of guano, and an analysis of milk, and these immediately showed that everything contained in the milk of the cows could be supplied also by the guano. The gentleman who had the cows on his farm had exported all these valuable ingredients (pointing to the diagram), phosphate of lime, potash, soda, nitrogen contained in the form of gluten, in the milk. But his next neighbour, who fed his bullocks in a similar manner with oilcake, had such a quantity of these materials put into the ground by the manure of his stock, that the guano produced no effect at all. So that you see the manure varies, not only with the quality of the substances supplied for food, but also with the nature and state of the animals employed in eating. There is another problem often proposed, viz., whether manure should be put upon land old or young, or at what season of the year should it be applied? There are as many differences of opinion on that subject as there are different localities in the country. Before we come to a decision upon that question, I must point out to you a few differences which exist in the plants grown by farmers. You do not always grow the same crops; there is a change: you have turnips, barley, clover, wheat, and so on; and there is a vast deal of difference between these several crops. One, like the turnip, has immense leaves, and attains considerable bulk, besides growing quickly; another, as wheat, is very slow and gradual in its growth. Now, it is evident that you ought to apply the greatest quantity of soluble matter to those plants which grow the quickest. You ought to apply the substances which are most soluble to those plants which take out manure most quickly: you ought to apply the substances which are least soluble to those plants which take out the manures most slowly. Now, applying that rule, you will perceive that within certain

limits the more your manure is decomposed the more soluble it becomes. When you first lay it down it is nearly insoluble; but, through the continuous action which takes place, the various substances are rendered much more soluble, so that it will act much more quickly. Therefore, rotted dung ought rather to be used for those plants which you wish to grow quickly, and dung not so much decomposed for plants of slower growth. Now, there are different times of the year for putting manure on the land. Some will put it on in summer, and leave the action of the air for the winter. The good effect of that will depend a great deal upon the dung itself, and the rain which falls in the succeeding months. If you put on your land well-rotted dung, and expose it during the three or four months of winter to the action of the water and the air, I have not the least hesitation in saying that the soluble portions will be exceedingly liable to be washed away from the soil. On the contrary, if you put on in the frost long dung, you will not be so likely to suffer loss; because the dung is not yet sufficiently decomposed to contain much soluble matter. I have now, gentlemen, spoken to some extent about the nature of farm-yard dung, and the best means of making it. I will conclude my observations on this part of the subject by observing that the first duty of the farmer is to prevent on his farm the loss of any substance which can by its decomposition into manure reproduce vegetable life. For this purpose not only ought the litter to be well taken care of, but even the weeds, which will sometimes appear even in the best farms, should be made, by fermentation with mould in the corners of the fields, to contribute their share to the general stock. The farm buildings should be furnished with shoots or spouts, to prevent the water from the roofs washing into the manure; the streams of water sometimes seen running through the mass of the manure should be turned into some other less destructive channel; the horse pond should be kept free from the too frequent irruptions, from the farm yard, of liquid manure — too valuable for the land, to be employed merely for the purpose of poisoning the unfortunate animals which are compelled to drink it; the urine from the horses and cattle should be received into properly constructed tanks, whence it can either be carted directly on to the fields, or pumped in dry weather over the manure; the tank and the manure heap should periodically be furnished with gypsum, to prevent as much as possible the escape of ammonia; and every other available means should be made use of to prevent the slightest waste. With one or two exceptions, however, the farmer is obliged to go to other sources for manure after he has collected all that he can obtain from his land. After he has decomposed all the substances which he can obtain from his farm, it is still necessary to place on the land guano, or some other substance. There are, indeed, two exceptions; two cases in which it is not necessary for the farmer to buy manure. The cases of exception are these: where there is irrigated land, or meadows occasionally under water; and where there are marshes exposed to the action of the sea, sea-spray, or to infiltrations of soluble matter through the soil. If you have five hundred acres

of meadow land, and have the means of irrigating them, it is well known that those five hundred acres will have the power of taking a certain portion of the inorganic matter from the water, and by its means of abstracting from the land the organic matter, and of thus producing immense crops. Experiments have been tried which have shewn that, in the case of water containing in solution ten grains of salt and four grains of carbonate of lime per gallon, after the action of the water on the meadows, there has been contained in a gallon of the water only four grains of salts, and two of carbonate of lime. The meadows retain, in fact, a portion of the mineral ingredients of the water which runs over them, and they will year by year furnish a large quantity of vegetable matter, which if made into manure, and used on the other parts of the farm, will supply the whole of the loss occasioned by the exportation of the barley and the wheat from the arable portion of the farm. I will only observe now that, in the case of a farm being furnished with a sufficient proportion of catch meadows, sufficient ingredients will generally be obtained therefrom to obviate the necessity of putting anything else on the farm. Well, then, the other case is that of marsh land, so near to the sea that it is supported by the infiltration of sea-water and by the saline matter brought unto the land by the breezes blowing from the sea. The marsh lands being often below high water, you can, through the infiltration of sea-water, obtain a sufficient amount of mineral ingredients for the general purposes of the farm. The crops got from the marshes go to manure the arable land, and to replace the substance taken away by what is exported in the shape of wheat, &c. Now, with the exception of these two cases, it is, I apprehend, necessary to import manures on the land, and it now becomes important to consider what shall be imported. Now, the first substance which I will mention is bone-dust. When one comes to consider the general state of the country, it is impossible not to perceive that the habits of the country have, for the last two thousand years, been robbing the land of one of its richest ingredients. Of course plants growing on the land have taken their bone-dust from the land, and animals have taken their bone-dust from the vegetables. It has been the habit of mankind, not only in this country but in others, to deposit the bones of their species in separate receptacles, and to waste the bones of other animals; so that there has been a continual loss going on through the mineral ingredients of bones not being restored to the land. The consequence is, that bone-dust, or phosphate of lime, has come to be one of those ingredients contained in the least quantity in the land. It is now something like fifty years since the first experiments were made as to the action of bones upon land. Bones were first put on the land in an oily, greasy state, and they did not then appear to do much good. Afterwards, however, they were put on after being deprived of the oily matter, by fermentation with ashes, and the best results followed. Since that period they have been tried in almost every part of the country, and with the exception of one or two strata, their beneficial action is almost invariably acknowledged. There

are, as I have intimated, one or two strata to which they cannot be applied. One of them is the main rock of Hampshire, which is the upper green sand-stone of geologists. I have known bones to have been applied there without producing any benefit; but though sixteen bushels per acre have been applied without producing any effect, I have known a much smaller amount of bones and sulphuric acid (super-phosphate of lime) to be very beneficial. Now the super-phosphate is merely one means of making bone dust more soluble. I believe that the proportion used is 1 cwt. of bones, and  $\frac{1}{2}$  cwt. of sulphuric acid. The action which takes place is this: the sulphuric acid seizes hold of the lime of the phosphate of lime, and liberates a portion of the phosphoric acid. The first result is that the phosphoric acid on combination with a small portion of the lime is rendered much more soluble. The action of the sulphuric acid is really to powder the bone-dust to the minutest divisions. When the super-phosphate of lime has continued for a few days in the soil, it is all reduced to the common phosphate of lime, but in a minute state of division. Well now, this I consider one of the greatest improvements of modern times. The action of the sulphuric acid is such as to bring the bone-dust into a much more finely divided state than could possibly be brought by any mechanical means that could be resorted to. Again, there is nitrate of soda and sulphate of soda and common salt. These have all been used as manures with beneficial effects. Nitrate of soda, on grass lands, is found to stimulate growth; but if used for cereal plants, such as wheat, barley, or oats, unless great care be taken, the effect is to throw down the crop, and to cause you to have a very much smaller amount of corn. I have known many instances in which the straw has been thrown down in consequence of this defect, 56lbs. to 84lbs. per acre of nitrate of soda is quite sufficient. Not one of these substances, however, contains silica, which is the great strengthener of the straw. If there be no silica the straw is sure to be weak; the use of the silica is to make the straw stand firm. The employment of these substances, then, except in minute proportions, for cereal plants, is not attended with any great benefit. The same may be said of nitrate of potash. Saltpetre acts in a very similar way to nitrate of soda; if it be used for these cereal plants it produces a larger quantity of straw, but if used in too great a proportion it throws the plants down. Now lime is very often used for manures. I wish to speak carefully with respect to the application of that, because a more important point cannot be touched upon. Chalk and marl are, we know, applied with abundant success in a great many countries. Now how does the effect of lime differ from that of chalk or marl? Why, excepting the primary effect, not at all otherwise than in reducing the lime to a minuter state of division. Common chalk is carbonate of lime; marl contains from 30 to 80 per cent. of it. When chalk is burnt you get the carbonic acid liberated, and caustic or quicklime left. On adding water to quicklime, you then get slacklime, *i. e.*, a union of 28 parts of lime with 9 of water. When this is spread abroad and turned over, in a few days the whole, by acting on vegetable matter and by

absorbing carbonic acid, is converted into carbonate of lime in a finer state of division than the finest chalk; it is also more equally disseminated through the earth, and the roots of plants can more easily get at it. Now I believe that the use of calcareous matter in land is something more than merely to supply the direct wants of plants; and from certain experiments it appears to me that calcareous matter is deficient in a great number of soils to a greater extent than is commonly supposed. About 16 months since, I published an analysis of the hop plant, and recommended that a certain kind of manure should be applied to the land for the purpose of growing the hop. My recommendation has been carried out in 30 or 40 cases. The mixture was 3 cwt. of guano,  $\frac{1}{2}$  cwt. of gypsum, a certain portion of coarse salt, with  $\frac{1}{2}$  cwt. of nitrate of potash. The result was that in the whole of the instances referred to, except two, the application was highly successful. By the application of what cost 3*l.* 10*s.* per acre a gentleman obtained 435 bushels of hops more than where he used 20 loads of farm-yard dung, which cost 12*l.* I sent for the soil and the subsoil where the manure had not produced its proper effect, and when I came to examine I found that the soils contained scarcely an appreciable quantity of carbonate of lime, one soil having four tons in 10,000 and the other eight in 10,000, a quantity amounting to little more than one-tenth per cent. of the soil. Where the manure answers the best I found 47 tons in 10,000. In all the cases, however, to which I refer I have not the slightest hesitation in saying that an additional quantity of carbonate of lime would have produced a still greater effect. A very singular property which chalk possesses is that in certain states it possesses the power of decomposing the salts of potash, soda, or ammonia, of retaining their acids and liberating their bases as carbonates. If sulphate of ammonia and chalk (carbonate of lime) be mixed together and then made wet with water no change is produced. But when the water evaporates, and the mixture is merely slightly moist, the carbonate of ammonia is quickly liberated. Or if the dry mixture be rubbed with moist sand until the whole assumes the appearance of a moderately moist but not wet soil, the carbonate of ammonia is speedily set free. If common salt, mixed with calcareous matter slightly moistened, be left for six or twelve months, an efflorescence of carbonate of soda will be found on the surface of the mixture. Many other instances of similar action might be mentioned, in which the chemical action in a moderately moist state is precisely the *reverse* of that which it is in a wet state. Every one knows that sulphate of lime (gypsum) when mixed with a solution containing carbonate of ammonia, as liquid manure or urine, will convert the carbonate of ammonia into sulphate of ammonia, thus arresting the escape of the volatile carbonate of ammonia. The same effect is produced when gypsum is added to wet or tolerably wet dung. It is not, however, so generally known that if by evaporation the mixtures are reduced to a state of moisture not greater than that of a good soil some time after rain, that is, a little moist, but *not wet*, a reverse action will take place, and carbonate of ammonia, instead of being retained, will be

liberated. This fact is most important in explaining the action in the soil of both sulphate of lime and carbonate of lime. If sulphate of lime be on the soil, carbonate of ammonia, brought down by the rain, will, in contact with it, become sulphate of ammonia. When the rain ceases, the water as it evaporates will carry away no ammonia; as the sulphate of ammonia, unlike the carbonate, though soluble, is not volatile. When fine growing weather comes, and the soil gets drier, the sulphate of ammonia suffers decomposition, and liberates carbonate of ammonia for the use of the plants. In a similar manner, if sulphate of ammonia be added to a soil containing a proper quantity of calcareous matter (carbonate of lime), the rain will wash the sulphate of ammonia into the soil. On the commencement of fine weather, the sulphate of ammonia will suffer decomposition, and will be converted into the carbonate of ammonia. The same effects will take place in calcareous soils on the addition of common salt (chloride of sodium), sulphate of soda, &c.; carbonate of soda being liberated. This effect of calcareous matter is of exceedingly great importance to be properly understood with reference to the application of artificial manures, and even of ordinary manure. It is not difficult to prove that sulphate of ammonia, or sulphate of soda, or sulphate of potash, or common salt cannot enter into the composition of the generality of plants without undergoing a change. If sulphate of ammonia, when used as a manure, entered into the plant in the state of sulphate, there ought to be pretty nearly the same relation between the nitrogen and sulphuric acid found in the organism of the plant, and the nitrogen and sulphuric acid found in the sulphate of ammonia. The relation in this latter instance is as 47 sulphuric acid to 14 nitrogen; but in no instance in plants does this relation exist, the quantity of sulphuric acid to nitrogen being always vastly smaller. The same could be proved with respect to other salts of ammonia, as likewise of potash and soda. If, therefore, these substances be found in ordinary manure, or be used as top dressing or otherwise on soils deficient in calcareous matter, we must expect them either utterly to be thrown away or only to be partial in their action. I believe the unequal results, often shown by experiments in different localities with the same top dressing, is attributable in many instances to an unequal proportion of calcareous matter in the soil.

Mr. MECHI: Then my friend Mr. Hutley is right in chalking every acre of land.

Mr. NESBIT.—Perfectly right. The land ought to contain if possible five or six per cent of chalk. I have recommended that every three years there should be an application of lime to the soil, irrespective of all other manures; and this will appear the more necessary when you consider the loss which is occasioned by the ordinary action of the air and rain. Besides the manure which I have mentioned, there are the animal substances, as shoddy, rags, horses' hoofs, and other substances, which are exceedingly beneficial to the agriculturist when the mineral substances are in proper proportions. If you furnish guano to the land without a proper supply of mineral ingredients, you will only deteriorate its

quality. The application of these animal manures is perhaps best in the case of those plants which are least capable of taking ammonia of the air. You are aware that these ammoniacal manures ought to be applied to those plants which have narrow leaves, as wheat, barley, &c., while mineral manures should, in general, be applied to those plants which have broad leaves, and which possess a greater power of absorbing the ammonia of the air. It has been proved again and again that mineral manures, when applied to mangel wurtzel and turnips, will produce all you want. I believe the meaning of the rotation of plants is simply this—that by supplying phosphate of lime and all necessary mineral substances to the turnip, you can get a crop which has obtained its ammonia from the air. This crop furnishes organic matter for the narrow-leaved barley. The bulky roots of the clover find organic matter for the wheat. There are many other points, gentlemen, upon which I might touch in connection with this subject, but I think it is unnecessary that I should take up your valuable time any longer. The necessity for the application of artificial manures is, I think, daily becoming more apparent. Now, a great dispute has been carried on between Liebig on the one side, and Boussingault on the other, respecting the merits of organic and mineral manures. Both these gentlemen are right and both are wrong. Liebig has stuck to the mineral manures, and has classed together plants which are very different in their nature; while, on the other hand, we have Busanco reckoning the value of every manure by the quantity of nitrogen which it contains. Now, the truth lies between the two. That you can grow some plants by the mere application of mineral matters is clear. If you look at the lava soils of Mount Vesuvius and others which are placed in a similar position, you will find the wild fig-tree growing there on the bare rock; and in a few years such soils are able to grow wheat. Every third year they grow wheat, the intervening years growing a little grass, which is fed by cattle. I am much obliged to you, gentlemen, for the kind manner in which you have listened to my observations, and I shall be very glad if what I have said should lead to a full discussion on the few points which I have been able to bring forward (Cheers). A communication by the celebrated German chemist, Dr. Thesenius, in the *Mark Lane Express* a few weeks since, stated that in some experiments made on potatoes with mineral manures only, the potatoes were perfectly sound, while those in the neighbourhood manured in the ordinary way were much diseased. Salt at the rate of 2 cwt. to 4 cwt. per acre for wheat I have known to produce most beneficial results. The straw stands stronger, and the grain fills in better. In the use of artificial manures the following general rules may be observed: Reference should in all cases be had to the habits of the plant, and to the chemical composition of its ashes: the manures should seldom be used alone, but *mixed*, according to the habits of the plant; and the *greatest care* should be taken to procure them from responsible and respectable merchants. The greatest trash is at present in the market, and I hope in

a few weeks to be able to publish some analyses, which may do something to expose the roguery to which the farmer is sometimes subjected.

Mr. METCH said he had applied the manure of his farm-yard diluted with sulphuric acid, and where the land had been so treated he had had the finest ears on any part of his farm. He really thought it desirable for them to buy bones for their turnips, which, at three-farthings a pound, would cost 5*l.* a ton. On that subject he entirely agreed with what had fallen from Mr. Nesbit. Of course they all admitted that to allow even a pint of manure to run off the farm was a neglect, a crime, and a sin (laughter). To be able to smell anything in a farm-yard was equally wrong. They ought to adopt every possible means to prevent anything like a smell in the farm-yard (Hear, hear). It should, he maintained, be as sweet as a lady's drawing-room (laughter). If the ammonia were fixed, there could then be no smell, and as it was generated it would be ready to be applied to the farm in the shape of sulphate of ammonia, or in some other form in which it was not evanescent and volatile. He was himself acting upon Mr. Warnes's plan. He felt sure that the more burnt earth they used to absorb the ammonia, the larger would be their grain crops; while for their turnip crops they might resort to those substances which were to be obtained so cheaply.

Mr. HUTLEY said he wished to put to Mr. Nesbit a question. That gentleman had laid great stress on good rotten dung. He himself had found dung in a state of fermentation much better than rotten dung; and, as a practical farmer, he wished to know why such stress had been laid by Mr. Nesbit on good rotten dung, as opposed to manure laid out one day, carried on another, and laid on on a third?

Mr. NESBIT said that a ton of rotted dung was more valuable than a ton of fresh. It had a greater effect, and the reason was this: In the general action of the decomposition of manure the ammonia was retained, and the whole was reduced into less bulk. They had double the amount of mineral ingredients, double the ammonia; they only lost the carbon and the hydrogen. He had never yet heard of an instance in which well-rotted dung did not, on trial, prove more valuable than fresh dung. It must be clear to every gentleman present that if there were a quantity of soluble matters, and they were exposed to rains, the result would be injurious. The decomposed manure would be washed away before the plants could be acted upon.

A MEMBER wished to ask whether or not Mr. Nesbit considered charcoal a manure?

Mr. NESBIT said that under various circumstances charcoal had been found very useful, by acting on the ammonia of the air, and condensing it within its pores. By experiments, one cubic inch of charcoal had been found to condense 90 inches of ammoniacal gas.

Mr. LOVE said he denied that a ton of rotted dung was better than a ton of fresh dung. He had weighed the two, and had found that it took 30 cwt. of fresh dung to make one ton of rotten dung; and he could state that one ton of fresh dung did as much

good to the land as one ton of rotten dung, simply, he believed, because the rotten dung lost those volatile ingredients which had been in it, and which gave the first leaves to the plant.

Mr. NESBIT said that was because it was badly made, and asked for what crop the dung was used?

Mr. LOVE replied that it was used for turnips and mangel wurzel. It was the general experience that rotten dung was the best. It was not judicious he conceived to drive off any single particle of matter, volatile or solid, which was contained in the manure of their farm-yards. As one who was born in another country, he could not but feel surprised at the conduct of landlords in this country in not doing their duty to their tenants, by giving them better buildings and other places for keeping the soluble manure (Hear, hear). It was through the medium of leases that his own countrymen had been able to make such great improvements, including the keeping of their manure in a condensed state (Hear, hear). There was as much of the spirit of improvement in England as in Scotland; further, he would say there was as much of the spirit of improvement in the room in which they were assembled that evening as in any country in the world (cheers). Mr. Nesbit had said a great deal about applying lime to the soil, that is, calcined lime; and he had stated that when applied to the land in the form of dust it very soon became carbonate of lime. That he denied *in toto*. He had seen chalk applied to land without doing any good at all. He agreed with Mr. Nesbit that Mr. Warnes's system was one of the best that had yet been invented for retaining all the good properties in animal and vegetable manures; and having himself put it in practice for three weeks, he could not perceive that any loss had arisen: that was the chief thing which they had to guard against. He demurred to Mr. Nesbit's remark, that soils in general required the application of lime every three or four years. Lime was a thing which continued in the soil for a long time; it always found its way downwards, and the only way to keep it up was to plough deeper and bring it back again. He would just mention that Mr. Shaw, of Northampton, having sent his soil to be analyzed by a chemist, was told that the only substance which needed to be applied was lime. He accordingly applied a quantity of lime, and the consequence was that not an atom of difference was produced in the space of three years. This was one of the discrepancies of chemists, as regarded the analyzing of soils. No doubt chemistry was right when it was properly known (laughter); but he thought the chemists of the day were as much behind in their knowledge of certain conformations of plants and of the substances from which they derived their nourishment, as they (the farmers) were. I believe that as fast as they acquire knowledge, we are found grasping it (Hear, hear).

Mr. NESBIT said that as farmers could see when chemists were wrong, so chemists could see when farmers were wrong (Hear, hear, and laughter). He repeated his statement, that, weight for weight, rotted dung was more valuable as a manure than unrotted dung,



Mr. TURNER: In all cases?

Mr. NESBIT said very much depended, of course, on the seasons; but he maintained that, irrespective of seasons, there was the most nourishment in rotted dung. This would appear evident if they considered how rotted dung was made; that one ton of it was formed from two tons of unrotted, that is to say, that they had twice the amount of silica of potash and of ammonia; that everything, in fact, was doubled in quantity, except a certain amount of carbon and hydrogen which escaped. The carbon and hydrogen escaped, because there was an action of the air causing them to do so. But it should be recollected that those were not the most valuable properties. Now, with respect to long and short dung, they were aware that the ploughing-in of these upon different lands, would make a material change. If the land were very heavy, long dung would have a chance of lightening the soil; but if such dung were the best, then it might be asked what was the use of putting bone-dust and other mineral ingredients? It was contended by Mr. Love that he was wrong with respect to the application of lime every three or four years; but he repeated the statement, that to throw on the land a large quantity of lime, and then abstain from applying any more for a number of years, was not a proper system of liming. In the case of land which required liming, the work should be done every two or three years. The more lime they put into the land at a time, the more they exposed to be washed away.

Mr. MECHI said that in Scotland it was now applied in the spring.

Mr. NESBIT: With respect to the failure of chemical experiments, he begged to repeat what he had said on a former occasion—that he would not be answerable for any faults but his own. He had before had Dr. Playfair's sins and misfortunes fathered upon himself (laughter). He had, however, nothing to do with the errors of other persons, and only when he himself had been proved to be in the wrong would he give way (Hear, hear).

Mr. LOVE said, it had been argued as if there were no other acid in the soil than carbonic acid. Now, it was well known that alumina was the common alum of the shops.

Mr. NESBIT dissented from this statement.

Mr. LOVE.—Now, if that were the case, there was sulphuric acid in the soil, and as the lime had the power of robbing it wherever it came in contact with it, that was the reason why the strong lands were made friable by the application of a considerable quantity of lime.

Mr. NESBIT begged to correct Mr. Love. Alumina was an oxide of a metal. What the action of lime might be upon sulphuric acid was another question.

Mr. TURNER said he was not going to enter at all into chemical questions, nearly all that he knew on the subject being derived from experience. There were two points, however, on which Devonshire farmers were supposed to possess a considerable amount of knowledge; first, the proper manner of managing catch or irrigated meadows; and secondly, the use of lime. More lime had probably been used in Devonshire within the last

century, than in any four counties of England combined. Now, on the subject of the use of lime, he thought Mr. Nesbit was right to a certain extent. Whether lime should be used every three years or every ten years must depend on circumstances. Lime could not be regarded as a manure: it was only a stimulant or alterative, intended to bring other substances into action. As used in Devonshire, they took care that it was never saturated with wet or mixed with water before it was subjected to atmospheric influence. Lime, when put on the soil, was never suffered to become slimy. In some parts of the country it was of little or no use, as, indeed, was the case with bone-dust. His own land was considerably scattered, and in one part of the farm lime was very useful, and in another part it produced no effect at all. He disagreed with Mr. Nesbit on the subject of dung (Hear, hear). He thought that a great deal of loss was sustained by over-rotting dung.

Mr. NESBIT.—*Over rotting!*

Mr. TURNER said, he thought that, if taken in the straw, as was done at Mr. Warnes's, dung would do much more good than it would if it were kept for two or three years. If three loads of half-rotted dung would go as far as three loads of rotted dung, and if it took three loads of half-rotted or long dung to make one load of rotted dung, it followed that there must be an immense loss. As regarded turnips, Mr. Nesbit was certainly wrong, for it was a well known fact that half-rotted dung would make turnips grow faster than well-rotted dung. He was open to correction, but for his own part he would not suffer dung to be over-rotted, because that involved considerable loss. If applied in the long state he thought it would do a vast deal more good and go further than if applied in any other state. With respect to Mr. Warnes's plan, his only doubt was whether the animal fattened and thrived as well over a mass of dung as it otherwise would.

A MEMBER observed that there was no fermentation.

Mr. TURNER said the only question in his mind was whether the animal could be as healthy and fatten as well. He wished to put a question to Mr. Nesbit. It was—whether the application of gypsum to manure tended to deteriorate it.

Mr. NESBIT.—No: gypsum is altogether a conservative.

Mr. TURNER was quite convinced by experience that it was unwise to rot dung very much. As to bones, in some parts of his farm they would not do any good whatever. His soil was of a hot nature. In farming nothing could be applied as an universal rule: a man must have a great power of observation in order to do right. Chemistry was, no doubt, an excellent thing, and did a vast deal of good; but practical knowledge would also tell greatly in the long run (Hear, hear). With regard to the period of applying lime, in his neighbourhood it was applied once in seven or eight years, and generally with the best possible results. It was applied with most success in breaking up old grass lands. He did not coincide in the opinion expressed by Mr. Nesbit that dung should be applied more particularly to corn, and lime and bones to turnips.

Mr. NESBIT said he had not mentioned lime. What he had spoken of was bone-dust and mineral manures.

Mr. TURNER said that in the case of the young turnip, lime would do a vast deal more injury than good. As to lime preserving potatoes, he had known an instance in which it was used last year, and the potatoes grown were just as bad as any others (Hear, hear).

A MEMBER wished to know if any one present had tried the effect of cutting straw into litter for the purpose of littering his cattle down.

Mr. MECHI said he had for many years invariably littered down with cut straw. The liquid as it ran from the animals saturated the straw, and every morning the straw was thrown into the tank.

Mr. WOOD said that as regarded Mr. Turner's observations on the subject of box-feeding, he could state that having tried box-feeding on Mr. Warnes's plan, he found no evil results as respected the health of the animals. He had at that time a bullock two years and a half old, who was subjected to that system, and he was quite as large, and as fine, as beasts usually were at that age, when suffered to run about. He had found, indeed, that bullocks accustomed to running about had not grown so fast as others when shut up in a box (Hear, hear); if the animal had been brought up to it, it seemed to have no effect at all on the growth. He had never seen any animals kept in stalls so clean as those which were kept in boxes. As regarded the manure, he would remark that it was invariably carried from the box to be laid at once on the land; and experience had taught him that it was better to use it in that state than to suffer it to decompose at all.

Mr. BODDINGTON said that he did not think there was any material difference of opinion amongst those who had engaged in the discussion; one gentleman had told them that he threw it up a week before he used it, and the question which that suggested was—how long it took to bring the manure into a certain state. No one had maintained that manure kept from February to May was better than manure kept for only a week or a fortnight (Hear, hear). They often heard men say—“We will leave that manure in a heap for such and such a time (generally a few days only), and then it will be ready for use;” and this remark suggested the real truth of the matter. The grand point was to hit the happy medium. He thought that manure if taken out and left for a week or ten days would be much better than if applied at once in the shape of straw. He really did not believe that there was much difference of opinion on that point.

Mr. TURNER wished to ask Mr. Nesbit whether, when liquid ran away, it was better to have it mixed with manure or carried somewhere else. He was against applying any liquid manure by itself; he had never seen any good effects arising from it. He had tanks underneath his yard, and it was an invariable rule with him not to let it run away, but to catch it in the tank, and then fix it with something. It was a well known fact that the entire liquid manure of a good farm would not manure two acres of land in the course of a year; where-

ever it was applied in a liquid state, it appeared to do scarcely any good whatever.

Mr. MECHI begged to state that some liquid manure mixed with sulphuric acid had grown the finest wheat on his farm. Of course they were all aware of the fact that carbonate of ammonia was so volatile that unless it were absorbed in some way there would remain nothing but water.

Mr. HARVEY expressed his thanks to Mr. Nesbit for having introduced the subject; as farmers, they were all indebted to scientific gentlemen who brought such subjects under their notice. It was possible that there might be points upon which, as practical men, they differed from the chemists; but he felt bound to say that they, as practical men, often committed much greater mistakes than lecturers on chemistry. Allusion had been made that evening to the effect of nitrate of potash or soda upon cereal crops. His own experience, and that of gentlemen with whom he was intimately acquainted, was in favour of buying such substances to use every year. As regarded liquid manure, he might state that in his own county (Norfolk) the practice was to make manure heaps as close to the tank as possible, and to apply to them the liquid in a manner very similar to what had been stated by Mr. Nesbit. First there was a layer of earth, then the liquid was applied; and then there was another layer of earth, until they were obliged to carry away some portion of the manure.

Mr. HALLETT could bear out the statement of the preceding speaker. During the last seven years he (Mr. Hallett) had paid great attention to the subject of manuring; he had the tank and the dung heap as near to each other as possible, and the liquid was emptied upon the heap every morning; the manure was kept for six months. He had received a premium from a society for the experiments which he had tried. He thought it was much better to take the manure from the heap than to take it raw from the animal. By applying 15 cwt. of manure, of the kind which he had stated, he had obtained four tons per acre more of turnips than by adopting another course. He admitted that they could not always keep manure for six months, and had himself occasionally thrown the manure on the lands, and then covered it up. The result of his seven years' experience on this subject was, that the best plan that could be adopted was that of keeping the manure hot, and letting the liquid flow over it every morning.

Mr. NESBIT said: I have one or two observations to make in reply. What I have said about long dung and short dung seems to have been quite misunderstood. I maintain, as I did before, that a ton of dung which has been rotted is far more valuable than a ton of dung which has not rotted. I do not maintain for one moment that it is necessary or proper to rot dung, and I never said so. What I say is, that if two tons of dung be rotted into one, the one ton which is left will be more valuable than that which has not been rotted. I repeat also that that dung which is fermented will be the most valuable in the case of those plants which grow the quickest. It appears evident that plants which

are growing quickly, such as clover and turnips, must have that which they require supplied to them quickly; and what I assert on the subject of rotted dung is, that the substances which go away are not so valuable as those which remain. When I speak of rotted dung, too, I suppose that the greatest possible pains has been taken to prevent the washing away of soluble matter. As regards nitrate of soda, I still hold that the application of that substance in limited quantity has good effect on corn crops; and I have constantly heard of salt being used for the purpose of strengthening the straw and filling the grain of wheat. Another point is, that we cannot reason upon a sure basis until we know the quantity of water that is contained in manures. One kind will contain 50, another 80, and another 90 per cent., and until we know the actual quantity of water there will always appear to be discrepancies. I maintain now, as I did before, that a ton of fermented dung is of more value than a ton of dung which has not been fermented; but I do not say that the dung of a farm ought to be rotted (Hear, hear).

The CHAIRMAN said, I have felt very much interested in the discussion which has taken place this evening. All that I have heard convinces me that we are as yet very imperfect in our knowledge of the proper application of chemical manures, and likewise what I stated at the commencement, that the management of farm-yard manures is anything but what it ought to be (Hear, hear). I quite approve of the remark made by Mr. Nesbit as to manures being kept as free from water, and from exposure to the air, as possible. Mr. Nesbit has alluded to Mr. Warnes's plan. That is a plan which is known, I believe, to every farmer in this room, and many members of the club are adopting it. I wish, however, to add, that I have a friend here who is going beyond Mr. Warnes's plan. My friend, Mr. Cook, from Suffolk, has for the last two or three years completely covered in his yards. By so doing he has got rid of the expense of making tanks, and also obtained an opportunity of commanding whatever degree of heat is necessary for his animals, which are not confined under that arrangement. Although the outer buildings for this purpose may require as substantial walls as common farm-yard buildings do, still the interior of those buildings can be constructed on a more simple and less expensive plan. I have no doubt we shall soon see the management of our animals in a very different state from what it is at present; and if we do not carry out the system of Mr. Cook, I feel persuaded that our animals will be placed either in boxes or in some position in which they will be under the farmer's control. With regard to liquid manure, Mr. Turner has asked what is the use of it. I have had some little experience of it, and it certainly at first it did not answer my purpose. I have found that when applied to the surface it produces no benefit; but, if it be placed in the manure heaps in the manner suggested, I hope the best results will follow. I trust that none of us will run away with the idea that liquid manure is useless. I agree with Mr. Mechi that it is quite sinful to let it pass away. I am one of those who

think that we cannot entirely depend on chemists in the present day as to the application of chemical manures; but I do think that practice and science combined will be able to benefit the agricultural community to a great extent. We are greatly indebted to Mr. Nesbit for the manner in which he has brought forward this subject; and I am satisfied that, the more we turn our attention to the application of chemical manures and the management of farm-yard dung, the better will be our crops (cheers).

Mr. SHAW, of the Strand, rose to propose a resolution in reference to the subject of the discussion. He said, although there might be some difference of opinion, between scientific men and practical farmers, yet it was on the discussion of such different opinions that the usefulness of the club, in a great measure, depended, and could not fail to be attended with benefit to agriculture. They had not yet arrived at a period when science and practice were sufficiently united: on occasions like these, practice would gather something from the emanations of science, and science would direct its movements all the better from what it learnt from practice (cheers). The resolution which he would propose was as follows:—

“That this meeting is sanguine in the expectation that great benefit will result from the use of chemical manures, and from the better management of farm-yard dung, and desire to record their thanks to Mr. Nesbit for his lecture this evening.”

He had worded this resolution as cautiously as possible, not being prepared to see the meeting commit itself to a determinate resolution as to the advantages of any particular points in the application of science, because he thought as yet they were only beginning to look through the vista at the future.

Mr. HUTLEY seconded the resolution, which was carried unanimously.

Mr. NESBIT briefly returned thanks.

Mr. SHAW proposed a vote of thanks to the Chairman, for his general attention to the interests of the club, and for his conduct in the chair that evening.

The CHAIRMAN said that, so long as he could be of service to the club, his efforts would never be wanting. He was proud to find that, during the short period that he had presided over the club, it had been in a most flourishing condition. He had told the members that it only required firmness and determination on their own part to ensure prosperity; and he was persuaded that the more interest they took in agriculture, the more importance would the club acquire in the eyes of the country.

The meeting then terminated.

YORK FARMERS' CLUB.—The following are the subjects for discussion for the three ensuing months:—May 13th, On the Growth of the Turnip. Mr. H. Hawking.—June 10th, On Agricultural Statistics. Mr. White.—July 1st, On Pleuro-pneumonia in Cattle. Mr. E. Allen, surgeon, York.

## THE LONDON FARMERS' CLUB.

## MONTHLY MEETING OF THE COMMITTEE OF MANAGEMENT.

Present—Messrs. R. Baker, W. Bennett, W. R. Browne, G. Emery, W. Fisher Hobbs, W. Hutley, T. Knight, E. Lewis, T. Mount, J. Oakley, J. Pain, W. Purser, W. Shaw, of the Strand, W. Shaw, of Northampton, R. Smith, of Burley, R. B. Smith, of Edmonton, J. Tyler, and J. Wood.

W. Shaw, Esq., in the Chair.

The Minutes of the last Committee Meeting were read, confirmed, and signed by the Chairman of this day.

The following gentlemen were elected Members of the Club :

Rev. R. T. Baker, 9, George-street, Minories  
C. M. Bidwell, Ely  
J. Bromley, Derby  
W. Carter, Boughton, Faversham  
S. Cheetham, Oakham, Rutland  
J. A. Fullarton, 19, East Claremont-street, Edinburgh  
J. Hutley, Rivenhall, Witham  
P. Love, Manor Farm, Naseby  
R. Mills, Inkpen, Hungerford  
J. Neame, Selling Court, Faversham  
R. W. Purchas, Pilstone, Monmouth  
J. Peachey, 17, Salisbury-square  
C. Stokes, Kingston, Kegworth, Nottingham  
T. Turner, Croydon, Surrey  
J. P. Williams, 1, Plowden-buildings, Temple

The names of fifteen other gentlemen proposed as members were read the first time.

Another Report from the "Tenant Right" Committee was received and adopted, and a Sub-Committee appointed to prepare an Address to the Members of the London and Local Farmers' Clubs on the subject.

On the proposal of Mr. Lewis, of Huntingfordbury Park, the following was substituted for the Discussion subject as placed on the card for the 3rd of May :

"On the advantages the Tenant Farmer would derive from the removal of Smithfield Market."

It was also arranged that Mr. Shaw, of the Strand, should, on the same day, bring the question of Agricultural Statistics under notice, with a view to take the opinion of the Club on the Bill on that subject now before the House of Commons.

It was resolved that the Meeting for the discussion of these important matters should commence at three instead of seven p.m.

A variety of other business was gone through, and a little after five the Meeting broke up.

April 12th, 1847.

## ON THE CULTURE OF THE CARROT IN GARDENS.

There are very few, whether in the higher or lower ranks, who do not take pleasure in watching the progress of vegetable life, not only in the flower, but also in the kitchen garden. Such persons cannot fail to have been struck with the extreme difficulty, nay, almost absolute impossibility, of raising good early carrots in old gardens. Whatever may be the cause, the fact is certain that, however beautiful may have been the braid, no sooner do the plants attain the thickness of one's little finger, than they are attacked by the worm. As this does not take place in the field, the probability is that the rich fat soil of the garden is peculiarly adapted to fostering the destructive insect. Various remedies have been tried by amateurs, particularly trenching and liming, with some, but very partial, success. The following remedy was suggested to the writer by the late Mr. Henderson, formerly head-gardener to Lord Panmure; and he has found it more successful by far than any other plan. It is simply to thin the carrots when in the seed-leaf, leaving the plants at the distance of six or eight inches from each other in the drill lengthways, and let the drills be six inches apart. The following is a detail of the whole operation, as successfully practised by myself for many years: I mix the seed with about three times the quantity of sand, or fine earth, but *not* garden mould. This I place in a milk plate, or other flat

dish. This I place, if possible, in a room where there is a fire; and, when there is sunshine, I place my dish by a window exposed to the south. The mixture must be turned and watered at least once in the two days. When the seeds have fairly sprouted, I then dig the carrot bed, which should have been previously dug in the end of the year, so that the soil may be pulverized by the winter's frost: the mould must be made as fine as possible. I then stretch my line along my bed, and with a light hoe I scratch a slight hole about the depth of half-an-inch, and at from six to eight inches from each other. Into each hole I deposit a pinch of my mixture; and, if it has been carefully prepared, there will shortly appear about five or six plants from each hole, which, of course, must have been filled with mould as soon as possible after the seed has been deposited. The ground having been newly dug, and the seeds being sprouted before they were sown, they will come away quickly, and before the weeds get up. Whenever they can be discerned, the strongest plant must be selected out of each cluster, and all the rest must be pulled out; but a stock of lettuce, to be early removed however, may be put in between every two plants. The whole operation can be accomplished in less time than by the usual method, and with much more regularity as well as a saving of seed.

## ON THE SCIENCE AND APPLICATION OF MANURES.

We have perused with very great satisfaction "A Lecture on the Science and Application of Manures," by the Rev. A. Huxtable, whose name is already so usefully and honourably known to the agricultural world by the exertions he has made to shew the advantages which must result from uniting "Science with Practice." We cannot better exemplify the usefulness of this lecture than by availing ourselves of the information contained in its pages, to answer the inquiry of a correspondent, who says—

"What is the necessary ingredient for his land to increase the quantity of corn? The soil is of a duffy nature, upon a gritty rotten whirstone, which grows a large quantity of straw in general, but deficient in quantity of corn to the acre. By the application of lime he finds the land becomes firmer for a time, yet grows as much straw and but small increase of corn. Turnips are grown with dung and guano upon it, and the most part of them are eaten on with sheep instead of bare fallow. The land is also well rolled, after being sown with corn, to make it firmer."

Upon this subject the Rev. Mr. Huxtable observes—

"By what process of cultivation, when we manure highly for wheat, the straw can be so much stiffened as to bear the increased weight of ear, is at present, in my humble judgment, one of the great problems in agriculture that presses for solution; as it is well known that this stiffness arises from the presence of the silicate of potash (an imperfect sort of glass), chemists have suggested that this soluble silicate, or that of soda, should be added to the ammoniacal manures which we use for wheat: but these salts are expensive; nor am I aware of any experiments having been made which would justify our incurring the outlay for them. Moreover, some interesting facts mentioned by Professor Johnston (*Journal of Agriculture*, p. 103, 1845) shew that there is already abundant silica in our cultivated soils, and that plants are able to decompose and extract silica for their use, even from the most stubborn silicates. If there be alkali enough at hand, the vital forces of the smallest living plant will form the silicates it needs—a process which man accomplishes only by the blast of the hottest furnace. I think, therefore, that in seeking to remedy weakness of straw, we should rather try to diminish that rankness of vegetation in our corn crops, which causes that weakness; and this I think we can accomplish by a simple application. I think there is one cheap and effectual remedy: it is common salt. This will make the straw heavier and stiffer, and correct the tendency of the ammonia, in the manure, to produce a rank vegetation.

Mr. Prideaux, of Plymouth, informs me that wheat grown very near the sea stands up better than that grown inland. Mr. Hannam testifies to the increased weight of the straw. Mr. Gardiner (*Highland Transactions*, p. 239, 1844) states, 'that 3 cwt. of salt per acre, thrown over wheat in May, produced no change of colour, but improved the tillering of the plants, which had small stiff, shining, wiry straw.'

"Bones digested in sulphuric or muriatic acid have the same tendency to check rank vegetation and to strengthen the straw; see *Mr. Gardiner's Experiment*, p. 242; also an experiment of Mr. Fleming (*Johnston's Lectures*, Appendix, p. 28), who dissolved his bones in muriatic acid, and applied the mixture to oats sown upon moss: he says that the straw appeared as stiff and shining as if it had been grown upon stiff loam.

"I think, then, that a *perfect* topdressing for the wheat crop, on light lands, should be composed of 2 cwt. of bones, well digested in 1 cwt. of sulphuric acid, 5 cwt. of shoddy, and 3 cwt. of salt; thus, in good years you might, I believe, grow six quarters of wheat per acre. On all light soils this assistance to the wheat should be given in the spring; but as in clay the decomposition of the shoddy is so slow, I should apply this manure when I sowed the wheat on my heavy land in the autumn. There is yet another way of growing a heavy crop of wheat on clay: lime the fields in the autumn, two or three weeks before sowing; top dress, in the spring, with superphosphate of lime, 3 cwt. of salt, mixed with 30 bushels of clay ashes, which have repeatedly been soaked in urine. I am vain enough to believe that this manure, suggested for wheat, will prove valuable, and quite worth the half-crown which you paid for your tickets."

We earnestly recommend every farmer to get a copy of this lecture; it is published by Simonds, of Dorchester. A cheaper eighteenpenny-worth of useful information has never been offered to the agriculturist.

## PRACTICAL OBSERVATIONS ON DRAINING.

BY GEORGE BROWN, CAPESTHORNE, NEAR CONGLETON.

London: Whittaker and Co., Ave Maria-lane.

The general attention which is paid to drainage at this time is evidenced by the large sums applied for under the late drainage act, and therefore these "practical observations" are most opportune. The author, in giving the results of his own experience, which extends over a period of thirty years, during which time he has laid several hundred miles of drains, lays down some valuable rules, and gives most improving practical hints on this greatest of all agricultural improvements.

## BOTANICAL SOCIETY OF LONDON.—THE POTATO DISEASE.

APRIL 9.

Mr. DENNES, having briefly addressed the meeting in reference to the subject of the establishment and progress and utility of the society, proceeded to read the following communications on the subject of the potato disease from Dr. Parkins and Mr. Taylor :—

“ Sir,—Accompanying this is a work lately published by me on ‘The Prevention and Treatment of Disease in the Potato and other Crops,’ which I have to request you will present to the Botanical Society, in my name.

“ Allow me, at the same time, to state that my object in publishing this work has been to show that the different forms of carbon possess the property of preventing the ravages of the potato pestilence. Agreeing, as I do most fully, in the conclusion drawn by so many writers, that the potato has been too extensively cultivated, particularly in Ireland, still, when we remember the valuable properties possessed by this root, and the impossibility of supplying its place by any known esculent, it becomes an object of the most vital importance to ascertain if any means exist capable of arresting the progress of this modern pestilence in the vegetable creation.

“ Although I have considered it necessary in that work to state the premises from which my deductions are drawn, in order to explain the *modus operandi* of the agents recommended by me, I deem it right to add that unless my views had been supported by practice as well as theory, I should not have presumed to recommend to others the adoption of means intended to remedy an evil of such magnitude. Independently of the evidence there advanced in support of the efficacy of charcoal in preventing the ravages of the disease, it has been my object to show that the employment of those substances which liberate carbonate acid gas has not only been sufficient to save the crop, but that it is to this circumstance, or the liberation or non-liberation of the gas, we must attribute the apparent anomalies and contradictory reports respecting the application of the different preparations of lime, and the muriate of soda, or common salt.

“ When the land has been dressed with salt and lime a double decomposition takes place, according to Sprengel and Boussingault, the acid of the salt uniting with the lime, and forming muriate of lime, while a portion of the carbonic acid will unite

with the soda, and form carbonate of soda. As, however, a small quantity only of the gas can be combined with the soda, and as the remainder will be liberated, to the action of this gas I have ascribed the benefit that has been derived from the employment of salt and lime when the latter has been a carbonate. As in order to produce such a result it is necessary to employ a carbonate of lime, we have an explanation afforded of the cause of the failure of these agents at other times and under other circumstances.

“ The same circumstances afford an explanation of the cause of the success and failure of these substances when used alone. Thus, when the lime has been in the form of a carbonate, and acids existed in the soil to which it was added, the same liberation of carbonic acid gas would take place as in the former instance. If, however, acids or neutral salts were not present, no decomposition would take place, and no gas would be liberated. So, again, when salt has been employed as a manure—a practice constantly followed on the greater part of the coast of England—the same extrication of gas would occur if chalk or lime existed in the soil, while none could be effected if the latter substances were absent. Hence the contradictory accounts that have been given of the success and failure of these agents when employed separately, the same as when used in combination. Believing that these different results from the employment of the same agents, and their failure under the circumstances pointed out by me (and, as far as my inquiries extend, the want of success can always be traced to the causes now assigned), confirm the truth of my deductions more than those direct experiments with a particular substance, the result of which has been invariably the same, I have been induced to call the attention of the society to this subject in the hope that more evidence may be collected in confirmation of my views, as there are few farmers who, in certain parts of England, have not employed one or other of these agents. On a future occasion I purpose offering for the consideration of the society a few remarks on the cause of the failure, and which time does not allow me to do now.

“ I have the honour to be,

“ Your very obedient servant,

“ J. PARKINS.

“ The Secretary of the Botanical Society.”

## "REMARKS ON THE POTATO DISEASE, BY

W. TAYLOR, F.L.S.

"Various opinions have been given respecting the 'potato disease.' Some say it is owing to a deficiency of 'starch;' others say it is in consequence of the bulbs being stored up in 'pits,' which produces fermentation, and causes the 'tubers' to throw out radicles or wasters, as they are termed. Now, as far as physiology is concerned, it is perfectly absurd, because all succulent bulbs, such as the potato, tulip, hyacinth, and onion, are naturally full of watery matter. This being the case, they will vegetate in any place, whether dry or damp, hot or cold; and independent of all this, their vegetative powers are still going on, producing fibres or 'wasters,' which nature has deemed right and proper.

"The 'solanum,' or wild potato of the woods in America, has been diseased in the same way as our cultivated ones, which have never been subjected to pits, nor allowed that privilege. This is evidently a sufficient proof the disease does not arise from the bulbs being put into pits; not only the potato has become diseased, but the 'olive plantations,' Indian corn, apple and pear crops, culmiferous and leguminous plants, oleaginous plants, as well as forest trees.

"The author considered that the disease arose principally from atmospherical changes which have taken place during the last two years, and had caused a peculiar effluvia to arise in the air; 'the celluliferous,' or cells of the bulbs, became impregnated with this noxious vapour; conse-

quently, the cellular tissue became ruptured and overcharged with a mass of inorganic matter.

"There cannot be any cause for indicating, in the least, the potato disease should arise from the bulbs bringing forth 'radicles' or shoots, before they are planted, because all bulbiferous plants are full of water, which compel them to vegetate; for instance, culmiferous and leguminous seeds will never have the power of vegetating, without they come in contact with air and earth. Now, it appears the potato was first introduced into this country by Sir Walter Raleigh, in the year 1597. More than 200 years have passed away without having the slightest appearance of disease. (Mind you,) if the seed of the disease had been planted 100 or 20 years ago, it is very evident it would have made a much more rapid progress than it has hitherto done. It is only two years since the crop has become almost a total failure."

The CHAIRMAN begged to observe that that society entirely discountenanced the notion, which was so industriously put forward, that the potato disease was owing to the prevalence of a particular description of insect; and from various communications which he had had with the most eminent scientific men both here and on the continent, the idea that the disease was attributable to any such cause appeared to be equally repudiated by them all.

A short discussion on the subject of the potato disease then ensued, in which Messrs. Parkins, Ayres, Hassell, and Ward took part; after which the chairman announced their next meeting for the 7th of May.

## WEST HEREFORDSHIRE FARMERS' CLUB.

The monthly meeting of this association took place at their club-room, Bredwardine, on Monday, the 1st March. The subject selected for discussion for the evening was "Tenant Right," when upon its introduction by the chairman, an animated argument ensued, almost every member expressing his opinion on the utility of the measure. The secretary then moved the adoption of the following resolutions, as embodying the sentiment of the meeting, which was at once unanimously agreed to:—

1st.—That it is the opinion of this meeting that a well-digested law of "Tenant Right" would be equally advantageous to the landlords, the tenant, and the nation:—first, to the landlords, by holding out to the tenant an inducement to invest his capital in permanent improvements by which their land would be much enhanced in value, and also by securing them against loss from dilapidations caused by ignorant and slothful tenants.

2ndly.—To the tenants, by securing to them, at the expiration of their term, the repayment of their capital so laid out in unexhausted manure and improvements; and

3rdly.—To the community at large, by securing to it the full amount of food the land is capable of producing, which amount it is now generally acknowledged would be increased, by a large capital being employed, at least one-fourth.

That in order to prevent harassing and expensive litigation on the question of amount of dilapidation and compensation, an arbiter should be chosen by each party, they nominating a referee, whose decision should be final.

Mr. Plant then announced to the meeting that Sir Velters Cornewall, Bart., had signified his intention of presenting to the club an annual sum of five pounds, to be applied for the benefit of agriculture in such a manner as the society should

deem most advisable. This communication was received by the members with general acclamation, and a vote of thanks to the worthy baronet was immediately proposed by Mr. Hadley, seconded by Mr. Parry, and carried unanimously. A resolution was also passed that the mode of applying the above sum should be taken into consideration at the next meeting.

Mr. Richard James also communicated to the meeting that it was the intention of the Messrs.

Carless, of Hereford, to present to the members for distribution and experiment a portion of seed of a new kind of Swede turnip. This being the second present of seed from those gentlemen, a vote of thanks was unanimously carried to them.

The usual hour of breaking up having arrived, the members separated congratulating each other upon the free and unrestricted interchange of thought and opinion to which the discussion of the evening had led.

#### NEWCASTLE FARMERS' CLUB.—THE MANAGEMENT OF MILCH COWS.

At the April monthly meeting (William Anderson, Esq., V.P., in the chair), the following donations were announced by Mr. Glover, the secretary, viz., the Journal of the Northumberland Agricultural Society (from the committee), and a list of the premiums offered by the Highland and Agricultural Society for 1847 (from the secretary). Solly on Rural Chemistry, White on Cattle Diseases, and the "Farmers' Friend," were ordered. Thanks were voted to James Archbold, Esq., Mayor, Colonel Bell, and John Moor, Esq., for the facilities which they had afforded in connection with the late competition at Fenham. New members were elected, viz. :—

Bell, Joseph, High Waskerley.  
 Donkin, Samuel, Bywell, Felton.  
 James, Edward, Wylam Hall.  
 Laws, William, Prudhoe Castle.  
 Laws, Peter, East Heddon.  
 Robson, John, West Chirton House.  
 Robson, Rev. James, Ponteland.  
 Walker, Tony, Brinkburn, Westoc.

Mr. CHARLES ARUNDALE, of Seaton Burn, introduced the subject of which he had given notice:—"The Management of Milch Cows." Cows, he said, were kept on almost every farm, although for very different purposes. He should confine himself to cases in which they were kept chiefly to supply milk for sale. To meet the demands of customers, cows were bought at all seasons, just calved or about to calve. The calves were sold without fattening, and it was the interest of the farmer to render the milk both abundant and palatable. On most real dairy-farms it was the course to fatten as soon as practicable, when the milk of the cows was reduced to four quarts a-day, and the cows were rarely allowed to breed. The fact of their being so often changed showed that while they gave a remunerating quantity of milk, for a certain time, they were rapidly and cheaply fattened for the butcher as soon as their milk was dry. Where much time or money was expended

in preparation, this system would not answer, nor would it be so universally adopted. Fattening and milking properties could therefore combine in the same animal, and they did so here. The breed generally found most useful was the old Yorkshire cow, or a cross from her with a short-horn bull. The cows that were more than ordinarily good milkers were introduced to the bull in season; and from the extra keep which was given, they were rarely suffered to go dry for more than six weeks. Much more care (observed an intelligent writer) should be bestowed on the diet of cows as they approached their time, the food being proportioned to their condition. When in high condition there was much risk of inflammatory action at the time of parturition. The farmer should therefore check beforehand every tendency to obesity—by giving less turnips than usual, and more fodder. But some cows in calf, when long dry, would fatten on a smaller allowance of turnips; and administering food in too dry a state helped to aggravate the tendency to inflammation. Other means must therefore be used, in conjunction with an alternation in diet; and, so far as medical treatment was concerned, there was nothing perhaps so safe as bleeding and laxatives. The critical period was the eighth and ninth months. At this season, bleeding, in proportion to the strength and condition of the cow, should be resorted to, as a remedy for the constipation to which she was then liable. Laxative medicine and emollient drinks should also be administered. A dose should consist of a pound of Epsom salts, with an admixture of ginger, caraway, and treacle, in a quart of warm gruel and the same quantity of sound ale. Much good advice on this head would be found in *Stephens's Book of the Farm*. The author judiciously recommended that in-calvers, shortly after they were dry, should have four or five pounds of oilcake per day. His (Mr. Arundale's) own practice was to give from a pint to three gills of linseed per day to a cow, according as she was in condition. He put the lin-



seed into a pail, and poured boiling water upon it. Cut hay was also introduced, with oat or wheat chaff; and the whole was covered up with an old sack, and left to steam half-a-dozen hours, before it was given. It was better still to boil the mixture, but this entailed extra labour. He used this food six or seven weeks before and after calving. It was laxative to the fat cow, and nourishing to the lean, and secured in both a proper condition of the parts affected by calving. It was true, as some farmers contended, that to purge or bleed a milch cow diminished her milk; but only for a few days: it afterwards returned more copiously than before, and improved in quality. He was no advocate for either; but, from the want of mild doses in season, many thousands of cows had died, in spite of every care and remedy at a later period. Cows, heavy in calf, he would also observe, ought not to be allowed to mix in the same field or fold-yard with those that were likely to come in season; nor should any disagreeable or nauseous smells be suffered to annoy them. Their byres should be well ventilated; pigs should not be slaughtered where they were kept; and, indeed, some experienced farmers would not allow bleeding to take place in their presence. There was no animal with so quick and delicate a sense of smell as the cow, and her nose should not be offended. After calving, and when the byre had been cleansed from all impurities, the cow, being naturally thirsty, should have a warm drink. He generally allowed her warm water, with about a third of her own beastings, and a few handfuls of oatmeal. A pailful of this mixture was enough at a time. Should she require more, another pailful might be given in an hour; and the drink should be administered occasionally for two or three days after calving. A common but very reprehensible practice was to give her an oat-sheaf, than which few things would more readily cause indigestion at such a time. Boiled barley or oats with cut hay and a handful of linseed, or bran-mash and linseed, was decidedly preferable. Nothing of an astringent nature should be given her, but rather whatever was laxative. He always administered, five or six hours after calving, 12oz. of salts, or thereabouts (according to the size of the cow), and 2oz. of powdered ginger, in a quart of gruel and ale. It was desirable that she should be milked as soon as possible, and fomented with warm water three or four times a day for half an hour, and hand-rubbed frequently and gently. He now came to the question whether it was more profitable to feed dairy cows liberally, and prolong the time of milking, or to let them dry sooner, and regain that condition which they inevitably lose if of any use at the pail. He had tried both plans, and was convinced that liberal feeding and punctual at-

attention would, in many instances, double and treble the quantity of milk. Before, however, describing his practice, he would explain the construction of his byre and boiling-house. [Mr. Arundale exhibited a plan. He had six stands for twelve cows, with a bull-stand at one end. Behind the stands there was a covered passage, with a liquid-manure trough; and also a covered passage in front, with a feeding trough.] He had erected the buildings at his own expense (with the exception of not finding wood and stone); and he confessed the cost was greater than he had anticipated. He would advise others to be more cautious before expending so large a sum on property not their own (a laugh). His mode of feeding was to commence in the morning when the milkers entered; to give mash at 5½ o'clock, turnips at 8½, hay at 10; after which they were left undisturbed until 1 o'clock; and he invariably found that the cows, within a short time of their coming into the byre, knew their meal times as well as the feeder. At 1 o'clock they had turnips again; hay at 3; at 5 (milking time), mash; and at 8, straw; when they were left for the night. The mash was made at about 10 in the morning for the afternoon-feed; and again made, after that feed, for morning. Clover hay, cut, was put into the mash-tub; boiling water was then poured in, so that the hay was thoroughly saturated; and grains were added—linseed or gold of pleasure seed—and salt. The grains formed a cover to confine all the steam. The proportions of the several ingredients were:—Clover hay, 6½ st.; grains, 12 st.; linseed, 12 lbs. (or gold of pleasure seed, 15 lbs.); salt, 2 lbs. This would suffice for twelve cows. When they had nearly finished their meal, the byreman gave them a portion of bran, or treat, in their troughs, which enabled them the better to take the watery remnant of the mash. A good cow, thus fed, would yield 14 quarts of milk per day, on an average, for eight months. He had now in his byre a cow which had been in milk two years and a half, and never in that time had a calf; and it was yielding 8 quarts per day. He had sold another to the butcher, on the previous Tuesday (March 30), for £16, which had been in his possession nearly two years, and yielded three quarts of milk on the morning that she was sold. [Mr. Arundale replied, by facts from his own experience, to the objections urged against the system of good feeding and prolonged milking, and strongly advised dairy farmers to keep their cows warm and comfortable.] As to the steaming of cut hay, or rather, the parboiling of it (which was his plan), he would not take upon him to say that by this means poor hay would be changed into good; but the steaming of hay, straw, or oat-chaff enabled the animal to ex-

tract from it more nutriment; and if a cow could be made to thrive as well on  $3\frac{1}{2}$  cwt. of steamed hay as on 5 cwt. of raw, or if, by the same expedient, a third or fourth straw could be mixed with hay, and the same effect obtained, the expense of cutting and steaming would be amply repaid. The same advantage was gained by grinding corn and beans for horses. As to the plan of putting milch cows in the folds, to avoid the expense of keeping when dry, he hardly supposed that it could be advocated by any gentleman whom he had the honour of addressing. With stock of all kinds, and especially with milch cows, the most profitable course was never to let them sink in condition. If a cow were stinted at the period in question, her milk would be so much diminished after calving as to overbalance the saving effected in her keep. There might be a difficulty, on some farms, in procuring a sufficient supply of provender; but there could be few farmers worse situated than he was, not having one single acre of what might be called good grass land in his possession; and where turnips, early and late kinds, might be grown with tares or clover cut, and the cows stall-fed, none need despair. [Mr. Arundale entered at considerable length into an inquiry as to the daily consumption of milch cows. Their appetites, it would appear, are aldermanic; and if the means were afforded them, they would fall into the same error as "humans," and "make beasts of themselves." Mr. A., of course, gives no encouragement to such excesses, but he strenuously contends for good living in the cow-byre, if you would not be "penny wise and pound foolish." Quantity as well as quality must be taken into consideration. The stomach will not digest rich food alone. As a general rule, give as much good wholesome stuff as the cow will eat clean; and the feeder, if he be attentive, will soon know each cow's appetite almost as well as his own. He must administer it rather sparingly, to avoid giving a surfeit; for if the cow should loathe her food, she will neither milk nor fatten; and if, by chance, she should be disgusted, let her food be kept back until her appetite returns, when it may be given to her gradually.] The act of milking (continued Mr. Arundale) required to be performed with great caution, or the quantity and quality would be inferior. The milk should be drawn quickly, and not a drop should be left. Whatever was suffered to remain in the udder would be re-absorbed, and no more would be generated than was necessary to supply the quantity withdrawn. There was therefore a double loss by the neglect, and of the best milk too. He was inclined to believe that incomplete milking was the cause why, in private families, where only one cow was kept, it dried so soon, and gave so much less

butter than was anticipated. Teats were not unfrequently closed, through the neglect alluded to, and from forcible rubbing down, between the finger and thumb, in stripping. The milk-pail should be large enough to contain the milk of one cow; for if the milker had to rise up and change the pail in the middle of the operation, some cows kept back their milk. Cows, also, would not milk so freely with a stranger as with a person to whom they were accustomed. Some cows milked more freely than others. The udders of free milkers had a soft skin and short teats; the others a thick skin and long teats. The one felt like velvet; the other like untanned leather. If the udder were foul, it should be washed before milking. The slightest taint gave a bad taste to the milk, especially when the cows were stall-fed on green meat. On the continent the stool of the milker was a light pail, with a cover, containing water and a sponge (or cloth). Cleanliness, in every respect, could not be too strongly enforced on the minds of all persons connected with the management of milk, butter, or food. Some persons maintained that cows yielded more milk the oftener they were milked. He had made repeated experiments with a view to test this doctrine, and found it to be fallacious. It was only when the secretion was rapid, and the udder would not contain the milk, but allowed it to drop spontaneously, that a third milking became necessary. After calving, however, he frequently milked them three or four times a day, for eight or ten days. The cow being a sensitive and capricious animal, she was easily offended, and should always be treated with gentleness. If she kicked during milking, or were uneasy, harshness would not cure her: she must be soothed and reformed by kindness. He never yet had a cow which was not overcome by gentle discipline. Mr. Arundale quoted Sir John Sinclair, Professor Low, and Mr. Ferguson, on the importance of dairy husbandry. Sir John showed how much greater a profit provender would yield, when given to a cow, for conversion into milk, butter, and cheese, than when given to an ox, for conversion into beef. How unaccountable, then, the prejudice which confined dairy husbandry to a few counties of Great Britain, while butter and cheese were imported from other countries! (Mr. Arundale, of whose address we give but an outline, resumed his seat amidst general applause).

A short discussion ensued. Mr. Arundale stated, in reply to members, that boiled turnips gave the butter a stronger taste than raw; that he turned the cows out for a few hours on fine days; that they were troubled with cutaneous irritation when kept continually in; that he never turned them out in winter, save incalvers; and that to dress them

down with a whalebone brush once or twice a-week kept them in good order.

Mr. RAMSAY said he had heard Mr. Arundale with much pleasure, but would like to have had a debtor and creditor account—what was the cost of feeding, and what the produce of the milk. It was always desirable to know whether a system was profitable or the contrary. He quite agreed with Mr. Arundale that cows should be fed well—extremely well. Of course the feeding must be varied according to the design of the dairy, whether it was the milk that was required, or butter. Mr. Arundale fed for milk, but his plan might not produce the most butter.

Mr. ARUNDALE: Undoubtedly the feeding must be different, if the object be different.

Mr. RAMSAY, after referring to one or two other things, spoke of the Ayrshire breed of cows as

yielding the most milk in comparison with the food they consumed.

Mr. ARUNDALE said the Ayrshire cows were excellent for butter, but not so good for milk. If he did not obtain 13 quarts a meal, he thought the cow a bad one.

Mr. RAMSAY called attention to glass milk-bowls, as superior in many respects to others; and stated that if a small quantity of soda—a handful or so—were thrown among boiling linseed, it would burst and form a fine pulp, almost (if not quite) as well as though it were crushed.

Mr. ARUNDALE mentioned, on the authority of the Rev. Mr. Huxtable, that a wine-glassful of chloride of lime, thrown into the milk before churning, would sweeten it better than saltpetre.

On the motion of Mr. Ramsay, seconded by Mr. Stephenson, a vote of thanks was given to Mr. Arundale, and the meeting broke up.

## REPORT ON THE EXHIBITION OF IMPLEMENTS AT THE NEWCASTLE-UPON-TYNE MEETING OF THE ROYAL AGRICULTURAL SOCIETY.

BY JOSIAH PARKES,

Consulting Engineer to the Society.

The show at Newcastle-upon-Tyne constituted the eighth anniversary of the Society's country meetings; and although it is true that so large a number of implements was not exhibited as on one or two former occasions, yet applications were made for seventeen more stands than at Shrewsbury, and more exhibitors appeared. The show-yard did not perhaps contain so many implements as at Shrewsbury; but this was, doubtless, attributable in part to the great distance of the exhibition from those districts of England where the implement-makers chiefly reside, and was partly owing to the repeated expression of the judges' opinion that exhibitors would act more wisely in restricting the number of their specimens to a fair measure of variety in respect of manufacture and cost, rather than in augmenting their expenses and encumbering the show-yard with repetitions of identical articles. A marked improvement was visible in the adaptation of several important implements to their uses, as will appear from the observations of the judges.

*Ploughs.*—The only fault to be found with the ground destined for the trials of the field implements was that the heavy land did not prove to be so stiff as is desirable on these occasions. In other respects the choice was perfectly satisfactory both to the judges and exhibitors, and the condition of the soil for the various trials could not have been more suitable at any period of the year.

The trial-ground was conveniently situated about two miles from Newcastle, at the farm of Mr. Henry Hall, of Gosforth Cottage, with whose preparations and attentions the stewards and judges had every reason to be well satisfied.

Ploughing was first commenced on the light land, seventeen implements having been selected for competition, some of which were furnished with two wheels, some with one wheel, and some worked without a wheel, or as swings; each plough being set to complete a land, without the interference of any party on the spot, until the whole performance was complete.

The manifestation of superiority in favour of the two-wheel ploughs made by Messrs. Howard and Co., of Bedford, was unquestionable, and in all the respects which would guide the judgment of a competent farmer in his choice of this important implement. They had two ploughs in the field, bearing the marks J. A. and H. L. It was the latter plough to which the judges awarded the prize of 10*l.*, remarking "that the sole of the furrow was cut perfectly flat, the land side clean and true, the furrow-slices were laid with perfect uniformity throughout the field, and in a beautiful position for receiving the seed." The J. A. plough was considered to be next in merit to the H. L., and but in a trifling degree inferior to the latter.

Good work was done by several other ploughs in

the field—the judges commending those respectively made by Mr. Grant, of Stamford; Mr. David Harkes, of Mere, Knutsford, Cheshire; and Messrs. Barratt and Ashton, of Hull; but observing that these parties “have much lee way to fetch up before their implements can equal the work done by Messrs. Howard’s plough.”

Fourteen ploughs operated upon the heavy land, and nearly similar distinctive characteristics were appreciated in the results; the judges again awarding the society’s prize of 10*l.* to Messrs. Howard’s H. L. plough, the work of the J. A. being next in quality—commending the performance of a two-wheel plough by Mr. Roberts, of Warwick, which, however, was thought to break its furrows too much, and to be better adapted for fallowing than seeding—with approbation of the work done by the ploughs of Mr. Harkes, and of Messrs. Barrett and Ashton. The judges did not consider the excellence of Messrs. Howard’s work on this heavier land to be quite so transcendent as on the lighter soil; and conceived that the makers would have done well to change their mould-board for the deeper furrow ploughed in this case, rather than have retained, as they did, the same mould-board which was used on the light land. They, nevertheless, gave it as their opinion that no plough exhibited on this occasion possessed the power or construction to move soil to equal depth, and with the same precision, as Messrs. Howard’s implements.

*Skin or Paring Plough.*—The offered prize for this implement was withheld, as the work was not considered to have been so satisfactorily performed as to justify the rewarding any of the implements tried, which fell short of the excellence attained on former occasions.

*Subsoil Pulverizers.*—The subsoil of the field on which these trials took place required draining, and was too wet for a perfect proof of the capabilities of implements which ought only to be used on stiff land after being well drained and when in a wet state. The judges again awarded the prize to Mr. John Read, of Regent Circus, Piccadilly, London. The stirrer used on this occasion was not thought to be so effective as it might be made, but the subsoil was unquestionably in an unfit state for this purpose. Mr. Read has, however, since benefited by the suggestions of the judges, and contrived stirrers to suit all states of soil.

The implement made by Messrs. R. Gray and Sons, of Uddington, near Glasgow, received much commendation. Messrs. Barrett and Ashton, of Hull, also produced a pulverizer of considerable merit.

*Scarifiers and Cultivators.*—The show-yard contained a large variety of these implements, many of which were put to trial, as grubbers in the first in-

stance, in a rough fallow, then as scarifiers on a clover ley. The prize was awarded to the well-known Uley cultivator, as it was found to pare the surface very much better than any of its competitors, and it made good work in moving the soil. Still the judges expressed a very decided opinion in favour of the implement for the first time exhibited by Messrs. H. Smith and Co., of Stamford, having nine tines, clearing five feet in breadth, and being cleverly worked by four horses. It is entirely composed of wrought iron, with an excellent lever apparatus for adjusting depth and raising the tines out of the ground. This implement worked in a very lively manner, and was thought to offer less drag to the team than any of the others; but it fell short of the Uley in surface-skinning.

A scarifier by Messrs. Barrett and Ashton, of Hull, was also commended by the judges, who, however, conclude their observations on this class of implements by remarking that they consider them yet open to great objections, and that they need considerable improvement.

The silver medal was awarded to Messrs. H. Smith and Co. for their implement.

*Harrow.*—The judges report most favourably of a new expanding harrow invented by Mr. Rich. Coleman, of Colchester. This implement is mounted on four light wheels, adjustable by levers to govern the depth of penetration by the teeth into the soil, so that it becomes a light or heavy harrow at will. It is readily expanded to cover 12 feet, or contracted to the compass of 4 feet. It worked admirably on very rough land; and the Society’s prize of 5*l.* was conferred on Mr. Coleman for this meritorious invention.

The Norwegian harrow, which created so much interest at the Shrewsbury meeting, and a description of which will be found in that report, was again produced by Mr. Stratton, of Bristol, with several improvements in its construction and means of management. The judges considered the specimen covering 5 feet in breadth to be the best adapted for all descriptions of soil; and observed that it is capable of thoroughly breaking up the furrow-slices from 3 to 6 inches deep, as the farmer may require, leaving the soil in a beautifully pulverized condition. An award of 5*l.* was given to Mr. Stratton, for this implement; and a silver medal to Messrs. Barrett and Ashton, of Hull, for a spiked roller or harrow—a powerful tool, which was thought well adapted for reducing very hard cloddy land, but not calculated to leave it in such fine tilth as the Norwegian.

*Drills.*—The competition for the three prizes offered by the Society was ably sustained by the several well-known skilful manufacturers of these machines. Mr. Hornsby, of Grantham, obtained

the prize for the drill for general purposes; Mr. Hunter, of Ulceby, Lincolnshire, that for turnips on the flat; and Mr. Teasdale, of Burneston, near Bedale, Yorkshire, that for turnips on the ridge.

The remark by the judges, that these invaluable implements may now be considered to rank among the most perfect in the list agricultural machinery, will be appreciated by the members of the society, and the more so by those who know the judges to have been all drill-farmers, critical, and chary of praise.

Mr. Hornsby introduced a very important, though very simple, improvement in the arrangement and weighting of the coulters-levers; and his mode of fixing the levers was considered preferable to that of any other maker. In action, the seed and manure were very accurately deposited and covered.

The prize given to Mr. Hunter for flat turnip-sowing was determined by the fact of his drill—only three others competing with it—being able to deposit and well cover the coarse manure provided by the Society; and the writer is enjoined by the judges to state their opinion that on future occasions the manure for these trials should be prepared by some accustomed drillman, so that its condition may be unexceptionable for the severest trials.

The tilth of the soil for the ridge-work trial is reported by the judges to have been beautiful, and all that could be desired. Drills by Messrs. Hornsby, Garrett, Smyth, and Teasdale competed. Mr. Teasdale carried off the prize, distancing his opponents in the appetite of his machine for manure, and in its power of passing and depositing it accurately. The experiment was made on very extreme and unnecessary quantities; but the judges observe on this faculty, as their predecessors have frequently done, that, in practice, that drill proves at all times equal to deposit the less quantity more certainly, which will deposit the greatest quantity and cover it neatly on a particular trial.

The form of the cone of Mr. Teasdale's rollers proved admirable for the purpose, the ridge being scarcely flattened by them; and the coulters were as well adapted to maintain deposition direct on the ridges, which preserved their true shape, although large quantities of manure and seed were sown and well covered with earth.

The judges observe that all the drill exhibitors on this occasion merit the approbation of the Society for their efforts and success in improving these machines.

A machine, termed by Mr. Garrett the "improved Kent drill," was exhibited and tried to the complete satisfaction of the judges. It is particularly well adapted for use by small farmers, embracing about 5 feet of ground at once, de-

positing and covering both manure and seed perfectly. The Silver medal was worthily bestowed for this implement.

*Drill Pressers.*—Mr. Hornsby was the only exhibitor of this article, but, although no competition was offered, the judges did not hesitate to award the Society's prize of £10 for it, by reason of its superior construction and capital working qualities, being well adapted for all those soils which occupiers may consider better suited to the operation of the presser than the drill.

*Horse Seed Dibblers.*—Two machines of this kind were exhibited—the one, well known, by Mr. Newberry, of Hook Norton, Oxon; the other, a new one, by Messrs. Barrett, Exall, and Andrewes, of Reading. The judges were of opinion that Mr. Newberry's machine had undergone considerable mechanical improvements, and that he had enlarged its scope without requiring greater power of draught: but, on trial, the deposition failed, and for the accidental reason of new paint adhering to the delivering parts, as stated by Mr. Newberry, which the judges fully believed.

The judges anger well of the implement produced by Messrs. Barrett and Co., and trust that these makers will again exhibit it; but, from some derangement which had occurred in its transit to the show-yard, this machine also would not act. Thus the Society's prize for this object could not be awarded.

*Hand Seed-Dibblers.*—Several machines were exhibited for abridging labour of this kind, and for regulating with more precision than hand-dropping has yet done the number of seeds deposited. The prize was given to Mr. Crawford, of Birmingham, and principally because of his implement dropping in one hole a fewer number (yet enough) of seeds than others.

The other competing implements were hand dibblers produced by Mr. Hodgkins, of Birmingham, and a hand-barrow machine by Mr. Newberry, with a single depositing wheel. The number of corns deposited in eleven successive holes by each was as follows:—

Crawford	.....	2	1	2	1	3	2	3	3	1	4	5
Hodgkins, single		5	4	4	2	3	5	4	4	3	4	3
———— double		3	2	1	2	3	3	3	3	2	2	2
Newberry	.....	6	7	7	7	7	8	8	8	10	9	5

The judges commend Mr. Newberry's wheel machine, but consider the quantity of grains put into each hole as unnecessary and unreasonable.

*Hay-Making Machines.*—Two machines only were exhibited, and both were fully tried on a good crop of grass, first spreading it from the swathe, and afterwards reversing the action, *i. e.* turning the same grass back. Both machines acted remarkably well in doing this plain work on even ground; but

Messrs. Smith's machine having a handy leverage for enabling the managing man to depress or raise the spikes quickly—a matter of great practical convenience—an award of £5 was given by the judges to these makers, rather than to their competitor, Mr. Grant, both of Stamford.

*Hay-Rake.*—Mr. Grant, of Stamford, again obtained from the judges an award of £3 for his excellent horse-rake, which was found to be much improved.

*Hay-Rope Machine.*—A very simple and effective machine for twisting hay-bands was produced by a poor working Welshman, Edward Pierce, of Llanassa, near Holywell, which did its work scientifically well, and was rewarded by a judges' premium of £2. Price £5.

*Whipple Trees.*—The silver medal was accorded to Mr. Harding, of Oldsprings, near Market Drayton, for his admirably simple, cheap, and strong dragging bars. These are articles which every farmer should possess.

*Weighing Machines.*—The Society's prize of £10 was adjudged again to Mr. James, of 44, Fish-street Hill, London. It is possible that the amount of portability which could be desired may be unattainable in machines of this kind, combined with the necessary accuracy, and to suit stock-weighing, carts, &c., &c.; yet Mr. James well merits the decision of the judges, his machines, being both in principle and practice accurately honest, and now adapted to a variety of farm uses.

*Chaff-Cutters.*—The prize for this universally necessary machine was again carried off by Mr. Cornes, and for the reasons given in the Report of the Shrewsbury Meeting; but the writer has received no account from the judges of the quantities cut in a given time, nor of the performance and relative properties of the competing engines.

*Linseed Crushers.*—

*Steaming Apparatus.*—

*Churns.*—

*Threshing Machines.*—

*Winnowing Machines.*—

*Root Washers.*—

*Steel Flour Mills.*—

*One-Horse Carts.*—

*Wheels and Axles.*—The writer can give no further account of the perfection of the above enumerated implements than that in the opinion of the judges thereof they merited the prizes and awards accorded to them as the best of their kind in the show-yard; nor is he able to state the extent and nature of the trial or competition to which they were subjected, the judges not having favoured him with any sufficient remarks on the subject, and he having taken no cognizance of the trials or results.

*Horse Hoes.*—The judges of the field implements speak in the highest terms of the utility and safe action of Mr. Garrett's often-rewarded implement of this kind for general purposes, considering that, with the steerage and management now adapted to it, and described in former reports, any fairly-skilled workman may be intrusted with it.

As regards turnip-hoes, the judges still consider that produced by Mr. Harkes, of Meie, Cheshire, rewarded both at Southampton and Shrewsbury, to be the best implement of the kind.

*Horse Works.*—The prize offered for engines of this order was not adjudged, as, although many excellent articles were in the show-yard, no one of them presented sufficient superiority to merit exclusive reward.

*Steam-Engine.*—The above remarks apply also to the steam-engine, Mr. Cambridge having produced the only one, and this had previously received a prize.

*Draining-Tools.*—The show-yard was deficient of any articles worthy of notice on this head, and the Society's prize was reserved.

*Drain-Tile or Pipe-Machines.*—The council would consider it out of place for the writer to give his own opinions on the several ingenious machines for the important purpose of manufacturing drain-tiles and pipes, &c., unassisted by any record or communication of the trials made to him by the judges of that department. He can, therefore, only express his entire agreement in the bestowal of the prize of £20 on Mr. Scragg, of Calveley, near Tarporley, Cheshire, whose machine also took the prize at Shrewsbury, in the report of which meeting an account of it appeared.

It was considerably improved at Newcastle, and so were several of the competing machines; but no one of them, certainly, would be found equal in practical use to Mr. Scragg's.

Mr. Garrett received a judges' award of £5 for a machine invented by Mr. Weller, of Capel, Surrey, which possesses some good properties, and is capable of turning out some very large objects.

The following additional information on the history of the employment of small drain-pipes may not prove uninteresting. The writer had heard from one of his workmen—an old Lincolnshire drainer—that in his youth his father had laid pipes in Sir Thomas Whichcote's grounds of Aswarby, near Sleaford. The story has been confirmed by Sir Thomas Whichcote, who observes—"It is about forty years since the pipe-tiles were laid in the park here, and up to the present time the drains act well. I am not aware of any of them having stopped or given way, although the land is very flat, and in many places the fall not good. The pipes were made by hand, and tapering, so that one end

entered the other, having a clear water-course of two inches in diameter at the small end."

The epoch of the application of pipes to land drainage in Lincolnshire would seem, therefore, to have been nearly concurrent with that by Mr. John Read, at Horsemonden, in Kent.

Mr. Robert Hervey, of Epping, states, that he patented a machine in 1817 for making pipes by vertical pressure, "and in the year following drained three acres of land with them, and they now act as well or better than they did at first. Those I used were one and a quarter inch bore." Further—"In my first experiments I pierced holes round about the pipes, and at the latter end of summer, when they had lain about two or three years, a heavy storm came, and I discovered a stoppage. Upon taking up the pipes at that spot I found one nearly filled with hard worm casts, which being cleared out, I have not been further troubled by obstruction." It appears, however, that a neighbour of Mr. Hervey's found some roots had entered by these *flute*-holes in some pipes crossing under a fence. With these exceptions Mr. Harvey's drains are as perfect, and the pipes as sound, as the day they were laid. He, of course, immediately abandoned the vicious practice of boring holes, from the idea that water could not get into the pipes fast enough at the junction of each pair; but this experience of the inutility of holes, and of the injury which may be produced by openings of only a quarter of an inch diameter, shows the attention which drainers should pay to using those pipes only which are well made, and well fitted at their ends.

It has also come to the writer's knowledge that the late Mr. Boulton, of Tew, Oxfordshire, used pipes of one inch bore, three feet long, made of porcelain, by Mr. Wedgwood, of Etruria, for the conveyance of clear spring-water to his house, in the year 1826. The ends of these pipes were closely fitted into each other, being water-tight, and under pressure, the joint having been made by turning one end and boring the other by means of machinery made at the celebrated manufactory of Messrs. Boulton and Watt, of Soho, Birmingham.

Finding these pipes answer so well for conveying water, they were subsequently used plain as at present—without boring and turning the ends—to drain land, and, the writer is informed, with perfect success up to this period.

*Clod Crushers and Rollers.*—In this department no competitor appeared against Mr. Crosskill's roller, of which he exhibited numerous specimens, varying in size and weight, and adapted to the different purposes to which experience has proved the implement to be usefully applicable. The sum of money placed at the free disposal of the judges being on this occasion much more limited than at

previous meetings, and no prize having been offered by the Society for rollers of any kind, the judges appended to their list of awards an unanimous expression of the estimate formed by them of the merit of this clod-crusher or roller, including a hope that the Council would reward its inventor with the Society's gold medal for its introduction, and for the several successive improvements made upon it by him. At a subsequent meeting, the Council, acting upon the recommendation of the judges, conferred this, their highest, mark of distinction upon Mr. Crosskill.

The judges have further remarked in their communications with the writer, that "they consider this implement, with its latest improvement, to be the most beneficial one used in agriculture exhibited at the Newcastle meeting." The improvement thus referred to consists in the enlargement of the eye of each alternate ring, forming collectively the series of rings or discs of which the roller is composed; so that of these rings, which are 23 in number, 12 have eyes fitting the axle just freely enough to revolve upon it, whilst the 11 alternate rings have their eyes enlarged about half an inch more in diameter. This arrangement has added materially to the effect of the implement in abrading and reducing hard clods; it has also induced among the rings a more efficient self-cleaning movement, when the roller is used on moister soils or softer clods; so that, practically, the scope and power of the roller have been augmented, without adding to its cost, or impairing its extreme simplicity; and it can now be employed on soil when in states which would have clogged it, or have diminished its effect if all the rings on the axis had eyes of similar size.\*

The superior results arising from this disposition of parts are altogether attributable to what is properly termed *action*—mechanical action; and it has been owing to its possessing this function in so high a degree, that Mr. Crosskill's patent-roller has proved to be more effective in comminuting and compressing soil than the common plain roller, or than the serrate-edged ringed-roller with a square axle, first introduced by him. This property will be better understood by narrating shortly the history of the invention.

The use of rollers for agricultural purposes is probably coeval with, or was immediately subsequent to, that of the plough, or of the rudest stirrer of the soil. The roller is found in countries where agricultural processes are in a purely nascent state. In England variations have been long since, and advantageously made, both in the materials and

\* This improvement was suggested to the patentee by Mr. Robert Neilson, of Halewood, near Liverpool.

construction of the implement. Instead of wood—usually a rounded tree of little weight—rollers have been composed of stone, and of cast or wrought iron; they have also been formed of two, three, or more parts, revolving either on the same axle, or on independent axles. But these, whatever may have been the number or arrangement of their parts, were invariably made plane on their surfaces, until Mr. Crosskill, about the year 1832, imagined the form of roller now under consideration.\* His first plan consisted in forming a barrel, by stringing a number of narrow indented rims or discs loosely upon a square axis, the whole revolving, together with the axis, in the journals of the frame. In addition to the saw-like teeth into which the periphery of each rim was divided, other teeth were formed, projecting sideways from the plane of the rim, and in a radial line from the centre, so as to leave no portion of the soil unoperated upon. This roller gradually fought its way into considerable practice, being found to effect a much greater amount of superficial pulverization than the common plain roller. Extended experience disclosed other uses than mere clod-crushing, to which it was applicable; and at the same time pointed out defects which deteriorated its performance and diminished its value. The rolling of young wheat and spring corn, or other plants, was commenced with it, and usefully; but it was found that, on turning short at the headlands, injury was done by tearing up the soil in the act of turning. A greater scope for turning than is convenient was, therefore, necessary to avoid this evil. Another evil resulted when using it on soils at all damp or sticky, from the adhesion of earth to the teeth and their interstices, which further limited its useful employment. Mr. Crosskill, observing these defects, applied himself to their remedy, and in 1842, he took out a patent for the present implement, the improvements consisting, first, in setting each toothed rim free to revolve separately on a round, instead of their being fitted on a square axle; and secondly, in giving a different form and direction to the lateral teeth. By the first-named alteration the independent action of each rim was secured, so that each rim in the progressive movement of the whole series, revolves upon its axis, and at the rate exactly due to the space to be travelled over in surmounting the irregularities presented to it; whilst in turning, all tearing of the soil or plants is

avoided by the same faculty, which permits every rim or disc to adapt its velocity to the space required for each one to pass over, either forwards or backwards, in the act of turning; in fact, this roller can be turned about on the centre of its axle without producing any injurious effect. The independent motion of the rims also provided a powerful means of self-cleaning; for, inasmuch as the velocity of the several rims is perpetually varying, so they rub off the soil which might otherwise adhere to them—an action now further increased, as before observed, by enlarging the bore of the eye of each alternate ring, which causes a kind of eccentric or up and down motion to take place between each pair, and among the whole series of rings or discs.

Mr. Crosskill's square-axle toothed roller first made its appearance in the Society's show-yard at Cambridge in 1840—the round-axled patented machine at Derby in 1843: a premium of £20 was awarded for it by the judges at Southampton in 1844, and it gained the Society's prize of £10 at Shrewsbury in 1845, having on all occasions of trial at the Society's shows greatly excelled the performance of every other roller brought into competition with it. Journal, vol. iv. p. 560, contains a large collection of instances of its utility in arresting the ravages of the wire-worm—an effect owing probably to the forcible bite of the teeth on the ground—in the pulverization of stiff, and compression of light soils, together with the opinions of numerous agriculturists upon its value as a roller of various crops in a state of young growth. Its application to the latter purpose has greatly extended since that period, and the writer may bear his testimony to the success attending its employment on pasture land in destroying the white slug, curing mossiness, and especially in consolidating soft grass-land after drainage. For these latter uses the effect of the implement is greatly enhanced by weighting it to the full extent of the power of the team which can be commanded.

#### JUDGES.

William Hesseltine, Worlaby House, Barton, Lincolnshire.

Thomas P. Outhwaite, Bainessee, Catterick, Yorkshire.

Henry Higgins, Brinsop Court, Hereford.

Bryan Millington, Asgarby, Sleaford, Lincolnshire.

John Oakley, Darland, Chatham, Kent.

Nathaniel Blake, Stanton Harcourt, near Ensham, Oxon.

JOSIAH PARKE.

\* Spiked rollers are not here referred to, as they cannot accomplish, and are not employed for, the three purposes effected by Mr. Crosskill's single implement, viz., crushing clods, compressing soft soil, and rolling cultivated land.



## ON THE SEWAGE MATTERS OF HOUSES AND OF TOWNS.

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

Some years have now elapsed since the question of the value of liquid manure, as systematically used in Belgium and on the Continent, was first pressed upon the attention of the landholders of this country. When this great public effort was making, an equally important branch of the question was also industriously enforced upon the attention of the constituted authorities, viz., the enormous waste of the valuable fertilizing masses of the liquid manure which is ever constantly pouring into the rivers of this country through endless sewers. It is only, however, of late, that the results of these efforts have begun to display themselves—not by those slumbering commissioners, who ought long since to have adopted means to prevent so great, so national a loss; but rather in spite, as it were, of their profound lethargy on the subject of these sewerage matters, if not of their very active opposition to its interception and useful employment. An Act of Parliament was, only during the last session, at last obtained, by which a portion of the sewerage of the metropolis will be for the first time diverted from London's great sewer, the Thames, into a better, a profitable field, viz., the land. This commencement will lead, I trust, to other and more extended operations: of the result of which I have little fear. That the company may make mistakes at first in their mode of applying the irrigation water, is very probable; and again, it will, I dare say, in the early stages of their career, be applied to land for which it is the least adapted—such as the deep tenacious clays, and other soils which cannot be readily and rapidly drained; but, in spite of all these I hope unfounded fears, I have, I repeat, little doubt of the eventual success of the New London Sewerage Company. But when all that is possible to be done in this way with the metropolitan sewers is fully accomplished, yet still this will only be an example and guide to far more extended improvements—efforts which were first so successfully commenced by the citizens of Edinburgh, and have since been followed by those of Salisbury, and by the Duke of Portland, in the case of the sewerage matters of the small town of Mansfield. It is to these latter instances that I am more anxious at present to direct the landowners attention, since these last named remunerative improvements were made by the use of the sewerage of small ill-drained towns (for neither the population of Salis-

bury, nor Mansfield is more than about 10,000); and these improvements well illustrate the truth of an observation which has very often been urged upon the attention of the cultivator—that in all irrigation cases, the *proportion of water required to accomplish a given result*, although it diminishes in bulk as the impurity of the water increases, yet that still, as the quality becomes weaker, it is easy by the use of a greater bulk of such water to cause the same degree of fertility. During the evidence which was produced during the last session, before a committee of the House of Commons, several instances were adduced in support of this position, cases which can hardly be too generally known and understood. Mr. James Smith, in his evidence (216), gave one or two such instances. “At Clitheroe, in Lancashire,” he observed, “Mr Thompson was induced to fit up a small pumping apparatus; he has a village there, and a bleach work, where there is a great deal of soap suds and sewerage matters from the village generally.... At my recommendation he fitted up pumps, and with pipes conveyed it over his pasture land; and in order to test, before he had gone on with his operations, what was likely to be the result, he applied eight tons of liquid manure to a given extent of land—to an acre; to another acre he put fifteen tons of common farm-yard manure, in the usual way of dressing; to another acre he put three cwt. of guano: the result was, that the grass which was raised by this sewage water was superior to the grass raised either by the guano or by the common farm-yard manure—the produce being fifteen tons against eight. I had also,” continues Mr. Smith, “another set of experiments made at Stirling, which gave very interesting results. I employed a person there, upon whom I could rely, to make the experiment for me. He laid out in divisions some land, of a rather sandy loam: the first portion he manured with farm-yard dung and ashes mixed, at the rate of twelve tons per acre; and at a cost of 48s.; a second portion with the same compost, giving sixteen tons per acre, and at a cost of 64s.; a third division with guano, two cwt., costing 16s.; and another with guano, four cwt. per acre, at a cost of 32s. Another ridge, similar in extent to the whole of this, was manured with sewer water, at the rate of sixteen tons per acre, taking this at 3d. per ton, the cost would be 4s. The average produce of the

dung and the guano was forty-five bushels per acre of good barley; that with the sewage water averaged forty-two bushels per acre, showing that this small quantity of sixteen tons of sewage water had the effect of coming very nearly up to the dung—the sewer water was taken from a tank into which it flows from the streets of Stirling.” And when, in another portion of his evidence, referring to the Duke of Portland’s meadows at Mansfield (to which I shall hereafter recur), he added, “I have seen the Duke of Portland’s meadows—the land was very poor sandy land. It cost the duke, I believe, £30 per acre to bring the land into a proper form for irrigation; but it was land, I understood, not worth 4s. 6d. per acre before; and it now carries so many crops a year, that even in that distant neighbourhood, having a small portion of sewage water, notwithstanding that, he lets the land which is nearest the town, and receives the water in its best condition, at £14 an acre, the land at a greater distance he lets at £5 an acre.”

The detail of these great improvements carried on at Clipstone Park, by his grace the Duke of Portland, is full of interest to the landholder. In many rural districts, conveniently situated for obtaining even the mere waters of rivers, especially if they have passed through a populous district, and been enriched (as such streams are always very perceptibly) by receiving its sewage matters. As I have in another place remarked, these meadows, which extend over about three hundred acres of the naturally poor soil of Selwood Forest, are thus described by Mr. J. E. Denison (*Jour. Roy. Agri. Soc.*, vol. i. p. 359):—“The eye, after wandering through the glades of the forest, and resting on the brown carpeting of fern and heather with which it is clothed, is amazed on coming suddenly in view of the rich green meadows extended for miles before it, laid in gentle slopes and artificial terraces, and preserved in perpetual verdure by supplies of water perpetually thrown over their surface. The land immediately occupied by these meadows was, in its wild state, a line of hill-sides, covered with gorse and heather—a rabbit warren, over which a few sheep wandered—and a swampy valley below, thick set with hassocks and rushes, the favourite haunt of wild ducks and snipes, through which the little stream, the Maun, wound its way in its descent from the town of Mansfield. The whole track, both upland and lowland, are of very little value. The valley was in many parts from nine to ten feet deep in bog, and almost worthless: the hill-sides varied in quality, but £60 a year would have been a full rent for the 300 acres. Indeed, the whole of the Clipstone Park Farm, when taken in hand in the year 1816, containing 1487 acres, had been let for the sum of £346. In the year 1819 it

occurred to the Duke of Portland that by following the stream up towards its source, and tapping it at a high level, the water might be carried over the surface of the dry and sterile hills, its course through the valley might be straitened and the bog drained.” It is needless to follow in detail the progress of the works: that they were successful is proved by the fact of their present high rental as given by Mr. Smith. That the sewage matters of the town of Mansfield have materially aided in this great result is proved by the evidence of Mr. Tibbett, their intelligent manager; for Mr. Denison says in another place—“The quality of the water is very important; soft water is the best—mineral waters, and waters from peat, mosses, and bogs are found to be injurious. After strong rains, the washings of the streets and sewers of the town of Mansfield, which discharge themselves in the Maun, give great additional efficacy to the water. Mr. Tibbett compares its virtues in that state to ale when, in its ordinary condition, it would not deserve a better name than that of small beer. It will sometimes deposit a sediment in one watering of the thickness of a sheet of paper.”

The composition of the Mansfield sewage matters, to which I have thus alluded, was ascertained by Mr. T. J. Cooper; and I give these results, not only for the purpose of explaining the cause of their fertilizing effects, but as a guide to the owners of other poor lands, that may in far distant districts be in a similar way enriched. One gallon of the clear liquid, evaporated to dryness, gave 77·3 grains of solid matter, containing—

	Grains.
Ammonia . . . . .	4·02
Chlorine . . . . .	9·63
Lime . . . . .	7·10
Sulphuric Acid . . . . .	2·63
Magnesia . . . . .	1·05

There was also found with potash, soda and animal and vegetable matter in a soluble form, phosphate of lime 0·9; earthy matter and sand 1·6 (*Report of Com. on Metro. Sewage*, p. 153).

This analysis appears to pretty well give the general composition of all town sewage matters. Thus, the sewage matters of Edinburgh, examined by Mr. Cooper, were found to contain per gallon 78 grains of solid matters: these were also composed of a quantity of soluble, animal, and vegetable matters, some potash and soda, and

	Grains.
Ammonia . . . . .	4·45
Sulphuric Acid . . . . .	3·00
Lime . . . . .	6·84
Chlorine . . . . .	12·10
Phosphate of Lime . . . . .	1·06

The composition of the London sewers is very similar to those of the above-named towns. A

gallon of the liquid portion of the sewage water of the King's Scholar Sewer was found to contain 85·3 grains of solid matter. This consisted of a large proportion of *soluble* animal and vegetable matters; besides the following substances (*Appendix to Report*, p. 153):

	Grains.
Ammonia . . . . .	3·29
Sulphuric Acid . . . . .	0·62
Phosphate of Lime . . . . .	0·29
Lime . . . . .	6·05
Chlorine . . . . .	10·00

With some potassa and soda.

The mechanically suspended matters of a gallon of this sewer water amounted to 55 grains; of which 21·22 grains were combustible, and consisted of animal matter rich in nitrogen, some vegetable matter, and a quantity of fat, and 33·75 of matter consisting of—

	Grains.
Phosphate of Lime . . . . .	6·81
Oxide of Iron . . . . .	2·01
Carbonate of Lime . . . . .	1·75
Sulphate of Lime . . . . .	1·53
Earthy matter and Sand . . . . .	21·65

From the result of these examinations the cultivator will perceive not only the value of the fertilizing ingredients of the contents of the sewers of a town, but of the pretty uniform composition of such streams. Of the value of the great mass of matters thus hourly pouring into the rivers of England, polluting their waters, and steadily impoverishing the cultivated soils of the kingdom of their richest organic matters, the public can hardly be too often reminded. "By carefully conducted experiments and very accurate gauging" (*Fertilizers*, p. 221) "it has been ascertained that the principal London sewers convey *daily* into the Thames 115,608 tons of mixed drainage, consisting, on an average composition, of one part of solid and mechanically suspended matters, and twenty-five parts of absolutely fluid. But if we allow only one part in thirty of this immense mass to be composed of solid substances, then we have the large quantity of more than 3,800 tons of solid manure daily wasted in the river from London alone. This, at the rate of twenty tons of solid manure per acre, is sufficient 180 acres of land; and if we give 300 days on which this manure was collected, this would afford an annual supply for 54,000 acres." To place this in another point of view: a recent report on the improvement of Manchester gives the following table (formed from the analysis of the water of the river Medlock, which flows through that town, on the 2nd of October, 1845, by Dr. R. Smith), showing the quantities of the several constituents of plants discharged by that river daily and annually into the sea.

	Per Diem.	Per Annum.
	cwts.	tons.
Potash . . . . .	173	3,200
Soda . . . . .	257	4,640
Lime . . . . .	940	16,900
Magnesia . . . . .	9	160
Phosphoric acid . . . . .	71	1,280
Silica (in solution) . . . . .	266	4,800
Alumina . . . . .	18	320
Oxide of iron . . . . .	124	2,240
Sulphuric acid . . . . .	444	8,000
Chlorine . . . . .	151	2,720
Organic matters 1,355 cwt. } containing 6 per cent. of } nitrogen, or . . . . . }	80	1,440
Insoluble matter, chiefly } silica, alumina, and iron }	1,860	33,600

There is a practical application of these researches which is to some degree applicable to every farmhouse—nay, every cottage; for be it remembered that the composition of the sewerage of a town is chiefly that of the mass collected from many houses. It has been calculated that the sewerage of a house properly collected, and mixed with only water, is amply sufficient to annually manure an acre of land for every adult person who dwells under its roof. Is not this a consideration to the owners of many farmhouses where a copious supply of water is readily obtainable, and where it only needs the construction of a water-tight house-sewer to convey it into a reservoir, or into the water employed in irrigation? Have many of the readers of these pages ever considered that, supposing the members of their household to be in number say five (the average of the inhabitants per house of all the houses in England), then the contents of a sewer such as that to which I have alluded would amply suffice to fertilize every year five acres of land. Did they ever consider these losses, and how readily it might be avoided? Did such persons ever consider how in most cases, where a proper slope is obtainable, a few earthen pipes would convey all the sewage of the house, which is now so commonly allowed to stagnate and ingender diseases in tanks, or waste away in "a nice porous stratum of sand?" With the evidence of one or two chemical philosophers confirmatory of the asserted value of this house sewerage, I will for the present conclude my observations on this truly important theme.

"Although," says M. Sprengel, "there can be no doubt that this material is one of the strongest manures, it is still in most places managed with less care than any, and in many places altogether neglected; yet the greater or less value attached to it in any country is certainly a proof of the degree in which the agriculture of that country has advanced. Where pains are taken with it, hu-

bandry will be found in other respects excellent; where it is little thought of the art in general will usually be less perfect. It is to the use of this substance drawn from reservoirs in the towns of Belgium, that Belgium in a great degree owes her fertility; while in many large towns in Germany (and M. Sprengel might have, too, correctly added in every town in Great Britain) it is allowed to drain into the rivers. Since 1,200lbs. weight of it may be reckoned for each unit of population, it is easy to see, where population is counted by millions, how important its application must be. It decomposes far more rapidly than the excrements of horned cattle, and emits much ammonia, combined with phosphuretted hydrogen, sulphuretted hydrogen, and carbonic acid gas; and therefore, when improperly managed, loses a great amount of its power-

fully manuring matter."—*Jour. Roy. Agri. Soc.*, vol. i., p. 497.

And adds Leibig (*Organ. Chem.*, p. 195): "In respect to the quantity of nitrogen contained in excrements, 100 parts of the urine of a healthy man are equal 1,300 parts of the fresh dung of a horse, and to 600 parts of those of a cow. Hence it is evident that it would be of much importance to agriculture if none of the human urine were lost. If we admit that the liquid and solid excrements of man amount on an average to 1½lbs. daily (1¼lbs. of urine and ¼lb. of feces), and that both taken together contain 3 per cent. of nitrogen, then in one year they will amount to 547lbs., which contain 16.41 lbs. of nitrogen, a quantity sufficient to yield the nitrogen of 800lbs of wheat, rye, oats, or of 900lbs. of barley."

### TURNIP-ROOTED CABBAGE KOHL-RABI.

BY J. TOWERS, MEMBER R.A.S., H.S.L., ETC.

Having lately written somewhat at large upon the beet-root, I am desirous, even as a duty due to the existing situation of rural affairs, to make public what I know of the culture and usefulness of this vegetable, especially as a friend has put into my hands a small packet of the seed produced in the East Indies, where the plant is grown as a most delicious table bulb, under the name of "Kno! Kohl" or "Kole." Some years ago I was assured by a gentleman, long resident in India, that in those hot localities, where the atmospheric moisture amounts almost to that of a vapour bath, this bulb advances with the utmost rapidity, two or three weeks sufficing to bring it to perfection, when, being boiled as a turnip, its pulp is delicate, and of the consistency of custard. Upon this recommendation I tried repeated experiments, and produced fine plants; but the temperature of our spring was always too low to permit rapid growth, hence the bulbs became hard, coarse, and stringy.

This plant is a *brassica*—as much so as are the turnip and Swede, but its bulb is not produced under or even upon the surface of the soil; it, on the contrary, is elevated by a stout foot-stem nearly an inch wide and from three to five inches high. On this column (the texture of which is so hard and compact as to defy the ravages of any grub) stands the true bulb; its figure is generally handsome, nicely rounded, and set off to advantage by the leaves which are fixed on its sides, in pairs, one leaf on one side, the other opposite to it, each pair emerging at right angles to the one below it. In 1837, when the Swedes and turnips were riddled.

and thus destroyed by the larva of *agrotus*, the grey-brown caterpillar of a small buff-winged moth which emerges in April and May, the kohl rabi was recommended by many as a substitute for turnips. I then corresponded upon the subject with the gardener, and I believe farm-manager, of Myssenden Abbey, Bucks, who for a time strongly advocated the substitution, believing that while the kohl defied the grub on the one hand, it was also preferable to the Swede as food for sheep; but the caterpillar passed away, as do all such occasional nuisances, and kohl rabi vanished soon after. We cooked it at times, in order to prove its value as a table vegetable; but the pulp could not be made tender, and the odour while boiling was so offensively diffusible that it could not be tolerated. Thus, experience has made no progress during ten years, and yet I can hardly conceive that we have been justified in thus abandoning one of the hardest bulbous plants of which the flock master and grazier might avail themselves.

The culture of kohl rabi is easy; the plant bears, and indeed profits by, transplantation; therefore, the seed is to be sown in some open spot of the garden, in good but not richly-manured loam. The soil is first digged, made quite fine, patted with a spade, or evenly trodden, and then raked till firm. The number of plants required being estimated, a small space for the seed-bed (in proportion) will suffice. March or early in April is the best season, and it will be found advantageous to draw shallow drills, crossing each other, about an inch or an inch and a half apart, like a chequer, in order to provide

regular distances for the seedlings, which in no instance ought to grow helter-skelter in those patches or clumps that follow broad-cast sowing. The seeds being trickled as evenly as possible across this plot will lie in the drills only, and thus a very little thinning out will leave the plants at about one inch and a half asunder. They will then grow regularly, and when fully developed and formed can be removed during moist weather, so as to stand at about the same distances as Swede turnips.

I am not aware that very rich soil is required; but a good loam moderately manured, as done in the north, must be preferable, as it will provide for horse-hoeing, and insure cleanness in the spaces. At all events, the plant is hardy and enduring; and just in proportion as its growth is rapid, so is the bulb more tender, juicy, and of fine flavour. I grew my plants on flat ground, and always found them regular in growth; but on split manured ridges twenty-seven inches asunder, the plants ten or twelve inches apart, they would prosper more, and soon present a fine object, since their figure is peculiar, and besides the lateral leaves which are placed on the bulb as before mentioned, each has a crown of leaves at its summit. There are two varieties—one tinted purple; the other buff or pale greenish yellow, somewhat like the Aberdeen turnip: the latter appears more tender in its flesh, and therefore to be preferred for table use.

Several attempts have been made to introduce the kohl to the farm, but each has failed—why, I cannot determine; but certain it is that not a single plant has been seen near my abode for nearly ten years.

Dismissing this subject, I am led to offer a few remarks on the long-red or Surrey carrot, in consequence of perusing the article by Mr. Sullivan, in the last number, pp. 304 *et seq.*

I agree with all that writer's remarks upon the deep preparation of the soil, but hesitate in advising the introduction of much manure. All our fine carrots come from Surrey, near Chobham; the soil that adheres is evidently a black sand. We see many from eighteen to twenty-one inches long, perfectly straight, and without lateral distortions. Here, do what we may, it is scarcely possible to grow handsome plants. However, I succeeded once, and the dealers were eager purchasers of what I could spare. The site had been a small orchard taken out of the thicket, but quite overgrown with grass. I had it trenched three spits, the grass turves turned over to the bottom, and salted; the lowest spit was then kept at bottom,

the middle and upper retained in their places, or mixed. The whole, therefore, might be called a fresh maiden loam—a yellow, hazel, gritty soil. Herein the spindle-roots went down without branching, and very fine they were; but in the garden they usually fork, and we are reduced to the *early horn* variety. My experience, therefore, conforms with the opinion of an able writer in the *Quarterly Journal of Agriculture*, some years ago, who stated it as a fact, that the only method by which long carrots could be insured, was the selection of a plot of fresh, unmanured, light or sandy loam, *that had never been under vegetable crop.*

Mr. Sullivan makes it a point that the dung applied should be decomposed, and thoroughly incorporated; in a word, that it should be, as in the Surrey sands, as homogeneous with the barren staple, existing as black humus; but in light loams, fresh from under turf, and so friable as to break when let fall from the hand after pressure. Humus is not required; and I would earnestly recommend powdered charcoal or charred turf-ash to be used with the seed. If it act as it does by turnips, the *braird* will soon gain ascendancy; and, seasons favouring, the young carrots will carry a firm, erect head; proving the truth of Mr. Sullivan's remark, that "a strong and plentiful braird is generally an unerring index of an abundant crop."

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SALE OF SHORT HORNS.—At the sale at Brantingham, by Mr. Wetherell, of Durham, of Mr. R. F. Shawe's short-horns and sheep, the attendance was very large, and included many of the first breeders in the country. The following prices, in guineas, were realized. Cows and Heifers.—Gentle, 22; Ruby, 36; Custard, 33; Margaret, 26; Acorn, 50; Flirt, 32; Chintz, 50; Dewdrop, 26; Sylph, 44; Churn, 35; Rosary, 28; Poplin, 40; Slipshod, 45; Ayesha, 39; Ringdove, 46; Juliet, 27; Zenobia, 33; Evelina, 27; Geranium, 43; Raisin, 36; Purity, 42; Almond, 60; Curd, 50; Cambric, 31; Barbara, 26; Popinjay, 40; Soubrette, 30; Bridgett, 29; Grace, 30; Sea Nymph, 68; Saucy, 20; Cashmere, 27; Albumen, 33; Shoehorn, 66; Belinda, 21; Jewel, 57; Caudle, 28; Fairy, 22; Eva, 19; Buttercup, 10; Rosamond, 50; Dahlia, 21; Brenda, 14; Gazelle, 29; Calico, 32; Artful, 20; Active, 21. Bulls.—Guy Fawkes, 50; Artizan, 51; Soldier, 21; Artichoke, 22; Mameluke, 26; Sceptre, 20; Rudiger, 27; Arthur, 30; Crusader, 13; Spencer, 37; and Sobraon, 15. There were 220 hog sheep offered in 22 lots, and sold at 11s. to 57s., averaging 48s. 10d. Also two fat oxen, sold for £60 to Messrs. Leonard of this town.

STALLIONS FOR THE SEASON.

Name.	Colour.	Age.	Pedigree.	Performances.	Principal Performance.	No of winners out by.	Size of Intrepid.	Standing at	Apply to	Price.
Accident	brown.	12	by Camel, out of Miss Breeze, by Phantom	never appeared	—	3	—	Whelock, Sandbach	J. Skerratt, Esp.	10 gs., h. b. 5 gs.
Amorino	bay	7	by Velocipede, out of Jane Shore, by Wafal	started 3, won 1	won Ascot Derby	untried.	—	Moulton, Newark	—	5 gs., h. b. £2 5s.
Anfi-Repeater	chestnut	5	by Gladiator, dam by Langar	started 1	—	untried.	—	Hutton Sessa, Thirsk	S. Pkayne	5 gs., h. b. 2 gs.
Archy	bay	8	by Camel, out of Garcia, by Octavian	started 8, won 3	won £100 at Newmarket	untried.	—	Stockbridge	Mr. Isaac Sadler	5 gs., h. b. 3 gs.
Ascanian	brown	12	by Priam, out of Lucy, by Mulley	started 22, won 2	won £50 at Newcastle	untried.	—	Edgewar-bury, Edge-war	—	5 sovs., h. b. £2 10s.
Auekhand	brown.	8	by Touchstone, out of Maid of Honor, by Champion	started 9, won 5	won £700 at Ascot	untried.	—	Farnboro', Hants	—	10 sovs. (40 subs.)
Barnacles	chestnut	14	by Cain, dam by Bounthom	started 25, won 11	won Goodwood S.	untried.	—	Bath	Mr. Harvey, V.S.	thoroughbred <i>gratia</i> , h. b. 3 gs.
The Baron	chestnut	5	by Birdcatcher (Irish), out of Echidna, by Eo-nomist	started 12, won 5	won St. Leger	untried.	—	Stockwell, Surrey	J. Lowry	12 gs. (20 subs.)
A Bay Horse	—	10	by Mulatto or Sarch, out of Young Petrarbo, by Rainbow	started 4, won 1	won £100 at Hampton.	untried.	—	Stockwell, Surrey	J. Lowry	2 gs.
Bay Middleton	bay	14	by Sultan, out of Cobweb, by Phantom	started 7, won 8	won the Derby	untried.	—	Turf Tavern, Doncaster	W. Cunningham	10 sovs.
Beiram	chestnut	18	by Sultan, out of Miss Cantley, by Stamford	started 17, won 8	won Drawing Room S.	62	Planet.	Burgley, Stamford	Lord Exeter	10 sovs.
Belzoni	brown	24	by Black-lock, out of Mappella, by Dick Andrews	started 29, won 11	won Ascot Oaks	12	Cocoon Nut.	Wroughton, Leicester	Mr. Lucas	10 gs., h. b. 3 gs.
Benedict	bay	13	by Peter Lely, out of Phantasia, by Phantom	started 9, won 3	won £120 at Ascot.	untried.	Mungo Park.	Lutterworth, Leics	Mr. H. Reeve	5 gs., h. b. 2 gs.
Ben-y-Ghlo	chestnut	7	by Emilius, out of Kate Kearny, by Benedict.	started 23, won 11	won the Warwick Cup.	untried.	—	Gullane, Haddington, N.B.	Mr. M. Dawson	7 gs., h. b. £2 10s
Calmark	bay	14	by Zingarec, dam by Rubens	started 27, won 12	won Gorbamby S.	untried.	—	Stockwell, Surrey	J. Lowry	10 s., h. b. 4 gs.
Camel Junior	bay	8	by Camel, out of Velocity, by Black-lock	never appeared.	—	untried.	—	Stockwell, Surrey	J. Lowry	10 sovs., h. b. £2 10s
The Caster	bay	7	by Emilius, out of Castaside, by Mameluke or Camel	started 11, won 4	won Lavant S.	untried.	—	The Lodge, Wentworth	—	7 gs., h. b. 3 gs.
Cutesby	bay	7	by Slauc, out of Cobweb, by Phantom	started 1	—	untried.	—	Stedmere, Malton	—	10 gs., h. b. 5 gs.
Charles XII.	brown.	11	by Voltaire, out of Wagtail, by Prime Minister	started 84, won 16	won St. Leger.	untried.	—	Wellesbourne, Stafford	W. Price	15 gs.
Charham	chestnut	8	by The Colonel, out of Hester, by Camel	started 16, won 8	won the Criterion	untried.	—	Williesden	Messrs. Tatfersall	10 gs., h. b. 5 gs.
Charlon	bay	11	by Sultan, out of Clara, by Fillo da Puta	started 20, won 11	won the Cheserewich	untried.	—	Michel Grove, Sussex	Mr. Forth	10 gs., h. b. 2 sovs.
Colwick	brown.	19	by Fillo da Puta, out of Stella, by Sir Oliver	started 29, won 9	won the Chester Cup	9	—	Eastly Abbey, Yorksh.	R. M. Jacques, Esp.	5 gs., h. b. 2 gs.
Cotherstone	bay	5	by Touchstone, out of Emma, by Whisker	started 11, won 7	won the Derby	untried.	—	Falcon, Brouyard	Mr. Deveux	5 gs.
Cowl	bay	7	by Bay Middleton, out of Crucifix, by Priam	started 8, won 9	won the Buckenham	untried.	—	Althorpe, Northampton	Mr. J. Elliott	15 sovs. (40 subs)
The Cure	bay	6	by Physician, out of Morsel, by Mulatto	started 26, won 15	won the Claret	untried.	—	Skirmet, Honyington	—	8 gs., h. b. 3 gs.
Defence	bay	23	by Whalebone, out of Defiance, by Rubens	started 1, won 8	won the Claret	untried.	—	Thames, Henly-on-Avon	Mr. T. Hussey	10 gs., h. b. 3 gs.
The Doctor	black	13	by Dr. Sprax, dam by Lottery	started 44, won 29	won the Hooton S.	65	The Emperor	Hatherly, Cheltenham	J. Nolan	10 scvs. (10 subs.)
Don John	bay	12	by Trump or Warwely, dam by Comus	started 10, won 9	won St. Leger	4	Malcolm.	Angel, Catterick	Mr. H. Harrison	10 gs., h. b. 5 gs.
Dreadnought	bay	10	by Defence, dam by Selim	started 10, won 1	won £480 at Newmarket	untried.	—	Breeby, Burton on Trent	Mr. Taylor	20 sovs. (30 subs.)
Duelmaster	chestnut	11	by Mulley, out of Dukerda, by Waxy	started 10, won 1	won £480 at Newmarket	untried.	—	Northampton	Mr. S. Dickens	7 gs., h. b. 2 gs.
Earl of Richmond	brown.	7	by Touchstone, out of Queen of Trumps, by Velocipede	started 1, won 1	won the Claret	2	Duleet	Lewis, Sussex	Mr. T. Brown	10 sovs., h. b. 5 sovs.
Emilian	bay	8	by F. Williams, out of Virginia, by Smolensko	started 18, won 8	won Lyme Park, Newton	untried.	—	Eagle Spareshook, Essex	Mr. Whitfield	5 gs.
Emilius	bay	10	by Orville, out of Emily, by Stamford	started 18, won 8	won Southampton S.	untried.	—	Berley, Essex	Mr. T. Spalds	5 gs., h. b. 2 sovs.
Engwear	bay	7	by Arlington, dam Margaret, by Addressan	never appeared	—	149	Priam	Eastly Abbey, Yorksh.	R. M. Jacques, Esp.	16 gs. (25 subs.)
Engy	chestnut	8	by Penitentiary, out of ayesha, by Addressan	started 6, won 2	won the Derby	untried.	—	Thornhill, Clay, York	W. Walsington	2 gs., h. b. 2 gs.
Esprit	chestnut	12	by Langar, out of Olympia, by Sultan	started 21, won 2	won Drawing Room S.	untried.	—	Marshall, Sussex	—	2 sovs., h. b. £2 10s
The Era	bay	20	by Penitentiary, dam by Whisker	started 25, won 12	won Copeland Handicap	4	Pyrrhus the First	Blisford, Northampton	Mr. T. Potterton	15 gs.
Erasmus	bay	20	by Mose, out of Eliza Leeds, by Comus	started 25, won 7	won Liverpool Cup	untried.	—	Barrow, Seby	—	3 sovs., h. b. 2 sovs.
Falscat	brown	2	by Touchstone, out of Decoy, by Fillo da Puta	started 15, won 4	won Drawing Room S.	untried.	—	Moulton, Newmarket	—	11 sovs.
Fought-a-Ballagh	brown	2	by Sir Hercules, out of Guecello, by Bob Booty	started 3, won 3	won St. Leger	untried.	—	Brithford, Wrexham	—	10 gs., h. b. 5 gs.
Gahanthus	bay	8	by Laugar, out of Cast-steel, by Whisker	started 6, won 3	won Great Yorksh. Han.	untried.	—	Dean's Hill, Stafford	Mr. J. Painter	12 gs.

Calcar	bay	9	by Muley Molech, out of Darioletta, by Anadis	started 13, won 5	won Manchester Cup	untried.	untried.	Harker Lodge, Carlisle	Mr. Blamire	7 sovs.
Gaper	bay	7	by Bay Middleton, out of Flycatcher, by Godolphin	started 21, won 9	won the Criterion	untried.	untried.	Liswoyey, Glamorgan	Mr. T. Williams	—
Gibraltar	bay	10	by Muley, out of Young Sweet Pea, by Godolphin	started 9, won 5, & divided 2	won the Port	untried.	untried.	Hampton Court	Mr. Wooley	10 sovs., h. b. 5 sovs.
Gilbert Gurney	chestnut	12	by Muley, out of Miss Orville, by Pendulum	started 19, won 4	won Wolverhampton S.	2	untried.	Mount Pleasant, Bedford	Thomas Morgan	10 sovs., h. b. 2 gs.
Giovanni	brown	10	by Filho da Pata, dam by Don Juan	started 59, won 29	won Manchester Cup	4	untried.	Weston out-French, Derby	Mr. W. Parker	5 sovs., h. b. 2 gs.
Glyon	brown	10	by Physician, dam by South-ayer	never appeared	—	untried.	untried.	Hadley, Whitechurch	Mr. W. Hassell	—
Gomboury	bay	17	by Buzzard, out of Broadard, by Whak-bone	started 11, won 3	won Goodwood Derby	untried.	untried.	Stout's Nest, Croydon	Mr. G. Boast	7 sovs., h. b. £3 10s.
Hackway	chestnut	13	by Economist, dam by Nabocklish	started 38, won 23	won Goodwood Cup (2)	15	untried.	Rossmead Lodge, Kidder	T. Ferguson, Esq.	10 gs., h. b. 3 gs.
Hawk's-eye	brown	9	by Langat, out of Kite, by Bustard	started 20, won 6	won £130 at Newmarket	untried.	untried.	Saturation Inn, Donce	Mr. Gamwell	7 gs. (vampers) and dams of vamps
Heaman Platoff	brown	11	by Brumadorf, dam by Comus	started 10, won 6	won Northumberland Pl	12	untried.	Stratlam Castle, Darl.	Isaac Walker	10 sovs., h. b. 8 sovs.
Honest John	bay	7	by Bay Middleton, out of Mouches, by Emilius	never appeared	—	untried.	untried.	Childen Strand, Wilts.	Mr. J. King	3 sovs., h. b. 2 gs.
Jenny Diddler	brown	8	by Jerry, out of Marpessa, by Muley	started 19, won 6	won the Wokingham	untried.	untried.	Myton, Boroughbridge	—	—
Jerry	black	26	by Smoleusko, out of Louise, by Orville	started 10, won 5	won St. Leger	73	untried.	Stud Paddock, Newm.	Mr. R. Headley	5 sovs., h. b. 2 sovs. (£20 subs.)
Indigo	bay	11	a pure Arabian	started 4	—	untried.	untried.	Hutton Fessay, Thrusk.	S. Pinkney	1 gn.
Johnny Boy	bay	11	by Jerry, dam by Adrossun	started 4	—	untried.	untried.	Coppice Farm, Notts.	Mr. A. Chesler	10 gs., h. b. 3 gs.
John o' Gaunt	chestnut	9	by Turus, out of Mona, by Partizan	started 38, won 29	won Newmarket S.	untried.	untried.	Turf Tavern, Doncaster	Mr. Cunningham	8 sovs., h. b. 4 sovs.
Jontan	brown	12	by Cain, out of Margaret, by Edmund	started 6, won 1	won the Derby	untried.	untried.	Hampton Court	Mr. Wooley	15 sovs.
Jonathan	bay	17	by Tom, dam by Young Southsayer	started 8, won 4	won Chesterfield Stakes.	untried.	untried.	Mytola, Canterbury	B. Norris	9 gs.
snared	chestnut	16	by Sultan, dam (sister to Cobweb) by Phantom	never appeared	—	untried.	untried.	Hippodrome, Bayswater	—	10 gs., h. b. 2 gs.
Knur	chestnut	11	by Touchstone, out of Verbeena, by Partizan	started 33, won 2	won Liverpool St. Leger	untried.	untried.	High Wycombe, Bucks	Mr. Smallwood	10 sovs., h. b. 3 sovs.
Krenlin	bay	12	by Sultan, out of Francesca, by Volocepe	started 42, won 12	won R. Hunt Cup	4	untried.	High Wycombe, Bucks	Mr. W. Derry	7 gs., h. b. 3 gs.
Kt. of the Whistle	chestnut	9	by Liverpool, out of Otis, by Whisker	started 40, won 26	won Ascot Cup	untried.	untried.	Brixworth, Northamp.	Mr. W. Kirby	10 gs., h. b. 3 sovs.
Launcelot	brown	10	by Camel, out of Emma, by Whisker	started 10, won 6	won St. Leger	2	untried.	Murton, Rawcliffe, York	Mr. Kirby	20 gs.
Laurel	brown	23	by Blacklock, dam by Prime Minister	started 27, won 12	won 8 Gold Cups	13	untried.	Bangor, County Down	Mr. Winsor	8 gs. (35 subs)
The Libel	brown	5	by Pantaloon, out of Pasquinade, by Camel	started 7, won 3	won Chester St. Leger	untried.	untried.	Stockwell, Surrey	J. Lowry	12 gs., h. b. 6 gs.
The Little-known	bay	11	by Muley, out of Laceria, by Zodiac	started 7	—	untried.	untried.	Preston Montford, Salop	Mr. Croft	10 gs.
Mango	brown	13	by Emilius, out of Mustard, by Merlin	started 17, won 11	won St. Leger	2	untried.	Knottingley, Ferry bridge	Mr. Smallpage	5 gs., h. b. £2 11s.
Marshal South	chestnut	9	by Volocepe, dam by Corberus	started 7	—	untried.	untried.	Angel, Catterick	D. Douglas	7 gs., h. b. 4 gs.
Melbourne	brown	13	by Humphrey Clincker, dam by Cervantes	started 18, won 9	won Pulatine Slakes	72	untried.	Wellsbourne, Stratford on-Avon	—	—
Muley Molech	brown	17	by Muley, out of Nancy, by Dick Andrews	started 17, won 11	won the Port	2	untried.	Stockwell, Surrey	Mr. Price	10 gs., h. b. 3 gs.
Mus	bay	14	by Bizares, out of Young Mouse, by Godolphin	started 42, won 17	won Orleans Cup	5	untried.	Stockwell, Surrey	Mr. E. Ward	15 gs., h. b. 5 gs.
Nurwid	brown	3	by The Saddler, out of Miss Tree, by Merlin	never appeared	—	untried.	untried.	J. Lowry	Messrs. Tattersall	20 gs., h. b. 5 gs.
Nurwid	bay	7	by Tomboy, dam by Comus	started 7, won 3	won St. Leger	untried.	untried.	Calbridge, Uttoxeter	Mr. F. Rawlins	£1 10s.
Oakley	bay	9	by Taurus, out of Oak Apple, by Royal Oak	started 49, won 31	won the Cohnun	untried.	untried.	Morton-on-Swale, Northampton	Mr. W. Burton	10 gs.
Old England	bay	5	by Mouches, out of Fours, by Deface	started 12, won 8	won New St. Ascot	untried.	untried.	Willowbrook, Pontefract	Messrs. Tattersall	10 gs., h. b. 3 gs.
Oriando	chestnut	23	by Touchstone, out of Vulture, by Langer	started 17, won 10	won the Derby	untried.	untried.	Ackworth, Pontefract	—	—
Pantaloon	chestnut	6	by Casrol, out of Idalia, by Partizan	started 7, won 6	won Warwick Leger	29	untried.	Stud Paddock, Newm.	W. Taylor	10 sovs.
Perkin Warbeck	chestnut	6	by Beiran, out of Romlake, by Rowton	started 10	—	untried.	untried.	Cawston Lodge, Rugby	—	—
Peter the Hermit	chestnut	7	by Gladiator, dam by Volocepe	started 10, won 3	won 100 gs. at Lewes	untried.	untried.	Belgrave Gate, Leicester	Mr. F. Bailey	7 gs., h. b. 3 sovs.
Phieron	bay	10	by Beiran or Sultan, out of Lucretia, by Reveller	started 6, won 2	won Grand D. Michael S.	untried.	untried.	Stout's Nest, Croydon	Mr. G. Boast	5 sovs., h. b. £2 10s.
Physician, Young	black	12	by Physician, out of Spicewit, by Southsayer	never appeared	—	untried.	untried.	Whiteley, Stamford	Lord Exeter	10 sovs.
Picaron	black	10	by Voltair, out of Handmaid, by Walton	started 8, won 2	won the Morsby	8	untried.	Middlethorpe, York	—	—
Plempontary	chestnut	16	by Emilius, out of Variation, by Pericles	started 26, won 16	won Great Yorksh. H. (2)	untried.	untried.	Burghley, Stamford	Lord Exeter	15 sovs.
Pompey	brown	7	by Emilius, out of Variation, by Bustard	started 8, won 3	won Newton St. Leger	3	untried.	Burton, Pad-en	Mr. E. Baxter	5 gs., h. b. 2 gs.
Prime Warder	bay	13	by Cudham, out of Zarna, by Morisco	started 10, won 5	won Newton St. Leger	untried.	untried.	Bonehill, Tamworth	Mr. E. Ward	10 gs., h. b. 5 gs.
The Prior	brown	8	by Muley Molech, out of Rebecca, by Lottery	started 16, won 3	won £140 at Chester	untried.	untried.	Harbo' Hotel, Melton	J. Mason	7 sovs., h. b. £2 10s.

Continued on next page.

STALLIONS FOR THE SEASON—(Continued).

Name.	Colour.	Age.	Pedigree.	Performances.	Principal Performance.	No. of winners out by	Sire of	Standing at	Apply to	Price.
Prizefighter...	chestnut	7	by Gladiator, out of Barbara, by The Laird...	started 5, won 2	won Great Yorkshire S...	untried.	—	Leicester	Mr. Sheppard...	10 gs. (winners and dams of winners <i>gratis</i> ).
The Provost	brown...	11	by The Saddler, out of Rebecca, by Lottery, by Buzzard, dam by Pictou	started 14, won 8	won Scarborough Stake.	2	Infringe	Catterick	Mr. C. Pylus	10 gs.
RobertdeGorham	chestnut	6	by Langar, out of Rufina, by Blacklock	started 7, won 3	won the Criterion	untried.	Dog Billy	Catterick	Mr. C. Pylus	7 gs.
Ratcatcher	chestnut	17	by Venson, out of Soldier's Daughter, by The Colonel	started 65, won 25	won the Cleveland Cup	4	—	Willstead	Messrs. Tattersall	8 gs., h. b. 5 gs.
Red Deer	bay	6	—	—	—	—	—	—	—	—
Redshank	bay	14	by Sandbeck, out of Jakanna, by Sofiu	started 26, won 10	won Chester Cup	untried.	—	Turf Tavern, York	Mr. Foster	8 gs., h. b. 5 gs.
RobertsdeGorham	brown	14	by Sir Hercules, out of Dunvernay, by Emilius	started 31, won 19	won Mostyn Stakes	8	Scarlet Runner	Little Totham, Witham	Mr. Guldhampton	10 gs., h. b. 3 gs.
Robinson	brown.	12	by Robin, out of Miss Muley, by Muley	started 26, won 7	ran second for the Derby	untried.	—	Horn, Arundel	R. Mates	3 gs., h. b. 2 gs.
Rossoul Khan	bay	10	—	started 15, won 6	won £140 at Newcastle.	—	—	Great Driffield	—	£2 10s.
St. Bennett	brown	13	by Cotton, out of Darlolette, by Amadis	started 33, won 11	won Northumb. Pl. (2.)	1	Isabella Noel	The Lodge, Wentworth	Mr. H.S. Waring	7 gs., h. b. £2 10s.
St. Francis	bay	12	by St. Patrick, out of Surprise, by Scud	started 19, won 28	won the Ascot Cup	untried.	—	Newmarket	Mr. Pettit	10 gs.
St. Martin	brown.	14	by Adcock, out of Galena, by Walton	started 19, won 9	won the Dumfries Cup	9	Sir George	Close House, Darlington	Mr. P. Croft	10 gs., h. b. 5 gs.
Serrogins	bay	12	by Tramp, out of Arcot Lass, by Ardrossan	started 23, won 9	ran second for St. Leger	1	Fistuff	Lane Paddocks, Sheffield	Mr. J. Atkinson	5 gs., h. b. 2 gs.
Scutari	bay	10	by Sultan, out of Velvet, by Oiseau	started 22, won 9	won Newmarket Stakes	untried.	—	Burghley, Stamford	Lord Exeter	10 gs.
The Sea	bay	17	by Whitebon, dam by Orville	started 5, won 2	won £135 at Croxton Pk	2	Mermaid	Halewood, Liverpool	Mr. Patterson	10 gs., h. b. 3 gs.
Sea-horse	bay	8	by Camel, out of Seobreezy, by Paulowitz	started 7, won 1	won Wolverhampton L.	untried.	—	Dycers, Dublin	—	5 gs., h. b. 3 sovs.
Sensation	bay	5	by Shame, out of Adela, by Emilius	started 8, won 1	won £50 at Bibury	untried.	—	Senniticos, Chichester	Mr. G. Clark	3 sovs. (winners and dams of winners <i>gratis</i> ).
Sheffield	bay	8	by Liverpool, out of Teresa, by Langar	started 5, won 1	won £37 at Stirling	untried.	—	Lumley Park, Fence Houses	W. Nixon	5 gs., h. b. 2 gs.
Sir Hercules	black	21	by Whitebone, out of Peri, by Wanderer	started 9, won 7	won the Charet	47	Faugh-a-Ra lugh	Wilson, S. S.isbury	—	25 sovs. (40 sub.)
Sir Isaac	brown	16	by Camel, out of Archure, by Filho da Puta	started 7, won 3	won a Produce at Liverpool	4	Yardley	Yardley, Birmingham	Mr. Holloway	10 gs., h. b. 3 gs.
Slane	bay	14	by Royal Oak dam by Orville	started 18, won 9	won Waterloo Shield	41	Stang	Hampion Court	Mr. Worley	25 sovs.
Sleight of Hand	brown	11	by Pantaloon, out of Decoy, by Filho da Puta	started 8, won 3	won Liverpool Cup	untried.	—	Stedmere, Malton	—	7 gs., h. b. 4 gs.
The Sluggard	bay	14	by Napoleon, out of Flora, M'Fvor, by Master Robert	started 4, won 1	won £100 at Henton Park	untried.	—	Craven Arms, Southam	—	10 gs., h. b. 3 gs.
The Spotted Boy	grey	8	by Hampton, out of Emma, by Don Cossack	never appeared	—	—	—	Sledmere, Malton	—	5 gs., h. b. 2 gs.
The Squire	grey	9	by The Saddler, dam by Minos	started 17, won 9	won Newcastle St. Leger	untried.	—	Widmore, Malton	Mr. B. Rickelby	5 gs., h. b. 2 gs.
Suringle	grey	11	by The Saddler, dam by Minos	never appeared	—	—	—	Low Crosby, Carlisle	Mr. J. Rickelby	10 gs., h. b. 3 gs.
Swinton	grey	10	by Mulatto, out of Ringlet, by Whisker	never appeared	—	—	—	Scally, Scarborough	Mr. J. Ireland	5 gs., h. b. £2 10s.
Teazer	grey	7	by Stumps, dam by Young Phantom	never appeared	—	—	—	The Lodge, Wentworth	—	5 sovs., h. b. £2 10s.
Theon	brown.	9	by Emilius, out of Maria, by Whisker	started 6, won 3	won Doncaster 2 yrs. S.	2	Brunette	Rawcliffe, York	Mr. Kirby	3 gs., h. b. 1 gm.
Thesk	bay	10	by Voltaire, dam by Whisker	started 31, won 11	won Wolverhampton S.	untried.	—	Thirk	Mr. T. Swallow	10 gs.
Thistle Whipper	bay	9	by Beale, out of Miss Malby, by Filho da Puta	started 11, won 8	won £325 at Newmarket	untried.	—	Langstock, Stockbridge	R. Etwahl, Esq.	5 gs., h. b. 2 gs.
Tom Brown	bay	17	by Etelpham, out of Miss Newcastle	started 3, won 1	won £50 at Worcester	1	—	Wood's Farm, Chesdale	—	8 gs., h. b. 4 gs.
Torr Boy	bay	16	by Tomboy, out of Bessy Bellam, by Filho da Puta	started 2, won 2	won Chester 2 yrs. S.	1	—	Wood's Farm, Chesdale	—	8 gs., h. b. 2 gs.
Toncalstone	chestnut	15	by Veolcheped, out of Jane, by Moses	started 19, won 7	won Albany Stakes	35	—	Wroughton, Wills	—	30 sovs. (40 sub.)
Valentissimo	chestnut	22	by Blacklock, dam by Juniper	started 10, won 7	won Liverpool Cup	124	—	Wootton, Wills	—	6 gs., h. b. 3 gs.
Venison	chestnut	14	by Barizcan, out of Faith, by Smolensko	started 22, won 16	won Portland Handicap	82	—	Wootton, Wills	—	15 gs.
Villains	black.	7	by Voltairone, dam by Niagara	started 10, won 3	won Northampton Handicap	untried.	—	Wootton, Wills	—	10 sovs., h. b. 4 sovs.
Vol-au-vent	bay	6	by Voltairone, out of Pauline, by Moses	started 13, won 3	won Newmarket Handic.	untried.	—	Stockbridge	Mr. Isaac Sadler	thoroughbred, <i>gratis</i> .
Voltaire	bay	21	by Camel, out of Phantoms	started 6, won 5	won the Doncaster Cup	68	—	Bradwell, Leeds	Mr. J. Pearson	thoroughbred, <i>gratis</i> .
Whitcomb	brown.	13	by Camel, out of Abundantia, by Muley	started 4, won 3	won the Lavant	2	—	Bradwell, Leeds	—	8 sovs.

(The Groom's fee, if not included, varies from 2s. 6d. to £1.)



## WOOLER FARMERS' CLUB.

A meeting of this institution took place at Wooler on Thursday, the 8th April, (Christopher Howey, Esq., in the chair, when an excellent paper was read by Mr. Henderson, of Langleford, on "Hill farms, with hints for their improvement," which excited an animated discussion, more especially as to the expediency of turning Highland Ewe Hogs.

Mr. Darling, of Hetton House, afterwards submitted the following paper on the question of

## TENANT-RIGHT.

The question of "Tenant Right" has of late obtained so much attention, and been brought so prominently forward, both by the subject being discussed at many of the Farmers' Clubs throughout the country, and those discussions published, and further, by the introduction of a bill in Parliament for its adjustment, that it would seem scarcely necessary any further to canvass the matter, except for the very obvious reason, that the more the subject is discussed by different bodies of men, whose various positions, whose different education, whose peculiar views and mode of considering the bearing of the question, and whose cherished prejudices lead them to think differently from others following the same pursuits in other localities, the more certain it is to be stripped of all doubt and difficulty, and the more certain to be speedily brought before the public eye in its truth and simplicity; and when once public opinion is fully formed on the principle upon which a fair and just settlement of a tenant's rights should be based, no time will be lost by the proprietors in agreeing to what is admitted by all parties to be an act of justice to their tenants, and to themselves the best security for the payment of their rents, and the progressive improvements of the country.

"Tenant-Right" appears to be generally understood to mean an equitable right of a tenant, to receive, on leaving a farm, a fair price or equivalent for all money expended during his tenancy, in improvements beyond the good cultivation of the land, and for which he has not been long enough in possession to be reimbursed by the advantages accruing from such improvements. These may be either permanent, such as draining, fencing, and building, or partially permanent, such as an outlay for artificial and extraneous manures. A most important difference must exist as to the two classes of improvement. In the first, a legislative enactment might fix a certain proportion to be borne by the land, and settle that part of the subject for ever; but it is impossible to fix any stated per centage which the landlord ought to bear of the second class; and it appears to me that the principle of remuneration being admitted by lease, the adjustment must ever be left to arbitration.

In considering the whole question, it may be resolved into three divisions—first, the effect which the general adoption, whether voluntary or by legislative enactment, of a system of tenant-right would have on the community at large, by its action on the productiveness of the country; secondly, its effect on the rents of the landlords; and thirdly, its bearing on the interests of the farmers.

In treating on these three heads, I shall reverse their position, and first consider its bearing on the interests of the farmers. There are in this country two classes of tenancy—the one, where a lease is granted for a certain term of years; the other, a yearly tenancy. Let us begin at the lowest step—the yearly tenancy. How

has this system worked? If we judge by the knowledge which our own observation conveys, we shall at once declare it to be inconsistent with good farming, and therefore a system replete with loss to the landlord, discouragement to the tenant, and baneful to the community; but in other counties of England it is not always so. In some districts, where this practice prevails, the land is well cultivated, the rents well paid, and the tenantry happy and prosperous. But in those districts there does at this time exist a system of "Tenant-Right," which secures to the occupier a fair return in case of quitting his farm, for unexhausted improvements. Here, then, we have a practical proof of the value of a recognized "Tenant-Right," shewing that even with the disadvantage of a yearly tenancy, "Tenant-Right" acts beneficially on all parties. Without "Tenant-Right," what inducement can any farmer have, on entering a piece of land, to lay out his capital? True, he finds his land in a state of poverty and dirt—his plough will scarce turn over the furrow for quickens—his corn can hardly rear its head for runches and other noxious weeds—his turnips, after all the pains he has taken to get his land clean, turn sickly, and their fading leaves too surely point out the necessity of lime to protect them from the ravages of auberry or fingers-and-toes—the impossibility of sowing his wheat, when his neighbours do so, cries loudly for drains—his grass fields, overrun with rushes, show how ruinously the stagnant water is acting on the herbage which ought to feed his half-famished stock. His mind says, "Drain, lime, improve;" but his sense of justice to his family says "No. You are but mortal—you may lay out in improving this property all that you have saved to leave your wife and little ones—you may be cut off in your prime—your capital all sunk in the property of another—you have no lease—you have no power to demand, through your executors, a return of all this outlay—your poor widow and orphan children may, at the will of others, be turned from the farm, where you have vested your all. No law can compel restitution; and it may be they are driven from comparative comfort, and all the decencies and many of the luxuries of life, to seek, with blanched cheek and sinking spirits, the eleemosynary aid of strangers." Such is a picture of what may, and I am sorry but constrained to say, in truth, what has occurred where the system of yearly tenancy prevails. That this is an extreme case, I owe it to the character of our aristocracy to admit; but does it the less point out the necessity of some mode by which the recurrence of such an event may be averted? What yearly tenant can say, "This cannot be my case?" What though his landlord may be an amiable man, feeling for his tenantry as a father for his children. Is a landlord more than mortal? Can he say to death, "Come not near me! I will not die? Can he even secure from his successor the same kindly feeling, the same fatherly care, which he himself has been ever ready and anxious to bestow on the tenantry on his estates? It may be a distant relation is the next succession: he may be a kind man, he may be disposed to do justly; but he knows not the country, he knows not the people, and he may have advisers equally unknown; and who dare say what will be the result? If such a state of things can exist, I think no one will deny the necessity of a "Tenant-Right" as applicable to the yearly tenancy. It is held by many, that in all cases leases should be substituted for the yearly tenancy. Leases have so long formed a prominent feature in the

agriculture of Northumberland, at least in this part of the county, that we are naturally attached, it may be prejudiced, in their favour. But it is undeniable that if a proper system of "Tenant-Right" were universal, many excellent arguments in favour of yearly tenancy might be adduced, and the advocates of leases would lose in the argument their main-stay and prop, viz., the certainty a tenant has, in entering on a lease, that time at least will be given to obtain from his outlay the expected remuneration *with the return of the capital invested*. In all leases the owner or his agent sees that a clause is inserted, whereby, at the determination of the lease, the tenant is liable for all cases of dilapidation; and if a tile be off the roof, or a pane of glass broken in the window of any building, the landlord can recover from the tenant the amount. But if the tenant, finding the buildings inefficient, the walls insecure, or, it may be, a part of the lands ruined with wet, applies his own capital to erect a new shed, a cottage, or additional accommodation to the steading, or to the effectual drainage of the land, whereby the farm is permanently improved, and its yearly value increased, he has no legal claim on the landlord, the money so laid out becomes the fee simple of the proprietor, and his outlay only makes it a more difficult thing to treat for a renewal of his lease; and in many, probably the majority of cases, his tent is raised from the very fact of his having sunk his own capital in the property of his landlord. Is this as it should be?—is there no want of a "Tenant-Right" here?

We now come to the third division of our subject—the effect of a system of "Tenant-Right" on the productiveness of the country. Rent is that portion of the produce which is reserved for the *use* of the land, as so much per cent. is given for the use of money, and varies according to the quality of the soil, the demand for farms, and the desirableness of the tenancy. Farms let from year to year without a "Tenant-Right," are attended with so much risk, and are looked upon with so much suspicion, that in the same locality from 10 to 30 per cent. more will be given for land of like quality where a lease can be had, than for a yearly occupation. The consequence is, that a poorer class of tenants are generally found occupying the farms let from year to year—the lease-giving agents having the best choice of tenants. Lower rents are and must be accepted, and the danger of loss in the application of tenants' capital, induces a system of bad farming, a kind of hand-to-mouth management, which results in deteriorating the property; and when any number of such farms are unhappily before the public, a reduction of the already low rent must be submitted to, and even then it is difficult to get a tenant to comply with the terms of occupation. What a change would a "Tenant-Right" effect on these properties! The tenant would no longer fear the loss of his capital; he would no longer be in yearly fear of having to "turn out;" he would be in almost as good a position as his envied neighbour, the leaseholder; a better and wealthier class of tenants would compete for the hitherto neglected farms; better rents would be freely given; an improved system of agriculture would be introduced; the land would rise in value; the produce in grain and food would gradually and regularly increase, and thus the community would be benefited, and the country enriched. But would no effect be felt on the productiveness of the land let on lease, as well those let from year to year? Let us look at the system at present prevailing in this district. Leases vary from 14 to 21 years. A farmer knows that, generally speaking, he has very little certainty of a renewal at the end of his term. What is the consequence? He finds his farm in

poor condition—he has a given time to bring it into heart; but he must also bear in mind that when his term expires, he can have no claim against his landlord for permanent improvements or unexhausted manures. He prudently calculates accordingly, and hurries into the land the lime and other improvements which he sees it stand in need of, carefully avoiding in the last few years of his lease any outlay which will not yield an *immediate and ample* profit. Thus he ceases, during the last years of the term, to force the land: he ceases to drain; he ceases to expend his capital, unless he sees clearly that it will be returned to him with interest in *one or two* crops. The result is certain. The land, if naturally poor, becomes exhausted, and is left in somewhat the same poor state it was found on his entry. If his calculations have been well made, no great loss of crop will be sustained in his time, for he will apply so much to the land as will be just taken out at the expiration of the lease. But the land is now returned to the landlord, no better for the excellent cultivation expended on it during the early years of his tenancy; and for a few years of the next term it cannot be expected to produce so much, either in corn or stock, as it did after he had brought it into a productive state, by a judicious and liberal application of manures and capital. Two results are the consequence; the one of great moment to the country—four or five years of certain and considerable loss in productiveness; and to the landlord, a certainty of a rent commensurate with the disadvantages a tenant has in entering a farm out of condition: both of which results would have been avoided if an equitable system of "Tenant-Right" had enabled the outgoing tenant to depend on his capital being repaid on leaving, and his only risk being the chances common to all traders, of a fair interest on his venture.

I have thus, Sir, I fear, at too great length for your patience, endeavoured to shew that a fair and well-considered "Tenant-Right" will have a beneficial effect on both landlord and tenant, and be conducive to the general good, by increasing the annual produce of the country; and I shall now shortly refer to the question, whether it is advisable that the measure should be a compulsory enactment of the Legislature, or a private agreement between landlord and tenant. If it could be introduced generally to the agreements for farms, I should prefer such a mode of adjusting the matter to a Parliamentary law. But as I cannot, from all I have seen of the unwillingness of both landlords and tenants to introduce anything of serious change into their contracts, believe that in many years the question would be thus settled, I own myself, however averse to such a mode, compelled to say, that I believe a compulsory enactment of the Legislature is absolutely necessary to insure the carrying out of a consummation so devoutly to be wished as a well-defined "Tenant-Right;" and I beg to propose the following resolution, with such modification as the meeting shall determine:—

"Resolved that in the opinion of this meeting, a well-defined 'Tenant-Right' would be eminently conducive to the increased productiveness of the country, to the immediate advantage of the landholders, and a great benefit to the occupiers of land, whether on lease or otherwise. Resolved, that in furtherance of this desirable object, a petition to Parliament be prepared and presented, with the signatures of all the proprietors and farmers of the district who will sign it."

The time of the meeting not admitting of any lengthened discussion, no vote was taken, but an adjournment agreed to till next day of meeting.

## NORTON FARMERS' CLUB.

The monthly meeting was held on Monday, April 19; Mr. J. Lister, of Greenhill, in the chair. Mr. J. Wheelhouse, of Eckington, was elected a member of the club. On announcing the business for the evening, the Secretary stated that Mr. Nelson had consented to postpone the reading of his paper on the best method of destroying weeds, in order to afford Mr. H. C. Flory, of Myrtle Spring academy, an opportunity of making some remarks on the means of effectively securing a sound and abundant crop of potatoes. The number of members present was greater than on any former occasion, the Magistrates' room, at the Bagshaw Arms, being completely filled. A long and spirited discussion first commenced on the Bill brought into Parliament by Mr. Pusey respecting tenant-right.

Mr. J. LEE, of Dalton Parva, protested against all such questions being entertained by the Club, which he maintained were totally irrelevant to the objects they had in view, namely, the cultivation and improvement of the land. He had before stated his opinion on the subject of tenures, and he again urged that it was an utter impossibility to frame an act of Parliament which would be applicable to all parts of the country, owing to the various and necessary customs which prevailed. Every tenant ought to have full liberty to make the best bargain he could with his landlord, and the same privilege ought also to be conceded to the latter. The interests of the two were identical, and he thought they had sufficient honesty and good sense to make their own agreements, without asking for the aid of an act of Parliament. Mr. Lee proceeded to quote opinions in favour of his own on this subject, and among others those of H. G. Ward, Esq., member for this borough; Mr. Bennett, an eminent agriculturist; and the Duke of Richmond. He concluded by moving that the next business be proceeded with.

Mr. A. WRIGHT seconded the motion. He fully acquiesced with the remarks of Mr. Lee, and considered all such questions to have a political bearing, and calculated to produce feelings of jealousy among the members. Let the members stick to the cultivation of the soil.

Mr. JAS. JENKIN: If we cannot get an act, we can make known our opinions. It had been said that many were backward in making improvements; he replied that if drones were found in the country, it was because they were oppressed.

Mr. J. GREEN said that tenants had as much right to be protected as landlords, and he thought there was much in Mr. Pusey's Bill to be approved.

Mr. R. BOOKER, jun., of Hazlebarrow, said he differed from the mover and seconder of the motion. If the Club could not discuss such questions as tenures, he should like to know what the society was established for. For his part, he thought the Bill of Mr. Pusey was necessary, in order to afford a guarantee against advantage being taken of tenants' improvements. He had lately been in the south, and in Suffolk he heard from a tenant, that no allowance whatever was made for improvements, however great. He was informed by one farmer that he dare not cultivate his farm in the manner that it was desirable, because he could be removed by his landlord without compensation. While there, he was happy to say, that he (Mr. Booker) heard from his own landlord that he considered the custom in Norton was an equitable one. In their neighbourhood farmers had a claim for draining done within ten years; but in the south not a farthing could be obtained by an entering tenant, who was liable, at a year's notice, to be

turned adrift by capricious or unfair landlords. He (Mr. Booker) contended that one general rule for the holding of farms would be an advantage to the landlord, the tenant, and the country at large. Property had its duties as well as its rights, and he thought that excellent axiom should be considered by all landlords. He was sorry that some of his friends considered the subject of tenures a political question. In his opinion it had no political bearing whatever. After some other remarks, Mr. Booker concluded by moving, "That this Club consider Mr. Pusey's Bill on tenant-right, if passed into law, would be an advantage both to landlords and tenants."

Mr. BROOKE, of Baby, seconded the amendment. He agreed with Mr. Booker that the Bill would have been more fair and reasonable had provision been made for compensation for sheep tillage. They would, however, take the measure as originally proposed, as an instalment of their rights. He denied that it was a political measure. In that part of the country where he resided, he was satisfied that many improvements would be carried out if the tenant could claim for real improvements.

Mr. FLORY did not think a more important subject than that of tenant-right had ever been brought before the Club. The landlords and tenants had equal rights, and he believed the Bill introduced by Mr. Pusey into the House of Commons recognised the claims of both. He should support the motion of Mr. Booker.

The SECRETARY said, members seemed to be unaware that the tenant-right Bill had undergone the ordeal of a select committee, and had come out with considerable alterations. Such being the fact, he deemed it a waste of time to discuss the measure till they knew the nature of the alterations. It was said by an eminent journalist that the changes in the Bill have so reduced the potency of the measure, that the most apprehensive landowner need not fear the claims of his tenants to be paid for improvements. If that be true, he submitted that they were going to approve or negative a measure they did not understand. They might, however, give an opinion on the Bill in its original shape, which he for one deemed worthy of consideration.

The CHAIRMAN and others made a few brief remarks on the motion, and

Mr. LEE replied to the objections which had been urged against it.

It was then put to the vote, and Mr. Booker's amendment was carried by a majority of 3 to 1.

## POTATOES.

Mr. H. C. FLORY, after a brief apology for introducing a matter of such great importance without giving the usual notice, said that potatoes were so universally allowed to be a valuable article in our *culinaire*, that he thought it the duty of every philanthropist to institute an inquiry into the cause of its recent deterioration, and if anything he could suggest should happily point out the means whereby to secure sound and abundant crops in future, it would afford him the most infinite satisfaction. For many years a kind of dry rot, pock-mark, or blotch, has been observed amongst potatoes, in consequence of which many of them were unfit for food. But in 1845, and particularly last year, the disease spread over all Europe, and assumed so virulent a form that in some localities upwards of two-thirds of the crop was destroyed. The cause of this disease, although seriously, but perhaps superficially, inquired into, remained unknown, and the disease itself was pro-

nounced a mystery. Yet in this case, like in most others, truth lies much nearer to the surface than people are apt to suppose. With all plants, propagation by seed is most in accordance with nature. Instead of applying this to the potato, we have been going on for a great number of years in a mode that is unnatural, and that in a climate which is cold and foreign to this esculent. This has now caused a degeneracy—in a word, our potatoes have become weakened and degenerated by a long-continued and unnatural mode of propagation, and they cannot, during their growth, bear any sudden change of temperature—drought or moisture. Speaking from analogy, we observe the same fact in human beings. Weak and nervous individuals are very much affected by any sudden change of temperature. I am thence led to conclude that the potato diseases which have now prevailed for some years—such as pock-marks, blotches, and dry rot—and the disease of last year, which was formerly unknown, were caused amongst our weak and degenerated potatoes by sudden changes of temperature. It follows, thence, that there is no alternative but to raise the potatoes from seed as the most natural and the safest mode. But, since the potato is a tropical plant, and cannot form perfect seed in the open air in our cold climate, potato-berries ought to be gathered in autumn before frost sets in, and kept in dry places where frost cannot reach them, in order that they may ripen and perfect the seed. The greatest mistake formerly committed was in sowing unripe and imperfect seed, consequently it required two or three years before a tolerably large potato was obtained, and to this we may ascribe the cause of so many persons being deterred from cultivating potatoes from seed. About the end of January, or beginning of February, the berries must be broken by the hand, and placed into a tub or other vessel, wherein they must remain from six to eight days to ferment a little. Then water is to be thrown on them, in which they must be well stirred, in order to separate the pulp and husks from the seed, which should then be cleansed and dried, and kept in a warm room until sown. Towards the end of March, or beginning of April, the seeds, as they require artificial heat, must be sown in a hot-bed, made of horsedung, the grains a quarter of an inch asunder, and about half an inch deep—and if there are no sashes to the hot-bed, it should be covered up at night with mats or boards—for the young plants are very sensitive of cold, and by so doing, make the seed early productive in this cold climate. Until the plants are put out, the soil in which they were sown must be kept moderately moist, and when they have put out, they must be freely watered, if the weather be dry. By the middle of May, when the plants will have attained the height of about four inches, the potato plants should be transplanted in a rich loose or sandy soil, at the same distance from one another as usually is done with the potato sets. They should be set a couple of inches deeper than they were in the seed-bed. This will cause them to form fresh roots, which produce the most and best tubers. The plants in the seed-bed may be examined from time to time, and if they have not produced any tubers, they may be left until they have attained the height of five or six inches, and then be transplanted three inches deeper than they stood in the seed-bed. The young plants should not be suffered to form tubers before they are planted out, for, in that case, they would be too much weakened. The earthing up or moulting should be done early, and not too much; for if the plants have been set out according to the directions given, their fibres will extend considerably, and these would be injured by a late or too deep moulting, the production of tubers be delayed, and the produce diminished. This, then, is the process which

has been advantageously pursued by some continental agriculturists for the last few years. From an ounce of seed they have raised, in one season, 50 sacks of sound and full-grown potatoes, and proved that potatoes so raised are strong enough to resist the generally existing disease for six years at least. Mr. Flory, in the course of his remarks, ably and lucidly propounded his views on the subject, and in confirmation of his opinions, drew attention to the recent discovery made by M. Zander, a native of Germany, who was said to have established, beyond doubt, the possibility of raising sound potatoes from seed. Mr. Flory said, the conclusions of M. Zander appeared to him so highly consistent with the rules of nature that he should endeavour in future to carry out the system in his own garden and grounds. He sincerely hoped others would do the same, and if their efforts should prove successful, as he had no doubt they would, in regenerating that invaluable esculent, they would aid in conferring a blessing on the human race.

Mr. BROOKE doubted the theory of Mr. Flory, because he had raised potatoes by mere accident from seed, which afterwards produced unsound roots. He admitted, however, that he could not say the seed was sound in the first instance.

Mr. A. WRIGHT was afraid Mr. Flory's was a forlorn hope, for seedlings had proved a failure in many instances.

Mr. BOOKER, jun., had some doubts as to the success of the plan. It was well known that seed, brought from different parts of the world last year, and planted in this country had failed. Besides, there were several kinds of potatoes, such as Holberry kidneys, which never bore any seed or flower. How were such kinds to be propagated?

Mr. NELSON said he had had a good deal of experience in potato growing, and a seedling potato might easily be told from any other; in all such he thought there would be found no difficulty in raising seed under glass. He also recommended raising crops by transplanting the extra tubers. Where there were five inches, he would remove two of them when about six inches high. By this plan he had raised several extra crops.

Mr. JAS. ANDY said, he was no potato grower, but he had been long accustomed to grow bulbous and other plants from seed, and he considered it the best plan. Unless plants are cultivated from seed, in time they degenerate, and it appeared to him that the same argument would apply to potatoes.

Mr. GREEN thought they all ought to adopt the best plan to insure a continuance of the potato as food. He must confess he had been much delighted with Mr. Flory's remarks, which had been plain and comprehensive. However they may differ in opinion on the subject, he was sure that every member would agree in one sentiment—that they were deeply indebted to Mr. Flory for the zeal and good-will shown by him in his endeavour to promote their interests.

Mr. LEE said many esculents were raised from roots. He saw no reason for supposing that the potato had degenerated from planting. The potato onion, for instance, still continued sound. The fact of gooseberry and many other trees being raised from cuttings, was an argument against the theory of raising from seed exclusively.

Mr. FLORY explained. He did not say that it was the best plan to raise every thing from seed, but that it appeared to him most in accordance with nature.

The conversation was prolonged for some time longer, and was concluded by a unanimous and hearty vote of thanks to Mr. Flory for the information he had afforded.

The next meeting will be held on the 3rd May, when Mr. Nelson's postponed paper will be read.

REVIEWS.

THE PIG: A TREATISE ON THE BREEDS, MANAGEMENT, AND MEDICAL TREATMENT OF SWINE. BY WILLIAM YOUATT, V.S.

London: Cradock & Co., Paternoster-row.

This work intended by the talented and lamented Youatt to be the last of his series of domestic animals, is now before us, and will, with his writings on "the Horse," "Cattle," "Sheep," "the Dog," &c., occupy a prominent place in the study of the naturalist as long as our language is known: the energy of his powerful mind was never more fully developed than in the production of this volume; and society has lost in him one of its brightest ornaments.

He had been long collecting the materials of the history of this animal. The same deep research, the same pleasing style of composition which we find in his other publications on the domestic animals are evident in this, and perfecting as it does the series, we are confident it will be as widely sought after, and be as popular, as the other celebrated productions of his prolific pen.

Upon a perusal of this volume the desire to extend the knowledge of science is evidenced in every line. Seldom have we met a work which grasps its subject with more vigour; his selections of the notices of ancient and modern agricultural writers are compiled for the purpose of interweaving them "into a groundwork of his own ideas and experience." He was actively engaged in veterinary practice, and from his own observation was thus enabled to treat upon the nature and habits of a domestic animal hitherto so little understood. We have here upon the impress external marks of a mind acute and vigorous, treating of the several breeds of the pig in every clime and country—their diseases are explained, and medicines suggested for combatting them. The principles of breeding, fattening, &c., are treated on, and ample directions given, which to the "housewife" will be most welcome; we allude to the methods of salting pork and curing bacon and hams. In short, this work must take its stand by those before mentioned, as no other person could perfect the series but he who was chosen by the Council of the Society for the Diffusion of Useful Knowledge to be *their* editor on the subject of domestic animals.

The engravings with which it is illustrated have been drawn from life by William Harvey, Esq., and as a work of typography it reflects great credit on the publishers for its artistic finish.

CULTIVATED PLANTS OF THE FARM.

BY JOHN DONALDSON.

London: Groombridge and Sons, 1847.

The author treats on the different plants which are chiefly cultivated in this kingdom—namely, the cereal, leguminous, esculent, and tuberos. A great deal of practical information is contained as to the profitable production of wheat, oats, peas, rape, rye, vetches, turnips, carrots, barley, beans, cabbages, parsnips, beet-root, and the potato.

AGRICULTURAL QUERY.

TO THE EDITOR OF THE MARK LANE EXPRESS.

Why should lime prove congenial to the growth of some plants and retard the growth of others?

For instance, a piece of ground (about an acre) in the spring of 1845 was limed at the rate of 100 bushels per acre, and in June was, with the adjoining land, boned and sown to Swedes. The crop was all good, though the limed part did not grow so rapidly at first, yet ultimately there was little difference in the weight per acre,

though more top where the lime was applied. The following crop was oats, when the limed part was not only one-third less than the crop adjoining, besides being costly, and a week later at harvest, but overrun with rye-grass, which destroyed nearly all the clover, whilst where there was no lime applied the clover is excellent. I should also observe that the land was a piece of waste prior to its being broken and tilled to turnips with bone, then oats, after which to wheat, manured with muck from the farm-yard, followed by turnips, when the lime was used. 1st. Why should the limed land produce more top and not more bulb than the land not limed? 2nd. Why should lime be injurious to the growth of oats? 3rd. Why should lime cause the more rapid growth of rye-grass and injure the clover?

The following analysis was taken from the soil of an adjoining field, which was broken from the wastes, near Seelyon Common, in the parish of St. Stephens: in 1835, sown to turnips, followed by two crops of oats, and laid down to permanent pasture. The analysis of the soil was made in 1845. This may assist those who may be inclined to answer the queries:

Water, evaporated by stove-drying.....	14.06
Vegetable and animal matter burnt.....	12.01
Silica, and siliceous grit.....	49.54
Oxide of iron.....	7.30
Carbonate of lime.....	1.05
Carbonate of magnesia.....	0.25
Sulphate of lime.....	1.05
Muriates.....	6.54
Alumina.....	7.10
Phosphate of lime.....	0.10
Potash.....	1.00
Humus soluble in alkalies.....	6.00

Probus, April 2, 1847.

100.

COMPARATIVE PRICES OF FEEDING MATERIALS, &c.

FIRST WEEKS IN APRIL, 1846, AND APRIL, 1847.

Circular by Mr. Telfer, of Ayr.

With regard to feeding materials, it will be observed that prices have had a sudden fall of late, which is ascribed to recent heavy arrivals from foreign countries, and the supposition that the stocks in Great Britain and Ireland are larger than was at one time supposed. The advance in the value of money has also tended to check speculative purchases.

Lentils, as a new article, are coming into favour as a comparatively cheap and nutritious food for dairy cows.

In guano, a good deal has been done at last month's rates. Ichaboe of good quality has become very scarce in the large seaports, which is causing Peruvian to be more looked after.

For top-dressing hay and pasture lands, Peruvian has been found, in all trials here, to be infinitely superior to Ichaboe.

DESCRIPTION.	Price in			
	1846.		1847.	
	per ton.	per ton.	RISE.	FALL.
	£ s.	£ s.	£ s.	£ s.
Oil Cake.....	10 10 13	0 2 10	—	—
Oil Cake Meal.....	10 10 13	0 2 10	—	—
Egyptian Beans.....	8 16 11	4 2 8	—	—
Egyptian Bean Meal.....	9 4 12	8 3 4	—	—
Indian Corn.....	9 4 13	0 3 16	—	—
Oatmeal.....	16 16 24	6 7 4	—	—
Lentils.....	—	11 0	—	—
Lentil Meal.....	—	12 0	—	—
English Beans.....	—	14 4	—	—
Dutch Beans.....	—	13 16	—	—
Peruvian Guano.....	10 15 10	15	—	—
Ichaboe Guano.....	8 15 8	15	—	—
Barrel Flour, per 196 lbs.....	1 14 2	0 6	—	—
Indian Meal, per 196 lbs.....	—	1 10	—	—

## METEOROLOGICAL DIARY.

BAROMETER.			THERMOMETER.			WIND AND STATE.		ATMOSPHERE.			
Day.	8 a. m.	10 p. m.	Min.	Max.	10 p. m.	Direction.	Force.	8 a. m.	2 p. m.	10 p. m.	
	in. cts.	in. cts.						8 a. m.	2 p. m.	10 p. m.	
March	22	29.73	29.83	39	56	49	N.E., S.E.	gentle	fine	sun	cloudy
	23	29.83	29.73	38	50	42	S. West	lively	fog	sun	fog
	24	29.77	29.90	38	50	42	W. by S., N.W.	gentle	fine	sun	fine
	25	30.—	29.99	31	53	45	S.W., East	gentle	fine	sun	cloudy
	26	30.—	30.—	42	58	47	S., West	gentle	cloudy	sun	fine
	27	30.01	29.87	46	57	49	S., Easterly	gentle	fog	sun	cloudy
	28	29.63	29.60	46	52	37	S.W., N. by E.	variable	cloudy	cloudy	cloudy
	29	29.77	29.70	31	43	35	N.E., N.W.	strong	fine	sun	fine
	30	29.70	29.65	31	43	34	N.W., West	gentle	fine	sun	fine
	31	29.55	29.47	28	38	33	N. West	gentle	fine	sun	fine
April	1	29.40	29.30	30	41	35	S., Westerly	brisk	fine	cloudy	cloudy
	2	29.28	29.30	28	40	33	N. N.W.	lively	fine	sun	fine
	3	29.36	29.43	30	42	41	N. N.W.	brisk	fine	cloudy	cloudy
	4	29.64	29.64	33	44	41	West	brisk	fine	cloudy	fine
	5	29.63	29.72	41	51	43	W. by N.	lively	cloudy	sun	fine
	6	29.73	29.83	41	52	47	W. by N.	brisk	fine	cloudy	cloudy
	7	29.82	29.65	46	55	47	W. by N.	gentle	fine	fine	fine
	8	29.65	29.55	47	56	47	West	very high	cloudy	cloudy	fine
	9	29.70	29.77	40	53	46	W. N.W.	high calm	fine	cloudy	fine
	10	29.87	29.90	41	53	44	Westerly	gentle	fine	cloudy	fine
	11	29.93	29.88	40	48	48	W. by South	gentle	haze	cloudy	cloudy
	12	29.75	29.70	46	56	53	Westerly	gentle	cloudy	cloudy	cloudy
13	29.85	29.92	41	48	38	N. East	brisk	cloudy	cloudy	cloudy	
14	29.94	29.94	36	40	38	N. East	brisk	cloudy	cloudy	cloudy	
15	29.90	30.—	34	44	35	N. by East	brisk	fine	cloudy	fine	
16	30.—	29.91	29	44	37	N. by East	fresh	fine	sun	fine	
17	29.84	29.79	28	46	39	E., W.S.W.	variable	fine	sun	cloudy	
18	29.85	29.83	30	48	42	N. West	gentle	fine	cloudy	fine	
19	29.80	29.72	36	51	43	S.E., S.W.	gentle	fine	sun	fine	
20	29.85	29.92	36	54	47	W. by South	gentle	haze	fine	cloudy	

## ESTIMATED AVERAGES OF APRIL.

Barometer.		Thermometer.		
High.	Low.	High.	Low.	Mean.
30.54	29.20	74	29	49.90

## REAL AVERAGE TEMPERATURE OF THE PERIOD.

Lowest.	Highest.	Mean.
36.77	48.66	42.715

## WEATHER AND PHENOMENA.

March 22, fine sunset, with rain clouds. 23, foggy morning and evening. 24, a little rain, beautifully clear. 25, keen night, frost, then very fine and warm. 26, a sprinkling of rain, hot sun. 27, dense haze, clearing about noon. 28, fine rain most of the day. 29, scuds of rain and sleet, a sudden change to cold weather. 30, hoar frost, very cold night. 31, variable, sharp frost.

LUNATION.—Full moon, eclipsed this night about 10 o'clock.

April 1, rough, cold day, sleet. 2, strong rime, snow. 3, piercingly cold, snow and rain. 4, fine day, cloudy evening, some snow. 5, rainy morning, clearing off. 6, cloudy day, a hint of rain. 7, no

sun, but fine, with broken clouds. 8, generally cloudy, warmer from the west. 9, some rain. 10, fine intervals. 11, haze at 7 P.M., followed by some hours of rain. 12, gloomy, starchy clouds, and rain at night. 13, a total and wintery change. 14, cold, fine intervals, with heavy, black clouds. 15, cold, scuds of snow. 16, keen night, powerful sun. 17, cloudy, changeable. 18, very fine morn, milder. 19, fine morning, with very low temperature. 20, much warmer in the day, after cold night.

LUNATIONS.—Last quarter, 8th, 3 h. 26 min. afternoon. New moon, 15th day, 6 h. 22 min. morning.

REMARKS REFERRING TO AGRICULTURE.—This whole period has been cold, ungenial, and contrary to the usual progress. Corn, however, advances slowly, and all the crops are safe as yet, only that the want of rain is seriously felt by the oats. It is to be hoped rain will soon come on, and be followed by genial warmth. Hitherto, every fall of rain or snow has invariably been soon succeeded by a northerly change of wind and piercing night-frosts. The whole season has been anomalous and perplexing.

## CALENDAR OF HORTICULTURE.—MAY.

RETROSPECT.—Prospects.—On this 16th day of April my night thermometer marked, as its lowest depression, 3° of frost (F. 29); the maximum, by a great power of sun, has been since raised to 44°: and the wind is, and has been (subsequent to the beautiful, and for a few hours, genial rain of Sunday, the 11th) at north by east, piercingly cold, and so severe from sunrise to sunset, that coverings over the forcing-houses, pits, &c., were blown about and uplifted, in defiance of boards and cords. We complain not; but really, after eighteen weeks of cold weather, during which a great part of the period was gloomy and sunless, it is remarkable that after every fall of rain from a south-westerly quarter the benefit thence derivable has been negated by a return of parching wind and frost. Many fine vegetables have been injured by these recurring attacks, especially when they were preceded by snow, and, as a natural consequence, all garden produce is very late. The forcing departments have also claimed severe and expensive attention.

It is an unpleasant duty to find fault with any mechanical invention, but having just witnessed the perfect adaptation of a flue, and mode of ventilation by the simplest of means, in a house built for a gentleman under his own direction, we feel the defects of those double-cylinder boilers, that were for a time much lauded about three years since, and of which many, of course, are still in action. At a late chemical lecture, on the economy of fuel, the Professor clearly proved that the carbonic acid produced by the combustion of charcoal or coke has the power actually to dissolve heated coal in passing through it, thereby not only producing oxide of carbon at the expense of the uninflamed coal, but carrying that off as an invisible gas through the chimney. In the double cylinder arrangement, wherein the case or hollow formed between the outer and inner vessel contains the water (the latter being itself the furnace), a body of coke that rests upon the gridiron grate at bottom, while in a state of high combustion, emits, of course, a volume of carbonic acid. This gas in its passage through the heated but unignited coke above it unites with the nascent carbon vapour from that coke, and thus, as stated, carries off the essence of the fuel. In proof of this theory, it very frequently happens that on raising the iron cover of the furnace to examine or feed the fire (which to appearance is burning quietly) an explosion and rush of hydro-carbonous

flame takes place almost immediately after the ingress of the atmospheric air from above. Thus, not only is danger incurred by the operator, if his face be over the opening, but there is demonstrably a continuous waste of fuel which ought not to exist. Some loss is incurred in every furnace, but it may be much diminished if the boilers assume the form of an oven, and are surrounded on every side by fire, whilst the central part, or oven, itself the fire-place, is closed by an air-tight door, and its ash-pit equally guarded. Such furnaces will consume the commonest cinders or "breeze," and keep alight for twelve hours; whereas the upright cylinders, fed from above, require the best coke, and are rendered by their very construction little better than "gas retorts." I hope that these extended remarks may prove valuable to the forcing gardener.

## OPERATIONS IN THE VEGETABLE GARDEN.

Every one of the directions given for March and April applies now, in a season so backward that all the crops are a month in arrears: thus, peas, beans, salads, and all the cabbage tribes, can be sown. Some peas there are, and in fine state also, and these, as all other vegetables, should be assisted by good hoeings and other usual appliances. The ground is in a state so truly excellent, that it is a pleasure to deal with it; all we want is a good supply of really genial rain, and frequently recurring sunny intervals—deprecating, as one must, the hot burning rays as much as the severe nipping frosts.

*Kidney Beans* ought to be sown twice, and the ground being warm would soon bring them on; but it is to be hoped that there are thousands already sown in pots under protection, and ready to go with entire root-balls into their allotted ground when frosts appear gone; however, we must remember what May has done in bygone years, and can yet effect, late as the season already is.

It is not too late to sow or transplant *Asparagus*, provided the beds or plots be in the state of deep preparation so often insisted. Seedlings raised in such a fertilizing staple will not be far in arrear of transplanted year or two-year-old roots, because the removal gives a check, and it too often happens that those purchased remain many hours out of the ground. The same remarks and objections apply to sea-kale.

*Cabbage*.—Plant out twice or thrice for succession. Sow hearting cabbage and all the varieties of



broccoli: also Savoys, borecole, and Brussels sprouts. If the ground be light, always tread it firmly before drawing the drills, and draw those of an even depth of about half an inch; cover the seed, and tread or pat the soil well: if the season and earth be dry, water the drill.

*Spinach*.—Sow repeatedly the round-seeded, for the plant soon flies to seed. Sow also *Radish*, white mustard, cress, a little horn-carrot-seed, and onion. Prick out *Celery* seedling, into a small bed, taking care to have a layer of mellow dung an inch or two below the roots, because they will ultimately work and mat into the manure, thereby giving security to their final removal.

*Cauliflower*.—Plant out twice in very rich ground, and sow for succession. Transplant all the sweet aromatic herbs.

Sow *Lettuce* frequently, so as to keep a constant supply of young and hearing plants.

Hoe all the crops and spaces; and in doing this, thin out the root-crops to their proper distances. Make it a point to run the hoe or small-toothed rake among and between advancing seedlings, partly to detach and somewhat thin them; and then from time to time draw out supernumeraries. Water lettuce liberally in dry weather.

#### FRUIT DEPARTMENT.

Trim the *Vines* freely. Clear out useless shoots, and prepare the bearers for early nailing. They are very tender for some weeks. When the young, fruitful shoots advance two or three joints beyond the clusters, nip out the germ of the next joint, and pursue this course with all the axillary laterals.

*Disbud*, by times and degrees, peaches, nectarines, &c. Wash the trees plentifully with clear water; and, to prevent snails, try a solution of blue vitriol on the brick spaces of the wall, avoiding the leaves and wood. A tarred strip of wood nailed over the whole length of the wall as far as the trees extend, and at an inch or two above the soil, will

tend to guard the fruit from ants, earwigs, and wood-lice.

Keep strawberry-beds and rows free from weeds, and lay short grass-mowings around them. This cleanly mulch would keep in much moisture, and prevent the evil that for the two last summers has resulted from the fierce power of the sun.

Train in the fig-branches, and remove supernumeraries. Look over and secure the grafts that have taken and are growing.

The fruit-plants of all the forcing departments must be sedulously attended to, according to the directions repeatedly given.

#### FLOWER-GARDEN.

About the 15th—especially if the weather and soil be, as we hope, a little moist—begin to arrange the parterre masses, and also the groups or combinations of borders and patches. In the first, attend to the adaptation of height and position of one and the same plant; in the other arrangement, study size, colour, and display: and herein taste must guide. Masses possess simplicity, but much imposing grandeur; miscellaneous planting requires more judgment in every respect. The double, French-yellow, and the dark-stained *wall-flowers* ought never to be overlooked; their odour is fine, and the effect of a good bed imposing. Slips or cuttings root freely under a hand-glass; retain also those old worthies, the sweetwilliam, Indian pink, common and clove pinks, scabious, lychnis, and phlox, and the double rocket. The single rocket, or dame's violet, is fragrant beyond expression.

Repair box-edgings; clean and roll gravel; sweep, roll, and mow lawns, and reserve the short grass.

Hawthorn, privet, holly-hedges, and all evergreen shrubs, may now be shorn and thinned out as required, to keep them in orderly figure.

## AGRICULTURAL REPORTS.

### GENERAL AGRICULTURAL REPORT FOR APRIL.

From the date of our last report the weather has been very fine for all out-door farm operations, which have progressed rapidly, without the slightest interruption. With the exception of the last week, scarcely any rain worthy of notice has fallen in any part of England; owing to which, and the continuance of cold nights, vegetation in general has made very little progress. Still, however, it is extremely gratifying for us to be able to report favourably of the young wheats, which, though

stunted in growth, are exhibiting a healthy appearance, considering the long prevalence of easterly and northerly winds. The spring crops have been nearly all sown, with the land in fine condition for the reception of the seed. It would, of course, be premature for us to offer any opinion upon the future; but we entertain a strong conviction that the present backwardness of the crops in general will be productive of much ultimate benefit as regards the produce of the soil.



Notwithstanding the decided failure in the growth of potatoes last year—and which failure was unquestionably general—we are happy in being able to state that comparatively large breadths of land (much larger than many parties appear to imagine) have been planted with that esculent, the stocks of last year's growth of which on hand are decidedly smaller than we ever recollect them at any previous corresponding period of the year; hence, as much as 14*l.* per ton has been paid in the London market for the best qualities.

The provision markets have been again very firm, and the quotations of both live and dead meat have had an upward tendency. On Monday, the 26th inst., both beef and mutton advanced in Smithfield quite 4*d.* per 8 lbs., the primest Scots selling at fully 4*s.* 6*d.*, and the best old Downs, in the wool, 5*s.* 8*d.* per 8 lbs.; with every prospect of a further rise in prices. From Scotland and various parts of England the receipts of slaughtered meat into London have been small, and which have produced good currencies.

In most of our large grazing districts the supply of food for the cattle is getting scarce and dear; and, as there is now no substitute to be found, many of the graziers have forwarded their stock for sale fully a month earlier than they would have done under ordinary circumstances. Copious showers and warm weather are now much required, to provide an increased supply of pasture herbage, and improve the health of the stock—beasts in particular—which is by no means good, as we hear of the epidemic having made serious ravages.

The lambing season has passed off tolerably well, if we except that experienced in some of our northern counties, in which some great losses have been sustained.

Our advices from Ireland and Scotland are to the effect that great scarcity prevails in most parts. Prices of grain have consequently improved, with an active demand. The stocks of grain have been reduced to a very low ebb, even in the best districts.

**REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.**

Notwithstanding the supplies of fat stock on offer in our various cattle markets held in the past month have been seasonably extensive, especially those of beasts and lambs, we have to report a firm general inquiry, at improving quotations. At no previous corresponding period of the year have finer or better-conditioned beasts and sheep been brought forward than in the period just alluded to. In point of fact, the greatest difficulty has been frequently experienced by some of the butchers to obtain animals in a half fat state. This fact, which

has had considerable influence upon the value of Russian produce, proves more than any other that we could adduce, the existence of unusually large quantities of food during the winter months; and we have no hesitation whatever in saying that, had it not been for that circumstance, we should have had to dwell at some length upon more than usual losses, not only from the graziers being compelled to forward their stock to market earlier than usual, but likewise from the long-complained-of epidemic, which, as it is, has committed some rather serious ravages in our northern districts. Judging from present appearances, even in the face of an average lambing season, we are led to conclude that the present year will prove a very dear one for store stock, particularly for tegs. This observation may appear somewhat opposed to our oft-repeated views as to the operation of the new tariff admitting live animals for consumption here free of duty; but our readers must bear in mind that, contrary to almost general expectation, the number of sheep in Holland is decreasing, and the prices are on the advance, even though the condition is miserably deficient. We therefore do not expect very large importations of sheep from that or any other quarter during the present year. On the other hand, however, there appear to be most abundant supplies of beasts, and which are likely to reach us in a good state between this and the close of the present season.

The extent of the arrivals into London since our last is shown in the annexed table:—

IMPORTS OF LIVE STOCK INTO LONDON.	
	Head.
Beasts.....	2,884
Sheep.....	2,687
Calves.....	255
Total.....	5,826

Out of the above, 418 of the first description of stock have been oxen; the remainder (or 2,466 head) cows. The importations at the same time last year consisted of 707 beasts, 1201 sheep, and 8 calves. At the outports they have comprised, in the past month, about 1680 head, chiefly from Holland.

A great scarcity of food, arising from the backwardness of vegetation, is now complained of in most of our large grazing districts; yet we are by no means inclined to the opinion that our markets will be heavily supplied with stock for some time hence; and it is therefore very probable that prices will be well-supported during the coming month.

Increased supplies of both beasts and sheep have been on offer in Smithfield; yet a large business has been doing at improving prices. Both items have stood thus:—

SUPPLIES.		Head.
Beasts.....		17,810
Cows.....		461
Sheep and lambs.....		103,620
Calves.....		1,049
Pigs.....		2,570

The following is a comparison of the numbers brought forward at the corresponding periods during the month of April in 1845 and 1846.

	April, 1845.	April, 1846.
Beasts.....	12,800	15,224
Cows.....	600	587
Sheep and lambs.....	110,400	91,620
Calves.....	600	905
Pigs.....	1,600	2,351

## COMPARISON OF PRICES.

	April, 1846.		April, 1847.	
	s.	d.	s.	d.
Beef, from 2 4 to 3 6 ..	3	4	3	4
Mutton ..	8	4	6	3
Lamb ...	5	4	6	8
Veal ....	4	4	5	4
Pork ....	3	4	5	2

Up to Newgate and Leadenhall, the arrivals of slaughtered meat from Scotland and various parts of England have been small, while a full average amount of business has been doing, at somewhat improved currencies. Beef has sold at from 2s. 8d. to 3s. 8d.; mutton, 3s. 8d. to 4s. 10d.; lamb, 5s. 2d. to 6s. 4d.; veal, 4s. to 5s. 2d.; and pork, 3s. 8d. to 5s. per 8lbs. by the carcass.

## ESSEX.

The extraordinary severity of the winter, which we trust is now about to terminate, has produced a lateness of all descriptions of growing corn greater than has been known for some time, and the severe frosts of the 16th and 17th gave a still further check to vegetation. At the same time, should a fine and mild temperature succeed, there appears to be every encouragement to hope that a large and abundant crop will follow. The appearance of all the spring-sown crops is good, a finer seed-time throughout never having been known; but wheat in many places has suffered in plant from the severity of the winter, though we do not report it to be so injured as materially to affect the general crop, as warm rains and temperature combined would remedy much that now appears unpromising. We have very much improved wind-blown wheat by early hoeing, and cannot too strongly recommend the plan. The thin sowing of wheat which has been recommended by many writers, and economically adopted in the seed-time by many farmers, will this year be attended with great deficiency of plant, and consequent loss. A neighbour of ours, who has this year sown thin, has given his decided opinion it will be attended by a most serious loss to him; and certainly the appearance of it is exceedingly bare and unpropitious. We have always discontinued the sowing of less than ten pecks of wheat per acre, except on superior land, being fully persuaded that land bearing an *excess* of straw is highly favourable to succeeding crops, and goes far to prevent the ravages of wire-worm, the growth of weeds, and the prevalence of mildew. Till within the last seed-time we have always sown twelve pecks per acre, and the cleanliness of the stubbles after the crops have been carried has often called forth the admiration of our friends. At the same time,

we admit a greater quantity of grain *might* have been the result of less seed, but not equal in value to the benefit of the increase of straw and cleanliness of the land. The breadth of wheat sown has been by no means excessive, the price at which barley has been selling affording quite as much inducement to grow that grain as wheat, if not more so. There has been a great quantity of barley sown, to the exclusion of oats. Of beans and peas a great breadth has also been planted, and these are good in plant. All have a most healthy appearance, and promise most abundantly. Tares and young clovers are very backward, though many flockmasters have been forced to put their flocks on thus early, at a very great sacrifice of future produce. Turnips have long ago disappeared, and the cost of keeping cattle and sheep by artificial food through the winter and spring baffles all calculations of profit, or rather we should say of loss. Thousands of acres of pasture-land have been fed off so close that, should a dry season follow, it must tell very severely upon the forthcoming crop of hay. Hay-stacks have not disappeared to the extent it might reasonably have been supposed in so sharp a winter; and we report a full average supply remaining for future use. This is partly to be attributed to the low price it has been selling at, and to the very short stock of cattle in the hands of the farmer, and which appears to be lessening every succeeding year. Many causes unite to discourage the farmer from fully stocking his land—the very severe losses which resulted from the epidemic, the panic which followed the enactment of the tariff, the exorbitant prices asked for lean cattle ever since at our markets and fairs, so out of all proportion to the price of fat stock, the high price of artificial food, the poor crop of turnips, the fear of foreign importation, and, above all, the low price of meat, have all combined to discourage the farmer from pursuing with spirit a branch of his business attended with so unfavourable, so hazardous contingencies. We have pleasure in reporting the epidemic among cattle as far less fatal this season than the preceding ones, and trust it may be gradually wearing itself out, or, at any rate, appearing in a far milder form. Turnip-lands are in a very forward state, and mangel-wurzel has been already planted to some extent. Potatoes have not been sown so extensively as in many seasons, either by the farmer or his cottager, both fearing a recurrence of the disease so destructive to that hitherto useful plant. The stocks of corn of all descriptions in the hands of the growers have so diminished in our county that, independent of a supply from abroad, we hesitate not to say the whole we have got would not be too much to have (with our present consumption) in store the first week in August next; and every day confirms our previously-expressed opinions that farmers, millers, and bakers hold comparatively little; and unless America and the northern parts are as abundantly provided as they profess to be, a pressure may be felt, if not dangerous, at least trying and painful to the last degree. Four months' consumption, and for aught we know five, must take place ere any part of the crop of '47 can be brought into consumption. The speculator, in the mean time, having nearly the command of our markets, Ireland, France, Portugal, Belgium competing in self-defence for a supply, our own markets so buoyant that ordinary samples of wheat, which in some seasons would not have commanded 35s. per qr., now find ready purchasers at 70s. or 80s., the distillers looking in vain for their accustomed supply of inferior grain, it may be imagined the agricultural interest is flourishing; but such is by no means the case, the deficient crop, and the unprecedented haste with which it was thrown on the market at some 60s. per qr., making the circumstances of the generality of farmers but little better than in preceding years.

## AGRICULTURAL INTELLIGENCE, FAIRS, &amp;c.

**ASHTON FAIR.**—There was an excellent stock of sheep, and a fair show of horned cattle. On the whole a tolerable business was done.

**BEDFORD FAIR.**—There was a large supply of store beasts, but the trade was dull; though, where a trifling reduction in price was submitted to, sales were effected, and many taken off. Of fat beasts there was rather more than an average quantity, which fetched from 6d. to 6½d. per lb. There was a large supply of store sheep: trade dull, but many sold at a small abatement in the demands of the sellers. In fat sheep, towards the close of the day, there was much business done, prices varying from 6½d. to 7d. out of the wool. A short supply of good horses at high prices, but few sold: those of a middling description were of but little value.

**CHESTER CHEESE FAIR.**—There was about the average quantity pitched, all of which was in good condition. Buyers were numerous and demand brisk. All was sold at an early hour in the morning. Prices ranged from 58s. to 64s. One good dairy sold for 67s. The fair on the whole was satisfactory to the farmers.

**CATTLE FAIR.**—The show of stock was limited. Milch cows were in good demand. Fat beasts were worth 7d. per lb. and sink. Fat sheep were worth 8½d. Some good horses were shown in the horse fair, and eagerly bought up. There was a fair demand for hack and draught horses.

**DEVIZES FAIR** was more largely supplied with cattle than we ever remember seeing it. This, added to the high prices asked, may account for many being driven away unsold. 25*l.* was in some instances the figure required for good heifers, but from 17*l.* to 20*l.* was the usual sum. The number of sheep penned was, on the other hand, small beyond precedent—2,000 being nearly the outside exhibited for sale. The horse fair was better than usual, and several sold at 40 guineas each. Some of the animals offered for sale were fit only for the knacker.

**ELLESMERE FAIR.**—There was scarcely a fat cow offered, but a good supply of well-fed barrens, which, owing to a large attendance of purchasers, fetched 6d. to 6½d. per lb. Cows and calves being scarce, also sold well. There were but three pens of sheep; readily sold at 6½d. per lb.; and ewes and lambs were very dear. Pigs, although plentiful, sold at better rates than before.

**GLOSTER MONTHLY MARKET.**—There was but a short supply of beef, which obtained from 5½d. to 6d. per lb., with a ready sale. The show of fat sheep was rather large for the season of the year, and met a good sale at from 7d. to 7½d. per lb.; and some prime wethers, of light weights, obtained 7½d.

**HOWDEN FAIR.**—There was a greater show of beasts than we have noticed at any previous Spring fair, but the demand rather slow, at some little decline in price. In-calfing cows sold from 14*l.* to 18*l.*, and 19*l.* each. We had a moderate show of sheep. Beef, 6s. to 6s. 6d. per stone; mutton, 6d. to 7d. per lb. The attendance of farmers and dealers was numerous and respectable. There was a tolerable show of horses; the demand for which, of a good quality of every description, was much greater than the supply. Some of the best horses were purchased in the stables at prices varying from 70*l.*, 80*l.*, to 100*l.*, and some nags were sold at 60*l.*, 70*l.*, and 80*l.* each. The fair throughout was in the highest degree satisfactory.

**LINCOLN FAIR.**—There was only a very small show of horses, and as usual first-rate animals obtained high prices. Capital cart-horses fetched high prices. The great buyers now scour the country prior to the fair, and buy up all the most valuable horses before the fair commences. A very large number of sheep was penned; the quantity being variously estimated at from 35 to 50,000, and probably the latter number is nearer the truth. The supply of fat stock was but small, and was bought up readily at very high rates. The sellers asked large prices at the commencement, but as the buyers held off, the prices were brought down. The very best description of hogs made about 50s. per head: for fair sorts the prices ranged from 42s. to 47s. The quality of hogs this year is not on the whole so good as on previous years, being generally poor in flesh, perhaps owing to the severity of the winter. A very excellent pen of hogs was brought in by Mr. Giles, of Branton, and sold at 53s. per head; Mr. W. Rudgard had also some good ones, together with Mr. Bayles, of Riseholme, and Mr. T. Wynn, of Lincoln. The exhibition of the sheep on the side of the hill was a beautiful picture, and the sight was visited by hundreds of the citizens.

**LOCKERBIE MARKET.**—There were about 2,200 hogs, chiefly cross-bred, exposed for sale, and though the market was a slow and hanging one, they were nearly all sold. The condition and weight were greatly inferior to former years; and though the general prices of the stock were smaller, the rate in proportion to the real value was nearly as great. The most common prices of half-bred hogs would run from 25s. to 32s. For one considerable lot 40s. was asked, but they were not sold, at least in the market hours; Cheviot wether hogs, 29s. to 24s.; and ewe hogs, 16s. or 17s. For the prize lot, belonging to Mr. Wright, Bengall, 57s. was given; and for some small lots in the pens, for butchers, 35s. to 45s. was paid. Very few fat cattle were shown for sale, but they met a ready market at fully 7s. per stone. Two stots of Mr. Gillespie's gave about £24 each. There were a few store cattle of various sorts shown for Penrith Fair, and sold. A lot of fair three-year-old stots of Mr. Jardine, Dalmakeddar's, gave £11 15s. each.

**SHREWSBURY FAIR.**—There was a large supply of prime fat cattle, and being an equally large demand, sales were effected readily at good prices; the smartest animals rather over 6d. per lb., but the average 6d. The demand for half-meated oxen and heifers was rather flat, owing to the lateness of the spring. Cows and calves also dull of sale. Butter and cheese sold well; the former at 10½d. to 1s. per lb. In the cheese fair the lowest prices were 40s. to 50s. per cwt.; and at the Howard-street market there was a good supply of cheese for the time of year, chiefly of the later make, which fetched from 54s. to 63s. per cwt.; all was readily sold. Bacon 7½d. to 8d. per lb.

**WORCESTER FAIR.**—The show of cows was great, particularly barrens and cows with calves. Good beef sold readily at 6½d. to 7d. per lb. There was a small show of sheep stock; but good mutton sold at 7d. to 8d., and all cleared off early. A limited number of horses; the best realized high prices. Pigs are on the decline. Buyers were very numerous for all sorts of stock, some of which changed hands several times.

**SALE OF SHORT-HORNS.**—On Friday, the 16th inst., the sale of short-horns belonging to Mr. Thomas Wetherell took place at Newton Hall farm, near this

city, and on no former occasion have we observed so many first-class breeders from all parts of England, Ireland, and Scotland assembled, anxious to possess themselves of animals which appeared to be the admiration of every one present. It must be very gratifying to Mr. Thos. Wetherell, who is so young a breeder, that the animals should have realized such high prices, the average of which exceeds many sales of old and experienced breeders. Amongst the gentlemen present we noticed Wm. Torr, Esq., Thos. Brooks, Esq., F. Isles, Esq., J. Topham, Esq., and T. Parkinson, Esq., from Jincolnshire; W. B. Colvin, Esq., J. Louth, Esq., and T. Louth, from Essex; John Booth, Esq., R. Booth, Esq., J. Maynard, Esq., J. M. Hopper, Esq., B. Wilson, Esq., L. Severs, Esq., H. J. Turner, Esq., J. Beetham, Esq., R. Eastwood, Esq., and George Harrison, Esq., from Yorkshire; — Robinson, Esq., Bedfordshire; Wm. Satkin, Esq., J. Barnes, Esq., C. H. Bainbridge, Esq., S. Deighton, Esq., J. Crofton, Esq., G. Wood, Esq., H. Newby, Esq., and H. J. Spearman, Esq., from Durham; Jas. Fawcett, Esq., Cumberland; Capt. Barclay, T. T. Cartwright, Esq., J. Wilson, Esq., M. Stewart, Esq., and W. Watson, Esq. (Keillor), from Scotland; Messrs. Arthur, Moor, Ferguson, and Macdonor, from Ireland; also the agents of Earl Ducie, the Earl of Zetland, Lord Westminster, Sir John Hubback, Messrs. Hoare, bankers, Grant Duff, Esq., Eden, N.B., H. Strafford, Esq., &c. The following are the prices which the animals brought:—Lot 1, Molly, 21 gs., to Mr. Deighton; lot 2, Duchess, 19 gs., Mr. Brookes; lot 3, Jewell, 25gs., Mr. B. Wilson; lot 4, Marchioness,

26 gs., Mr. Beetham; lot 5, White Rosalind, 52 gs., Mr. Robinson; lot 6, Blossom, 37 gs., Mr. Colvin; lot 7, Silvester, 37 gs., Mr. Torr; lot 8, Emily, 29 gs., Mr. Anderson; lot 9, Lady Sally, 40 gs., Mr. Colvin; lot 10, Bright Eyes, 44 gs., Mr. Robinson; lot 11, Crystal, 105 gs., Earl Ducie; lot 12, Sweetbriar, 36 gs., Mr. Torr; lot 13, Catherine, 33 gs., Mr. Spearman; lot 14, Marchioness, 31 gs., Mr. Spearman; lot 15, Victoria, 36 gs., Mr. Anderson; lot 16, Cherry, 60 gs., Mr. Jas. Robinson; lot 17, Countess, not sold; lot 18, Rolandina, 31 gs., Col. Kingscote; lot 19, Dowager, 140 gs., Earl Ducie; lot 20, Janette, 86 gs., Mr. Robinson, Clifton; lot 21, Queen of Trumps, 33 gs., Mr. Tollman; lot 22, Moss Rose, 50 gs., Captain Barclay; lot 23, Rosebud, 86 gs., Mr. Eastwood; lot 24, Roseleaf, 40 gs., Mr. Giles; lot 25, Red Rose, 15 gs., Col. Kingscote; lot 26, Ruby, 19 gs., Mr. Isles; lot 27, Strawberry, 22gs., Col. Kingscote; lot 28, Raspberry, 22 gs., Mr. Emmerston; lot 29, Splendour, 17 gs., Mr. Colvin; lot 30, Princess Alice, 20 gs., Lord Zetland. Bulls.—Lot 31, Emperor, 25 gs., Mr. B. Wilson; lot 32, Lord Durham, 105 gs., Mr. Colvin; lot 33, Duke of Clarence, 130 gs., Mr. Harvey; lot 34, Lord Strafford, 24 gs., Mr. Deighton; lot 35, Exquisite, 31 gs., Mr. Arthur; lot 36, Admiral Nelson, 15 gs., Mr. Deighton; lot 37, Victory, 30 gs., Mr. Anderson; lot 38, King Dick, 60 gs., Mr. B. Wilson; lot 39, Lambton, 20 gs., Mr. Dudding. Some of the very best of this splendid stock were purchased by B. B. Colvin, Esq., of Monkham's Hall, Waltham Abbey, Essex.

## REVIEW OF THE CORN TRADE DURING THE MONTH OF APRIL.

The weather experienced during the greater part of the month now about to terminate has been exceedingly cold and ungenial. Until about the 20th instant the thermometer fell regularly every night below the freezing point; and though the days have been sunny, the wind having been almost constantly from the northward and east, the temperature has at no time been warm. The want of rain—having had only two or three showery days—has also been a good deal felt, and the general character of the weather has resembled that usually experienced in March far more than what we are accustomed to in April. Under these circumstances, vegetation has made very little progress; and as compared with last year, the season may be considered a month or six weeks in arrears. It is, therefore, more than probable that the next harvest will be late—at all times a great drawback, but more particularly so at present, owing to the shortness of the stocks. We are, however, happy to say that we have hitherto heard of no complaints respecting the appearance of the autumn-sown wheat except its backwardness; and as the spring corn has been well got in, an interval of warm moist weather would soon work a great improvement in the aspect of the country. Still it must be confessed that our prospects for the

future are not very encouraging; as yet we have hardly had a single spring-like day; and as for the warm showers, so beneficial in April, they have been wholly wanting. The keen east winds and sharp night frosts may have done more mischief than is yet shown; and though it is far from our desire to predict evils, we cannot help feeling some apprehension, the country being at present in a very awkward position to encounter a deficient, or even a late harvest.

In our last monthly notice we expressed an opinion respecting the quantity of wheat in the hands of the farmers, and gave our reasons for coming to the conclusion that the stocks held by the growers were less than in ordinary years at the corresponding period. What has since taken place has tended greatly to strengthen this belief: indeed we now scarcely have a doubt on the subject. Whilst the sowing of spring corn was going on, small deliveries were to be expected; but as this important occupation has some time past been brought to a close, and the supplies from the farmers have, nevertheless, fallen off rather than increased, it is hardly possible to suppose that they can be large holders. We are wholly at a loss to conceive what inducement there can be to hold

back, if there really be anything like the usual quantity of wheat in stack and barn. Surely prices are sufficiently high to satisfy the most sanguine; and though we do not regard any material fall likely, still a favourable change in the weather, coupled with large supplies from abroad, might easily cause a reduction. These considerations would, we think, have had the effect of inducing farmers to thrash freely, if they actually had much to dispose of; and we, consequently, regard the recent decrease in the deliveries as a strong proof of our previously-given opinion, that the enormously increased consumption of bread has reduced the stocks in the hands of the producers in nearly the same ratio as those in granary, and that there is at this moment so little corn in the kingdom as to render a very large importation of foreign absolutely necessary. The public appear, however, to be still under the impression that speculation has been the cause of the rise in the value of bread-stuffs; and the notion that farmers are holding back their wheat is still very prevalent. Merchants have, therefore, been less inclined than usual to enter into investments in the article; and the purchases recently made have been either for the supply of immediate wants, or for shipment to France. The export to the latter country has, on the whole, been extensive. About the close of March there was a temporary cessation in the French demand; but latterly the inquiry has again become very active, and many cargoes have been bought during the last week or two, in Lincolnshire, at prices fully as high as those obtained at any previous period since harvest. The wheat bought has, therefore, been either consumed or has been taken out of the country—which is a very different thing to the mere changing of hands, such as takes place in times of speculation; and we feel fully persuaded that the whole of the expected supplies from America, Russia, &c., will be wanted before another harvest can be gathered.

To give our readers a more precise account of the changes which have occurred in prices since the end of the month than can be collected from the foregoing remarks, we shall proceed in our usual way to lay before them a detailed report of the fluctuations which have taken place at Mark-lane. As a general remark it may, in the first instance, be observed that the arrivals coastwise into London have been small throughout the month; whilst the quantity brought forward by land-carriage samples from the neighbouring counties has been very scanty.

In the early part of the month business, though firm, was rather quiet, and it was not until the 12th instant that prices underwent a decided advance: on that day, however, there was a nu-

merous attendance at Mark-lane from different parts of the country, and also several French buyers; factors consequently raised their pretensions, and nearly all the English wheat exhibited was sold at rates 2s. to 3s. per qr. above those at which purchases might previously have been made. This rise in the metropolitan market naturally influenced the value of the article in the provinces, and during the succeeding week a similar advance was established at most of the markets of importance, as well in the agricultural as in the manufacturing districts. Meanwhile no increase took place in the supplies into London, and the quantity brought forward on the 19th instant proving short of what was required for the supply of the local and foreign demand, a further rise of 5s. to 6s. per qr. was easily established, good red wheat having on that occasion been sold at 84s. to 85s., and superior white at 90s. per qr. This great advance has not only been since maintained, but the upward movement has continued; and on Monday last (26th instant), purchasers paid 85s. to 86s. for the best runs of red Kent and Essex, and 90s. per qr. was exceeded for choice samples of white. These rates are higher than have been realized at any former period since harvest; and those farmers who have been fortunate enough to retain any part of their wheat till now, can obtain prices they could hardly have calculated on.

The very reduced state of the stocks of foreign wheat, and the indifferent quality of the little remaining on hand, have prevented extensive transactions. The arrivals from abroad have been on quite a moderate scale, and have been less in extent than the shipments to the continent. For the fresh supplies high terms have been demanded and obtained; but the stale granaried parcels have met with comparatively little attention, and on the latter the advance established cannot be estimated at more than 4s. to 5s.; whilst, as already stated, English wheat has risen 7s. to 8s. per qr. during the month. The London warehouses are at present almost empty; and we question whether there are above 30,000 qrs. remaining in granary in this port—a position of affairs not known for many years past.

During the first fortnight in March, the flour trade remained in a very dull state, and at one period it was deemed probable that the top price would be lowered by the principal millers. The subsequent rise in wheat has since, however, had the effect of advancing the value of the best London marks from 65s. per sack to 68s.; and on secondary sorts the upward movement has been somewhat greater, Norfolk households being at present worth 56s. to 60s.; whilst, at the end of March, they might easily have been bought at 52s.

to 55s. per sack. The most important fluctuation has, however, been in barrelled flour. Large arrivals into Liverpool from America caused the article to decline there in the early part of the month to 35s., and soon afterwards holders in London were anxious sellers at the same figure. This being considerably below the position the article usually holds in relation to English flour, buyers supplied themselves freely, and on the 12th instant good brands of Western Canal had again risen to 38s. Afterwards large purchases were made on French account, which with a continued and extensive demand for home consumption, caused a further advance of 4s. per barrel to be established during the succeeding week; and at present there are no sellers of Genessee, and other approved sorts, below 41s. to 42s. per barrel. At Liverpool the rise has been fully as great as in this market, in the face of further large arrivals from the United States.

Rye, an article which in ordinary years meets with very little attention in this country, has lately been much sought after for shipment to Holland and Germany; and the price, which at one period ranged about 54s., has risen to 60s. per qr., with more buyers than sellers.

The arrivals of English barley into the port of London have been small throughout the month; still the downward movement in prices continued until the 12th instant. At one time the best malting qualities were obtainable at 54s., and grinding parcels were sold as low as 40s. to 42s. per qr. Latterly, the inquiry for this grain has undergone a decided improvement, and we must quote all kinds 2s. to 3s. per qr. higher. The supplies from abroad have been rather considerable; but as it appears by the latest advices from the continent that prices had risen there materially, it is not likely that any further receipts of consequence will reach us from the north of Europe.

Malt was, in the beginning of March, very depressed in value; indeed, for a time it was almost impossible to dispose of secondary sorts at any price; the late rally in barley and the smallness of the supplies have, however, had the effect of causing an improvement in the inquiry, and the best Ware malt has recently brought 80s. to 83s. per qr., whilst ordinary kinds have commanded corresponding prices.

The stocks of English oats appear to be nearly exhausted, and the receipts coastwise have within the last few weeks fallen off materially; the arrivals from Scotland have also been very small, and from Ireland only a few thousand quarters have come to hand during the month. The dealers have consequently had to depend almost wholly on the foreign supplies; and though these have been to a fair

extent, they have barely sufficed for the consumption. The fluctuations in the prices of oats have been rather important; in the first instances a fall of 1s. to 1s. 6d. per qr. occurred; but this had the effect of bringing buyers to market, and the decline was recovered on the 12th of March; and since then a rise has been established, quotations being now 1s. to 2s. per qr. higher than they were at the close of March. From the present position of affairs, we are disposed to think that this grain will advance in value, unless more important arrivals should hereafter be received from Ireland.

Owing to a large quantity of old beans being left on hand at harvest-time, the shortness of the last crop has not hitherto been very greatly felt; the article appears, however, now to be reduced into a narrow compass; and a simultaneous falling off in the supplies has taken place of late in most parts of the kingdom. The arrivals into London have hardly kept pace with the demand, and the consequence has been a gradual but steady rise in prices; similar qualities to those sold the last week in March at 47s. being at present worth 50s. per qr., and for really fine parcels 56s. per qr. has been realized.

Peas have likewise come forward sparingly at Mark-lane, and white boilers have remained almost stationary at 60s. per qr. Grey and maple peas have been a good deal inquired for, for shipment to the continent, and 54s. to 57s. per qr. has been paid for fair to good qualities.

Indian corn has met with comparatively little attention; supplies from America direct to Ireland having caused a material falling off in the demand for this article in the English markets. In this state of things prices have settled down, both in London and Liverpool, at a point about 20s. per qr. below the highest range; and fine Galatz, which was worth 72s. to 74s. per qr. in Feb., cannot now be quoted much over 54s., whilst the ordinary sorts of American may be had at 50s., and even under. The value of this article is now, perhaps, somewhat below what it ought to be, as compared with wheat; and after the Irish markets shall have been cleared of some of the recent importations, a moderate advance will, if wheat remains at its present height, most likely take place.

In noticing the position of the continental grain trade, we shall commence by directing attention to the almost universal scarcity at present felt all over Europe. That France had not grown sufficient corn in 1846 for the consumption of her inhabitants, was known months ago; and that Holland and Belgium would most likely have to import largely, was also pretty clearly foreseen; but it was not generally expected that wheat would rise at Hamburg to 84s. per qr. through sheer scarcity, and that

rye, the staple article of consumption throughout Germany, would be bought up in England to supply the wants of Prussia. Such has, nevertheless, been the case; and it is now but too evident that a large portion of the old world will have to look for supplies of bread-stuffs to America. Abundant, therefore, as the yield of the last crop happily proved in the United States and Canada, it may yet be questioned whether the arrival from the other side of the Atlantic will be sufficiently large to meet the extensive wants of Europe; and we certainly are not among those who expect that a great reduction in the value of grain can be brought about by the American supplies. The most recent accounts from New York, New Orleans, Baltimore, and Philadelphia, agree in describing the stocks of flour and grain at these several ports as nearly exhausted; and though large supplies were looked for from the interior, we think that when these are divided to meet the demands of Great Britain, France, and the Netherlands, they will not prove at all too large. At New York good brands of Western Canal flour were quoted  $7\frac{7}{8}$  to  $8\frac{1}{4}$  dollars, equal to 35s. 10d. and 37s. 6d., free on board, on the 8th April, which with 7s. 6d. for freight to England, shipping charges and insurance, would render the cost here more than the article is worth just now either in Liverpool or in London.

From the Baltic we can, it would appear, reckon on comparatively little assistance. At Stettin, Rostock, and many other places, the quantity in warehouse is described as trifling in the extreme, and supplies from the farmers had fallen much short of the demand; and the consequence of which had been that moderately good qualities of red, weighing only 59lbs. to 60lbs. per bushel, had risen to 68s. to 70s. per qr.

At Danzig the stocks have also been greatly reduced; and though the Polish supplies down the Vistula had not begun to arrive, yet there were so many orders on hand from places requiring wheat, that it was confidently expected that all which might come to hand from the quarter named would meet a quick sale. Good high-mixed wheat was quoted 71s. to 72s. per qr., free on board, at Danzig, on the 20th instant; of really fine high mixed there was none remaining. Rye had risen there to 58s. per qr., and all kinds of Spring corn were equally dear. There is one other quarter, however, from which important assistance may be calculated on—we allude to Russia. Besides, what may be dispatched from Odessa and other places in the Black Sea, large shipments are likely to be made later in the year from Riga, St. Petersburg, and Archangel. Of the Odessa supply the bulk of the wheat will probably in the first instance go to Marseilles, and if France should offer a more profitable market

than England, will remain there. The shipments from the upper ports in the Baltic will for the most part consist of rye and oats. The first of these articles is likely to find its way to Germany and Holland, and only the oats to Great Britain, where they cannot be expected to arrive till about June or July.

CURRENCY PER IMPERIAL MEASURE.

APRIL 26.			
WHEAT, Essex & Kent, red ..	79	83	White .... 82 87
Do. new ..	82	85	Do., new .. 85 89
Norfolk and Suffolk ..	77	81	White .... 82 85
RYE, new ..			..... 54 58
INDIAN CORN ..	50	53	Extra .... 54 55
BARLEY, Chevalier, new ..	52	57	Mating .. 53 55
Distilling ..	49	51	Grinding .. 43 45
Scotch ..	47	51	Irish .. — —
MALT, Brown ..	69	71	Pale Suffolk ..
Waro pale ..	77	78	& Norfolk 75 77
OATS, English, feed ..	31	35	Chevalier .. 70 83
Irish, feed ..	30	33	Potato, &c. 34 36
Do., Potato ..	33	35	New .... 32 35
Scotch, feed ..	36	38	Do. .... 33 35
BEANS, Tick ..	47 49	Harrow .. 50 51	Potato .. 28 42
PEAS, Essex and Kent, white boilers, new ..			Pigeon 54 58
Maple, new ..	55	60	..... 60 62
Grey or Hog ..	54	57	Blue .. 74 81
Do. non-boilers ..			Do. non-boilers .. 74 81
FLOUR, Town-made and first country marks, per sack ..			..... 63 68
Norfolk and Suffolk ..			..... 51 60
Stoke and Yorkshire ..			..... 52 56

FOREIGN.

WHEAT, Danzig and Konigsberg, finest high mixed ..	81	84	
Do. mixed ..	76	79	Saale Morks, Anhalt 76 81
Silesian and Stettin ..	76	79	Mecklenburg .. 76 81
Pomeranian ..	77	81	Polish Odessa .. 72 75
RYE ..			..... — —
BARLEY, Hamburg, Konigsberg, Dantzic, and Russian malting ..			..... 46 53
Do. distilling and grinding ..			..... 43 46
OATS, Dutch and Friesland, Brew or Poland ..			..... 32 33
Danish or Swedish ..			..... 30 32
Russian and Mecklenburg ..			..... 30 33
BEANS, Small or Pigeon ..	45	50	Egyptian .. 40 41
PEAS, white boiling ..	none		Grey or hog .. none
FLOUR, Danzig, per brl. of 196 lbs. ..			..... — —
American ..	40	42	Canadian .. 39 40

IMPERIAL AVERAGES.

Week ending	Wheat.	Barley.	Oats.	Rye.	Beans.	Peas.
Mar. 13th ..	74 2	52 10	31 2	55 1	52 7	54 11
21th ..	75 10	51 10	31 3	56 8	51 11	57 2
27th ..	77 0	51 4	31 6	56 0	51 10	58 9
April 3rd ..	77 1	51 3	31 8	57 7	51 5	56 10
10th ..	74 5	49 8	32 7	54 10	50 10	56 0
17th ..	74 1	48 4	29 7	56 1	49 10	50 7
Aggregate average of the six weeks which regulates the duty.	75 5	50 11	31 4	56 1	51 5	55 8
<b>Comparative Average.</b>						
Same time last year	55 5	30 2	22 4	54 1	34 10	33 11

PRICES OF SEEDS.

APRIL 26.

The operations in Cloverseed were on a very restricted scale this morning, but holders were by no means disposed to accept less money, and the few speculative purchases made were at fully the terms of this day se'nnight. In other sorts of seeds there was hardly anything passing, and in the absence of business, quotations remained nominally unaltered.

Rapeseed, 31l. 33l.	Irish, —l. —l.
Linseed, Baltic, 48 50	Odessa, 47 50
Mustard, per bush., white 8	10 brown, 0 10
Caraway, 41 43 new, 42 44	Coriander, 18 21
Hempseed, 35 38 per qr.	Trefoil, 17 19
Canary, 69 69 fine, 62 66	Tares, Spring, 7s. to 7s. 6d.
Linseed Cakes, English 13l.	13l. 10s. per 1000
Linseed, English, sowing 50	crushing 46 49 per qr.

## HOP MARKETS.

BOROUGH, April 26.

During the last week there has been a good demand for Kent Hops with colour, and prices are very firm. In other descriptions there is but little doing.

Sussex pockets ..... 76s. to 90s.  
Weald of Kents ..... 88s. to 100s.  
Mid. and East Kent do. 100s. to 130s.

MAIDSTONE, APRIL 22.—During the past week we have had cold frosty nights, some of them severely so for this period of the year, and a low temperature has prevailed generally. Under such circumstances, the hops have scarcely made any progress; and until we get more favourable weather, they are better off in their present backward state, than they would be if more advanced in growth; for in that case, such frosts as we have lately experienced would make sad havoc among them. Poling is getting well in advance, and in gardens where it is completed, affords good shelter and protection to the plant during this cold ungenial weather.

SWINGFIELD, APRIL 19.—The hops are very *shy* at starting, which is better than being too *pert* at so early a period as last year. Notwithstanding, some have commenced poling. Several new plantations have been made in Mid-Kent.—*Sussex Express*.

## POTATO MARKETS.

SOUTHWARK WATERSIDE, April 26.

The weather has been much warmer during the past week, which has considerably affected the sale of Potatoes. The arrivals of foreign were also comparatively large; these together caused a great depression in this market. There was but little business done at any price, and the highest quotations may be considered nominal.

Yorkshire Reds.....	s. 240	s. 260	bridgshire Regents	220	to 240
Ditto Regents ..	200	to 260	Ditto Kidneys....	200	to 220
Lincoln and Cam-			Dutch.....	180	to 200

SUNDERLAND, APRIL 17.—As the consumption of potatoes is limited in consequence of the high prices, there is plenty for the demand, and the quality in general is very good; there is no doubt but there are stores of this root in this neighbourhood, but they are held back, as one half at the present price will probably pay as well as the whole at a reduced one, the other half serving for cattle feeding or other uses of the holders. Present prices from 2s. to 2s. 2d. per peck of about 16lbs.

LEEDS POTATO MARKET.—This market continues to be thinly supplied with Potatoes, at rather better prices than last week. Prices range from 4s. 4d. to 4s. 6d. per weigh of 48lbs.

POTATOES.—A middling supply. Red, 24s. to 25s.; white 26s. to 27s. per load of 20 stones.—*New-castle Journal*.

## WOOL MARKETS.

The state of this trade is sound amidst all the surrounding shocks of monetary affairs and of dearness of provisions, an entire absence of speculation having allowed every department to rest on its legitimate basis. Down fleeces have realized an advance of  $\frac{3}{4}$ d. to  $\frac{3}{4}$ d. a pound, affording thus a sufficient argument as to the deficiency of the last clip, and a larger quantity could be sold at the present prices if the market were better supplied; indeed if there had been the usual quantity grown, the price, instead of advancing, would have retrograded at least ten per cent., which was the depreciation expected

by many persons unacquainted with the fact of the diminished stock of sheep in the country. We observe, from the small quantity of Lambs sent to the market, that the farmers are alive to this, and will take the opportunity to increase their stock.

LEEDS, April 23.—We have not any change to notice in this market, as to the amount of sales or quotations of prices. There is a steady demand for the immediate supply of the manufacturers, and prices remain firm in consequence of the light stocks in the hands of the staplers, and the impossibility of obtaining further supplies from the farmers to meet the present rates of the markets.

WAKEFIELD, April 22.—We have no new features to report on the trade this week; the demand remains languid, without any change in prices for either combing or short wool.

## LIVERPOOL, APRIL 24.

SCOTCH.—The tightness in the money market no doubt checks the demand for Laid Highland Wool (as well as the other classes): the business done this week has been exceedingly limited at barely former rates. There is still a fair inquiry for the best kinds of Crossed and Cheviot Wool at about late rates; the inferior of both kinds are still neglected.

	s.	d.	s.	d.
Laid Highland Wool, per 24lbs....	7	0	to 7	9
White Highland do.....	10	6	11	0
Laid Crossed do... unwashed....	8	6	9	6
Do. do... washed.....	9	6	11	6
Do Cheviot do... unwashed.....	9	0	11	0
Do. do... washed.....	12	0	15	6
White do. do.....	21	0	22	6

FOREIGN.—We have no feature to notice in our market this week. The dearness of money has no doubt a bad effect on our markets generally.

## FOREIGN.

The Wool market has been rather dull, and it is to be hoped the money pressure will be over ere the sales of next month come on. No doubt the American buyers will begin to operate now, as there is a good profit on manufactures sent to the United States. True to their text, however, they wait till the last moment, in order "to buy in the cheapest market, and sell in the dearest."

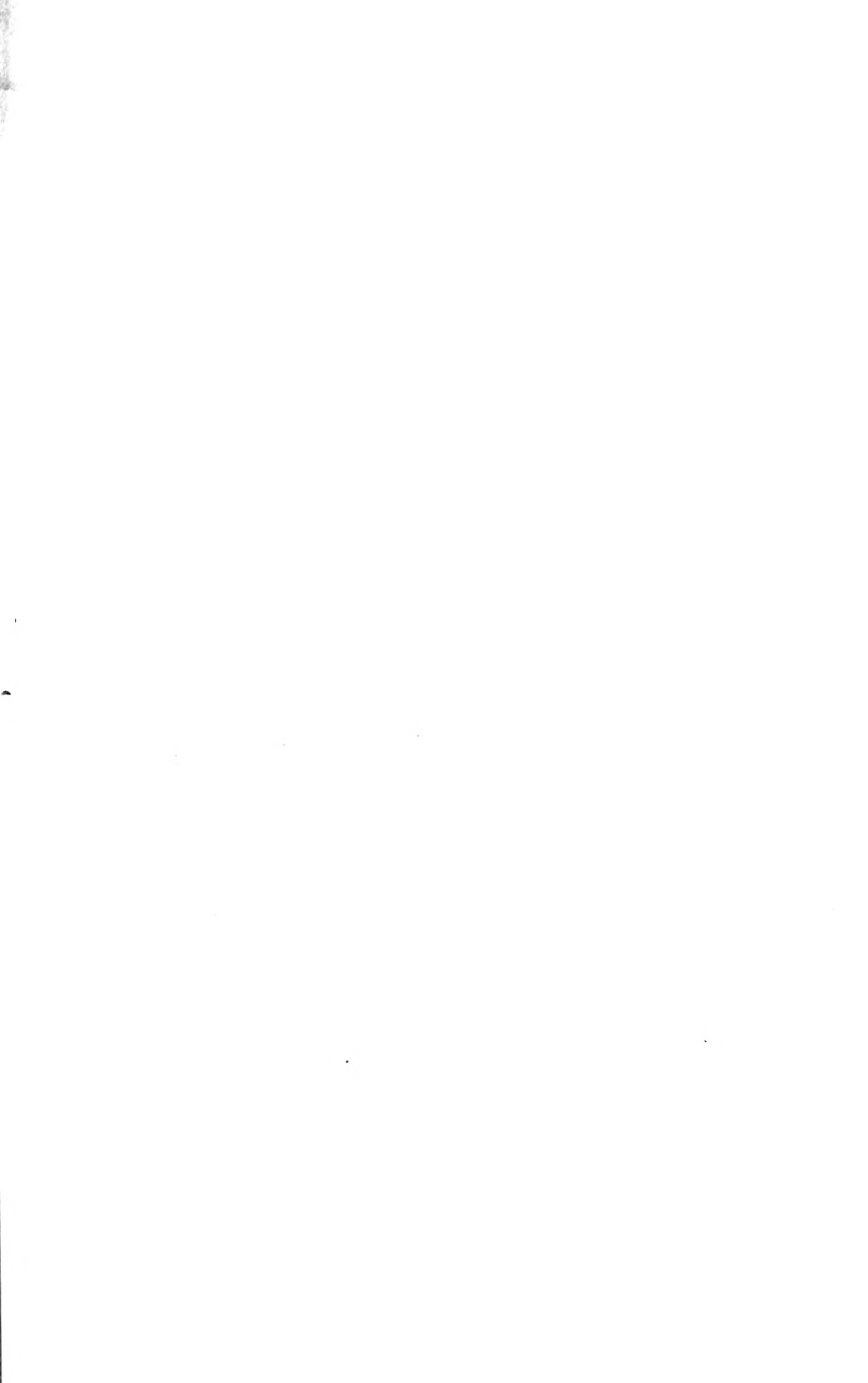
The Breslau Wool market, according to advices of April 15, had been favourably affected by large purchases of the staple, comprising Russian and Polish single clip, at about 48 to 60 rix-dollars. Silesian lambs' Wool was taken for English account, and was very scarce. Speculators were taking Wool at 6 to 8 dollars advance for delivery, although money was scarce; and if the harvest prospects proved favourable, a good business was expected.

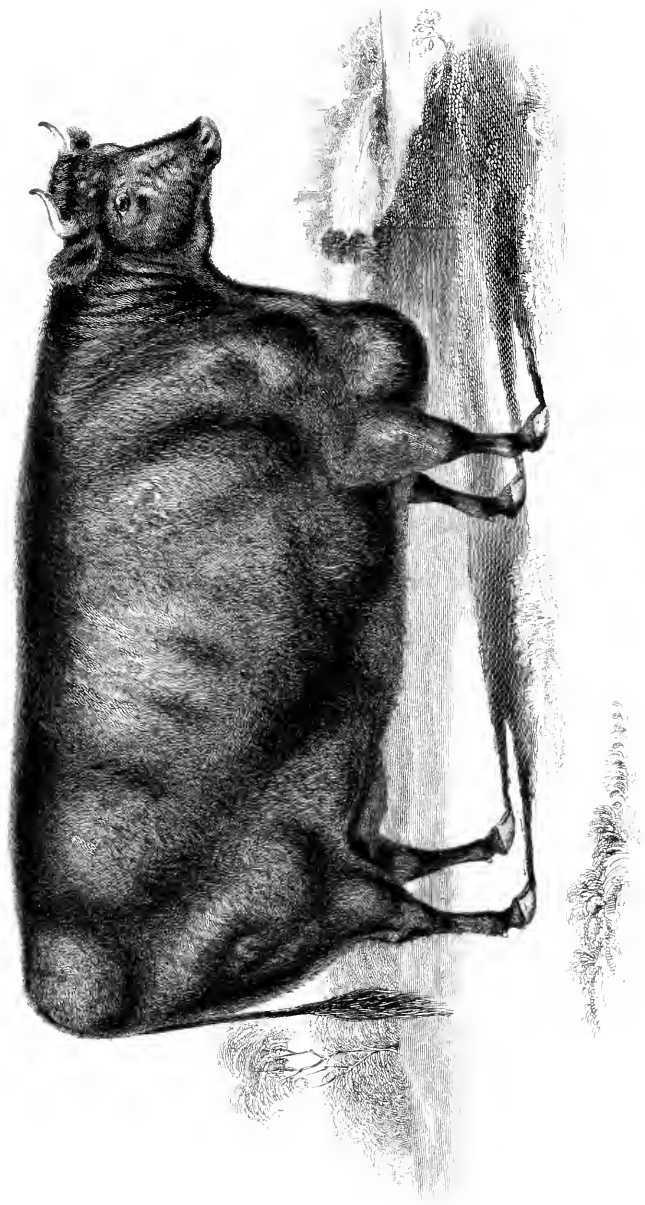
Accounts of the 17th instant, from Leipzig, state that a limited business had been done in goods. Common woollen fabrics did not sell well; but the lighter fabrics found readier buyers.

## HIDE AND SKIN MARKETS.

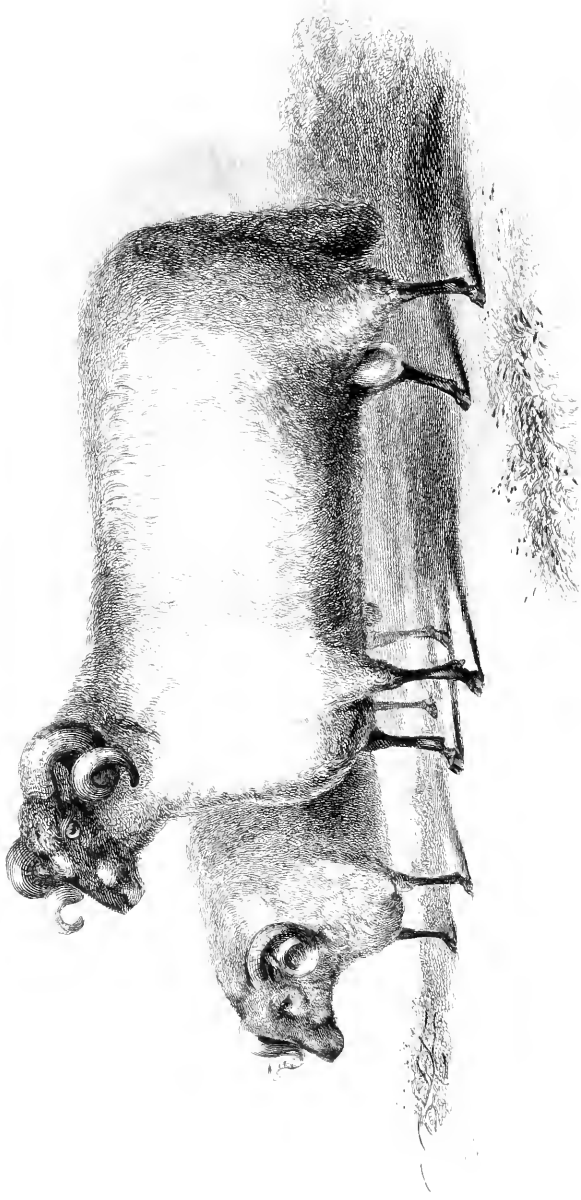
	s.	d.	s.	d.
Market Hides, 56 to 64lbs.....	0	2 $\frac{3}{4}$	to 0	3
Do. 64 72lbs.....	0	3	0	3 $\frac{1}{2}$
Do. 72 80lbs.....	0	3 $\frac{1}{2}$	0	3 $\frac{3}{4}$
Do. 80 88lbs.....	0	4	0	4 $\frac{1}{2}$
Do. 88 96lbs.....	0	4 $\frac{1}{2}$	0	5
Do. 96 104lbs.....	0	5 $\frac{1}{4}$	0	6
Calf Skins.....	5	0	6	6
Horse Hides.....	13	0	0	0
Polled sheep.....	5	6	6	6
Kent and Half-breds.....	4	8	5	4
Downs.....	3	10	4	8
Shearlings.....	0	6	0	10
Lamb Skins.....	2	0	3	3











# THE FARMER'S MAGAZINE.

JUNE, 1847.

No. 6.—VOL. XV.]

[SECOND SERIES.

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## PLATE I.

### A HIGHLAND SCOT AND DURHAM HEIFER.

The subject of our first Plate is a Highland Scot and Durham Heifer, the property of his Royal Highness Prince Albert, which obtained a Silver Medal as the best animal in the extra stock, at the Smithfield Club Show, in December last.

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## PLATE II.

### BLACK FACED SHEEP.

A prize of Ten Sovereigns was awarded at the Royal Agricultural Society's Show at Newcastle-upon-Tyne, in July last, to Mr. Charles Summers, of Parkhead, Whitfield, near Haydon Bridge, Cumberland, for the best Shearling Ram of this description. It was fifteen months old, and bred by himself.

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## THE EXTENDED FIELD CULTIVATION OF VEGETABLES.

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

It is certain that within the present century the farmer has very materially increased the list of his cultivated crops; and that this variety in his rotations will be yet more extended, there is, I think, little reason to doubt. This extension, too, will perhaps not be entirely confined to the cultivation of green-crops raised for the consumption of live stock, or of the cereal grasses, but may, in favourable situations, include with advantage, the more valuable varieties of fruit and vegetables.

We are all aware to what a profitable extent, in particular districts, such cultivation has long since extended. The immense and valuable apple and pear orchards of Herefordshire and Devonshire, the cherry orchards of Kent, the plums of the latter county and of Surrey, are well known instances of the profitable and extensive cultivation of common fruit. And to a considerable, although a minor extent, is the cultivation of even the pine-apple carried on in the south of Sussex and other places. Of culinary vegetables, the cultivation of the superior varieties has not only arrived at a very large amount, but I cannot but feel that this

might be still more advantageously extended in many localities by the farmer. Few persons, in fact, are aware of the extent to which the demand for many vegetables extends. Take, for instance, the asparagus: "This," remarks Mr. George Johnson, in his valuable *Gardeners' Monthly Volume*, vol. 5, p. 96, "is especially cultivated extensively for the London market; and it is estimated that in the Surrey parish of Mortlake alone, there are generally about eighty acres under this crop. One grower there (Mr. Biggs) has sometimes had forty acres under asparagus at one time. A great deal is also grown near Deptford: one grower there (Mr. Edmonds) has had eighty acres entirely under this crop—a statement which must appear almost incredible to those who have not witnessed the loads of this article daily heaped on the green stalls of the metropolis for the space of nearly three months." This root delights in those soils which contain common salt. It is, in fact, a marine plant, and is found wild on our coasts about Harwich, Weymouth, &c., and always grows with increased luxuriance in our gardens, in soils

dressed with salt. These facts explain the subsequent observations of the author of the Monthly Volume, when he remarks (*ibid.*, p. 97): "In a garden formed at Dunbar, in the very beginning of the 18th century, by Provost Fall (a name well known in the mercantile world), asparagus was for many years cultivated with uncommon success. The variety used was the red-topped, brought from Holland. The soil of the garden is little better than sea-sand. This was trenched two feet deep, and a thick layer of sea-weed was put in the bottom of the trench, well pressed together and beaten down. This was the only manure used, either at the first planting, or at subsequent dressings. There was, in this instance, an inexhaustible supply of the article generally at hand, as the back door of the garden opened to the sea shore."

I think it not improbable, that in many of the warm valleys of the south of England, in sites where the beds could be occasionally irrigated, and the crop not annually cut so close as at present, this root might be cultivated to a much larger and more profitable extent than at present. Of the irrigation of this crop, Mr. G. Johnson remarks (*ibid.*, p. 99), "The cultivation of this vegetable is introduced by our countrymen even into the hottest latitudes of the tropics. Mr. J. Newman has published the successful mode he has adopted for obtaining it good, in the island of Manritius, and we have eaten of it—excellent in quality, and nearly of an average size in Bengal. Daily irrigation is there the chief essential."

Some attempts are now making by Mr. Clement Hoare and others, to introduce the successful cultivation of vineyards in the south of England; and those considerable plantations of Mr. Hoare, when I saw them some time since at Shirley, in Hampshire, certainly appeared to promise well, although trained in a way which was different from any thing I had before seen. It is certain that the vine was *formerly* cultivated to a considerable extent in England—a cultivation, there is little doubt, first introduced by the Roman Conqueror; "as," says Mr. G. Johnson (*Gardeners' Monthly Volume*, vol. 3, p. 8), "the Roman settlers became better acquainted with the widely different districts of the island, and probably as they advanced further into the south, they found that some parts were not unfit for vineyards. They consequently applied for the imperial permission to plant them; and though the application was refused by the narrow-minded policy of Domitian, it was granted A.D., 278, by his more sagacious successor, the emperor Probus. That period, then, was the birth-time of British vine culture, and despite the succeeding wars and intestine convulsions attendant upon the invasions of the Northmen, that culture

was clung to, and progressed. The blood of the grape was too justly estimated by the jolly monks of those days, to permit the craft requisite for its culture to be numbered with the lost arts. *Guin-wgdden*, *guin-breu*, *guin-ien*, or *fion-ras*, the name of the vine in the Welsh, Cornish, Armoric, and Irish dialects, is, literally, *the wine-tree*; and plantations of it were flourishing here at the commencement of the eighth century, as Bede testifies (*Eccles. History*, b, 1, c. 1). The Norman Conquerors did not decline from this attention paid to the vine by their Saxon predecessors. At Edmondsbury, in Suffolk, the monks of its monastery planted a vineyard in 1140, and William of Malmesbury, then contemporary, says that vineyards were possessed by barons, as well as monks; and that the grapes of the Isle of Ely furnished wine, next best in quality to that from the grapes of the vale of Gloucester. Amongst other places, it is evident that Winchester was, at an early period, celebrated for its vines. And it has been contended that its name is hence derived; and that when the Saxon gave it the name of Winchester—that is, the city of wine—they so called it because there was the best vintage in Britain. At Rochester, a large piece of ground adjoining to the city is now called The Vine; another is so called at Seven-Oaks, in Kent. This is also the name of the seat, formerly of the Baron Sandes, in Hampshire, and now of Mrs. Chute. At Halling, near Rochester, a former bishop of that see had formerly a vineyard; for when Edward the Second, in the nineteenth year of his reign, was at Bockingfield, Bishop Hanson sent him thither, as Lambarde tells us, "a present of his drinkes, and withal both wine and grapes of his own growth, in the vineyard at Halling." Of Sussex, Lambarde writes: "History doth mention that there was about that time (the Norman invasion) great stores of wine at Santlac, near Battel." And he adds, as to Berkshire, "The like whereof I have read to have been at Windsor, in so much as tithe of them hath been there yielded in great plenty, which giveth me to think that wine hath been made long since within the realm, although in our memory it be accounted a great dainty to hear of." He further observes that some part of the wine was spent in the king's household, and some sold for the king's profit. In the reign of Henry III, the neglect of vineyards in England is attributed, by Twynne, in part to that fondness for French wine which then came upon us. In this king's time, about the year 1260, a dolium (36 gallons) of the best wine could be bought for forty shillings, sometimes for two marks, and sometimes for twenty shillings.

In the county of Kent, there are also, as Mr. Main remarks (*Quar. Jour. Ag.*, 1846, p. 384),

extensive and profitable fields of filbert trees; and there the farm labourers are adepts at the proper method of rearing and pruning the trees. These plantations, in fact, extend to an extent of several hundred acres, and I have little doubt but that their cultivation might be very profitably extended in other portions of the kingdom with equal success. We find also that in many districts the cultivation of certain fragrant plants is carried to a remarkable extent. Thus, in the county of Surrey are found many considerable fields devoted to the growth of lavender, peppermint, &c. The parish of Mitcham has a good many of such plantations; and it is remarkable, in the case of some of these, such as lavender for instance, that a very poor and light gravelly soil is best suited to this plant; being, when grown on such lands, more fragrant, longer lived, and more capable of enduring severe weather, than in a rich soil. In rich or moist soils, it grows, it is true, luxuriantly; but then it is commonly destroyed in the winter. As this plant delights in a dry, open situation, the cultivation of it on many soils might surely be extended; for there is always a considerable demand, not only for the green lavender flowers, but for the high-priced oil extracted from it by a very easy distillation process.

It is hardly necessary to enlarge this list of readily produced vegetables, fruits, and flowers, whose cultivation might, in so many favourable districts, add to the farmer's profits. There is hardly a locality in which one or other of the class of those to which I have alluded may not be occasionally introduced with advantage; and in the consideration of such partial variations in the ordinary crops of the farm, the young agriculturist will not forget that such modes of cultivation, by lengthening the usual rotation in any degree, is accompanied with considerable indirect advantages. The land becomes more productive by such changes; and in the case of some of them, they certainly prevent the increase, if they do not destroy some of the destructive insects which prey upon the ordinary crops of the cultivator. Thus, white mustard, woad, peas, beans, &c., are secure from

the attack of the wire-worm, perhaps the most powerful and the most tenacious of life of all the insect enemies which the ordinary crops of the farmer have to encounter. The Lincolnshire farmers, as I have elsewhere had occasion to remark, find that a broken-up pasture sown with woad is quite free from the wire-worm during the following crop of wheat. And when speaking of a similar result after a crop of white mustard, Mr. Talbot remarks (*Jour. Royal Ag. Soc.*, vol. 5, p. 202): "This fact I have demonstrated perfectly to my own conviction. I first tried the experiment on half an acre of fallow field, of 50 acres, which was much subject to wire-worm. The whole field was fallowed and sown with wheat; the half acre, which was previously cropped with mustard, was wholly exempt from the wire-worm—the remainder of the field was much injured. Encouraged by these results, I sowed, the next year, a whole field of 42 acres, which had never repaid me for 19 years, in consequence of nearly every crop being destroyed by the wire-worm. I am warranted in saying that not a single wire-worm could be found the following year. I am therefore (he concludes) under a strong persuasion that the wire-worm may be successfully repelled and eradicated, by carefully destroying all weeds and roots, and drilling white mustard seed, and keeping the ground clear by hoeing." The mustard is not only excellent to plough in as a preparation for a wheat crop, in the way alluded to by Mr. Jesty (*ibid.*, vol. 4, p. 587, and vol. 5, p. 358), but as green food for sheep, as described by Mr. T. C. Burroughes, of Gazely (*ibid.*, vol. 7, p. 31). The increased number, or the extended rotation of the farmer's remunerative crops, then, even in but a minor and only locally applicable degree, is an object too important and too self-evidently so, to need any illustration. For such enlarged rotations not only add to the bulk of his corn, and improves both the quantity and the quality of the flour which it produces, but it renders it less liable to disease, or to the attacks of the insect vermin, which are in too many instances the agriculturist's greatest pest.

## ON THE MANURES OF THE FARM.

BY THOMAS SULLIVAN.

(Continued.)

My last article on this subject concluded with an extract from "Liebig's Chemistry of Agriculture," showing the powerful fertilizing properties of human excrements. It was shown that when preserved and judiciously applied, either separately or

in combination with absorbent or desiccating matters, they restore to the soil the elements abstracted from it by the crops. They contain, in short, all that it is requisite to add to the soil, in order to promote the vigorous growth of the plants

used as human food. It has been ascertained that the solid and liquid excrements of a healthy man, if judiciously preserved and applied, may be made to produce sufficient corn and roots for his own subsistence. The almost universal neglect of night soil as a manure may be ascribed partly to the want of proper arrangements for preserving and preparing it for use; but chiefly, I think, to an undue appreciation of its value; for we may reasonably conclude that if agriculturists in general were duly sensible of its fertilizing powers, they would readily devise some means of preserving and applying so useful a manure.

The impediments to the general employment of night-soil as a manure are its moisture and offensive odour, which prevent its removal in a recent or unprepared state to any distance. But these obstacles can be obviated without at all diminishing its value as a fertilizer, after which it can be transported without inconvenience to the most remote parts, and used with the greatest facility. Several methods are adopted for accomplishing this object; and in those towns on the continent in which the manufacture of night-soil into manure-cakes constitutes an important branch of industry and commerce, different expedients are had recourse to for rendering it portable, and removing its fœtid smell. The Chinese, who get the credit of possessing the greatest practical knowledge of the value and uses of excrementitious manures, mix the night-soil with one-third of its weight of rich marl, form the mixture into cakes, and dry them by exposure to the sun. These cakes are said to constitute a common article of commerce throughout the celestial empire, and are entirely destitute of offensive odour. The absorbent properties of the earthy substances with which the night-soil is combined prevent any disagreeable smell.

In France night-soil is likewise prepared for use in various ways, and there also it forms an article of internal commerce. It is converted into a powdery substance called *poudrette*, which is highly valued for its fertilizing properties. In Paris and other large cities night-soil is preserved with much care. On attaining a certain degree of dryness, by exposure to the open air, it is manufactured into cakes by mixing it with lime and ashes, and exported to different countries, particularly to Belgium, where it is dissolved in liquid manure, and applied with the greatest advantage to every description of crop. In Belgium itself the utmost attention is paid to the preservation and economical employment of night-soil, and indeed to every species of excrementitious manures. It is there used principally in a liquid state, and in different stages of putrefaction, according to the nature of the crops to which it is to be applied. The Fle-

mings, as is well known, are exceedingly partial to the use of liquid manures; so much so that frequently after the farm-yard dung has been properly fermented they throw a large quantity of water upon it, and the solution or washings alone are carried to the field.

Immense quantities of human excrements are permitted to be carried off from our cities and towns by sewers to the sea, or other convenient outlet, whereby an incalculable amount of loss is annually sustained by the community at large; for by judiciously applying these fertilizing matters to the land, its productive powers would be very materially augmented, and, in consequence, an increased quantity of food would be raised to meet the wants of the public. Night-soil has been prepared or desiccated for a number of years past in London, whence the article is taken to different parts of the country. In Edinburgh this substance is not, I believe, manufactured into cakes, or otherwise prepared for exportation; but there the contents of the common sewers are turned to good account in irrigating the "meadows" in the vicinity of the city. Formerly the greater portion of those meadows was a mere unproductive waste, producing nothing but the coarsest herbage. Owing, however, to the united influence of judicious draining, in the first place, and of continued irrigation with the valuable and enriching contents of the sewers, the land has attained an astonishing degree of fertility, and realizes not less than from 25*l.* to 30*l.* per acre per annum. It is kept permanently in grass, and yields the most abundant crops of hay, being generally cut down three or four times in the course of one year.

But we shall now proceed to the farm-yard, and endeavour to show how the night-soil obtainable there may be advantageously appropriated. Instead of being a nuisance, as must be the case when it is neglected, this fertilizer can be collected in considerable quantity at every extensive homestead, and turned to useful account at little trouble or expense. No farm-yard, however well-arranged and commodious the buildings may be for their respective purposes, can be said to be complete without a *necessary* or privy, for the use of the servants and labourers; though this appendage is frequently altogether omitted, whereby no inconsiderable loss is occasioned. There should invariably be an apartment for this purpose in some convenient out-of-the-way spot; and it might be so arranged as to admit of sliding a long box in and out beneath the seats. There should be an iron ring or hook affixed to one end of the box, for the purpose of enabling a horse with plough-harness and swing-tree to be attached, that the box may be easily removed when required to a suitable



spot where the excrements might be mixed with absorbent matters. Different substances may be employed for this purpose. The great object is to imbibe the moisture, and remove the fetid smell of the excrements, and render them capable of being easily pulverized. The disagreeable odour of night-soil, it is well known, may be destroyed by an admixture of quick-lime; and in fine weather it can be quickly dried by exposing it in thin layers to the action of the atmosphere, a quantity of lime being, at the same time, strewed over it: it is then easily reduced to a powdery state, and may be applied to turnips or other green crops, in the same manner as guano and similar substances. The disagreeable smell of this manure arises chiefly from the presence of sulphuretted hydrogen gas. The admixture of caustic lime with night-soil has been objected to on the ground of the chemical decomposition which would thereby ensue, and the consequent evolution and waste of ammoniacal gas; but we have the high authority of Liebig for stating that the efficacy of human feces as manure does not depend on their ammonia or nitrogen. Hence, in depriving night-soil of smell, we do not diminish its value as a fertilizer.

We prefer, however, to mix this substance, while in a recent state, with absorbent earthy matters, such as wood ashes, vegetable earth, turf mould, coal ashes, &c. These imbibing the rich juices of the night-soil, are themselves thus converted into excellent manure. The mass may be beneficially sprinkled with diluted sulphuric acid. Night-soil being speedily decomposed is evanescent in its effects; and I am therefore of opinion that it should always be used, in the raising of turnips or other green crops, in conjunction with farm-yard dung. The latter may be distributed in the usual way along the hollows of the drills; and after covering it up, a rut is to be made with the hand-hoe on the summit of each raised drill, in which the pulverized night-soil is to be deposited in a continuous line, in the same way that bone-dust is sometimes applied. The turnip seed is then sown, and covered in by levelling the top of the drills with the back of a rake. On a large scale, the night-soil brought to a pulvulent state may be deposited in the drills by means of a machine similar to that used for depositing guano. The propriety of using night-soil and farm-yard dung in conjunction in raising turnips will be obvious, when it is considered that the former being easily decomposed, furnishes immediate nourishment, and thus quickly forces the young plants into rough leaf, and places them beyond that critical stage in their growth in which they are most liable to be attacked and destroyed by their voracious enemy, the fly. Every turnip-grower knows that a vigorous, healthy braird is

generally followed by a plentiful crop, especially on clay soils. The application of a small quantity of night-soil will insure a strong braird; and the more substantial and enduring dung beneath it serves to prolong the growth of the crop till the latest period in the season. A similar result commonly follows the employment of guano and farm-yard dung in the production of turnips.

It is rarely that the residences of the gentry are furnished with any arrangements for collecting together the contents of the water-closets, &c., with a view of employing them to increase the productiveness of the soil; the most general custom being to allow the sewers either to lose themselves in the ground, at some distance from the house, or to deliver their valuable contents into the nearest stream, or other convenient outlet. But it is needless to use any argument to show that this is another culpable waste of the means of promoting the fertility and productiveness of the soil, and that such drainage ought no longer to be permitted to pollute the water in the streams or rivers into which it flows, instead of enriching the land, and producing an increased quantity of food. Now all these matters may easily be preserved, by constructing a small reservoir at some convenient spot, into which the contents of the drains and water-closets should be delivered. It is advisable, however, that everything should first be caused to pass through a cesspool, in which the solid matters may subside. When it becomes necessary or expedient to draw forth the contents of the cesspool, they should be mixed with fresh vegetable mould, wood ashes, or other absorbent matters, to imbibe the moisture, and prepare this highly fertilizing substance for application to the land. The liquid manure may be transferred from the cistern to the cart by means of a pump; but the ammonia should previously be fixed by the addition of sulphuric acid or calcined gypsum.

Besides the substances already adverted to, there are various other matters about a house and farm-yard which either constitute powerful fertilizers themselves, or convert other substances with which they may be mixed into excellent manure. The principal of these are bones, blood, and offal of all sorts, the water in which soap has been used, &c. All the bones should be kept separately until a sufficient quantity has been collected for breaking down, by means of hammers, into a state fit for using. By employing sulphuric acid to effect their further pulverization, a considerable saving in the cost of manure would thus be effected. The other substances above mentioned may be regularly carried to the manure-yard, or, which is perhaps preferable, deposited in a pit excavated for their reception. An intelligent friend, who devotes

much attention to this branch of farm management, has a large, square pit excavated in the ground at the rear of the necessary, into which pit the excrement is dragged from time to time. The ashes, urine, and all sorts of refuse from the house, are daily deposited in this common receptacle; and the value of such an accumulation may readily be inferred from the nature of its several ingredients. A quantity of turf mould, dry peat moss, or other absorbent substance is added from time to time, in order to imbibe the liquid portion of the contents; and the gaseous exhalations emitted from the fermenting mass are regularly fixed by the agency of sulphuric acid. When the pit becomes full the contents are shovelled into carts, in which they are removed either to the field intended to be manured, or to any suitable spot convenient to the steading. By the adoption of this simple expedient a very important addition is made to the other manures of the farm, and that too at little or no expense. The compost thus formed is applied, in conjunction with farm-yard dung, both to turnips and potatoes, and invariably with the most beneficial results. There is still another species of animal excrement, produced in greater or less quantity on every farm, which I cannot omit noticing before concluding this branch of our subject, namely the droppings of fowl. The dung of domestic fowls is a well-known powerful manure, though somewhat transient in its effects. It, as well as the dung of pigeons, may be regarded as the *guano* of the farm-yard, and ought to be equally prized. It should not be applied separately, but mixed with earth or some other substance less powerful than itself, such as coal-ashes, saw-dust, &c.

We come now to the consideration of a most extensive and important method of augmenting the quantity of manures upon a farm, namely by the formation of *composts*. All sorts of animal and vegetable refuse, and, in short, every article, of whatever origin, susceptible of undergoing fermentation, may form ingredients of a compost; and although some of these substances may, perhaps, be too powerful, others too unimportant to apply separately, yet when mixed in a heap, or general receptacle for such matters, and amalgamated into one homogeneous mass by fermentation and careful intermixture, they lose their individual properties, and form excellent manure, capable of increasing the productiveness of the soil. The materials suitable for this purpose are very numerous, many of them being found on every farm, while others are obtainable at little cost.

The recent introduction of the manures of commerce has certainly contributed to render agriculturists in general more negligent of the waste matters convertible into manure, which abound in most

farm-yards; and has also, it is admitted, diminished the necessity for forming composts on so extensive a scale as was previously both requisite and customary. But notwithstanding the cheapness and acknowledged utility of some of the portable fertilizers, it will still be for the interest, and ought always to be the aim, of every cultivator to render himself as independent of the manure market as possible; besides, most of the materials that are commonly employed in the formation of composts may be obtained at little or no expense, being found in greater or less abundance either on or contiguous to the farm.

The formation of composts has been objected to on account of the amount of manual and horse labour required for collecting and carting the materials on any extensive scale; but this objection may be obviated by a judicious arrangement of the work to be executed at different periods of the year and during particular vicissitudes of weather. I should certainly hesitate to recommend any practice which would divert horse labour from its legitimate employment, or necessarily occupy the farmer at a time when the prosecution of more important operations demands his undivided attention; but there are certain periods of the year and certain states of the weather, when the labourers and horses on a farm are either little engaged, or are unable to proceed with the ordinary routine of management; and advantage might be taken of the occurrence of such opportunities for the collection and mixing of the materials for forming composts. Thus there are several weeks after the completion of turnip sowing in summer, when little is to be accomplished by horse labour on the farm, particularly in localities where there are no bare fallows to work, and only a limited extent of green crops to hoe and clean. By collecting the materials, both during the interval between turnip sowing and harvest, and during a continuance of hard frost in winter and early spring, the formation of composts would neither occasion much expense nor cause the neglect of any essential operation on the farm. Now that guano and a few other portable fertilizers, the efficacy of which has been abundantly proved, are within the reach of every agriculturist, the propriety of incurring much labour or expense in forming composts may be regarded at least as problematical; but there can be no doubt in reference to the advantage of employing the *spare* time of both men and horses, in collecting together all sorts of putrescent refuse—and, in short, all matters containing elements of fertility, to which the farmer has ready access.

Having premised these general observations on the subject, I shall now endeavour, first, to explain the *principles* which, in my opinion, ought to be

kept in view, in the formation of composts for particular soils; secondly, advert to a few of the most approved modes of forming composts with different materials; and thirdly, adduce the result of my own experience as to the influence of certain mixtures upon the growth of the crops to which they were applied.

Having already noticed the formation and application of composts formed by saturating refuse vegetable earth, bog stuff, &c., with liquid manure from the cattle houses or the tank, as well as those formed by mixing night soil with certain absorbent matters, it now only remains under this division of my subject to advert to such compounds as may be formed by the combination of other materials to which most farmers have access, or which can readily be procured. As has been already observed, the materials presenting themselves for the formation of composts are very numerous. Rich vegetable earth, added to all sorts of soft, putrescent refuse, and lime combined with substances containing a considerable proportion of inert organic matter, form valuable mixtures for application as manure with most of our cultivated crops. But in determining the most eligible materials for the formation of composts, the nature and wants of the soil to which it is intended to apply them ought to be duly considered. It is the practice in some quarters to mix a portion of the soil from the fields with farm-yard dung, to be returned, after a brief interval, to the same land from which it was originally taken. With the farmers who practise this system, the primary object is to augment the bulk of the manure heap; its fertilizing quality being supposed a secondary consideration. The impropriety of this practice is, however evident; for although a mixture of farm-yard dung in a fermenting state with earthy substances abounding in inert vegetable matter is well known to constitute an excellent top-dressing for all kinds of land, particularly such as differ most in nature and composition from the earth employed in the compost, yet I am of opinion that little, if any, benefit can arise from mixing dung with soil taken from the arable fields, containing little or no inert matters to render soluble, and which is again to be returned to the same land from which it was removed; while a considerable amount of additional labour is thereby occasioned. The mixture of cultivated earth of this description with farm-yard dung produces no alteration in the component parts of the earth, when it contains no dead vegetable matters to be acted upon and rendered soluble by fermentation; but on the other hand, when the earthy materials employed in the compost are of a different character from the soil to which it is to be applied, and contain, besides, much inert organic matters, as garden

mould, old earth banks, &c., the decomposition of the dung brings this dead matter into a state of solubility, while the earth itself also operates beneficially in this case as an alterative of the texture and composition of the soil.

Although it has frequently been recommended to farmers to mix large quantities of earth with farm-yard dung, for the purpose of imbibing and retaining its moisture and gaseous exhalations, yet experience has convinced us that such a practice is anything but profitable. At all events, any advantage that may be expected to accrue from the increased quantity is counterbalanced by the additional labour which its application imposes, not to mention the injury the land may sustain from the extra amount of cartage. A great, if not the great, recommendation of the manures of commerce is their portability; and certainly I think the intelligent cultivator ought to study more how to improve the *quality* of the farm-yard dung, than to augment what is, in fact, already sufficiently bulky, by the addition of extraneous matters destitute in themselves of elements of fertility. The Flemish farmers, who are noted for their industry and intelligence, generally wash out all the soluble ingredients of their fermented dung, in order to obtain its most valuable constituents in small bulk, and thereby diminish the labour of applying it to their crops. Though questioning the propriety of mixing any considerable quantity of cultivated soil with farm-yard dung, yet refuse vegetable earth, and all substances, such as the scourings of ditches, the parings of road-sides, old banks of earth, &c., which abound in inert or decomposing organic matter, may, for the reasons already adduced, be occasionally added with advantage to the manure heap. These materials will imbibe the valuable or gaseous matters evolved during the fermentation of the mass; and if well incorporated together, and not in too large proportion, they will thus be rendered almost, if not altogether, as valuable as the dung itself.

As has been already observed, regard must be had in the formation of composts with putrescent and earthy matters to the nature and composition of the soil to which it is purposed to apply them. Thus, a compost for sandy or other light soils is best formed by mixing what are designated *cold* manures, such as the excrements of animals which chew the cud, with clay, the sediment of pools, &c.; while composts for stiff clay soils should be formed of *hot* manure, *i. e.* the dung of the animals that do not chew the cud, as horses and swine. The excrements should be mixed with light vegetable earth, sand, or road scrapings. The latter being the substance of stone comminuted or ground down by the wheels of vehicles, is, owing

to its gritty quality, peculiarly valuable as an alternative for clay soils. Lime is likewise advantageously applied with the foregoing materials, particularly when it is purposed to apply them to adhesive lands; but here it is proper to observe that farm-yard dung, quick-lime, and earthy substances, cannot, with propriety, be mixed together in the same compost. As a general rule, lime should never be applied with animal or putrescent ma-

nures, unless, perhaps, for the purpose of preventing the evolution of noxious effluvia. According to chemists, quick-lime forms insoluble compounds with almost all animal and vegetable substances that are soft. It would therefore be injudicious to mix that substance with dung and earthy matters in the formation of a compost, although the lime and earth may, with propriety, be mixed together.

(To be continued.)

## ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

A WEEKLY COUNCIL was held at the Society's house in Hanover Square, on Wednesday, the 28th of April; present, the Earl of Egmont, president, in the chair; Earl of Lovelace; Lord Braybrooke; Lord Portman; Mr. Almack; Mr. Raymond Barker; Mr. Batard; Mr. Brandreth; Mr. Burke; Mr. Cherry; Mr. Commerell; Mr. Evelyn Denison, M.P.; Mr. Hodgetts Foley; Mr. C. Miles; Mr. Northeast; Mr. Pellatt; Mr. Pendarves, M.P.; Professor Sewell; Mr. Slaney; Mr. Reynolds Solly; Professor Simonds; Mr. Hampden Turner; and Professor Way.—Mr. William Proctor Stanley, of Peterborough; the Rev. V. Knox Child, of Takeley, near Bishop's-Stortford; and Mr. Charles Bosworth, of Dishley, near Loughborough; were elected members of the Society: and the names read of ten Candidates for election at the next meeting.

The following communications were laid before the Council:—

1. Remarks by Mr. Apsley Pellatt and Mr. Burke on the character of the Farming in the neighbourhood of Boulogne.
2. A paper on the Cultivation of the *Trifolium hybridum*, or Alsike Clover, with dried specimens of the plant and a supply of the seed, from Mr. William Taylor, F.L.S.
3. A paper on the Cultivation of Waste Land in Brabant, from Mr. W. C. Selby.
4. A drawing from the Hon. R. H. Clive, M.P., of a subsoil cultivator employed by him with great success.
5. Suggestions from Mr. Bullock Webster on the subject of discussions on facts connected with the drainage of heavy lands.
6. An account of the successful employment of a pair of scissors, of peculiar construction, in the cutting of lambs, from Mr. Munn, of Throwley House, Feversham.
7. A notice from Mr. Shelley that he should apply to the Council at their next monthly meeting, for leave to include a certain number of Southdown *wether* lambs in the competition for a sweepstakes into which he had entered for the Northampton meeting.
8. A letter, through Professor Sewell, from Mr. Orgill, of 3, Newman street, on the application of the ex-

traneous or refuse manuring matter of the inland towns of England to agricultural purposes, in lieu of guano; expressing his willingness to exhibit his prepared manure, and give any information on the subject of his inquiries throughout the country to such of the members of the Society as would favour him with a visit.

Lord Portman and Mr. Slaney having expressed their willingness to give a full trial to the seeds of the Alsike clover then presented by Mr. Taylor, the Council decided that the general meeting on Saturday, the 22nd of May, should be held at twelve o'clock.

The Council then adjourned to Wednesday, the 5th of May.

A MONTHLY COUNCIL was held at the Society's House in Hanover-Square, on Wednesday, the 5th of May. Present: His Grace the Duke of Richmond, K.G., in the chair; Earl of Ducie; Earl of Lovelace; Lord Portman; Hon R. H. Clive, M.P.; Sir Robert Price, Bart., M.P.; Sir John V. B. Johnstone, Bart., M.P.; Colonel Austen, M.P.; Mr. Raymond Barker; Mr. Bennett; Mr. Brandreth; Mr. Bramston, M.P.; Mr. Browne; Mr. Burke; Colonel Challoner; Mr. Cherry; Mr. Evelyn Denison, M.P.; Mr. Druce; Mr. Hodgetts Foley; Mr. Garrett; Mr. B. Gibbs; Mr. Grantham; Mr. Hillyard; Mr. Fisher Hobbs; Mr. Hudson (of Castleacre); Mr. Jonas; Rev. C. E. Keene; Mr. Kinder; Colonel MacDonall; Mr. Miles, M.P.; Mr. Pendarves, M.P.; Mr. Pusey, M.P.; Mr. Pym; Professor Sewell; Mr. Shaw; Mr. Shaw, jun.; Mr. Shelley; Mr. Slaney; Mr. Robert Smith; Mr. Stansfield, M.P.; Mr. Stokes; Mr. Bruce Stopford; Mr. Tawney; Mr. Thompson; Mr. Hampden Turner; Mr. Thomas Turner; Professor Way; Mr. Wilson; Mr. Almack; Mr. Commerell; Rev. A. Huxtable; and Rev. R. Knight.

*Finances.*—Colonel Austen, M.P., Chairman of the Finance Committee, laid before the Council the Report of that Committee for the preceding month; from which it appeared that the amount of funded capital had been raised to £9,998 17s 3d. stock, and that the balance in the hands of the bankers was £1,968. The Chairman explained that this balance was made up as follows: Northampton balance £1,136, arrears of subscriptions



son; Mr. James Richardson; Mr. H. R. Yorke, M.P.; Mr. Beckett Denison, M.P.; Mr. Aldam, M.P.; Mr. Gott; Mr. H. C. Marshall; Mr. John Heaton; Mr. Edwin Eddison; Mr. Tutin (Mayor of Ripon); and Mr. John Ord; who communicated such detailed local information respecting those parts of the Yorkshire District, with which from their immediate residence they were more particularly connected, as would furnish to the Council the most complete evidence of the respective capabilities of the proposed localities to afford accommodation for the members and best promote the objects of the Society. These Deputations received from the noble Chairman the thanks of the Council for the favour they had done the Society by their attendance on that occasion, and the information they had supplied in reference to the question then under consideration. The Deputations then withdrew, and the Council proceeded to a mature deliberation of the whole subject, previously to their decision on the question; and finally resolved, that the CITY OF YORK should be the place of the Country Meeting of the Society for the year 1848. Mr. Hudson, M.P. (the Lord Mayor), and the other members of the Deputation from York, on their return to the Council-room, were informed by the noble Chairman of the decision the Council had just made, when they expressed, on the part of that ancient city, their gratification at the result then communicated to them, and the unanimous and cordial feeling with which every effort would be made by the citizens of York to give the Society a hearty welcome, and promote, to the utmost of their power, the success of the Meeting and the national objects of the Society.

*District for 1851.*—The Council then proceeded to determine the district within which the Country Meeting of the Society should be held in the year 1851, and decided, on the motion of Lord Portman, that such district should comprise the Counties of Kent, Surrey, and Sussex, and be designated "The South-eastern District."

*Election of Council.*—The Council prepared, pursuant with the terms of the Bye-laws of the Society, a list of the 25 Members of Council for the two years ensuing the Northampton Meeting, to be recommended for election at the General Meeting on the 22nd inst.

*Judges of Stock.*—The following Committee was appointed to select and recommend from the nominations made by Members of the Society at the General Meeting on the 22nd inst., the Judges of Stock for the Northampton Meeting, namely:—Lord Portman, Mr. Shaw, jun., Mr. Druce, Mr. Brandreth, and Mr. Shaw.

*Castrated Animals.*—The Council having decided that, by their 19th Regulation, no castrated or spayed animal could be allowed to enter the yard, Mr. Shelley signified his intention of showing, agreeably with that decision, in the Sweepstakes proposed for the Northampton Meeting, only entire Southdown Lambs, without including among them (as he had intended, should the Council have permitted him, under the supposition that such animals would have increased the interest of the exhibition) any *wether* lambs of that breed.

*Consulting Chemist.*—Mr. Pusey laid before the

Council a letter addressed to him by Dr. Playfair, expressing his wish to resign the appointment of Consulting Chemist to the Society, on the sole ground that his other engagements so entirely occupied his time and attention, as to prevent his due attendance at the Meetings of the Council, or the duties of the appointment in question. He expressed, however, his hope that, as one of the Honorary Members of the Society, he should still have it in his power to render his best services from time to time, as called upon, in promoting the objects of the Society, for whose welfare he entertained the deepest interest. The Council, in accepting this resignation, ordered a vote of their best thanks to be conveyed to Dr. Playfair for the valuable services he had already rendered to the Society as their Consulting Chemist, accompanied with an expression of their regret that the Society should lose his valuable aid in that capacity. The Council then ordered that, at the next Monthly Council, the question of filling up the vacancy thus occasioned should be taken into consideration.

*Local Prizes.*—Mr. Brandreth gave notice that, at the next monthly Council, he should move the consideration of the propriety of devoting the £350, left out of the £450 placed at the disposal of the Society by the Yorkshire Agricultural Society, to specific prizes to be given within the Yorkshire district in 1848.

*Wheel Subsoil Cultivator.*—The Hon. R. H. Clive, M.P., favoured the Council with an account of the wheel subsoil cultivator he had employed with so much advantage. It consists of a hollow wheel, about 3½ feet in diameter, furnished on its outside rim with curved spikes (in pairs): these enter the ground nine inches below the plough, which the wheel subsoil follows drawn by two horses; and on coming up the spikes clear themselves. He had submitted the operation of this implement to the best practical farmers in his neighbourhood, and they highly approved it. He had ordered another to be made, which he would submit to the Council at a future meeting. It failed in rocky ground, but in gravel and loams it answered admirably.

*American Stove and Cooking Apparatus.*—Mr. Pusey favoured the members with an opportunity of inspecting in the library the operation of this stove, and its capabilities as an apparatus for cooking a great number of dishes at the same time with a small consumption of fuel.

*Stewards.*—On the motion of Mr. Brandreth, Mr. Brandreth Gibbs was appointed Director of the show; Mr. Druce, Mr. Pym, and Mr. Kinder, Stewards of the Cattle Yard; and Mr. Miles, Mr. Shelley, and Mr. Thompson, Stewards of the Implement Department, at the Northampton Meeting.

The Chairman informed the Council of the concern felt by their President, the Earl of Egmont, that he was unavoidably absent from their Meeting of that day. The Council then adjourned to Wednesday, the 12th inst.

A weekly Council was held at the Society's House in Hanover-square on Wednesday, the 12th of May: present the Earl of Egmont, President, in the chair; Sir John Johnstone, Bart., M.P.; Mr. Almaek; Mr. T.

Raymond Barker; Mr. J. Raymond Barker; Mr. G. Raymond Barker; Colonel Challoner; Mr. Commerell; Mr. Foley; Mr. Fuller; Mr. Gleig; Mr. Holland; Mr. Kinder; Colonel Mac Douall; Mr. Miles, M.P.; Mr. Parkins; Mr. Putland; Professor Sewell; Mr. Shaw, jun.; Mr. Slaney; Rev. W. Stephens; Mr. Bruce Stopford; Mr. T. Turner; Mr. T. R. Tweed, and Professor Way.

*Alsike Clover*.—Mr. William Taylor, F.L.S., of 314, Regent-street, London, having communicated to the Council at a former Meeting a statement relating to the *Trifolium hybridum*, or Alsike Clover, the attention of the Members on the present occasion was called to the following particulars contained in that communication:—The plant is indigenous in Sweden, where it has been cultivated in the native pastures of that country for the last hundred years, and has in some cases been known to grow to the height of five feet, although in England it attains only that of two feet. The root is fibrous, and the heads globular. The plant bears a greater resemblance to the white than to the red clover; and although its stems are recumbent, they do not root into the soil like those of the white clover; in short, it may be described as a “giant” white clover, with flesh-coloured flowers. The first sample of seed received by Mr. Taylor was collected by Swedish peasants from their pastures, and sent to him by Professor Rauch in the year 1836. This sample was in husk, and mixed with various other Swedish grass-seeds. In 1838 a doubt was raised whether the Alsike clover was a *hybrid* between the white and red clovers, or a distinct natural species, when it was submitted to the inspection of Professor Don, who pronounced it to be the latter. The plant yields two mowings annually. Linnaeus observed the Alsike clover growing in poor, bare, obdurate clays, in the Morea, where no other plant could be made to vegetate; and yet, under such unfavourable circumstances, this clover flourished with an uncommon degree of luxuriance, and yielded shoots as tender and succulent, although not so abundant, as if reared in the most richly manured fields. Micheli mentions the plant as growing in open situations on a clayey soil, and as being, in his opinion, worthy of cultivation. Sturm says it is found in Holland, and that he tried its cultivation along with that of a great number of other clovers placed under the same circumstances, and that the result convinced him that there is no other kind of clover equal to it for the purposes of feeding cattle. Ehrhart also refers to it as a plant in his time but little noticed, but well worthy of trial by farmers, on account of its abundant crop and its value as food for oxen and sheep. Mr. Taylor concludes his paper with the following observations:—“If the soil is in good condition, a field of this clover will last many years in prime; but every other year, it will be necessary to bring on a moderate coat of manure. By this means the future crops, and the duration of the plants in health and vigour, will be greatly increased. The red clover will last only two years in perfection, and often, if the soil be cold and moist, nearly half of the plants will rot, and in the second year bald places will be found in every part of the field; besides that in Septem-

ber and October many crops left for seed are lost in consequence of the heavy rains during that period; while the Alsike clover, on the contrary, ripening its seed much sooner, and continuing in vigour much longer, much risk and expense are avoided, and a large profit accordingly accrues. Further, when this plant is once established, it will remain for a great many years in full vigour, and produce annually a great quantity of herbage of excellent quality. The principal difference I have suggested between feeding clover off on the land, and consuming it in a green state, is this: the quick growth of the grass after mowing shades the ground, and prevents the sun from exhaling the moisture of the land so much as it would have done if fed bare; and consequently, after mowing, the grass continues to grow with vigour, and as soon as one crop is off, another begins to spring up; on the contrary, when cattle feed it, they frequently destroy as much as they eat, besides bruising the necks of the roots with their feet, and thus preventing the clover from growing up so freely as it does after a clean cut by the scythe. In hot weather, too, the common season for feeding off clover, the flies are generally so troublesome to the cattle, that in order to brush them off the animals are continually running from hedge to hedge, and thus occasioning an inconceivable amount of injury to the crop; but when fed in stalls and yards, they are more in the shade, consume quietly, and without waste, the whole of what is given them, and thrive better accordingly. The best method of disposing of the Alsike clover crop is either by mowing it for hay, cutting it occasionally as green food for different kind of live stock, or feeding it down with oxen, sheep, or other animals. By the first mode, a large quantity of hay for the purpose of feeding working horses may be produced with but little expense or trouble; in this case, however, the crop should be mown as soon as most of the heads are in full bloom, and before they begin to turn brown and die away; the most proper time may be known by attending to the foliage on the lower part of the plants; when the leaves turn yellow, decay, and drop off, the crop should be cut as soon as possible, for by standing longer the plants will lose more at the bottom than it can gain at the top. The crop usually attains this state some time about the middle of June, and it is always the best practice to cut it rather early than late, as by remaining on the ground the plants lose their heads and lower leaves, become hard, exhausted, and reduced in bulk, and after mowing are longer in sending up new shoots and in affording good herbage. The period for putting in the seed should be regulated by the method in which the business is performed, and the views of the cultivator. When the Alsike clover is sown without crops of any other kind, the work may be executed any time between March and the latter end of August; but with corn, it must depend on the season such crop is sown. The quantity of Alsike clover-seed required is from 10lbs. to 15lbs. per acre; an extent of crop that will produce many tons annually of green herbage, independently of a supply of seed. There is no plant so well adapted for transplanting as this clover, for it may be taken up at the expira-

tion of two or three years, and planted in another situation. The plant when taken up is merely divided, and the fibrous roots cut a little with a pruning-knife: so that a farmer need never be at a loss for a crop of clover. I have myself about twenty rods of Alsike clover, which has been sown ever since 1840, and is now looking as well as ever. It has been cultivated on an extensive scale in Suffolk and in Essex; and Mr. Barratt, of Wicken, near Stoney-Stratford, in Buckinghamshire, has several acres of it growing upon a very poor stiff loam. The Alsike clover does not suffer from the severest frosts, nor is its foliage injured by their influence; freezing weather being found simply to suspend the growth of the plant. Its propagation admits of great extension; and it will flourish on the most barren land, where very few grasses will scarcely grow at all, producing a heavy crop of seed, and affording an abundance of nutritious herbage for horses, oxen, and sheep."

*Miscellaneous Communications.*—The Duke of Grafton favoured the Council with a statement of the satisfactory results attending the administration of a remedy proposed for Pleuro-Pneumonia amongst stock, in the "Farmers' Almanac" of the present year.—Mr. Crame, Veterinary Surgeon, of Shrewsbury, reported, through Professor Sewell, the result of his inquiries into the nature of the cases of Pleuro-Pneumonia communicated to the Council at a former meeting, by Viscount Hill.—Mr. Saul, of Garstang, transmitted a plan he had found advantageous for a Cottager's Cooking Stove, which required fuel to the amount of only 4½d. per week in price to effect its objects. Colonel Challoner thought it would be useless to recommend any stove in which sheet iron was the principal substance employed in immediate contact with the fire and smoke. He had himself directed to be constructed, for some of his cottagetenants, a simple arrangement for a fire-place, which had been found very useful for keeping the food of the family in a hot state, without inconvenience or injury, for several hours. This plan consisted in making the bed of the fire-place hollow and capacious, by means of a cast-iron plate the size of the intended fire-place, and about an inch thick. This iron plate formed the bottom of the fire-place, and on it the fuel, whether consisting of coals, coke, turf, or wood, was burnt. Its further edge rested against the back of the chimney, while its two ends were supported by three-course brick-work on each side; a sheet-iron door in front completed the arrangement. An oven or hot chamber was thus obtained *below* the fire, six inches deep and about two feet square, which formed, at a trifling cost, a convenient receptacle for keeping the dinner of a labouring man, or of his family, warm and comfortable for a considerable time. It was sufficiently hot for this purpose, but not for cooking the victuals in the first instance, or for affecting their quality afterwards by charring or drying them up.—Mr. Hudson, of Castleacre, presented a mass of compactly intertwined fibrous roots of an ash tree, taken from an underdrain on the farm of Mr. Robert Leamon, of Whitwell, near Reepham, Norfolk, and which had so completely filled up the tile into which it had introduced itself, as to stop the

drain. Colonel Mac Douall had known the fibres from roots of the elm insinuate themselves in a similar manner into drains, and impede or entirely prevent their action. Mr. Putland cited the instance of such roots from trees in the churchyard at Rye, in Sussex, entering into the cellars of the houses in a tough and strong state of growth, and causing much trouble and inconvenience.—Mr. Longcake transmitted from Maryport, Cumberland, a paper containing his new theory of vegetable physiology.—Mr. Culverhouse stated his inability to prepare and supply in due time this spring the requisite quantity of his deal compost for the model experiment on the growth of turnips proposed by Mr. Miles, M.P.

The Council having ordered their thanks for these communications, adjourned, on the motion of Mr. Raymond Barker, over Wednesday, to the 26th inst.

The annual meeting was held on Saturday, May 22, at the house of the society in Hanover-square. The Earl of Egmout presided. The Earl of Yarborough having been chosen president, and the trustees and vice-presidents re-elected to their offices, Messrs. C. Barnett, J. Booth, A. Hamond, R. B. Harvey, J. E. Denison, M.P., and the Hon. Capt. Henry Howard, M.P., were elected by ballot members of the council, and the remainder of the council re-elected. Mr. Hudson, the secretary, then read the following:—

#### REPORT.

The Council have to report that since the last General Meeting of the Society in December, they have had their attention particularly directed to the following general subjects of inquiry, viz:—

##### I. FINANCES,

##### II. COUNTRY MEETINGS,

##### III. DISEASES OF CATTLE GENERALLY,

##### IV. ANALYSIS OF ASHES OF PLANTS.

At that time the funded property of the Society consisted of £7,000 Stock; it has now been raised by further investments of capital to the amount of £8,999 Stock; since the same date the sum of £3,671 has been received on account of annual Subscriptions and Life Compositions, of which £487 consisted of arrears paid up on account of former years. The following arrears, however, amounting to £3,862, still remain unpaid:—

1843	....	£431
1844	....	856
1845	....	1,258
1846	....	1,317

In order to offer increased facilities to Members in the payment of their subscriptions, the Finance Committee have made arrangements for their collection within the range of the London District. During the last half-year, 45 Members have died, 140 have been struck off the list, and 147 new Members have been elected. The Society now consists of

91	Life Governors,
195	Annual Governors,
607	Life Members,
5478	Annual Members,
20	Honorary Members;



making a total of 6,391 members. The Finance Committee will lay before the Members a statement of the accounts of the Society for the half year ending on the 31st of December last, as audited, agreeably with the bye-laws, on the 21st instant, by the Auditors elected on the part of the Society.

The Council have received from the authorities of Northampton, the liberal subscription of £1,200, towards the expenses of the Country Meeting of the Society to be held in that town in the month of July next; and on account of the well known position of Northampton, its central situation, and the ready access to it from every part of the country, there is every reason to expect a numerous assemblage of visitors. From the circumstance of a larger number of implements having been entered for this meeting than on any former occasion, and in consequence of the very extensive applications daily making by intended exhibitors for entries of stock, the Council anticipate a most gratifying exhibition in each of the departments of the show. The local authorities of the town are engaged in making every arrangement for the comfort, convenience, and economy of the visitors expected on the occasion; and the directors of the London and North Western Railway have signified their willingness to promote, by every means within their power, the convenience of the Society and the accommodation of the public generally during the period of the meeting.

The Council have decided that the Rev. Mr. Huxtable should be requested to favour the Members, on the Tuesday evening in the week of meeting, with a statement introductory to a practical discussion on the subject of the Growth of Turnips by means of artificial manures, the particular combination of manure best adapted for particular cases, and the readiest mode of detecting adulterations in the general preparations now so generally on sale; and that Professor Way should also be requested to favour the Members on the same occasion with a Scientific Outline of the conditions affecting the growth of the turnip, and a chemical explanation of the action of the different manures employed. The Council have further decided that on the Wednesday evening in the week of meeting, Mr. Thompson should be requested to favour the members with a statement, introductory to a practical discussion, on the comparative advantages and disadvantages of the thick and thin sowing of wheat. The Council have no doubt that the discussion of these important topics will lead to the communication of many valuable results of practical experience. The Council have decided to hold the Country Meeting for the Yorkshire District in the year 1848, at the City of York; and they have defined the district of the Country Meeting of 1851 to be that comprising the Counties of Kent, Surrey, and Sussex.

The Council have decided to discontinue, after Michaelmas 1848, the appropriation of the sum of £200 per annum to the Royal Veterinary College; and to appoint a Committee to recommend the best means of improving the Veterinary Art, in its special application to the Diseases of Cattle, Sheep, and Pigs, conform-

ably with the eighth object indicated in the charter of the Society.

Professors Way and Ogston having conducted the important chemical investigation confided to them, on the inorganic substances which are found constantly to occur in the constitution of plants, their report of the results obtained during their research has been made known through the medium of the Society's *Journal*; and they are still actively engaged in the prosecution of their arduous task. The Council earnestly hope that those Members of the Society who have time and opportunity for the purpose will avail themselves of the striking facts adduced in that communication, and endeavour to ascertain, by actual trial, the practical value of the inorganic elements essentially required by cereal crops to complete their growth under the most favourable circumstances.

The Council have the satisfaction of witnessing in every direction the beneficial effects resulting from the operations of the Society, in the increased energy with which all parties interested in agricultural pursuits concur in their efforts to advance, as the main-spring of national prosperity, a sound and scientific agricultural practice, combined with every available means by which the produce of the land may be most abundantly, and at the same time most economically, increased.

By order of the Council,

JAMES HUDSON, *Secretary.*

*London, May 21, 1847.*

The adoption of the report was moved by Mr. Hercy, seconded by Sir R. P. Jodrell, and carried unanimously.

Col. CHALLONER having read the half-yearly account of the finance committee, and a vote of thanks having been passed to the auditors, which was acknowledged by Mr. Knight and Mr. Hampden Turner,

The Duke of RICHMOND proposed a similar compliment to Lord Egmont, who, he said, had taken great interest in the prosperity of the society. Some years since, it was difficult for any gentleman to bring forward his own experience in agricultural matters. There were farms remarkably well cultivated in different parts of the country; but new methods never got very far from where they were first practised. The formation of the society had indeed effected what had been described by one of their presidents as making agriculture fashionable. They had turned the attention of tenant farmers to the improvement of the soil; but nevertheless there was much to do; for unless the landlords gave their co-operation it could not be expected that the farmers would take any very great interest in the matter. The society had been a great benefit to the country at large; and so long as it continued to have the support of the tenant farmers, and that of such gentlemen as were present that day, he did not doubt that it would continue to prosper.

After a few words from the Hon. R. H. Clive, M.P., with regard to the agricultural college of Cirencester, the chairman acknowledged the compliment which had been paid him, and the proceedings then closed.

HALF-YEARLY ACCOUNT, ENDING 31st DEC., 1846.

<i>Receipts.</i>	£	s.	d.
<i>Balance</i> in the hands of the Bankers, 1st July, 1846.....	2564	17	10
<i>Balance</i> in the hands of the Secretary, 1st July, 1846 .....	25	19	2
Dividends on Stock .....	110	8	8
Life Composition of Governor .....	40	0	0
Life Composition of Members.....	269	0	0
Annual Subscription of Governors.....	232	0	0
Annual Subscription of Members .....	2760	6	0
Sale of Journal.....	167	4	6
Sale of Cottage Tracts .....	7	16	1
Receipts during the half year, on account of the Country Meetings, &c.....	1620	10	11
Duke of Northumberland's Prizes .....	100	0	0
Local Prizes for Black-faced Sheep ....	35	0	0
Local Prizes for Cheviot Sheep .....	15	0	0

£7948 3 2

*Signed* { C. B. CHALLONER,  
THOS. RAYMOND BARKER.

*Payments.*

Permanent Charges .....	278	12	6
Taxes and Rates .....	17	1	2
Establishment Charges .....	425	10	5
Postage and Carriage .....	44	18	0
Advertisements .....	5	4	0
Expenses of Journal.....	1328	1	2
Cottage Tracts .....	11	16	0
Prizes.....	1312	0	0
Duke of Northumberland's first Prize ..	50	0	0
Local Prizes for Black-faced Sheep ....	35	0	0
Local Prizes for Cheviot Sheep .....	15	0	0
Payments during the half-year, on account of the Country Meetings .....	925	18	2
Analysis of Ashes of Plants.....	120	0	0
Subscriptions repaid .....	4	0	0
Bankers' Transfers .....	2	5	6
Miscellaneous Items.....	5	15	8
<i>Balance</i> in the hands of the Bankers, 31st December, 1846 .....	3356	0	8
<i>Balance</i> in the hands of the Secretary, 31st December, 1846 .....	10	19	11

£7948 3 2

Examined and Audited 21st May, 1847.

*Signed* { CHAS. TAWNEY,  
C. H. TURNER,  
THOS. KNIGHT.

NEW MEMBERS.

Mr. William Aldam, junr., M.P., of Frickley Hall, near Doncaster; and Mr. Thomas Turner, of Croydon, Surrey, and Regent-street, London; were elected Governors of the Society.

The following new Members were elected:—

Brent, Dr., Sydney Cottage, Woodbury, Exeter  
Broadhurst, Thomas M., Brandiston, Woodbridge, Suffolk  
Carter, Thomas A., Mayor of Lynn, Norfolk  
Cooke, John Malsbury, Towcester, Northamptonshire  
Cook, Edward, Stratford; St. Mary, Dedham, Essex  
Cook, William, jun., Orton, Rowell, Kettering, Northampton  
Cottle, William, Cheney Court, Box, Wiltshire  
Guillemeau, Jacob, Twickenham, Middlesex  
Eckley, Richard, Darlington Place, Bath  
Edmeston, Robert, Chatten Park, Wooler, Northumberland  
Foulkes, John Jocelyn, Eriviatt, Deuligh, North Wales  
Harrison, John, Summerlands, Kendal, Westmoreland  
Harkes, David, Mere, Kentsford, Cheshire  
Hibbert, Washington, Bilton Grange, Rugby, Warwick  
Hill, Colonel, Tickhill, Castle, Bawtry, Notts

Kersey, Henry, Framsdon, Stoneham, Suffolk  
Leamon, Robert, Whitwell, Reepham, Norfolk  
Legh, Richard, Fox Hall, Owestry, Salop  
Lugar, Henry, Hengrave, Bury St. Edmunds, Suffolk  
Martin, Peter, Chilham, Canterbury  
Meir, Henry, Tunstall, Newcastle, Staffordshire  
Parkinson, Captain Charles Augustus, Clifton Villas, Maida Vale  
Pulver, Thomas, Broughton, Kettering  
Rawson, Charles, Wardale Hall, Whitehaven  
Richards, Thomas Wright, Glendon Lodge, Kettering, Northamptonshire  
Stunt, Frederick, Higham, Rochester, Kent  
Taylor, Frederick, Worcester Park, Ewell, Surrey  
Thomas, Edward David, Walfield House, Bulth, S.W.  
Tupholme, Thomas, Horncastle, Lincolnshire  
Wharnccliffe, Lord, Wortley Hall, Sheffield, Yorkshire.

REPORT OF AN EXPERIMENT WITH SPECIAL MANURES, AS APPLIED TO THE GROWTH OF TURNIPS IN THE SUMMER OF 1846.

CHARLES BARCLAY, ESQ., BURY HILL.

SIR,—In compliance with your request, I beg to present you with a report of the experiments made with special manures for the growth of turnips, on your estate during the last summer.

In order that the nature of the several experiments may be the better understood, and consequently a more correct estimate formed of their different results, I will state as briefly as possible the nature of the soil, the course of cropping which it had previously undergone, and the preparatory cultivation of the land for the crop; together with any other attendant circumstances which may serve to illustrate the subject.

The nature of the soil in question, is a light blowing sand, very shallow, with a considerable quantity of rubbly surface stones, resting on a subsoil of sandstone rock. In point of quality, I believe I am justified in saying, it is almost as poor as any land in the county of Surrey. The part of the farm chosen, on which the trial took place, was a field of ten acres in extent; and old ley of three years standing, the layer commencing immediately after a crop of oats. The land was broken up with the plough as deep as it was possible to go, in the autumn of 1845. In the following April, the land was again ploughed, in an exactly opposite direction to that taken in the autumn. The plough was never again used, the cultivation being completed by the use of Biddell's scarifier; the couch and roots of the grasses were collected by Grant's lever horse rake, some small part of which was burnt on the land for the sake of expedition, and the remaining greater portion carted to the yards.

From the backwardness of the season, and the multiplicity of work which necessarily attends an extensive breadth of turnips, the sowing was delayed till the twenty-second and twenty-third of July. The seed and manure were deposited by a drill manufactured by Smyth, of Suffolk, worked by two horses, drilling three rows at eighteen inches apart at each breadth. The kind of seed the "red round."

The field was divided into ten portions, containing an acre in each; but owing to some part of the manure not being sufficiently dry to work quite properly, the divisions first made were necessarily altered, which will account for there being but nine portions mentioned below.

I here subjoin a tabular statement of the quantities and kind of manure applied to each portion; together with the cost of each, and also the weight of the whole

produce per acre. It should be observed that the field was as nearly as possible of uniform quality; and the cultivation, both previous and subsequent to the sowing, on all parts exactly alike.

A Particular of the quantity and description of Dressings applied for the Growth of Turnips, on the Ten Acre piece of Land at Merriden; with the cost of each kind, and the weight of the produce per acre.

No. of the piece of land.	Quantity of land contained.	Descriptions of the dressings applied.	Quantity of each kind used, with their respective costs.	Cost per statute acre.	Weight of roots per statute acre.	Weight of tops and tails per acre.	Total weight of produce per statute acre.
1	a. r. p. 1 0 0	Crushed bones Turf ashes	8 bush. bones 2s. 6d. 1 0 0 16 „ ashes, at 5d. 0 6 8 <hr/> 1 6 8	£ s. d. £ s. d. <hr/> 1 6 8	tons cwt. qrs. lbs. 9 1 3 20	tons. cwt. qrs. lbs. 3 0 2 16	tons. cwt. qrs. lbs. 12 2 1 36
2	1 0 0	Crushed bones Turf ashes Nitrate soda Nitrate potash	8 bush. bones 2s. 6d. 1 0 0 16 „ ashes . . . . 0 6 8 $\frac{1}{2}$ cwt. soda, at 23s. 0 11 6 $\frac{1}{2}$ cwt. potash 33s. . 0 16 6 <hr/> 2 14 8	2 14 8	10 1 1 20	3 0 1 4	13 1 2 24
3	1 0 30	Crushed bones dissolved in sulph. acid Turf ashes African guano	4 bush. bones . . . . 0 10 0 84 lbs. acid, at 1d. . 0 7 0 16 bush. ashes . . . . 0 6 8 1 cwt. guano 87. 10s. 0 8 6 <hr/> 1 12 2	1 7 1	12 0 2 24	3 1 2 24	15 2 1 20
4	1 0 30	Crushed bones dissolved in sulph. acid Turf ashes African guano Nitrate of soda Nitrate of potash	4 bush. bones . . . . 0 10 0 84 lbs. acid, at 1d. . 0 7 0 16 bush. ashes . . . . 0 6 8 1 cwt. guano . . . . 0 8 6 $\frac{1}{2}$ cwt. soda . . . . . 0 11 6 $\frac{1}{2}$ cwt. potash . . . . 0 16 6 <hr/> 3 0 2	2 10 8	14 1 1 4	5 0 1 4	19 1 2 8*
5	1 0 0	Muck of an ordinary kind African guano Turf ashes	8 cart loads of muck, at 4s. . . . . 1 12 0 3 cwt. guano . . . . 1 5 6 20 bush. ashes . . . 0 8 4 <hr/> 3 5 10	3 5 10	13 1 2 24	5 0 0 0	18 1 2 24
6	1 0 0	Muck African guano Turf ashes Nitrate of soda Nitrate of potash	8 loads of muck . . 1 12 0 3 cwt. guano . . . . 1 5 6 20 bush. ashes . . . 0 8 4 $\frac{1}{2}$ cwt. soda . . . . . 0 11 6 $\frac{1}{2}$ cwt. potash . . . . 0 16 6 <hr/> 4 13 10	4 13 10	13 1 0 10	4 0 0 16	17 1 0 26
7	1 0 30	Muck Crushed bones dissolved in sulph. acid Turf ashes	8 loads of muck . . 1 12 0 4 bush. bones . . . 0 10 0 84 lbs. acid . . . . . 0 7 0 16 bush. ashes . . . 0 6 8 <hr/> 2 15 8	2 6 0	7 1 2 26	3 0 1 20	10 2 0 18
8	1 0 30	Muck Crushed bones dissolved in sulph. acid Nitrate of soda Nitrate potash Turf ashes	8 loads of muck . . 1 12 0 4 bush. bones . . . 0 10 0 84 lbs. acid . . . . . 0 7 0 $\frac{1}{2}$ cwt. soda . . . . . 0 11 6 $\frac{1}{2}$ cwt. potash . . . . 0 16 6 <hr/> 3 17 6	3 4 10	12 0 0 0	3 1 1 4	15 1 1 4
9	1 1 0	Muck Crushed bones dissolved in sulph. acid African guano Turf ashes	8 loads of muck . . 1 12 0 4 bush. bones . . . 0 10 0 84 lbs. acid . . . . . 0 7 0 1 $\frac{1}{2}$ cwt. guano . . . . 0 12 9 16 bush. ashes . . . 0 6 8 <hr/> 3 8 5	2 14 8	12 1 2 20	3 1 3 8	15 3 2 0

\* By measure, 820 bushels per acre, weighing 40 lbs. per bushel.

The weight of top and tail per acre may seem small in proportion to the weight of roots; but it must be remembered that the weighing took place immediately after a month's unusually severe weather, the land being

at a considerable elevation, and very much exposed. The crop was hand-hoed twice, and thrice horse-hoed.

On all the portions where dissolved bones were used, the plants came more forward to the hoe than where they were not used; but beyond this there was not much perceptible difference in the appearance of the different parts, until from a month to six weeks had elapsed, when No. 7 began to grow less rapidly than the rest. At the end of between seven and eight weeks No. 1 began to fall off; and in a few days No. 2 followed. Further than this difference, the eye could hardly detect where the separation of each kind of dressing took place.

It will doubtless be looked upon by some as rather a curious account; but I am persuaded that it is by making experiments such as these we shall *practically* arrive at that knowledge so much to be desired; viz., *the specific dressing which each crop requires, and how this shall be varied to suit the different descriptions of soil.*

The crop of turnips, which, by the bye, are considered exceedingly good, are now being fed off on the land; after which, it will be sown with barley, cow-grass following. The growth of these crops will be narrowly watched, and any particular effects which may be noticed will be reported at a future period.

I am, Sir, your very obedient humble servant,

THOMAS PAGE.

*Holmwood Farm, Dorking, Surrey,  
11th of February, 1847.*

REAPING MACHINES. — Much inquiry has been made of late as to the progress we are making in manufacturing reaping-machines for the Canadian market. For general information, we would state that a very ingenious person in this city has been engaged for the past six months in bringing to perfection an article which combines all the advantages of Mc.Cormack's machine, together with a great many improvements thereon—among others, we may state that it possesses increased strength, is easier wrought, the amount of friction being reduced, &c., and that each machine is warranted to reap, in a proper manner, with the power of two horses and the aid of a man and a boy, from ten to fifteen acres of heavy wheat in a day of ten hours. The machines are built for service; and consequently the very best materials are employed in their construction, and in all cases they will be warranted to the purchaser. As they are a very expensive article to manufacture, we shall only build to order, and therefore advise all who are desirous of purchasing during the present season to send forward their orders as soon as possible, as only a limited stock of suitable material has been purchased; and, as we have good reason confidently to anticipate that a very considerable number will be required, no delay should be made in giving us the necessary instructions, so as to allow every justice to be done to the orders received. We were instrumental in importing last season four reaping machines from New York State, each of which cost at the factory 26*l.* 5*s.*, and duties and other charges brought the price up to 31*l.* 5*s.* The machines we are having manufactured are better than the imported machines in every particular, yet we are determined to sell them for the very lowest price at which they can possibly be afforded, viz., 20*l.* each—payment being in all cases required on delivery at our warehouse. A machine such as we are manufacturing, with proper usage, will last from ten to fifteen years, and will, unless the quantity of grain sown be very great, be capable of cutting the grain of two or three farmers; so that it would be wisdom for neighbours to join together in purchasing one of them, by

which means the expense will be trifling in comparison to the benefits that could be derived from their use. In one establishment in New York State 500 of Mc.Cormack's machines are in process of being manufactured; and the same firm built last season 200, all of which found a ready sale at the factory at 26*l.* 5*s.* each. The price asked this year is 25*l.*, and we are informed by one of the proprietors that the demand for them is likely to be so great that it will be with great difficulty that it can be supplied. We have no scruple in saying that the machines we are getting built are not only a great improvement upon any yet introduced, but that the price at which they are offered is *very considerably less*, which is a most material point for the consideration of intending purchasers.—British American Cultivator.

ST. GERMANS FARMERS' CLUB.—The monthly meeting of this club was held in the Town Hall, St. Germans, on Friday, the 9th of April. Mr. Lorraine, of Holwood, occupied the chair. The subject which stood on the card for discussion was, "The Growth of Mangel Wurzel and Carrots," introduced by Mr. William Herring, of Trecorn, Quethiock. As these roots are about to be cultivated in the place of the potato, and Mr. H. being considered an agriculturist of great practical eminence and skill, there was an unusually large and respectable attendance of members and visitors. After a few prefatory remarks from the Chairman, he called on Mr. Herring, who said that the first thing to be considered in the cultivation of mangel, was the best mode of preparing and cultivating the soil for the plant; he very much approved of trenching and subsoiling—deep ploughing was also highly beneficial. The next step was the time for planting, quantity of seed necessary, and the proper food to develop the plant. He next noticed the best method of consuming the roots, and what animals they were best adapted for; he recommended the red in preference to the yellow globe, for though the latter was generally considered to be the most nutritive, yet the former was the most certain and heaviest root. Carrots required very nearly the same attention in the preparation of the soil except its being stirred at a greater depth; for it was his firm opinion that carrots drew the principal part of their nourishment from the subsoil, which he thought might be clearly established from the fact that when the upper part of the carrot root was no larger than a goose quill, he had frequently found it running down the subsoil to the depth of two or three feet; he also thought it was further proved by the absence of any lateral shoots. The land intended for carrots must be well manured in the autumn, for fresh dung would most certainly make the carrots fork. Carrot tops cut into chaff with other substances made most excellent food for horses, and the leaves of mangel were most excellent for feeding pigs. Mr. Herring, in conclusion, said he did not wish to see these roots cultivated in preference to Swede turnips (which he considered to be the farmer's *sheet anchor*), but mainly as auxiliaries: they certainly required a little more attention, but they must all remember the old adage, that "he that by the plough would thrive, must either himself hold or drive." A lengthened discussion took place, which was closed by some practical hints from the Chairman, recommending deep ploughing, clean weeding, and heavy manuring; and a unanimous vote of thanks having been accorded to Mr. Herring, for the ability and talent he had displayed in the arrangement of his subject, the meeting separated, highly pleased. The next meeting will be held on the 7th of May, when a lecture will be delivered by Mr. Dingle, of Linkinhorne, "on the breed and management of sheep."

## ON THE MAINTENANCE OF FERTILITY IN NEW ARABLE LAND.

BY JOHN C. MORTON.

The following observations are communicated to the Society,\* in consequence of Mr. Pusey's request that I should state the circumstances connected with this subject, which have occurred at Whitfield farm since it has been drained and broken up out of old grass land—now nearly eight years ago. They are prefaced by some remarks on the theory of the question; for that may now be considered sufficiently well established to claim our attention before we enter on what, at the best, is but one of the cases in which theory has met with a pretty full development.

But I may, perhaps, be permitted in the first place to refer to the pressing importance of this subject; for must it not be considered to involve the great agricultural question of the day? Population increases rapidly; an imperative demand exists for an increased production of food—for an increased supply of well-paid employment; yet more than one-half of the cultivable land in this country is now yielding *grass*! The co-existence of these facts is a strange thing. Surely it is possible to grow something better, more nutritive, more remunerating than grass; something involving the profitable employment of more labour in its cultivation. If all the plants the farmer grows be arranged in the order of their value, grass must stand *lowest* in the scale. Wheat, barley, oats, with their large and nutritive seeds, food for man; the turnip, carrot, parsnip, mangold-wurzel, and potato, with their large, fleshy roots and tubers, food for man and for beast, must all take the precedence of grass; *its* strawy stems and narrow leaves can hardly ever be so profitable to grow, and surely *never* in those districts of this country where a dense population is but scantily supplied with either food or employment. These thoughts will occur to every one who claims any acquaintance with agriculture; and their truth, as will be shown in the sequel, is borne out by experience.

Why is it, then, that so large an extent of this country is still merely pasture land? The reason I believe to be twofold. It is to be found—

1st. In the general dislike of landowners to the growth of any other crop wherever this one has obtained an establishment; and—

2ndly. In the absence, generally speaking, of sufficient capital in the hands of the present tenants of grass

lands to qualify them as cultivators of any other plant.

With the circumstances which have hindered a more extensive application of capital in agriculture, I have no concern here: the following remarks are directed exclusively to the grounds on which the first of the above "reasons" rests:—

Landowners generally object to the conversion of grass lands, and very naturally and reasonably too; for they find that a pasture ploughed up soon loses its fertility, and becomes of less annual value per acre. Grass, by the fact that it yields less acreable produce per annum than any other plant, and by the fact that this is generally all consumed on the land, proves itself the crop which least exhausts the soil. Any other plant—wheat for instance, or the turnip or potato—yields indeed more food per acre; but this very circumstance causes it to diminish the fertility of the soil from which it is taken. New arable land thus rapidly deteriorates in quality, and of course in value also, till ultimately it produces less food and yields less rent than the pasture out of which it was broken. But I am sure that this is no necessary consequence of growing other crops than grass, nor is this the universal experience of landowners and tenants on this subject. And I shall be very glad if a short statement of the grounds on which correct practice in this particular will be generally allowed to rest, along with the description of an experience in accordance with them, shall result in convincing any owners of pasture land farmed by intelligent tenants, that their own interest, in common with that of every other class in the nation, requires its subjection to arable culture.

The question for consideration is: How can any given degree of fertility in land be maintained? Professor Johnston has conclusively answered it, where he says—"Soils which are chemically and physically alike are agriculturally equal." Given, a soil whose net annual produce shall be a certain acreable sum, and you preserve its agricultural identity—its capability of annually raising similar crops, simply by taking care that its composition and its texture shall remain unaltered. This is what theory says upon the subject, and one does not see what objection can be made to a statement whose truth is so nearly self-evident. Agriculture is just to be considered as a manufacture, by which certain substances contained in the soil are converted into vegetable and animal produce; and its results, or, to use others terms, the fertility of land, must therefore depend on the occurrence of those

\* The Royal Agricultural Society.

substances in abundance, and in due relative proportion. Let them be present *thus*, and let the great mass of the soil—the mixed clay and sand and lime in it—be of such a texture as permits a sufficiently free passage through it both to air and water, and the soil will be at its highest pitch of fertility. Let either its texture or its composition fail of this standard, and its productiveness will diminish. And there is no need for imagining any mystery in this matter, as one is apt to do in cases, as in agriculture, where the unknown principle of life is concerned—this failure in the productiveness of a soil doubtless occurs just in the same way as does that of a tile-mill or a cotton factory, to which the raw material has been supplied in diminished quantity or of inferior quality. The fertility of the soil will be perfectly restored by replacing its texture and composition in their original condition. These are the two essential elements of its agricultural character. The *latter* is of the same obvious and immediate importance to vegetable growth that the furnishing of its food-store is to an animal; for on the composition of the soil depends the supply of nutriment to the plant. The *former* exerts an influence in several ways. On the texture of a soil depends its suitableness for the growth of different crops; light soils being adapted to one class of plants and heavy soils to another. It is on this also there will for the most part depend *rapidity* of vegetable growth; for to it is due the *facility* with which rain-water, falling on the surface of the land, dissolves its soluble portions out, and carries them to the roots of the plants. And, lastly, it is to the texture of the soil that that free access of air and of rain-water to every part of it is due, to the chemical processes connected with which so much of agricultural fertility must be referred. And it is this aspect of the matter which connects it with the subject of the present paper. Dr. Daubeny pointed out, in the last number of the journal, that independently of the small quantity of vegetable food, so to speak, available for use at any one time, an immense store resides in most soils in a dormant condition, capable of gradual development as it is required; and this process of development may by various artificial means, as by fallowing, the cultivation of fallow crops, the application of lime, &c., be greatly accelerated. It thus appears that there is hope for almost any soil; that in few cases can land be so “run out,” as to require the direct supply of *all* the substances which are needed to create fertility; for many of them are already present, and it only requires a little skilful management to exhibit them. It is on the same ground that we must explain the practice, often to be seen, of allowing worn-out land to “rest” for a while, after a long period of mismanagement has ex-

hausted its fertility. The success of this expedient, however, does not justify the practice, which is obviously most wasteful both of time and of means. The amount of “active” fertility in the soil ought, by a judicious system of cropping and of consumption on the farm, to be made nearly to reproduce itself year by year; and the gradual development of that which lies “dormant,” instead of acting as a sinking-fund to wipe out the evils of past mismanagement, would then go annually to increase the fertility of the land. It is the liability of arable land to the mismanagement I speak of which has hindered the conversion of thousands of acres of grass land, at a time when the larger acreable produce of good arable culture is so much wanted. May we not hope that the greater capability of improvement, which is also characteristic of *cultivated* land, will, as agricultural intelligence extends, be efficient for the future in inducing owners of pasture lands rapidly to bring them under the plough?

The following particulars regarding the cultivation of Whitfield farm, and its results, fully bear out the views which I have quoted from Professor Johnston and Dr. Daubeny:—

It may be well first to state some circumstances in the history of this farm, which have already been published elsewhere. In 1838 it consisted of 232 acres, of which 68 were arable; the farm-buildings then were few and nearly in ruins; most of the land was wet and undrained; much of it was occupied by hedge-rows, its extent being divided into 63 fields, and these being surrounded by wide, straggling fences, containing many timber trees; the brook which traversed the farm ran a most tortuous course, and was buried under alder and willow and hazel; several willow-beds, of considerable extent, occurred at intervals by its banks; portions of the eastern side of the farm were covered with coppice-wood and bramble; the soil on that side was dry; on the highest land shallow, on limestone subsoil; farther down, deeper, on sandstone; in the valley the land was very wet, containing springs of water in many places, and being liable to frequent floods from the brook; on the western side, also, it was very wet, lying on a variable subsoil, chiefly clay, though occasionally employed of alternating beds of clay and sand. Such was the condition of the land in 1838. Early in the following year the hedge-row timber was sold, realizing the enormous sum, for so small an extent, of 3300*l.* Preparations were then made for the drainage of the land, the grubbing up of the hedge-rows, the erection of farm-buildings, the making of good roads through the farm, the conversion of the grass lands, and the due cultivation of the whole. Since that time about 30 acres have been added to the

farm; the plans above referred to have all been carried into effect, and the time which has elapsed is so considerable, that, as regards the policy which has been pursued, the present condition of the land may fairly be taken as determining the permanence of its results. Its results are these:—

1st. As regards the landowner. A large and permanent, if not advancing, increase of fertility in the land. I do not here enter into any statement of the cost at which that increase of fertility has been obtained; the high price of draining-tiles, the exceedingly rough condition in which the land lay, the unpropitious nature of the season during which most of the operations were conducted, united to swell the expense of the improvements at Whitfield. They might have been, perhaps, now effected for a less expenditure; but with all this our subject has nothing in common: it is with the *permanence* of the result, not with its *cost*, that we have to do. On the latter point an overwhelming amount of evidence exists, that the cost of agricultural improvement is not such as to make it *unprofitable*.

2ndly. As regards the farmer. Of course, in the general, it is true that land lets for its full value, whatever that may be, and however obtained; but there can be no doubt that the results of draining, erection of farm-buildings, and other improvements, such as those carried on at Whitfield, are beneficial to the tenant, as permitting a profitable concentration of his capital, thus bringing the application of it more closely under his superintendence.

And 3rdly. As regards the labourer. The effect at Whitfield has been an increase in the amount of yearly wages paid, from about fifteen to upwards of fifty shillings per acre.

And I may add, 4thly, as regards the national interests, which are eminently concerned in any scheme for an increased supply of food, that the annual produce of this farm has increased, since 1838, from a value of £500 in cheese, butter, young stock, and a little wheat, barley, and potatoes, to one of about £1,800 in wheat, fat sheep, cattle, and pigs.

All these circumstances are stated simply as facts—no boast is either made or intended—similar results have doubtless been obtained elsewhere; and the inference to be drawn from all (a legitimate one, if I can show that these are now *permanent* characteristics of the land thus altered) is, that it is decidedly for the interest of *landowners* to take immediate steps for the proper *cultivation* of their grass lands; that, if this were done, *farmers* would be benefited—*labourers* would be greatly benefited—and that for *all* a permanently increased production of food would be obtained.

It may now be advisable to enter into some detail in illustration of the increased fertility which is asserted to exist on this farm. The following table exhibits the value of some of its fields ten years ago, when the whole of the parish was valued, and their valuation now, after having been seven or eight years in cultivation:—

Number of Field on Old Plan.		Gross Acreable Value, 1836.	No of Field on New Plan.	Gross Acreable Value, 1846.	Difference.
		s. d.		s. d.	s. d.
92	Pasture....	13 0	5	50 0	35 0
84	Ditto ....	17 0			
59	Ditto ....	27 0	2	50 0	23 0
89	Ditto ....	11 0			
91	Ditto ....	12 0	16	34 0	22 6
67, 71, 72	Ditto ....	17 0			
75	Ditto ....	20 0	6	50 0	30 0
105, 106	Ditto ....	11 0			
85, 86	Ditto ....	13 0	7	47 0	34 0
* 143, 144, 152	Arable ....	36 0			
* 153	Ditto ....	34 0	13	44 0	10 0

In justification of these items, I may give the history of one or two of the fields here enumerated. No. 8 was one of the poorest fields on the farm; it was drained in 1840, and its surface was pared and burned in the autumn of the same year; it was ploughed into perch-wide ridges, without reference

to the position of the drains, and it lay so till the spring of 1841, when it was sown with oats, of which it yielded a large crop—upwards of 8 qrs. per acre; the stubble was ploughed, and in the spring of 1842 it was manured and grubbed, or “cultivated,” and sold with mangold-wurzel, and it yielded an enormous produce of that root, certainly much above 30 tons per acre; in 1843 it was sown with wheat, and yielded upwards of 46 bushels per acre; in 1844 it was planted with po-

\* These grounds were naturally dry, and had the character of being “the best potato land in the parish.”

tatoes, but these partly failed owing to the dry-rot; in 1845 it bore wheat again, and there never was a finer promise of a crop than was exhibited on that field in the month of June, but the weather of July laid it, and its produce was greatly injured both in quantity and quality. Clover seeds and Italian rye-grass were sown among the young wheat in the spring of 1845, and several very heavy crops of rye-grass have been cut off the land during the past year. I do not think that the rental of this field is put too high at 50s. per acre.

Now, take No. 2, a field originally of much better quality than No. 8. It was pared and burned in the spring of 1840—ploughed, harrowed, and sown to common turnips, of which it yielded a fair crop; in 1841 it bore oats—a crop of about 10 qrs. per acre; in 1842 it was sown with the white Belgian carrot, and it yielded 22 tons per acre of them; in 1843 it yielded 42 bushels of wheat; in 1844 it yielded a crop of Swedes—not very good, owing to the character of the season; in 1845 the promising plant of wheat which covered it was laid and much injured by the rough weather during August in that year; during the past year large crops of Italian rye-grass have been cut off it.

I need not further describe the fields which have been selected. I believe they are pretty fairly valued. The immense increase which they exhibit in the annual value of some parts of the farm is to be attributed doubtless in great measure to the thorough drainage which it has received, to the buildings which have been erected on it, and to the roads which have been made through it; but also, and chiefly, to the conversion of its pastures, which have given profitable opportunity for the application of capital and skill. And does not the circumstance that the facts given are those of a history extending through a period of at least seven years, prove that they may be considered as *permanently* characteristic of the land to which they refer?—that is, so long as the present system of cultivation shall continue to be adopted.

So far from the land giving any sign of exhaustion, I do not hesitate to say that, during the past few years, it has been increasing in richness. Its great fault now is its tendency to grow too *much* straw, which being converted into manure for re-application to the land, has been year by year adding to the mischief; till now, by permission of the Earl of Ducie, our landlord, we have endeavoured to meet the growing evil by altering our system in part—seeding our rye-grass occasionally, and taking a crop of beans in place of a green crop; and it is hoped, by thus robbing the land of some of its fertilizing elements, to diminish that tendency to grow so much straw, by which our wheat crop has latterly been so much laid.

But I must now describe the method of cultivation by which this permanence in the fertility of broken-up grass-land has been secured. The principal feature in the system, and of course I do not describe it as any thing new, is the alternation of grain crops for *sale* with green crops for *consumption*.

After the drainage of the land, half of it was ploughed up before winter, and half pared and burnt early in spring; the former portion was sown, most of it, with oats; the latter was prepared for turnips. The elements of fertility naturally present in the soil ensured the abundance of the first crops, and thus sufficed, free of expense, to start that system of alternate husbandry in full vigour, which more than any other that can be named has the merit of self-maintenance. Every other year, for a longer or shorter period since, every field on the farm has borne a crop of wheat, and on the alternate years the crops have been successively clover, turnips, carrots, clover, mangold-wurzel, potatoes. The root crops have been for the most part carried to the buildings, and there consumed with and on the straw, by cattle, sheep, and pigs. The dung thus manufactured is either carried out, as it is made, to the fields on which during the ensuing year it will be used, or to stations near the liquid manure tanks, where it may be properly manufactured. About three thousand cubic yards are thus annually applied to the green crops. It is not only made from the consumption of roots and straw, but large quantities of oil-cake, oats, linseed, and beans are also consumed, and these no doubt add much to its richness. The annual application of so much fertilizing matter ensures heavy crops of roots and straw—it ensures *that* on which the farmer depends for the re-application each year of an equal quantity of manure. The system thus maintains itself: it was set a going without much expense, and it contains within it the elements of a permanent establishment.

No doubt in this, as in every other system of cultivation I have heard of, the soil suffers an annual abstraction of its substance; but this is not necessarily inconsistent with the maintenance of fertility. Dr. Daubeny has shown us that the soil contains, so to speak, an exhaustless store of fertilizing matter; and all that is needed to make this abundance apparent as well as real, is so to expose the soil, as that for every abstraction by the growth of a crop, a transfer of equal amount may be made by the solvent powers of atmospheric agents from the *dormant* stores within it, to those which are immediately available for the use of plants. It is upon an abundance of the latter description that the current fertility of a soil depends, and this may be maintained in spite of the continued robbery occasioned



by selling crops, provided the balance be made good. Now the efficiency of the system of cultivation adopted at Whitfield, in maintaining fertility notwithstanding heavy sales of farm produce, may be accounted for in great measure by the frequency of fallow crops, whose cultivation is attended by such constant and repeated stirrings of the soil, that rain water will have peculiar facilities for acting as a solvent upon its substance. In addition to this there must be considered the purchase and consumption of considerable quantities of cattle-food, and the preservation of the manure made from it.

These are the three points to which we must look for the maintenance of arable farming. As regards the second, I may just state how far the matters annually brought on to this farm go to balance the loss it sustains of the matters annually carried off it. The account stands thus:—There is an annual abstraction from the soil of about 500 quarters of wheat—the produce of 120 acres of land; and of an amount of beef and mutton equal to the increase during five months on 30 to 40 three-year-old oxen, and during eight months on 250 to 300 shearing sheep, as well as of the substance of some 20 or 30 bacon hogs, bred and fattened on the farm; in addition to this, there has lately been an annual sale of about 50 tons of Belgian carrots, and about 40 tons of potatoes. The mineral portion of all this matter is annually taken out of the soil. In the sales of vegetable produce alone, it thus sustains an annual loss of about 4 tons of its most valuable portion. But this is partly compensated by the purchased cattle-food which is consumed upon it:—About 200 quarters of oats, 10 to 20 tons of oil-cake, and 40 to 50 quarters of linseed, barley, and beans, are thus consumed. The weight of their mineral constituents may be about 35 cwt. This reduces the amount of robbery committed to 2½ tons; and we must suppose that the land is annually suffering an abstraction of this quantity of its best part, not to speak of the mineral portion of about 40 tons of butchers' meat also taken out of it. And all this, and more—for the land, so far from suffering from the treatment it receives, is exhibiting every year greater ability to grow the heavy and bulky crops it has hitherto yielded—all this and more must be manufactured and prepared as vegetable food, by the agency of the air and rain, out of the very substance of the land.

“But this obviously cannot last for ever—the land must ultimately be exhausted:”—So *he* will say who has not duly considered the origin of the soil and the means by which it is maintained. The mineral part of the soil is obviously the result of the disintegration of rock; and in the subsoil below it an endless store of similar matters exists. We may see here the great advantage of any system by

which the rain-water shall be enabled and induced to sink *through* the land down to the subsoil below it, *there* to effect the solution of those substances occurring there, which in their present state are useless to plants. And probably one great cause of the barrenness of undrained land is to be found in the circumstance that its crops, after using up the limited stores of food which it contains, are afterwards dependent upon the very small portion which the rain-water, under the unfavourable circumstances in which it is there placed, can provide for them. Undrained lands send the water off their surface; they do not permit it to penetrate, and thus it has no chance of performing that which may be called its appointed office—no chance of preparing from the substance of the soil a sufficient supply of nutriment for the plants growing on it.

The third point referred to above is also a most important one in the general scheme of permanent arable culture. It will be seen that, as it is, under our plan of cultivation (and the same will be found to a greater or less extent under every other plan in operation), a large draught is annually made upon the substance of the soil, in order to maintain its fertility; and it is not desirable unnecessarily to increase this call by carelessness in using the means we have of supplying the wants of the crops. The management of manure is obviously a most important branch of the farmer's business, and one to which a great deal of attention has of late years been directed.

Nevertheless, on a farm of any extent, my experience, so far as it goes, is entirely opposed to the alleged economy attending the use of the liquid-manure cart, which has been so extensively advocated. It is no doubt of the greatest importance that the urine of the animals fed on the farm be all saved; but this advantage is *dearly* bought by the labour which attends its *direct* application on distant fields. I believe that the cheapest and best method of consuming cattle-food, both as regards the manufacture of butchers' meat and the manufacture of manure, is Mr. Warnes' system of box-feeding. In it the straw used as litter accumulates under the cattle for many weeks together, the urine is entirely absorbed, and no water falls on the mass to wash out any of its soluble parts. This is the plan adopted here. The boxes are cleaned out when they become inconveniently full, which may be at intervals of twelve to fourteen weeks; and the manure, which is of the richest quality, is then at once taken to the field where it is to be used, laid upon a bed of earth, and thickly covered with the same. The manure from the sheep is prepared in the same way; it is removed, perhaps twice in the winter, from the sheds under which it accumulates. That, however, which is made in the stable is of

course daily carried out to a heap hard by, and the urine of the horses is collected in a tank near the place, and from this it is pumped, to soak the half-wetted straw.

It must be acknowledged, that here, as on every other farm that I have seen, there are many causes of waste in operation. The rain, as well as the liquid manure, falls upon the dung-heaps; and if the latter enriches, the former impoverishes the mass, which is alternately saturated by them. Large open yards, too, necessarily receive an immense quantity of rain-water in the course of the winter. Upwards of 27,000 cubic feet annually fall during that season on ours; a quantity and weight which it is impossible, with profit, either to collect in tanks or to carry to the fields. A large portion of this water *must* therefore run to waste, and it carries with it the soluble part of whatever manure it washes. We endeavour to prevent this as much as possible; and in consequence of our system of box and shed-feeding, we doubtless sustain less loss in this way than many other farmers; but a certain injury is no doubt suffered—one, however, which we think cannot be remedied by any application of the cumbrous machinery of water-carts and tanks.

It is to these three departments of farm-management, then, that we must look to keep up the fertility of land under arable culture: the alternate system of husbandry, by which the land receives almost every other year a thorough fallowing and cultivation; the consumption of large quantities of cattle-food, by which the loss sustained by the soil in consequence of sales of farm-produce is in great measure balanced; and the careful preservation of the manure that is made. Let the pitch of fertility be what it may, and whatever its cause, I have no doubt that attention to these particulars will preserve it. It may be owing to the natural character of the soil; it may be due to the skill of a former tenant; or it may be the extraordinary effect of *rotting or burning an old sward*—of bringing old pasture into cultivation. However it has arisen, there can be no doubt that ordinary energy will maintain it, if attention be paid to the points above alluded to.

No reference has been made to the use of artificial manures, as they are called. I believe that they are rarely necessary to the maintenance of fertility; no doubt they may often be advantageously used to *increase* fertility, but that is hardly ever desirable in the case of newly broken-up land; good crops may generally be obtained in such a case without much assistance, and that they may continue to be so obtained I am very sure. Will not the experience at Whitfield Farm, which I have described, be admitted as proof of this? Some of the land is a

deep gritty sand; much of it a stiff clay soil; in many places a peaty loam. On some fields we have a shallow limestone soil on rock; on others a deep vegetable mould resting on magnesian clay and stone; on *all*, when grass-land after drainage has been broken up, the scanty produce of cheese and butter, characteristic of its former condition, has been exchanged for bulky crops of roots and grain, a large produce of food for man and for beast; and on *all*, without the use of bought manure of any kind, these crops, so far from diminishing as years pass by, rather exhibit an increasing fertility in the land which yields them. Is there not variety enough of soil, and uniformity enough of result here, to justify general confidence? The fact is, that our crops of straw have latterly been so bulky as seriously to interfere with the produce of grain; the wheat has been laid and its yield injured in consequence of the luxuriance of its growth. This has been a growing evil, but it is certainly no sign of a diminishing fertility.

Now, I am perfectly aware of the extreme changeableness of farm experience, arising doubtless from the many uncontrollable and variable causes on which that depends; but it is impossible to disregard the *uniform* evidence of an experience extending over eight years; and I certainly think that the results of farm practice at Whitfield may well convince any landowner that the breaking up of his grass-lands, if profitable to him the first year, may easily be made so during every succeeding year of their cultivation, whether he grows wheat only, as we do, or introduces other grain crops.

I do hope that the facts stated, and the arguments urged above, may add in some measure to the influence which has been doubtless exerted by Mr. Bravender's admirable essay on a similar subject, in the last number of the Journal. It is certainly of great importance, especially for the labourer, that means be taken to induce the thorough *cultivation* of lands which now yield so little food and so little employment.—Journal of the Royal Agricultural Society.

*Whitfield Farm, near Wotton Underedge, Dec. 2.*

A baker at Strasburg has made some experiments in the kneading of bread by the introduction of portions of rice. He announces that he has ascertained with certainty that rice may be made to replace wheat in the proportion of one-fourth, and even of one-third, since, according to his statement, a kilogramme of rice will produce, in the manufacture of bread, two kilogrammes of the latter, while wheat will, in an equal proportion, produce only a kilogramme and a half. He maintains that, in spite of the high price of cereals, a middling quality of bread may be made in this manner at a moderate charge. The same experiments have, it appears, been made by several bakers at Paris, and with perfect success.

## THE LONDON FARMERS' CLUB.—MONDAY, MAY 3.

*Monthly Meeting of the Committee of Management.*—

Present: Messrs. W. Anderson, W. R. Browne, J. Gray, W. Fisher Hobbs, J. Hudson, T. Knight, C. H. Lattimore, J. Pain, W. Purser, R. Smith, of Burley, W. Shaw, of the Strand, Owen Wallis, and J. Wood. W. Shaw, Esq., in the Chair.

The Minutes of the last Meeting were read, confirmed, and signed by the Chairman.

The following gentlemen were elected Members of the Club:—

E. Chadwick, Esq., Somerset House, Strand  
 G. K. Cooper, Esq., Euston, Theford  
 J. Flowerdew, Esq., Hinderclay, Botesdale  
 H. Hannan, Esq., Burcott, Oxon  
 R. B. Harvey, Esq., Pulham, Harlestone, Norfolk  
 J. Lake, Esq., Ugby Hall, Stanstead  
 C. Lawrence, Esq., Cirencester  
 W. Lawrence, Esq., Woodhatch, Reigate  
 W. W. Luard, Esq., Witham Lodge, Essex  
 R. Ogle, Esq., Inner Temple  
 B. T. Stratton, Esq., Bristol  
 W. J. Street, Esq., Lincoln's Inn Fields  
 W. Walton, Esq., Merdon, Winchester  
 J. Webster, Esq., Tekirk, Market Deeping.

The following Works were announced as presented to the Club:—

"Mechi's Experience in Drainage." Two bound copies—by the Author. "The Farmers' Friend"—by the Editor. "The Cultivated Plants of the Farm;" "Clarendon on the Horse's Foot"—by Mr. Shaw, of the Strand.

On the motion of Mr. Browne, seconded by Mr. Pain, it was resolved—"That the thanks of the Club be given to those gentlemen who had presented the above Works."

A variety of other business was transacted, and at two o'clock the Committee Meeting broke up for the Extraordinary General and Discussion Meetings.

## LONDON FARMERS' CLUB.

An extraordinary general meeting of the Club was held at the Club-House, New Bridge-street, Blackfriars, on Monday, May 3, at two o'clock. Mr. Smith having been called to the chair,

Mr. SHAW stated that the meeting had been called at his instance, for the purpose of considering the following proposed alterations in rules 10 and 18:—

*In Rule 10*, "Any three or more members of the Committee may, by notice in writing, require the Secretary to summon a special meeting, notifying in the summons the special business to be transacted; and no other business shall be entered upon except that for which the meeting was called. Fourteen days' notice, at least, of any such meeting must be given,"—it was proposed to substitute seven for fourteen days' notice. *And in Rule 18*, "If at any time it shall appear ex-

pedient to adopt any new rule, or alter any old one, or to make any other proposition which may appear to the Committee to require the sanction of a general meeting, the Committee may call an extraordinary general meeting, on giving fourteen days' notice, specifying, in the form of a resolution, the subject intended to be submitted, the discussion of which shall be confined to that subject alone,"—it was proposed to substitute seven for fourteen days' notice.

On the motion of Mr. Shaw, seconded by Mr. Knight, these alterations were adopted by the meeting.

## MONTHLY MEETING FOR DISCUSSION—ON THE ADVANTAGES THE TENANT-FARMER WOULD DERIVE FROM THE REMOVAL OF SMITHFIELD MARKET.

The usual monthly meeting commenced at three o'clock, Wm. Fisher Hobbs, Esq., of Boxted Lodge, Colchester, in the chair. The subject appointed for discussion was "The advantages the tenant-farmer would derive from the removal of Smithfield market."

The CHAIRMAN said: Gentlemen, since our last meeting the Committee have prepared and issued an address on tenant-right, and I am happy to say that, from information which we have received from various parts of the kingdom, it appears that that address has met with universal approbation. In consequence of the favourable report which we have obtained from our friends in various quarters, we have considered it our duty to prepare a petition this day, which I feel persuaded the members of this club will be most happy to sign, in reference to the great question of tenant-right (Hear, hear). I trust that every one in this room, and every member of the club, will use his utmost exertions to carry out the principles upon which the tenant-right bill is founded; and I also hope that they will not forget the last clause of that address, in which we request the members to ask firmly for the support of their representatives in Parliament to the principles of the Tenant-right Bill. Gentlemen, I consider that this is a duty which you owe to yourselves, to your children, and to your country (Hear, hear); and I trust that when you return home from this meeting, you will take steps for the advancement of the great cause of tenant-right. The Committee have requested the Secretary to send a copy of this address to every member of Parliament. I hope you will consider that we have been doing our duty in the matter, and render us all the support you can. The subject which the Committee have selected for discussion this evening is "The advantages the tenant-farmer would derive from the removal of Smithfield market." I am happy to find that a gentleman is prepared to introduce that subject; and I feel persuaded, from the knowledge which he has of it, that he will bring it before you in an able manner. I must, however, request him to confine himself more especially to the subject of the removal of

Smithfield market, and to the question whether or not it is desirable to alter the day, and not to speak of any other plan, or in reference to any company which may be in contemplation with a view to the choice of a future locality (Hear, hear). I now call upon Mr. Lewis to introduce the subject for discussion this evening.

Mr. LEWIS said: It may appear almost presumptuous in me, who am a comparative stranger here, to introduce any question before the Club; but as I have been so much interested in the question of the removal of Smithfield market, and I conceive that the removal would be so advantageous to tenant-farmers generally in all respects, that on finding that the question was not to be brought forward by any other person, I could not decline to take upon myself the performance of my present task. You are all aware, no doubt, that there is now before Parliament a bill for the removal of Smithfield market. This bill was brought in, I believe, without reference to the benefit which the removal would confer on the agricultural interest. It has been brought in, in consequence of the nuisance which is created by a cattle market being held in the midst of this great city, and by the animals being driven through the streets of London at all hours, to the great risk of the lives of the inhabitants. And as regards slaughter-houses, I believe the object is to prevent the meat, which the consumer has to purchase, from being injured by the present system. I conceive, however, that this is a question which affects us as tenant farmers and graziers. No one is, in my judgment, more interested in this question than the tenant farmer, inasmuch as it affects him in a pecuniary point of view, while it does not so affect the consumer. I maintain that the driving of stock through the streets of London, to a place where there is no accommodation for them, must deteriorate that stock; and inasmuch as the stock is deteriorated, the interests of the tenant-farmer are sacrificed by the operation of the present system (Hear, hear). I will not now go into details as to the want of accommodation in Smithfield market. The want itself was most clearly proved some years ago before a committee of the House of Commons, at the period when Mr. Perkins obtained his bill for the establishment of Islington market. Proofs were then given of the confusion which prevails in Smithfield on every market-day, and of the injury which the stock sustains in going to the stalls. The scenes which take place baffle all description, and it is a disgrace to this country that they should be allowed to continue. I will only mention one circumstance to shew the want of accommodation. I understand that Smithfield was established in the reign of Edward III., in the year 1345. The area of Smithfield was then two acres. It has since been extended to five acres. The population of London is now nearly two millions, and I leave you to judge whether the increase of accommodation for the reception of stock has at all kept pace with the increase of population, and whether the present disadvantage to the grazier must not be immense. I think it must be allowed at once that a market which would suit the inhabitants of this town in the fourteenth century is not likely to suit the inhabit-

ants in the nineteenth. There are other reasons which tell, I think, most materially in favour of the removal of Smithfield market, and show that such an event would tend to benefit the agricultural interest. In the case of a market which has been established so long, the business being carried on for so lengthened a period on the same principle, it is very probable that great abuses have crept in. Now, on the removal taking place, those abuses will be corrected. Let me here mention a simple fact, which is, I think, rather important. I believe that most, if not all, of the salesmen are opposed to the removal of Smithfield market. That is a fact which appears to me to speak volumes. I will mention another circumstance in favour of the removal. One necessary consequence of that removal would be the alteration of the day (Hear, hear). That is, I conceive, by no means a minor consideration. In a moral and religious point of view, as well as in every other, the change is desirable. We can have no conception how much the sabbath is desecrated in consequence of Smithfield market being held on the Monday, and the droves of stock being driven to market on the Sunday. Another advantage connected with the removal is, that the grazier living at a great distance from London would save a day in sending up his stock, and this again is not a trivial consideration. Other reasons might be brought forward to show the advantages of the removal, but these are in my opinion the most important, and I will now leave it to those gentlemen who are such able advocates on all questions in which the tenant farmer is interested, to enforce upon you the necessity of coming to an unanimous resolution in favour of the bill which is now before Parliament. I also hope that we shall come to a determination on this subject, as our chairman observed, without reference to any company which may be established in relation to this question. We have met here to-day to consider the question on its own merits (Hear, hear) without reference to this or that company. The great object is to effect the removal of the market, and if we succeed in that, I think there will be very little difficulty as to the locality which the market shall occupy in future. Although I have very little doubt that you will this day adopt a resolution in favour of removal, yet let me remind you that a mere declaration of your opinion will not be sufficient. We must put our shoulders to the wheel, and if we petition parliament on the subject, and urge upon our representatives the duty of supporting this bill in the same way as we urge them to support the Tenant-Right Bill, we shall succeed in effecting our object; and let me say, in conclusion, that the Tenant-Right Bill is, in my opinion, the only one which is superior in importance to the Bill for the Removal of Smithfield Market (cheers).

Mr. SMITH said: I have no hesitation in following in the same strain as Mr. Lewis, and I am truly glad that he has had the moral courage, as an English yeoman, to bring forward this question (Hear, hear). The county from which I come—the county of Rutland—has for some time been prominent in advocating the removal of Smithfield Market. I myself moved with Mr. Handley in this matter at a period when the country was not at all prepared for the proposed change. At that

period our sheep were ten days in walking to London, consequently our capital was walking for ten days (laughter), and whatever payments might stare us in the face, it was impossible for us to place our hands on any return until the sheep had walked all the way to London. A new era, however, has arrived; railroads have come to our rescue; and it is now possible for us to have our sheep pasturing in Rutland on Monday morning, and delivered in London on the evening of the same day. I was not surprised at the observation of Mr. Lewis, that the salesmen of Smithfield market are entirely opposed to a change. Previous to the passing of the Reform Bill there were such things as close boroughs (laughter). I tell those gentlemen who place confidence in the continuance of this particular market, that the present age will not tolerate a monopoly in anything. The producers are, however, the first persons to be considered (Hear, hear). However desirable it may be for this great city to remove the stench which is now produced, and all the other evils attendant on the system, yet it must chiefly be remembered that we, the producers, are a very important class; and seeing that we are such an important class, I think the subject should be considered with special reference to our interests. When it was first proposed that oxen should be exhibited, not in the old yard in Goswell-street, but in some more convenient spot, the butchers made similar objections to those which they now urge against the removal of Smithfield market (Hear, hear). It was predicted that that change would be regretted; but it is now admitted that we can exhibit our stock in a convenient, instead of an inconvenient, spot, without any injury to our interests, and that there was no necessity for retaining the crowded, unhealthy, and uncomfortable state of things which existed formerly (Hear, hear). All we now ask, as farmers, is, that having railroads at our command we may be enabled to deliver the animals at once on their legs in the most beautiful state that they can be preserved. We ask that every man should be allowed to deliver his animals in the byres at some market or other, in that state of cleanliness and comfort in which they leave their homes (Hear, hear). Gentlemen, it has been said that the city of London has a formidable interest at stake. I shall not advert to that subject. I stand here as belonging to that particular class as a member of which I earn my daily bread (Hear, hear). But I would ask—Do you think that the corporation of the principal city in the world will, for a moment, form a barrier to so immense an improvement as that which is proposed to be effected? (Hear, hear.) Why, if the change were asked by the inhabitants of this great city, I feel persuaded that they would, as representing the interests of the inhabitants generally, at once give way on the question (cheers). It seems to me at this moment that it is quite possible to remove the objection as to the loss to be sustained by the corporation, by turning Smithfield into a grand central terminus for nearly all the great railroads (Hear, hear). I have, however, nothing to do with that question. What I contend is that the market ought to be held in a place where the animals could be exhibited to advantage. What is the state of things in Paris? Why, not a single

horned animal is allowed to enter the streets. There are slaughter-houses outside the city, and everything is carried on in a healthy and comfortable manner. Gentlemen, the most important point, I think, which we have to consider in reference to this subject, is the alteration of the day. However important it may be to remove Smithfield market, or rather to remove the sale of our cattle from that market to some other place, it especially becomes us as churchmen and as Christians to endeavour to do away with the infringement upon the sabbath. That, after all, is the principal thing to be kept in view. Let any man who is not convinced of this visit on a Sunday morning the byres of Smithfield, let him sleep in the neighbourhood, and make himself familiar with the scenes which are to be witnessed, and let him then say whether we should not hail the day when the stock are taken to market on Tuesday morning (cheers).

Mr. WILLIAM EVE said: Having seen a great deal of Smithfield market, I feel that I should be wanting in my duty as a member of this club if I did not make a few observations relative to the removal of that market (Hear, hear). Before I proceed farther, I wish to disabuse the public mind as to the nature of my connexion with the promoters of the new market at Islington. It has, I know, been publicly stated that after having been engaged rather conspicuously in Smithfield for many years, I am one of the directors of that concern. That statement is, however, incorrect. I was requested to take part in the directory, but I distinctly refused to accept the honour intended for me. It cannot, therefore, be said that I am an interested party, and no objection can be urged on that ground, at least, to what I am about to advance. I was engaged in Smithfield market for eighteen consecutive years, and I slept in the market more than one hundred nights in each year; consequently, you will give me some credit for having had an opportunity of witnessing what goes on, and I can assure you that I was not an unobservant spectator. In detailing the results of my experience, I will begin with the limited space which is occupied. If I am rightly informed on the subject, five acres is about the full extent of the market. Granting that this is the actual size of the area, not only the members of this club, but the whole nation also, must admit that five acres form a very inconsiderable space for exhibiting the enormous number of 40,000 sheep and 4,000 beasts. Observe, I am not speaking of extraordinary occasions, but of the regular course of things; and I believe the actual number has sometimes exceeded what I have stated. Now, what is our interest as graziers? I am a grazier myself. I have not been in Smithfield market for five years. I am happy to see in this room an individual who is watching my observations. I am not afraid of any individual's questioning or scrutinising what I advance here or elsewhere. What I am now uttering, I have not the least wish to keep from the public (Hear, hear). I repeat that I am happy to see in the room an individual who is living in Smithfield market, and who has, for a number of years, had experience in this matter. That gentleman will be able to make a faithful report of

what he hears on this occasion (laughter). Now, you must allow that 40,000 sheep and 4,000 beasts require a larger space than that which I have mentioned. I believe the whole number of sheep that the pens will contain is somewhere about 26,000, and even then they must be crammed in to a degree which it is frightful to contemplate. You will ask, what becomes of the other 14,000? I will not advance anything on this occasion but what I have seen as a salesman, and I have had an opportunity of gaining some little experience in the matter. Twenty, twenty-five, or thirty sheep are all that can be got into a pen at one time, and they are then so placed that many of them go back without an opportunity having been afforded for examining them. The more the animals have been jaded in being driven, the more likely are they to be crushed into the pen; and one result of this system is, that butchers do not take the trouble to inspect the stock. I believe that there is, in fact, a serious deterioration of the animals, and therefore a serious loss thrown on to the grazier. Well, then, the question recurs, what becomes of the 14,000 sheep that are left unprovided for? I will tell you. There are various yards round Smithfield—the Ram yard, the King's Head yard, and other places, where there is scarcely room for the horses and carts. The sheep are pressed together there as well as the parties can contrive to keep them; and they are removed to the pens as fast as room can be made for them. 150 or 200 sheep at a time are removed in order to make room for others. The sheep are urged out of the pens, and driven about to the different yards, and the conflict between the sold sheep coming out and the unsold sheep going in, may be easily conceived. Gentlemen, I candidly confess to you, that I have myself, as a Smithfield salesman, incurred many a serious loss at the expense of my employers, on account of the state of things which I am describing. I think this will shew that a pecuniary disadvantage is sustained by the graziers on account of the limited extent of the present space. The beasts are, in this respect, almost on a par with the sheep. They are in nearly the same position. I will here tell you one little anecdote in connection with Smithfield market. I have a brother and a brother-in-law in that market at the present time, and they are as much averse to the removal as I am in favour of it. One of them happened to have a great many beasts on the last great market-day. Some one said to him, "How are you getting on? You seem to be strangely muddled. Don't you wish that you had the new market?" He replied, "Any where but here. I don't care where, so that it is not here." That is, I believe, an echo of the feeling of salesmen generally. We should see it to be so if we could only probe them to the bottom, and make them speak out candidly; though supposed self-interest now predominates, and carries them in the contrary direction. The fact is, they cannot make up their minds to face the removal. There is another point to which I would call your attention. I understand that the innkeepers are making a great outcry against the proposed removal of the market. I should be very sorry to injure any body of men in their vested rights;

but at the same time, in this case, as in all others, personal interests must give way to the public good. Allow me to say, however, that I have known but few individuals—I speak only of what I know, and therefore I care not for question or scrutiny afterwards—allow me to say that if Smithfield be such a valuable place for innkeepers, I have known but few individuals who have made money in that capacity. I have met with only one or two—very few more—who have made fortunes in Smithfield market; and, therefore, viewed as a pounds-shillings-and-pence matter, I do not think that innkeepers have so much interest in perpetuating the present state of things as they themselves appear to suppose. At one house where I was quartered, the "Old Bear and Staff," there were six landlords or landladies in eleven years (cheers and laughter). With regard to the exhibition of stock, I would just observe that at Norwich, at Ipswich, and other places where large fairs are held, it seems to be one of the natural tendencies of man, whether from pride or self-interest, to have the stock exhibited in the most advantageous light—the ground is raised for that purpose. I want to see something of the same kind in the metropolis; I could wish to see the animals exhibited in such a manner that the spectators would at once be able to see what they are, passing his eye over the assembled stock in the same way as this is done at Baker-street (hear, hear). At Baker-street even ladies come to inspect the animals, and I really cannot see why this practice should not be encouraged. Now there are, I think, about 700 drovers ebbing, as it were, to and fro in connexion with Smithfield market during the week. In nearly all other classes you will find that there has been a general improvement within the last few years, but I am sorry to say that the drovers appear to stand still, if they do not even retrograde (hear, hear). During the many years that I was connected with that market I could see no improvement either in their morals, their habits, or their conversation. If you go there on a sabbath evening, and listen to the blasphemous oaths and imprecations which they utter in the ears of persons who are proceeding from St. Sepulchre's church and places of worship in other localities, and if you further witness the cruelty which is inflicted on the poor beasts, you will almost be reminded of Pandemonium, carried in imagination to the lower regions, by the scene which you behold and the words which you hear. For five-and-twenty years I was in the habit of sleeping within sight and hearing of all this, and therefore I do not speak of these things without having had full opportunity of witnessing them (hear, hear). When a person who is passing by has ventured to say to a drover, "Why do you ill-treat that poor animal?" the answer made has been a splutter of mud for his presumption, and sometimes greater violence still has been the result. My presence had some little influence over them because I was known in the market, and I did occasionally administer useful reproof. From the fact of my being connected with the market I was free from insult, but had I not been known they would have been as ready to insult me as any one else. This state of things is, I think, an additional cause for the removal of Smithfield market.

Gentlemen, on looking at a paragraph which has appeared in one of the newspapers, I find that at a meeting which took place at Butcher's Hall, on Wednesday, March 18th, it was resolved, "That the removal of Smithfield market with a view of promoting the public convenience, or of giving increased accommodation to the trade of butchers, is totally unnecessary; as, from the spacious enlargement and the judicious arrangements made by the corporation of London since 1834, together with an entirely new addition to the old area, there is sufficient accommodation for transacting the business of the market with perfect convenience and advantage to all parties." Now, I am astonished that any men could be found to make such a statement as this (hear, hear). I say emphatically that it is utterly at variance with the truth. If such judicious and adequate arrangements have been made, why are we met here to discuss the subject? (hear, hear). As far as the room will allow, I grant that every possible arrangement has been made for the accommodation and sale of the animals, and also for their well-being; but I am surprised that any one could make the declaration which I have mentioned. I deny what is asserted *in toto*. Mr. Lewis very properly alluded to the desecration of the sabbath. That is, I think, the worst feature of all. I entirely concur with Mr. Lewis in what he said on that subject. Are we not taught in scripture to respect the sabbath; and is the sabbath, I ask, to be considered as one of the ordinary days of the week, or is it to be considered as the seventh day? (hear, hear). Let any one who has been accustomed to an orderly and quiet life in the country, see drovers, salesmen, and butchers congregating in Smithfield on the Sunday morning; let him come and see the bargains which are being made, and the cattle, which are not only consigned to the different salesmen, but sold to the butchers on that very morning (Hear, hear), such a person must be astonished at what he witnesses. It is said in the decalogue, or the ten commandments, "Remember the sabbath-day to keep it holy." Is that, I ask, keeping it holy? Is it setting a good example to mankind to allow the Almighty's works, the animals which he has consigned to us for our daily use, to be prostituted in the light of day in the manner described? Can the corporation of London, too, look on at this desecration, and that too for a series of years? I am astounded at the very thought. When I see placed in front of that splendid fabric, the Royal Exchange, the inscription, "The earth is the Lord's, and the fulness thereof," when I consider that every thing necessary for our sustenance has been provided, that the east is ransacked for our luxuries, and that the western harvest supplies us with other enjoyments; and when I then see the corporation of London sitting idly and supinely by while the sabbath is desecrated in their own city, I confess that I am astounded and paralyzed by such a spectacle. And, gentlemen, I do not see why a few divinity observations should be considered out of place when we are dealing with this subject. Let me call your attention to the last chapter of Nehemiah; from the 15th to the 22nd verse of that chapter, you will find everything that is applicable to the case now under discussion (Hear, hear). I would advise

you all to look at that portion of scripture; you will see quite enough to justify the carrying of my views into effect. Look at another evil in common with the present system. Beasts are brought into Smithfield market on Sunday night; at nine o'clock on that night some of them are tied up; and, after this, they stand on the following day in the heat of a May-day sun. There is to be seen the beautiful Norfolk cow, which is raised at so great an expense. Though an Essex man, I have had an opportunity of witnessing the pains taken in rearing such animals; but, notwithstanding this, they are tied up on the Sunday night, and kept not only all night, but during the next day, without a bit of food or a drop of water, and with a burning sun, it may be, reflecting its bent upon them. I do not know how we could reconcile it with our duty not to endeavour to get rid of such a state of things. I think, however, I can see that the days of Smithfield market are numbered; and if they are not numbered, they certainly ought to be. We have been going on in this way for a long period; but I trust that the period is drawing to a close. I hope the few remarks which I have uttered will make some converts to the cause which many of us have at heart. If they make only a few, I shall be perfectly satisfied. I know I am looking down on the very *elite* of the farming interest of this country. I know I am surrounded by many men of talent and influence and high character. I trust that they will take the same view of the subject as myself, and that the stone having been set in motion they will not let it stand still until we have succeeded in removing this abominable nuisance.

Mr. LEE said that, though a young member of the club, he desired to make a few observations on the question before the meeting. He had formerly entertained a different opinion from that which had been expressed by Mr. EVE. Having taken an opportunity of speaking on the subject to graziers who, as he had supposed, understood it, and who were certainly in some degree interested in this matter, his conversations with those parties had led him to the conclusion that the removal of Smithfield market was likely to be injurious to the interests of the graziers. He now found, however, from the sentiments expressed and responded to by the members present, that the interests of the graziers lay quite the other way (Hear, hear.) He felt exceedingly glad that that was the case, because it narrowed the question very materially. The observance of the sabbath was a great point to be kept in view in all their social movements. It was quite certain that, as "righteousness exalteth a nation," so if any body of men combined together to maintain a system, which, although it might promote their pecuniary interests, was in direct violation of the plain commands of God, they combined to perpetrate that which must eventually act injuriously to the best interests of society. (Cheers.) He was glad that such a sentiment appeared to have taken hold of the minds of the members of this club, and that the matter was likely to be placed in its proper light, namely, the religious one, before the public. It had been objected, that if Smithfield market were removed, and the proposed slaughter-houses were established, the graziers would lose,

through the cessation of that competition which existed at the present moment. The trade would fall, said the objectors, into the hands of comparatively few carcass butchers; and instead of the grazier being able to dispose of his 200 sheep in lots of ten or twenty, he must dispose of the whole at once. The best judges, however, were of opinion that the graziers would be benefited, and he felt quite sure that the members of the community at large would benefit by a change.

Mr. ANDERTON (a member of the Common Council of the City of London) said—I certainly did not intend to take any part in this debate; I came here merely for the purpose of hearing and learning; but as an humble member of the Corporation, I have risen for the purpose of making one or two observations upon what has fallen from the gentleman who immediately preceded me. First, then, with regard to the day on which the market is held. If it be the wish of those who frequent that market to change the day from Monday to Tuesday, I really believe that there will not be found a single individual in the body to which I belong who will not consent to the change. (Hear, hear). I will myself undertake that, at the next meeting of the Court of Common Council, a notice shall be put on the business-paper for the purpose of discussing that question (cheers); and if those who are in favour of it will only show that it is their wish to change the day, by presenting a memorial to that effect, I am quite sure we shall have no difficulty whatever in changing it. With regard to the interest of the Corporation in the market, it must be well known that the Corporation has, within the last few years, expended enormous sums of money upon the market, and has, in fact, done everything that can be done to make it available for the purposes for which it was intended. Still, if it be the desire of those who frequent the market to change the site, the Corporation can have no opposing interest to serve; on the contrary, I believe the Corporation would obtain a much larger income by disposing of the ground occupied for the market in some other way, than by retaining it for its present purpose. They feel, however, that they are bound to consider the case of the graziers, together with that of the butchers, and of parties in the surrounding neighbourhood, who feel that they have an interest in the continuance of the present market. They would have been very blameable if they had not taken this view. It would then have been said, "Here is the Corporation of London giving up this market merely to obtain a larger sum for the ground!" (Hear, hear). The matter, therefore, rests entirely with you and with those who frequent the market. It is for you to say whether you will abandon the present site for some other. If you do abandon the present site, I hope you will find one which will suit your purpose better, and that the public also will derive advantage from the change. At the same time I hope that those who reside in the neighbourhood and have invested their capital on the supposition that the market would continue, will not be losers by any step which may be taken. They are fairly entitled to receive compensation from those who remove the market; and I hope that if the removal

should take place, there will be a proper consideration for the rights and interests of all parties (Hear, hear).

Mr. BURRELL could not but say that he felt somewhat surprised to see Mr. Eve appearing in the character which he did, and taking up the new market in opposition to the whole of his family—his brother and his brother-in-law, his father and his father-in-law.

Mr. EVE said he had not advocated the new market.

Mr. BURRELL said he stood corrected. It was only a short time since Mr. Eve was himself a public man in Smithfield market: within the last five or six years he had left it, and he had no doubt taken a very large bonus from his relations for stepping into his shoes. He was not aware whether Mr. Eve took any part in the struggle when the market was first proposed; but if he did take any part, he (Mr. Burrell) had no doubt it was as a strenuous supporter of the old market. Now it was not merely his own opinion, but that of the whole body of Smithfield salesmen, that the removal of Smithfield market would tend very greatly to injure the interests of the graziers. No other place could be so central as the present site. It was true that the new market would be very convenient for the northern and eastern counties; but it must be remembered that it was not those counties only which supplied Smithfield market with stock; there were Kent, Sussex, Surrey, Hampshire, Wiltshire, Dorsetshire, Somersetshire, Berkshire; and the greatest portion of the stock from the south and south-west had to come over Blackfriars-bridge or London-bridge. Smithfield stood in the centre; and it must be admitted that it was most convenient for the trade of the metropolis and its environs. A large number of beasts came floating up the river Thames, and were landed somewhere between Blackwall and London-bridge. They could not proceed to any distant market without being driven through the most crowded parts of the metropolis; and not only had they to be taken to the market, but when they were sold it was necessary to remove them again. Perhaps the Club is not aware that about 1,000 beasts and 8,000 sheep pass over Blackfriars-bridge weekly. That statement was made before the House of Commons by Mr. Eve's father-in-law. Now this question of the removal of Smithfield market resembles most questions which are taken up by the public. It is either taken up from mistaken notions, formed by the parties themselves, or from being misled by the false and scandalous misrepresentations of the public press—to which, I fear, my friend Mr. Eve and some other gentlemen have paid too much attention; because I am prepared to show that there is not one case in twenty in which death is the result of the accidents which sometimes occur. A death had occasionally occurred in consequence of the infuriated state of the animals; but in nineteen cases out of twenty the accidents which occurred did not result in loss of life; and he believed that for some years there had not been a coroner's inquest held upon the body of any person who had lost his life in consequence of the existence of Smithfield. It was not merely the removal of Smithfield market which was in question, and so much feared. The meeting were, no doubt, aware that a company had



already been formed to establish abattoirs, or common slaughter-houses.

The CHAIRMAN interrupted the speaker, and requested him to confine himself to the question of the advantages which the tenant-farmers would derive from the removal of Smithfield market.

Mr. BURRELL said, that he had no doubt that the proposed removal would be attended with serious injury to the graziers, inasmuch as it was probable that the beasts would be thrown into the hands of the carcass-butcher, by which means they would lose the advantage of that wholesome competition which had hitherto taken place. It was the retail butchers who were the best customers of graziers. In his opinion, very great injury would result to the graziers.

Mr. KNIGHT: You must show the causes.

Mr. BURRELL said, he was perfectly prepared to show the causes. They knew very well that a company had been formed to establish abattoirs, and there could be no doubt that one of the first results would be a prohibition against killing within the metropolis. In such a case, what would be the position of the butcher? He spoke of the butcher, but he was in reality more interested in the grazier. Still he must ask, what would be the position of the butcher who had spent hundreds and thousands, it may be, in erecting buildings and slaughter-houses, if he were deprived of the power of killing his stock at home? It was a very arbitrary power Parliament was asked to exercise; and one certain effect must be to deprive the country of that competition which was so beneficial to all trades. He never cared how many butchers he had to deal with—the more the better. If he had a number of sheep to sell, he would much rather see ten butchers than one, believing that he would then be much more likely to get a fair price. He was expressing not only his own opinion, but the opinion of a great body of salesmen at Smithfield market. He had heard some religious remarks from his friend Mr. Eve, but he was not prepared to follow him in scripture quotations. He had not enjoyed so much time for study. Mr. Eve happened to be one of those fortunate persons who had made a fortune in the market; but when gentlemen rose to speak, it behoved them to take care not to talk too fast, and above all to confine themselves to such statements as could not be contradicted. He had heard Mr. Eve declare that beasts were tied up by the neck at nine o'clock on Sunday night. He denied it. On no occasion was a bullock suffered to come into the market till twelve or a quarter before twelve. He (Mr. Burrell) had gone through the whole routine of market business for thirty years; he had watched the drovers very narrowly; he had endeavoured to prevent wanton cruelty, and to improve the general state of things; and when he heard Mr. Eve state that beasts were tied up at nine o'clock he confidently denied the statement; twelve o'clock was the time for the cattle to come into the market, and they were not suffered to enter it till ten minutes or a quarter of an hour before that time. With regard to what had fallen from Mr. Eve as to the drovers, he could not concur in the representations which had been made. He himself had seen

an extraordinary change. The drovers were, in his opinion, as much refined as their masters (laughter); and certainly there had been a great improvement within the last thirty years. The corporation of the city of London had done everything in their power to render the market as palatable to the public as possible; they had recently made very great improvements in it; they had enlarged it, and spent a great deal of money upon it. He would not say that every expenditure of money had been judicious, but certainly a great deal of money had been expended to advantage. He had seen it stated in the newspapers that there was not room enough for two thousand beasts; he believed, however, that the salesmen would bear him out in the declaration that there was room for four thousand, and that that number could stand very well. He would not indeed deny that there were times when it would be desirable to have more space, but every disposition had been shown on the part of the corporation to make more room. At this moment pens were being erected which would provide for nearly 3,000 more sheep. He had certainly been very much inconvenienced at times; but if he could only make the graziers see the matter in the same light as the salesmen saw it, he believed they would soon feel that it would be to their interest to leave out a certain description of stock. If some of the stock which came to him were his own, he certainly should take that course; and he believed that his friend Mr. Eve would do the same. There was one description of stock which should be in the market at three or four in the morning, and there was some stock which was only in the way; it was getting muddled, because it was not required, there being no buyers for it. The meeting had now heard both sides of the question. He had not been able to express himself in such a flowery manner as his friend Mr. Eve (laughter), who had been to school, perhaps, more than himself; but he had had as much practical experience from the age of eighteen as any man who stood on the stones, and the club had heard his testimony. That society was formed for the advancement and protection of agriculture; and he did hope that it would not be led away by any representations like those which had been placed before it. He could not tell what were the motives which influenced some parties in the course which they pursued. He knew that his friend Mr. Eve had taken up the matter very strongly indeed, to the surprise of all his old connexions. No one could have supposed that he would have taken the course which he had done. Mr. Eve was one of the gentlemen on the committee for the new market, and he hoped that on that account the meeting would guard against being misled.

A member asked Mr. Burrell what was his opinion with respect to the change of the day from Monday to Tuesday?

Mr. BURRELL said he did not doubt that the salesmen generally would echo such a proposal (Hear, hear). For some years he had himself attended to the Sunday business, but he happened at last to be made a churchwarden, and he never attended to it any more; he had not found himself a loser (cheers). He had no doubt whatever, from the number of petitions which had been

got up in various counties and numerous signed—he had no doubt whatever of the market being left where it was; but, as regarded the change of the day, he should himself certainly be a strong advocate for having a Tuesday's market instead of a Monday's.

Mr. KNIGHT inquired if that was the opinion of the majority of the salesmen.

Mr. BURRELL said he did not believe that any of the salesmen would object to it. A minister of the church in Rutlandshire had written to him on the subject, knowing that he was acquainted with Smithfield market, and he was very urgent as to the market not being held any longer on a Monday. He had replied to that communication that he thought there would be no difficulty in changing the day from Monday to Tuesday.

Mr. EVE said that his friend Mr. Burrell had cast some imputations upon him, and he must crave permission to say a few words in reply. He had been told that his relations were all interested in Smithfield market and anxious for the continuance of the market where it was now held. He thought, at all events, that that was a proof that he was disinterested in the course which he had pursued. One of his most intimate friends, Mr. Jones, of Smithfield, was opposed to him on this question; and the fact that he (Mr. Eve) opposed himself to those with whom he would naturally be desirous to agree, was at all events no proof that he was not disinterested in the course which he was taking. His friend Mr. Burrell emphatically denied that a bullock was ever tied up at 9 o'clock at night. He (Mr. Eve) begged to say distinctly that he had himself seen thousands tied up at that hour. The fact was, that Mr. Burrell was at home on Sunday evening: the circumstance of his residing nine miles from London kept him at home on the sabbath, and he had not had an opportunity of witnessing what he (Mr. Eve) had witnessed. The Club had heard from his friend a statement that 1,000 beasts passed over Blackfriars-bridge weekly, on their road to the market. He believed that the real number was only 700. As to the 1,000 beasts which came up to London by water, he would ask where they went to? They were taken to the new market, which was very handy. A great number of Mr. Lowe's beasts went there, and a great majority of the Dutch cattle also went to the same place.

Mr. BURRELL again rose to address the meeting.

The CHAIRMAN deprecated the personal turn which the discussion was taking.

Mr. BURRELL said he should be the last person to depart from the rules of the Club, or to say anything which could be objectionable, but he really could not submit to see himself put down without the opportunity of vindicating his own character and his regard for truth. He denied *in toto* the statement of Mr. Eve with respect to the cattle being tied up by the neck at nine o'clock.

Mr. ANDERSON said Mr. Burrell had failed to show what advantages the tenant-farmer could derive from the continuance of the Smithfield market where it was now held: he had not fulfilled the task which he had volunteered to perform. He (Mr. Anderson) did not appear there as an advocate for the Islington market in particular. Why should they not have three markets, in dif-

ferent parts of the town? To show the operation of the present system, he might mention that, though no one was more anxious than himself to have good animals, it had occurred to him not to know his own beasts when he saw them in the market. Indeed, he would defy any one to know the animals which they sent to the market, under existing circumstances. The system was such, that the best stock was often sold for the worst price.

Mr. SHAW said: Mr. Chairman and gentlemen, I congratulate you most cordially on the progress which this question is making. I began to think at one period of the debate that we were likely to arrive at a speedy conclusion, all parties appearing to be of one opinion as regards the interest of the tenant farmers in this question; but I am glad that opposition has elicited facts. I never felt any doubt as to the decision which would be come to, but I certainly thought that there were yet some formidable opponents; and the most formidable opponent that I contemplated was the corporation of the city of London. But a worthy member of the corporation who has addressed you has informed you that such is not the fact. I have observed on more than one occasion, however, that when the public has expressed its views very clearly, somehow or other the collective wisdom of that body has managed to prevent anything from being done within its jurisdiction. It is not the first time that the city of London has been successful in excluding improvements from within its walls (laughter). I remember that the corporation for a long time resisted the introduction of the police force; and more recently it has shown itself opposed to a measure which scientific men have proved to be most important, viz., the Health of Towns Bill. The population of this country is, in a great many instances, compelled to crowd together without the advantage of sewerage and of cleanliness; and such is the state of things, in this respect, that even a comparison between the effects of consequent disease and the ravages of war, will show that the battle-field often has the advantage when compared with the dangers to which human life is exposed by the want of arrangements essential to the protection of health. And yet I hear that the corporation of the city of London is likely to be successful in its endeavour to keep that excellent measure—the Health of Towns Bill—from obtaining an entrance within its walls. I congratulate you all, however, on the language which you have heard this day from a member of the governing body in the city with respect to Smithfield market. I am happy to hear that the corporation is most anxious to fall in with the views and feelings of the public as to a change of place and change of day, and that the sole spirit by which it is actuated is that of desiring to accommodate the public. It appears that the corporation of the city of London have not regarded expense in providing accommodation for Smithfield market; that the income arising from the tolls has had no influence with them, and that they have been influenced solely by feelings of sympathy for the vested interests of the salesmen and the publicans resident around Smithfield market. It appears to me that all parties will agree on the question except the

salesmen and drovers, or, perhaps I should add to the salesmen and drovers, the publicans and the butchers. As to the publicans, if a statement which we have heard is to be relied upon, it does not appear that they are much interested in the continuance of Smithfield market (Hear). Mr. Eve cannot be mistaken, I should suppose; but I should certainly have drawn a different conclusion from the fact of one house having had six landlords and six landladies in eleven years. I should have concluded that six large fortunes had been made in that period, judging, too, from the course which the publicans are pursuing in reference to this question. Now, I perfectly concur in Mr. Anderson's observations with regard to Mr. Burrell. I do not think that he has succeeded in making out a case for the salesmen. I listened very patiently to what he had to say on the subject; but I really could not discover anything which, in my opinion, ought to be allowed to influence our decision. Mr. Burrell seems to think that the public are generally mistaken in the notions which they form. Now I entirely differ from him on that point; and am rather disposed to concur in a remark made by one of our learned judges some forty years ago, "that if you give the English people plenty of time to think, you may depend upon their coming to a sound conclusion on any subject which may be brought before them" (Hear, hear). If I see any question which is being constantly agitated and is growing in the public mind, even if the object contemplated be contrary to my own opinions, I am rather induced to think that it is probable that my mind is imbued with prejudices, and that when a large majority are of a different opinion from myself, it is probable that they are right and that I am wrong. I must say that I do not hold in great respect any of the arguments which Mr. Burrell has advanced in favour of retaining Smithfield market. One of his reasons is, the number of beasts that pass over the bridge which is so near to us—Blackfriars Bridge. He told us also that it is many years since a coroner's inquest had been held upon the body of any person killed by an animal. In that respect I think he is mistaken. I am under the impression that within a few months a case occurred while the party was going over this very bridge which resulted fatally. He also spoke of the destruction of competition through the wholesale change which is now proposed. Now I do not think we need be at all apprehensive of a want of competition if we have good meat to sell: in London, at least, I think there will always be sufficient competition between parties who are prepared to serve the public, whether the animals go to Smithfield or to some other place. As regards the question of butchers killing their own meat, I fancy that a vast quantity of meat is purchased by butchers in all parts of the metropolis which has never been in Smithfield; and I think also that a very large portion even of that meat which does go into Smithfield market gets into other hands before it reaches the retail butchers. It actually passes through the hands of those large carcase butchers—who, Mr. Burrell fears, will monopolize the trade if Smithfield market is removed—before it reaches the public. I thought it was rather an awkward admission which Mr. Burrell made at the termination of his speech—that

the inconvenience now experienced in Smithfield market for want of room is owing to the time at which the animals are brought in. He suggests that the owners should exercise their judgment in selecting the best animals to send into the market first, and that when those were sold—say by about 9 o'clock—the inferior animals should be brought in. Thus he proposed to eke out Smithfield market by having relays of beasts to make up for the deficiency of space (laughter). Gentlemen, I do not apprehend for one moment that there can be the slightest doubt as to the decision to which we shall come; but as regards the Corporation of London, I am quite prepared to find that Mr. Anderson has been speaking without his host. He has, I believe, this morning delivered his own honest and liberal sentiments on the subject; but I fear that when he brings the matter before the corporation of the city of London, he will not find that body so ready to cede the point as he is, and as I am quite sure the corporation would also be, if they were animated by the same spirit as himself. But this is not the first question—in respect to which it has been proved to be true that continued perseverance must be successful (Hear, hear). Let me observe that that powerful voice, which will at all times support any agitation which is based upon justice—I mean the public voice—is raised on your behalf. You may rely upon it that you will have with you the voice of the metropolis; you will have with you the voice of all the inhabitants of large towns; and, further, you will have the united influence of those who desire to produce a change in the moral condition of those 700 drovers to whom allusion has been made. I do not blame the drovers and other persons in the same condition for their demoralization; it is my conviction that in ninety-nine cases out of one hundred other parties are to blame for the moral degradation into which such persons as the drovers are plunged. I contend that half the crimes which are committed in this country are the result of bad education and bad laws; and that many a man who goes to the gallows has not himself to blame so much as his parents or those who ought to have provided for his mental and moral wants (cheers). We must strive to improve the condition of this class of men. I myself have heard the drovers use language of the most shocking description; and this evil will never be cured so long as they are allowed to exercise their violence to vent their wrathful passion on the unfortunate animals, driven to and fro in crowded thoroughfares; and when not occupied in their calling, to congregate together in masses, as they do in the neighbourhood of Smithfield, and back each other up in expressions and conduct degrading to human nature. I hope, gentlemen, that you will persevere in this matter; and it is my conviction that if you do so, ere long—much sooner than Mr. Burrell imagines—you will succeed, and I am sanguine enough to believe that Mr. Burrell himself will yet become one of the most active parties to getting rid of this monster nuisance (Hear, hear).

MR. ANDERTON wished it to be perfectly understood that he gave no opinion either for or against the removal of the market. He had come there merely for the pur-

pose of listening. He wished to draw the attention of the club to one circumstance, viz., that if the corporation of London were to be guided by numbers, it would be found that the majority at present were not opposed to, but in favour of the continuation of the market. A petition had been presented a short time ago, not from hundreds merely, but from thousands of the graziers who frequented the market. Therefore, so far as the corporation of London were concerned, he must say that they had before them the fact that there was a very considerable majority at present in favour of continuing the market.

Mr. WOOD said he had waited to see what course the debate would take, and whether or not there was anyone in favour of continuing the market; and he could not help observing that those gentlemen who had so eloquently addressed the meeting in favour of the removal, came from the north (laughter). He had had a great deal of experience with respect to the effect of altering the time or place for holding markets; and he knew that very great loss was always occasioned to many parties by any change. Whatever might be determined upon, he hoped that they would not spoil one good market in order to have two bad ones. He did not at all concur in Mr. Anderson's observation that it might be desirable to have three or four markets; nor did he think that such an arrangement would tend to benefit the graziers. Now what they had really to consider was, the interest of the tenant farmer in this matter. There was, he was aware, a great deal of declamation with respect to the opinions and feelings of the public on that question. He, for one, would never be led by the press (Hear, hear). He rather wished that the press would be led by the public (laughter); but he knew very well that that was not always the case in this country at the present time (laughter). The press did its duty in repeating to the public what passed on different occasions; but when it attempted to lead the public, he could not help saying that what appeared in newspapers was only the opinion of one person, or of a few private individuals who were utterly incompetent to lead the public. Now many remarks had been made with respect to the opposition of the salesmen of Smithfield market. He thought it not impossible that there might be combination on the part of these persons. It was in the nature of things that there should be such combination: it was to be expected that parties placed in the position in which the salesmen were placed would endeavour to play into each other's hands. But as to the graziers becoming salesmen themselves, he thought that would be one of the worst sort of monopolies. There was no monopoly to which he was so much opposed as that of one man's carrying on two trades. For the farmer to be compelled to come up to London to sell his own beasts would be contrary to the doctrine of political economy, which taught that a division of labour was advantageous to all parties. The grazier should be left to employ all his energies in the production of what he had to dispose of, and not be placed in the position of salesman. He was surprised that Mr. Shaw should have appeared to be in favour of taking the

farmer's energies from his own proper business. It must be remembered that it was a great advantage to have a great number of customers competing for what was offered to them; and though he was willing to admit that the number of carcass butchers might increase, yet the demand would not be so great as to prevent the trade from being confined to the lands of a few carcass butchers; a circumstance which would be altogether injurious to the interests of those who sent their beasts to the London market. He quite agreed with those gentlemen who objected to the desecration of the sabbath. It was evident that under the present system the cattle must be driven on the Sunday, and a great many persons must be occupied on that day who might be set at liberty by an alteration of the days. At all events the question of site was quite distinct from the question of the day on which the market should be held; and with regard to the former, he had always understood that if there was any deficiency of accommodation the corporation would provide what was required. The first point was to have the market held in as central a place as possible, and it could not be doubted that Smithfield was the most central place that could be selected. It might be an advantage to those gentlemen who lived in the north to have the market held at Islington, but that would certainly be injurious to gentlemen who had the misfortune to live in the south; and he had observed, he repeated, that all the gentlemen who advocated the removal did, in fact, come from the north. As to the moral condition of the drovers, and their backwardness in point of civilization, he did not see how that could be effected by a change of locality; if the market were removed, the drovers would still be subject to the same influences as they were at present. Something had been said about the danger of knocking down old women, and similar events; but that danger would equally exist elsewhere. On the question of nuisance he must say that the law on that subject was very just, viz., that if a party came to a nuisance it was no nuisance at all; in order that anything might be a nuisance, it was necessary that it should be brought to him. As regarded our notion of the banks, he thought the argument on that subject was very strong indeed in favour of the continuance of Smithfield. On the whole he did not think a case had been made out for the removal of the present site.

Mr. BROWN suggested that two markets should be held in the course of the week. When Smithfield market was originated, the population was not more than one fourth of its present amount; and he would suggest that it had now become desirable to have two markets, one for the north and the other for the south; Tuesday and Friday being the days which he should prefer.

Mr. HUDSON said that with regard to the proposal to change the day from Monday to Tuesday, he did not think that even a change to one day later would obviate the objection as to sabbath desecration in all cases; it would still exist in the case of parties living at a great distance from the metropolis.

Mr. BURRELL defended the salesmen from the imputations which had been cast upon them, and said they did not desire anything which was inconsistent with the

interests of the graziers. He must say that there was as much honour and integrity amongst that class as in that room.

The CHAIRMAN then said: Gentlemen, I purposely abstained at the commencement of the discussion from giving you my opinions with regard to the removal of Smithfield market, but they are well known to many of my friends, and I now consider it my duty to convey them to the public. It is well known that many years ago, when our lamented friend Mr. Handley took an active part in this question, I was very active in assisting him; my opinions have, therefore, long been formed. I have always considered that the nuisance created by Smithfield market, the cruelty practised towards the animals, and the degradation to the City of such scenes taking place within it, required that the market should be removed, and I am very much pleased to find that the opinion expressed by so many farmers this day coincides with my own. With regard to the alteration of the day from Monday to Tuesday, my friend, Mr. Smith, knows that I told him a long time ago, that I considered it to be the wish of this Club and the farmers generally to alter the day, and I cannot but agree with Mr. Hudson, that the alteration from Monday to Tuesday will have a very beneficial effect. Perhaps in some parts of the country it might still be necessary to drive the animals on Sunday, but I think the railway companies would be willing to assist us, and instead of conveying the cattle by night-trains, would send them in the day, if that were necessary to prevent the desecration of the sabbath. I was much pleased to hear the remark of a worthy member of the corporation, that the corporation were ready to assist in altering the day, and also to learn from Mr. Burrell that the salesmen themselves would join with us in effecting that alteration. I do think that after the expression of opinion which has been heard in this meeting—a meeting which is certainly not an unimportant one as regards those who compose it, for I see present some of the leading graziers from various parts of the kingdom—I do think that that expression of opinion will be responded to throughout the country (Hear, hear). I expected to hear more remarks than have been made with regard to the loss occasioned to animals from their being driven to the present market. In some evidence given before a committee of the House of Commons some years ago, the loss arising from the injury which animals received in their transit from the country to Smithfield market was calculated at nearly one-eighth. Now, if any means could be devised whereby the animals could go at once from the railway into their layers—and I do not think that altogether impossible—it would be a great public benefit, because the meat would be in a much better condition, and the public would have a greater quantity of it. Mr. Anderson, the Duke of Bedford's steward, has stated to us that he did not know his own stock in Smithfield. I hope you will not forget that fact. I think that on various grounds—on account of the cruelty to animals, the desecration of the sabbath, the necessity of an increased supply of provisions for the consumer—we should, as a practical body, use our

utmost exertions to effect the removal of Smithfield market. Mr. Burrell stated that the salesmen cannot trust each other. I was very much surprised to hear him admit that; and I can only couple that with another statement which he made, viz., that the drovers are as much refined as the graziers themselves (laughter). Gentlemen, I for one consider that the days of Smithfield market are numbered, and I believe that the matter now rests with ourselves. Mr. Burrell, indeed, stated that there were numerous petitions from the country in favour of the old market. I am well aware that the salesmen of the old market have distributed petitions throughout the country. Last week a leading London salesman asked me to head a petition in favour of the old market. I replied that I had been for some years past an advocate for the removal; and I further told him that I felt persuaded that four or five farmers, at least, in the neighbourhood would support a petition in favour of the new market. He said his opinion was not so strongly in favour of the old market as it had been, and that he thought that if the feeling of the country were generally expressed in favour of the new market, he himself should be disposed to give it his support. Now I can state, with perfect confidence, knowing as I do the graziers of the kingdom, that four-fifths of them are decidedly opposed to the present locality; and if this club will only send petitions into the country in favour of the new market, I feel persuaded that we shall have an overwhelming majority. I trust that the resolution which you adopt this evening will be such as to confirm me in my opinion.

Mr. SHAW proposed the following resolution:—  
“That the removal of the cattle market from Smithfield is highly desirable.”

Mr. BROWN seconded the resolution, which was carried.

Mr. SHAW then moved the following resolution:—  
“That a change of the day on which Smithfield market is now held, from Monday to Tuesday, is highly desirable.”

Mr. NEAME seconded the resolution, which was carried unanimously. The meeting then broke up.

**CULTIVATION OF THE LETTUCE.**—Mr. Forsyth, gardener to the Earl of Shrewsbury, at Alton Towers, tells us that in that country *boiled* lettuce is a common dish, and recommends an improved mode of cultivation, by which four crops a-year shall be regularly secured. He says—“Any lettuce will grow freely in the open garden after the 22nd of March; in any rich garden soil four seeds in a square foot are sufficient: three crops in summer, off the same land, may easily be got, and if persons will go to the expence or trouble of transplanting lettuce many crops may be had; and as four will grow upon a square foot, and weigh, when young, half a pound each, every square yard of soil will produce, in the three crops in the season, half a cwt., which is 15 cwt. to the pole of ground, or 120 tons to the acre.”

## ON THE CULTIVATION OF CARROTS.

STR.—As I am frequently applied to by neighbouring farmers for information on the subject of cultivating carrots, I have determined on soliciting a space in your excellent journal for the purpose of disseminating as widely as possible the result of my practical and hitherto successful experience, having for five years grown from four to six acres of white Belgian and other varieties of this useful and prolific root. Although I have been fortunate enough to produce from twenty-six to thirty-three tons of white, and twenty-two to twenty-six of red carrots per acre on light land, I do not pretend to show up my system as the very best that can be adopted, although I believe that it is one that may be depended upon for producing a full and regular plant, and, allowing for seasons and the degree of attention on the part of the cultivator, a very satisfactory result.

Presuming that carrots are intended to supply the place of turnips, the land should be thoroughly cleaned as soon as possible after the wheat crop is secured in the autumn. My plan is to pare it about four inches deep with the skeleton or the common patent plough with the plat removed, leaving the land cut clean but not turned over; then to scarify it athwart; following up this operation immediately with rough harrows until the soil is thoroughly pulverized, and everything in the shape of weeds brought to the surface, where, if the weather be favourable, it soon dies. As soon as I am satisfied on this point, I plough everything deep under, where it may remain until the time for sowing commences—namely, from the second week in March to the second week in April, according to the season. In March the ground should be again harrowed and rolled, to pulverize the surface, and then dressed with from thirty to forty bushels of soot and from nine to ten bushels of common salt per acre, either mixed before sowing or thrown one over the other. These manures should be deeply ploughed in, and the land immediately subsoiled to the depth of from ten to sixteen inches under the common furrow, the subsoil plough immediately following the common one. It may then be harrowed with fine harrows, followed by a light roller, when it will be ready for the final operation of drilling.

Very much depends upon the manner in which the seed is deposited. After various trials, and attentive observation, I have adopted the system of very shallow drilling, merely dropping the seed upon the surface, to be immediately harrowed in

with the lightest and finest seed-harrows. The great cause of failure in producing a regular plant is the improper preparation of the seed, and the want of a proper drill to deposit it when prepared. My method of preparing the seed is as follows:—Three weeks, or sometimes more, before the season commences, I steep it for twelve hours in a tub, with a sufficient quantity of water to saturate it completely; the water is then drained off by leaning the tub on one side, holding a wisp of straw at the edge so as to retain the seed, which, when drained, is mixed up with dry sand, half a bushel to every six pounds of seed. On this part of the operation success in drilling almost entirely depends. The wet seed should be mixed with dry sand, which, by the moisture retained in the seed, will soon become sufficiently damp to accelerate vegetation, being all that is required. While the mass is sufficiently moist to adhere by pressing it in the hand, it is quite wet enough. In this state it should be kept, turning it over every day or two, and slightly sprinkling it now and then, to prevent its becoming too dry. Both extremes must be carefully provided against. If too wet, it will damp the whole mass of ashes, with which it must be finally mixed up; if too dry, vegetation will be checked instead of promoted, and that, too, at a very critical period. It now remains to describe the method of drilling; and, considering that few farmers are in possession of a suitable machine for the purpose, this is the most difficult part of the process. The machine I use for carrots is a one-horse manure-and-turnip-drill, having a barrel fitted with corn-cups to go in the place of the common manure-barrel, taking the seed from the manure-box. I have also a set of light, hammered-iron coulters to work in the place of the usual heavy cast ones, which make a very shallow crease of about 1½ inches wide, the seed falling through the large manure-spouts, forming a regularly-dispersed drill of the same width. If the common corn-drill be used, the seeds should merely fall upon the surface, instead of being crammed together in a narrow grip, from which, after the first hoeing into bunches, they could not be picked without injuring the tender fibres of each other. Having directed every six pounds of seed to be mixed with half a bushel of sand, every half-bushel will be found after steeping about equal to a whole one, which, allowing the drill to deposit three bushels per acre, will admit of two bushels of fine dry cinder-ashes to be added to the sand and seed for every acre.

When dry ashes are not to be procured, finely-sifted sawdust, very dry, will be found a good substitute. The distance I prefer is fourteen inches between the drills, and eight inches between the plants if red, or twelve inches if Belgian carrots. The Belgian are the best for rich loams, the Studley or James' green-top for sandy soils. It is a good plan to mix a portion of parsnip, turnip, or mustard-seed amongst the carrots, for the purpose of showing the drills before the young carrots become visible. When this plan is adopted, hoeing may be commenced very early, which is a grand desideratum. The expense of hoeing is about 30s., and that of digging up about 25s. per acre. My method of storing is merely to collect them into heaps of about five yards long and two yards wide in the field, two or three men or strong lads wheeling them up to the heaps, and children filling the barrows, while two other hands pack them in every respect the same as is usual with mangel-wurzel, except that no straw is requisite. Three inches of

soil is sufficient to protect them, the tops of the clamps being merely covered with carrot-tops to keep out the wet, which covering may be removed in about three weeks, and the clamp entirely closed with perfect safety. As soon as the leaves begin to turn yellow, the roots may be taken up, every two men laying the carrots neatly in a row between them, so that the children who follow may be enabled to cut off the tops without treading them under foot, laying them in small heaps, to be carted from the field and given to sheep, lean stock, or horses, in the yard. All stock are fond of, and will do well upon them, if kept clean and free from grit. Thanking you, Sir, for the space I have occupied in your journal, which I am aware is never more freely granted than in the cause of agriculture,

I remain, your obliged and obedient servant,

GEORGE JONES.

Marsham, 10th March, 1847.

—Norwich Mercury.

#### YORK FARMERS' CLUB.—CULTIVATION OF CHICORY.

At the March monthly meeting of the members of this club, the subject being "The cultivation of chicory as an exhausting plant," in the absence of H. S. Thompson, Esq., of Fairfield, the president, Mr. Hawking, of Linton-upon-Ouse, was called to the chair.

Mr. GRAVES, of Harton, introduced the question before the meeting, by stating that he was the means of having the subject brought under discussion. He was not at all acquainted with the cultivation of chicory, and he should not like to ask his landlord to allow him to grow the plant, unless he was perfectly satisfied that by so doing both parties would be benefited. The question, he thought, to be decided was, whether it would be advantageous or otherwise to grow chicory for a length of time, whether it would impoverish the land, and whether it would exhaust it after the growth of one crop.

The CHAIRMAN said he had no experience in this matter himself, and he had not paid much attention to it until that day fortnight, when he saw a field at Clifton, near York, in which the plant was cultivated. He went to a person who was graving up the chicory, and, after seeing the roots, he came to the conclusion that the plant was not more impoverishing (if as much) than the carrot crop itself, unless there was something deleterious in the root which might be pernicious to the growth of corn. Supposing that chicory was an impoverishing plant, yet with the extraordinary graving it

required, he thought the operation acted in a similar manner to subsoil ploughing, and therefore would prove beneficial to the roots of other plants. After the subject had been proposed for discussion, he had written to several parties relative to it, but had received no definite information. Some of them had told him that they had obtained equally as good crops after the growth of chicory as before, but all seemed to agree that to grow it to advantage it required an extraordinary amount of tillage. One gentleman had suggested twelve good cart loads of rotten manure per acre, in addition to hand tillage, and that if the manure were so applied the land would be as servicable for the next crop as if turnips or potatoes had been grown. Another gentleman had said that if from seven to ten tons per acre, according to the season, were applied on turnip land, after the turnips had been eaten off by the sheep, they might be able to receive a good crop of corn after that. One gentleman had told him, previous to coming to the meeting, that last year the crops of chicory had failed in many places; that individuals who had embarked their money in its growth had lost their capital; and, besides this, the land had become impoverished, and in a worse state for corn than before. He was, therefore, placed in some difficulty as to coming to a conclusion one way or the other, but he believed that chicory would produce no greater ill effects upon a succeeding crop than carrots. Two years ago he sowed some carrots upon an acre and a half of

land, and, to bring the land into good order, he, in the month of November, strewed upon each acre twenty loads of good rotten manure dug from the dunghill in the fold-yard, and after the carrots were taken up at the latter end of the year, the land was sown with wheat. The crop on that occasion he considered a defective one, taking into consideration the nature of the soil and the tillage which had been bestowed upon it. This showed that carrots impoverished the land. But with regard to chicory, he would observe that if the remuneration to be obtained by its growth was so great as had been stated, he was of opinion that land-agents and landowners ought not to debar the tenantry from growing it, because they would be enabled to purchase artificial tillage and the good manure of towns and make the land considerably richer by the extra growth of chicory than even by the corn crop itself. The agriculturists would also have the means of benefitting the poor around them by giving them employment; and the individual who gives additional employment to the poor, and spends his money in the cultivation of the soil, must feel an inward satisfaction at the good he is conferring upon his species, if even his profits merely cover the amount he has so expended. They ought to consider the benefits to be conferred upon the poor as well as their own interests (applause).

Mr. SMALLWOOD, of Middlethorpe, stated he had grown chicory for four successive years. The first year it was sown on a piece of land from which two crops had been taken, the land was ploughed twelve inches deep, and 3 cwt. of Peruvian guano per acre put upon it. A portion had applied to it rape dust, but he found guano answered his purpose the best. He had an excellent crop of chicory, and the land was afterwards sown with barley, previous to which he caused to be applied half a dozen loads of manure per acre. The crop produced last year six quarters and two bushels per acre, and weighed about thirty-two stones four pounds per quarter. He had grown both turnips and potatoes after chicory, and both had turned out excellent crops. The chairman had made allusion to the employment of the poor, and what he had to state on that point was that he had employed as many as from sixty to seventy persons a day for a month together in attending to his crops of chicory. He was at present employing eighteen hands in the same way. He had grown chicory as thick as his wrist, both upon light and strong clay land, the latter description, however, being lightened by mixing with it a quantity of sand. He did not think that chicory exhausted the land so much as a crop of turnips; and the ground for his stating this was that the tops, which grew to a very large size,

not being wanted, were suffered to remain on the land, to which, after having rotted and become a manure, it imparted a great deal of nourishment. With regard to turnips, however, the leaves could not be used for any such purpose. He considered that chicory produced no injury to the land, and his crop of corn, this year, after chicory, gave him ample satisfaction.

Mr. WHITE said that not having been able to meet with any chemical analysis of chicory, he had been obliged to make an analysis himself, and the result was that it contained, like turnips, an immense quantity of water. Chicory contained about seventy-six per cent. of water, of the organic elements about twenty-two and a half per cent., and of the inorganic one and a half per cent. So much for the proximate analysis. An ultimate analysis proved the existence of the phosphate, sulphate, and the hydrochlorate of potassa, with the hydrochlorate of lime. Now here at once they saw the chicory did not very much impoverish the land, and, as Mr. Smallwood had observed, as the leaves themselves were left on the land it could not possibly be so injurious as the turnip crop. He would go further (and his statements were made after careful reflection) by remarking that so far from being injurious, with a moderate amount of proper manure it became very useful to the land. From the depth to which the roots descended, viz., from twelve to twenty-four inches, they must, of necessity, act powerfully, in a mechanical point of view, to the soil. The very act of removing the plants would disturb the subsoil, and it was a question, therefore, whether as much good to the soil would not thereby be effected as by deep ploughing. They would bring to bear upon the surface of the soil those principles which were hid and buried underneath it. Still, however, it was a question whether the means employed by Mr. Smallwood were proper or not, and whether he might not have saved his money and improved his stock of chicory. Those plants which are required for their stem and leaves would always be best manured by those fertilizers which develop or give off ammonia the most rapidly. The ammonia acts immediately on the stem and leaf, and causes them to be extremely luxuriant. Those plants which were valuable for their ears, as the various species of corn—wheat, barley, oats, and rye—should have manure which less readily gives off ammonia; whilst such plants as the carrot, the turnip, mangold-wurtzel, and chicory, where the value depends nearly entirely upon the tuber or bulb, should not be manured with those fertilizers which give off ammonia, but those which impart the phosphates. There was a very considerable similarity between turnips and chicory, and in both he found lime and phosphorus



existing. Now, he would suggest that prepared bones, or the inferior spots of guano, such as that from Patagonia, Ichaboe, and Saldanha Bay, especially that from Saldanha Bay and Patagonia, would be the best manure for chicory. He would suggest that, as an experiment to any gentleman who might be desirous to grow chicory. The Chairman had alluded to what might be regarded as a popular error with respect to the growth of plants. A French philosopher, De Candolle, suggested some years ago that one plant became injurious to its own species; that is to say, that a plant would not grow so well two years together on the same soil, because it secreted some matter which was poisonous to itself or others of the same species. That error was nearly exploded; but it seemed that some faint glimmerings of it remained in the breast of the Chairman, who supposed that something might be given off, or secreted by, the roots of chicory which might be injurious to the succeeding plant. It was now, however, almost universally admitted that such was not the case. When the land is injured, it is injured by the removal or abstraction of certain principles required for the growth of plants, which cannot grow many years without injury to the land, because they remove the elements which each of the plants require. By a rotation of crops (and chicory, he thought, would make an excellent rotation in the course of seven, eight, nine, or ten years), the various principles were themselves taken out differing with each crop, and chicory would take out of the land principles that would be required by the turnip. He (Mr. White) had had some conversation with Mr. Foster, of Dunnington, on the subject, from whom he learned that inferior guano, such as he had mentioned, was useful in the cultivation of chicory (applause).

The CHAIRMAN, in allusion to what Mr. White had stated, observed that he thought chicory might be detrimental to the growth of green crops. Wheat never grew well after barley, nor after turnips or potatoes, unless they had an extra coat of manuring, and therefore he thought that chicory might, in some respects, have a detrimental effect on the roots of other crops.

Mr. SMALLWOOD stated that he had grown chicory in a field for two years together. He gave the land a good coat of manure after the first year, and the second crop was better than the first.

The CHAIRMAN said a gentleman had told him he had grown chicory in a field for twelve years together, and the last year the crop was the best that had ever been produced. He adopted the system of giving a good coat of manure.

Mr. WHITE said he would caution the farmers against the over-growth of chicory, as it was an

article for which they might not always secure a market. It might be employed to a limited extent, however, in the feeding of cattle, and it was employed in the Netherlands as a salad. It was sometimes grown in tubs on board ship as a salad, and it was also used in this country for the adulteration of coffee.

Mr. SMALLWOOD said horses were very fond of it, and, in reply to a question by Mr. White, he stated that his land had produced above twelve tons of chicory per acre.

The following resolution was then agreed to:—  
“That, in the opinion of this meeting, so far from chicory being an exhausting crop, it is beneficial to land when properly cultivated.”

The period usually allotted for discussion not having expired, whilst the discussion itself appeared exhausted, Mr. WHITE begged to be allowed to correct an error into which Mr. Pusey, M.P., had fallen, relative to the formation of superphosphate of lime. This gentleman, distinguished alike for his talents and his exertions in the cause of agriculture, had recently cautioned the farmers against purchasing the fertilizer in question of any manufacturer save one, as many adulterated articles were in the market. Unhappily this allegation was too true and greatly to be regretted. But in justice to the numerous manufacturers of superphosphate of lime, it should be observed that the hon. gentleman had drawn his conclusion of the extent of sophistication from incorrect premises, viz., the existence of large quantities of sulphate of lime in the compound. Now it was an incontrovertible fact (as he, Mr. White, had shown in a tabular form in his last lecture to the members of the club) that one, and an important result of the action of sulphuric acid upon bones, was the *formation* of a large quantity of *sulphate of lime*, together with the superphosphate of lime—a more soluble salt than that naturally existing in bone, the phosphate; this more ready solubility rendering the composition more immediately available to the growth of the turnip crop than the unprepared bones.

Mr. SMALLWOOD inquired what benefit the land would derive from the application of salt?

Mr. WHITE replied it would act beneficially by a disengagement of chlorine, an important constituent in vegetation.

The CHAIRMAN said he had found salt a very serviceable tillage for the barley crop, especially if the land had not had much lime before.

Mr. WHITE observed that it would be in the recollection of many gentlemen present, that upon the occasion of the discussion respecting the potato disease, the value of rough sulphate of magnesia, as a top-dressing for this plant, was insisted upon. He now would call the attention of the gentlemen

present to an article which appeared in the current number of the Highland Society's Journal, by P. F. H. Fromberg, and for which a premium of fifty sovereigns had been awarded by the Agricultural Association of Scotland, upon the chemical changes induced in the potato by the disease; in which it is clearly shown, that in proportion to the amount of disease is the decrease in the proportions of sulphuric acid and potash, and the increase of phosphoric acid; and that the substances which

ought to be present in the potato manure are as follow:—Potash, 1180lbs.; magnesia, 87lbs.; soda, 87lbs.; lime, 50lbs.; sulphuric acid, 416lbs.; phosphoric acid, 235lbs.; chlorine, 195lbs. per ton. Many of these, as his (Mr. White's analysis had proved), are found in the compound known as rough sulphate of magnesia, which is the residuum of the preparation of alum.

A vote of thanks was given to the Chairman, and the meeting separated.

## SCOTCH FARMING.

TO THE EDITOR OF THE FARMER'S MAGAZINE.

SIR,—There are some points in the letter of Mr. Hews, in your number for April (though containing some things correct and useful), which are calculated to mislead many an English farmer as well as landlord. With Mr. H., I have myself admired the beauties of Scotch farming, and fully bear him out as to the uniformity of good husbandry throughout the counties he has named. No one interested in agriculture can fail to be instructed and profited by an acquaintance with their systematic, intelligent, and economical practices; but when Mr. H. goes on to state that the farmers not only pay, but thrive upon rents of from £3 10s. to £7 per acre, and attributes their success to heavy crops, skilful cultivation, economy of management, thorough draining, long leases, &c., and wishes to introduce those high rents and high profits into England, he should state the superior advantages which our northern brethren have in the disposal of their crops, which we do not possess in England. The system of cropping does not vary materially from the best cultivated districts here, *i. e.*, the alternate white and green crop system; if any deviation takes place with them, it is not, perhaps, as with us, in favour of white crops, but in favour of the green—their temptation lies on that side, but ours in favour of the white, because the green crop to them is the most marketable and the most profitable too. In the Highlands of Scotland it is not uncommon to see a farmer possessing from 10,000 to 20,000 sheep without comparatively (perhaps not) any arable land at all. Again, it is not uncommon to see a farm of from 600 to 1,000 acres all arable, and with the green crop prevailing (perhaps in more than the average of farms in the Lowlands or Lothians it does so prevail), without a single sheep or head of cattle, save horses. Now comes the secret of Scotch rents and Scotch profits; the Lowland

farmer, with 150 or 200 acres of turnips, has his annual "roup" or auction sale, which is well attended by the Highland shepherds, or the "Border" cattle dealers; and he realizes, without further risk or trouble, from £15 to £30 per acre for his green crops, all to be folded at stated intervals, or housed on the premises—thus deriving all the profit as well as all the advantages of green cropping, and thus concentrating all his capital, his time, and attention, to the sole object of raising crops only. Will Mr. H., or any of his "intelligent" neighbours (for I know he has *some*), situated too as he is in one of the richest localities of that beautiful county, which has been justly styled the "Garden of England," with all the advantages of the best breed of cattle, and the most unrivalled sheep as to their fattening propensities—will any one tell us, however skilfully or economically he may have raised 100 acres of the best turnips his county will produce, that he can realize in *money*, by the rearing of his stock, profits equal to £15 or £20 per acre annually, independent of the portion folded for the benefit of his next white crop; or, supposing that all the sheep and cattle within an area of twenty miles around Exeter were to be annihilated, would the amount of turnips raised in that space command a market, or realize a sum per acre equal to that so readily obtained in Scotland? The only district to be found to require any assistance would be perhaps the north of Devon; and even there, if I mistake not, there is cultivable land enough to raise green crops sufficient to winter all they can breed on their poor and uncultivable pastures, which is not the case with the immense tracts of mountain Highland.

Believe me, sir, yours very truly,

E. BURNELL.

Hanham, near Bristol, April 28.

## ON THE ADVANTAGES AND DISADVANTAGES OF BREAKING UP GRASS LAND.

BY JOHN CLARKE, OF LONG SUTTON, LINCOLNSHIRE.

The great and benevolent idea suggested by this subject, the conversion of grass lands into tillage, is the extent of the provision to be made for the food and employment of the rapidly-increasing population of this country.

It is necessarily incumbent on the producer, the landowner, and the occupier to exert every energy to make the soil productive; and they conjointly are in duty bound to do so, even to the very utmost of its capability. The landlord ought to give every reasonable facility to this end, and the tenant must not be niggardly in his expenditure to promote improvements in its culture. As it is his duty, so is it to his advantage; nothing pays him so well as a judicious application of his capital to the soil he cultivates. Land must be kept in a good state of culture, or certain loss ensues; bad farming is ruinous to landlord and tenant; capital must be liberally expended to bring liberal returns—productive, remunerating crops. By this course the tenant is continually creating property in the soil by his own capital; and his landlord ought to afford him every encouragement for this purpose, and every opportunity to secure a favourable return for his outlay. This happily, in the present day, is the case: the understanding between landlord and tenant has become one of mutual good feeling; and vast improvements have been the result, and are still progressing. One amongst the many laudable efforts now making for the benefit of agriculture is the attempt to abolish the old prejudices relative to breaking up grass lands: these ignorant prejudices have long been the burthen and bane of every lease, of every old covenant, and they must be abandoned; for few deviations from obsolete practice can be so beneficial as the conversion of inferior pasture lands to tillage, and indeed, for special uses, it may be desirable to include some of the very best grazing fields. These, however, as a whole, are so valuable under pasture that but few inducements can be offered of sufficient importance to warrant their being so broken up. The question, however, may be asked, What is inferior grass land, or land of medium quality? In this neighbourhood every acre that will not fatten a well-bred sheep, of any breed, is inferior grass land; and every acre that will fatten such a sheep, but not a well-bred ox, is merely land of medium quality; land of

good quality, or “good meadow or grazing ground,” will fatten either.

*The Advantages of breaking up Grass Lands.*

There can scarcely remain a doubt respecting the propriety or profit of such a course; the advantages are so many and great, and the disadvantages so few. All lands of medium or even inferior quality will produce, under proper management, more animal food for man, and yield a good crop of corn alternately into the bargain. Nearly all these lands will produce more profit under arable culture, if confined simply to grow food for cattle, sheep, &c., than when under pasture; for such is the extraordinary growth of the best artificial grasses, and the many varieties of edible and esculent roots, that a far, very far, greater abundance of food, suited to every season of the year, might be thus produced, than could be grown spontaneously from the natural grasses, and of a more nutritious and fattening character. This practice, however, is not adopted, because the alternate course of husbandry is so much to be preferred. Land of this quality will not graze, to say nothing of fattening, more than from three to four sheep per acre, taking the whole year into account. But break that land up, pare it thin, and burn in the month of June; having taken part of the summer's grass, spread the ashes evenly, plough, and sow with rape or turnips; and it will be found that the first year's produce will yield food of exceedingly nutritive quality, capable of fattening twelve sheep per acre—that is, it will readily keep ten sheep, weighing from 20 to 24lbs. per quarter, for sixteen weeks. And the condition of this land may be easily kept up, if necessary; but in this state being too rich for wheat, it may be reduced by other cropping, as in the Lothians, by taking oats, two crops being taken successively, if requisite. If an alternate course is pursued, such as taking oats, clover, wheat, and fallow well manured for turnips or rape, then it might with common attention go on without limitation as to time, producing more food for stock than it did under grass. At the same time, crops of grain for the public good being the main object, it becomes worthy of consideration as to how far this should be carried out.

Unquestionably some of the best grazing-lands,

possessing a deep, open, friable loam, make astonishingly good arable lands, yielding excellent crops of corn for many years in succession, and if kept clean and properly manured, would rarely, if ever, require a fallow or fallow crop for feeding. In proof of this assertion, the following extract from the *Tithe Book* kept by the lessees of the tithes in the parish of Long Sutton, Lincolnshire, will show the course of cropping pursued for twenty years, in a small field of about four acres, without diminishing its fertility, so long as it was supplied with manure. This field the writer saw broken up; it has been under his observation throughout; and the crops have been uniformly good, and the mustard and wheat-crops splendid. The land naturally was never considered first-rate, but being for the most part of the term in the occupation of a veterinary surgeon, it was supplied with stable dung. It was broken up from grass in 1826, and has borne cropping as follows:—

1826.	1827.	1828.	1829.
Mustard.	Mustard.	Mustard.	Mustard.
1830.	1831.	1832.	1833.
Wheat.	Mustard.	Mustard.	Mustard.
1834.	1835.		
Mustard.	Potatoes.		
1836.	1837.	1838.	
Half wheat, half potatoes.	Half wheat, half potatoes.	Half wheat, half potatoes.	
1839.	1840.	1841.	
Half wheat, half potatoes.	Half wheat, half potatoes.	Half wheat, half potatoes.	
1842.	1843.		
Half wheat, half potatoes.	Half beans, half potatoes.		
1844.	1845.		
Wheat.	Potatoes.		

The mustard was the brown variety, and allowed to seed, which is so far thought to be exhausting that no landlord will permit it to be taken. The field is still undergoing the same course of crops.

The profitable production of food for man being the grand and ultimate object in agriculture, the conversion of such lands into tillage would easily and readily be compensated by the *hovel, the hammel, or fold-yard mode of soiling or feeding*; part of the food thus fed being grown on the arable lands, such as clovers, seeds, &c., aids them in their course; there, the artificial grasses, are produced in greater bulk and abundance than the natural grasses; thus more food is obtained, it causes much profitable labour, the animals thrive faster, large quantities of manure are made to be returned to the lands, so that good results in every way.

The somewhat novel but certainly beneficial mode of fattening cattle, sheep, &c., on grass seeds by help of linseed cake has already in a great degree

superseded the most valuable uses to which the best summer-fed pastures were commonly applied, *i. e.* to provide a supply of meat in the months of June and July, just in the intermediate time when the turnip-fed stock ceases, and before the general run of grazing lands yield their return. Latterly this summer grazing has been comparatively unprofitable, the cake-fed animals on clovers, grass-seeds, and the like, having come into competition with it.

On these grounds it might be seen that the best lands might, without detriment to the public welfare, be appropriated to arable culture. They would, in fact, be far more beneficial under tillage. It is land of this quality which is so much sought after by woadmen, chiccory growers, peppermint distillers; and for such uses the deeper the loam the better. For these purposes, in this neighbourhood, land will frequently fetch from £7 to £12 per acre for a term of years. The rent is certainly high, but as these crops exhaust without yielding manure, the wisdom here displayed is of a problematical character.

#### *Disadvantages of Breaking up Grass Land.*

These are comparatively few. It would be disadvantageous to break up those lands certainly of first quality, possessing a good deep loam, but resting on a subsoil of heavy clay. These heavy loams do not make first-rate arable lands, but in mild and showery seasons are equal to any as pasture-grounds, carrying an abundance of stock which thrive and fatten exceedingly fast: such should remain under grass.

There are many lands, though not of first quality, yet possessing a sweet nutritive herbage well adapted to the rearing of young stock. Where such are attached to breeding or dairy farms, the proprietor ought to pause before he grants permission to break them up. Even inferior lands situate near the larger town, or wherever required for convenience or special uses, ought to remain in pasture. All the mountain pastures, the cold clay uplands, and low swampy valleys, which, under ordinary circumstances, will not, from their local situation, pay the extra expense of tillage, must be left in grass—not, however, to be neglected, but to be drained and improved as much as possible. Where the locality is favourable, where they can be reached with facility, all the inferior soils will pay best under culture; and if not required for any specific purpose, they ought undoubtedly to be broken up, as being better for the labourer, the farmer, the landlord, and the public.

*The Labourer.*—To the labourer the breaking up grass lands is of especial advantage, as affording vastly extended means of employment. In the commonest process of breaking up grass land

much labour is unavoidably expended. It is indispensable to good culture that it be thoroughly underdrained: this must be effected prior to its conversion into tillage. Every useless hedge, crooked fence, old pollard trees, bushes, furze, or other obstructions, should be removed; every inequality of surface levelled down, and hollow filled up, so that the ploughs may work steadily. On many lands it is necessary to adopt the paring and burning mode of breaking up. These, and many other little preparations, are general upon turning pasture land into tillage. The great advantage, however, is in the regular daily labour to

be done throughout the year. This will cost upon an average, as shown by the annexed table, from 42s. to 65s. per acre; and is incurred in the various operations connected with arable culture, which, compared with land under grass, is in favour of the labourer as about 4s. to 50s. per acre, or nearly £1,200 per cent. more is expended on arable than pasture land.

For labour expended in shepherding (including sheep-shearing and care of wool), weeding, &c., an acre of grass land, will not exceed an average of 4s.; but the labour expended on an acre of arable land will be as follows:—

	Wheat.		Spring Corn.		Fallows.	
	£	s. d.	£	s. d.	£	s. d.
To manual labour in ploughing, per acre .....	0	2 0	0	2 0	0	9 0
Do. Harrowing, scarifying, and drilling .....	0	2 6	0	2 6	0	10 6
Do. Hoeing, draining, tending, weeding .....	0	6 6	0	6 6	0	13 6
Do. Harvesting, including the cutting, stacking, carting of corn crops, and the drawing, leading, cutting, and carrying out turnip crops.....	0	15 6	0	17 0	0	18 6
Do. Leading to barn, thrashing, dressing, and delivering to merchant .....	0	12 6	0	11 6		
Do. Fallow management, including manure loading and spreading on land, picking, and twitching....		....		....	0	10 0
For sundry labour in hedging, ditching, shepherding, &c., &c.	0	2 6	0	2 6	0	3 6
	2	1 6	2	2 0	3	5 0

		£	s.	d.	
Labour expended in	Wheat crop is	2	1	6	per acre.
Do.	Spring crop	2	2	0	do.
Do.	Fallow and crop	3	5	0	do.

The labour laid out upon arable land, then, is about twelve times more than is expended on pasture lands, so that it is surprisingly to the advantage of the labourer as a means of profitable employment; but it is also of great advantage to the farmer.

*The Farmer.*—To the farmer it is also of great, though not equal, advantage. Inferior grass lands will yield him adequate returns under good culture; but the better the land, the greater the benefit. Tillage lands are managed with less capital, and are more productive. Land that will graze four sheep per acre will, under good tillage, yield four quarters of wheat per acre, or eight quarters of oats, or six quarters of barley, every fourth year in rotation; and in the alternate years it will feed, first, on rape or turnips, ten sheep per acre, and on clover or grass seeds nine or even ten sheep per acre; but suppose this land will feed upon the average sixteen sheep per acre in four years on grass, it is evident that, under proper culture, it will feed the same number in two years, and in the other

two alternate years produce the crops of grain, so that the farmer produces as much mutton in the four years, and has his two crops of corn into pocket, excepting the difference in the cost of labour, and wear and tear of his implements. It is the practice of one farmer in the writer's neighbourhood to seed down without a crop: his custom is to fallow. After well working and clearing his land till the latter end of July, and having obtained a fine tilth, he then sows 1 sack ryegrass, 14lbs. white clover, 2lbs. parsley. In September it is forward enough to stock, when a moderate number of sheep are turned in for a few weeks. It is rested in winter, and in the spring he usually grazes from ten to sixteen sheep per acre, nearly all of which he sends fatted to market during the summer. This it will accomplish for two years, having a slight coat of dung the second winter. The soil is a sandy or silty loam of poor quality. What can inferior grass land do to this? The writer of these pages broke up, in the year 1830, a small field of seven acres, old, worn-out meadow, the produce

averaging not more than three-quarters of a ton of hay per acre. The following is the course of cropping since that time; and the crops uniformly good, except the beans of 1842. In the year 1832 the wheat yielded 56 bushels per acre:—

1830.	1831.	1832.	1833.
Oats.	Oats.	Wheat.	Beans.
1834.	1835.	1836.	1837.
Wheat.	Peas and beans.	Wheat.	Barley.
1838.	1839.	1840.	1841.
Clover.	Wheat.	Swedes	Wheat.
(27 tons per acre).			
1842.	1843.	1844.	1845.
Beans.	Wheat.	Barley.	Peas.
1846.			
Wheat, looking beautifully.			

And this very heavy course was pursued, with the best results, upon a piece of poor, exhausted grass land, the soil an alluvial loam of mild texture. Its fertility has been kept up by repeated but moderate supplies of manure, and thorough cultivation upon every returning season. Another field of twelve acres, in the writer's occupation, was broken up in the year 1831, and a still heavier course of crops taken, but without exhaustion; and at the present time it is fully capable of sustaining a similar course, with the usual adjuncts of good management and good dung.

A large breadth of land of medium quality, near the writer's residence, has within the past few years been broken up. The tenants, when under grass, stocked them thus:—In one case, five hoggets per acre, and a young steer to five acres, and in the winter one shearing per acre; in another case, two ewes suckling lambs, and two hoggets per acre, and a young steer to three acres; in other cases the same or very similar courses were pursued, the land carrying about one sheep per acre in winter. These lands have been broken up and planted with potatoes the first year. The labour expended in the setting and lifting these crops has been great, but the produce has abundantly repaid the outlay, the crops averaging from 350 to 600 bushels per acre of regents and other not very prolific, but very marketable, varieties. These have been followed with wheat, which course, under ordinary care, may be thrice repeated. Inferior grass lands cannot do anything in comparison! The return upon grazing such land is trifling, but the profit under culture is ample; and they can with comparative ease be kept up to the mark, or in truly good heart, as already shown, and must in this state be worth more to rent as arable than as pasture lands. By adopting the usual course of seeding, they may be made to produce *much more* animal food for the consumption of the public than before. Lands of first-rate quality pay still better. The crops of

brown mustard are frequently very valuable; and though the price is fickle—having varied, within the writer's recollection, from 8s. to 50s. per bush.—yet it is good policy on these lands to take a crop or more previous to wheat, which usually succeeds it, and often repeated to an incredible extent. The writer can point out several fields which have had three, four, and one as high as six crops of wheat in succession;\* he in one instance had two crops successively, averaging forty-six bushels per acre, and many similar facts might be mentioned, and these have continued under cropping without in any great degree impairing the fertility of the soil; indeed, after taking *woad*, it is a common practice to keep on cropping for many years, only varying the rotation, and with excessive yields. Lands of this quality can readily be replenished, and their productive powers kept up.

It is, in fact, impossible to prescribe bounds to the productive powers or capabilities of such soils, if kept clean, properly cultivated, and supplied with dung. It is an important inquiry whether such lands should, under any circumstances, remain under grass. They are exceedingly valuable as pasture, but under culture far more so; and the expense of labour in cultivation being by no means excessive, a great amount of food is produced at a small cost to the farmer. It is objected that these lands, being capable of producing so much animal food, ought not to be disturbed. The converse of this is, however, the case; the better the land, the greater the produce under arable culture. It might be shown very readily that, if such lands were merely and solely devoted to the growth of the best artificial grasses, and these mown and given to cattle or sheep in *hamnels* or *byres*, the result or proof in weight of beef and mutton would be quadrupled, and the manure thus made would keep it in fertility. It must be remembered that the lands here alluded to are the deep, open loams, not the loamy clays; these may probably be best under pasture, but the deep, friable loams ought to be brought into cultivation, and would in such way best pay the tenant, and yield a higher rent to the landlord.

In respect to the *very poor* or *inferior grass lands*, it may be questionable how far they will pay for cultivation. That they are of but little value under grass is very certain. The cold and wet mountain pastures, and low, swampy valleys or lands incapable of efficient drainage, cannot be brought into profitable culture; but the cold, heavy, and thin clays, moor-lands, and heath-lands, &c., will, under the alternate course of hus-

\* One field has sustained forty-five years' cropping without a fallow or fallow-crop.

bandry, be most profitable to the farmer, supposing their locality easily accessible. The heath-lands of Lincolnshire, which are synonymous with the down-lands of the southern counties, have, by judicious cultivation, become some of the most productive in the kingdom. One recently brought into cultivation (Welby-warren, near Grantham) is now producing beautiful crops of turnips, barley, seeds, and wheat.

Cold clays will produce remunerative crops under proper rotations and good drainage. The farmer will find it to his advantage to cultivate such, rather than continue them under grass, and he can command the necessary aid to render them productive, which is chiefly through pulverization and the due application of rape-cake, or other artificial manures. The late Lord Leicester's property in East Norfolk was of very little value before he commenced its improvement; it let for about 2s. 6d. to 7s. per acre; nearly all its productive powers have been supplied by its spirited cultivators, who have succeeded in making it one of the finest estates in the country. The soil is nearly all a sandy loam. If, then, soils of such poor and varied character can be cultivated with advantage to "the farmer"—the tenant—it must of necessity be of advantage to the landlord.

*Landlord.*—The landlord must unquestionably be benefited whenever it is requisite for good culture to supply the land with artificial aids, either in management or manures. All inferior soils require these aids, and being thus improved by culture, will always command an equivalent rent. It is solely in lands of first-rate quality that a landlord can suffer loss. Such lands, instead of requiring aid, require exhausting in some degree, when broken up, before they can be truly profitable as corn lands; the straw, being too luxuriant, will lodge and prevent the grain from properly filling; but the loss in this case is not in rent. Land of this quality will always, if in proper culture, be worth as much to rent; the loss is in the fee-simple; it is not so valuable for sale as when under grass, but if the extraordinary demand for such land for purposes already named, as for woad, chicory, &c., is taken into account, and for such uses fetching so high a rent, it will at once appear that the landlord in this case is also benefited by permitting it to be broken up; the landlord, then, as well as the farmer, is advantaged by the change, and the public shares in the arrangements.

*The Public.*—That it is of advantage to the public there cannot be a doubt, from the large supply brought to market. The necessity incumbent on the farmer to keep his land up to the mark, in order that he may be able to produce his crops in the highest state of perfection, will always prevent

its impoverishment; and the farmer must do it; he must farm well to secure a profitable return; this is an unequivocal axiom in agriculture; no apprehensions need arise on this ground.

It is almost superfluous to attempt to show a fact so self-evident as that land under culture will produce more food for man than in its natural state. It has been so from the time of Adam, to whom it was said, "In the sweat of thy face shalt thou eat bread," to the present. It was proved by the late Board of Agriculture, in the year 1801, in obedience to a requisition from the House of Lords. The Board ascertained that an acre of *clover, rape, tares, turnips, cabbages, or potatoes* will produce at least twice as much food as the same acre under grass of medium quality, and that the same acre would maintain at least as much stock as when under grass, besides producing every alternate year a valuable crop of corn and straw for the consumption of the cattle. An acre of land of first-rate quality, feeding or grazing the usual number of cattle and sheep, will produce in one year a return of about £6 per acre, *i. e.*, it will fatten 9 oxen of 60 stones each upon 8 acres; and allowing an increase of 12 stones each, equal to 13½ stones per acre, will, at 7s. per stone, leave a return of £4 14s. 6d. in beef, to which add the value of mutton and wool made during autumn and winter, from 2 sheep per acre at 12s. 9d. each; total £6 per acre, which estimate would, upon a yearly general average, be considered high. An acre of the best grazing land will produce then 13½ stones of beef, and 1½ stone of mutton, and 5 lbs. of wool, of the total value of £6 per acre. If the same acre of land is converted into tillage, it will produce 12 tons of potatoes or 5 qrs. of wheat every alternate year through a course of 21 years, so that it is as 12 tons of potatoes, or 5 qrs. of wheat, to 15 stones of meat and 5 lbs. of wool per acre; and similar results in point of produce would arise from all the inferior grass-lands being broken up. This part of the subject claims the most serious and careful consideration. The quantity of arable land in the United Kingdom amounts to 46,522,970 acres, and of grass 15,000,000 acres. It can be most satisfactorily proved that grass land, under arable culture, will produce twice as much food for man, besides finding him a vast amount of profitable employment; and, therefore, it becomes a question of the highest national importance. Nearly all the grass-lands are broken up in the most thickly peopled countries—in China, in Belgium, and others—with the happiest effects. The growing wants of this country demand that every facility ought to be given to promote this astonishing improvement in its agriculture; the population, increasing as it does at the rate of 1,000 per day, must be provided for—*it must*

*be fed*, and the most strenuous efforts are required, *and must be made*, to supply the daily consumption, and that at as cheap a rate as possible. This supply resting mainly with the landowner or his tenant, it is of some consequence to show that the interest of the one and the profit of the other will be best promoted by the conversion of grass lands into tillage—this has already been done, and needs no repetition, but for the great difficulty of convincing the farmer that it is to his interest to manage so as to continually improve his land, and in this way benefit the landlord as well as himself; and it is only in this way that he can do it, and that the landlords in general would be induced to allow their grasslands to be broken up. The farmer *must* adopt and practise *high farming*—he *must* lay out much capital in cultivation, manure, and drainage; his profit depends upon this—the soil *must* be replenished and kept up to the mark; culture will do much, but manure will do more, and neither will be decidedly effective without good drainage. The poorest soils will give the largest proportional returns for these particular items of expenditure. This course is a progressive one; land will improve under good culture, and ultimate benefit *must result*. Manures suited to every kind of land are to be obtained; and when it is once brought into a productive state, it will, in a great measure, be self-supporting, by growing a sufficiency of herbage, under a proper rotation, to supply the requisite manuring: and, depend upon it, this supply of manure will contribute beyond any other to the farmer's profit; it is his "sheet-anchor," his "mainstay;" it supplies the very essence required by the crop, and both land and crop would soon be valueless without it—"muck (says the old adage) is the mother of money." If these principles were carried out with respect to a large portion of the 15,000,000 of acres still under grass, what an amazing amount of food may yet be produced from the soil of these kingdoms without impoverishment! and in describing the mode of breaking up and tilling each kind of grass-land, the object will be to point out such courses as shall, by judicious management, fully carry them out, so that in every respect it shall "*be better for the labourer, the farmer, the landlord, and the public.*"

The mode proposed for breaking up and tilling each kind of grass land:—First, down lands, wold lands, or heath lands. These lands being thus designated in different localities are taken together, and may be further classed under these variations:—Sandy downs, light gravelly soils, thin clay, strong heavy clays, moor land, and heath land. These are all met with in high open ridges, or in widely extended and elevated situations, and from their thinness of soil and varied quality demand es-

pecial attention. It is highly important that the small amount of fertility they naturally possess should not be impaired by being improperly broken up. The very common and almost universal mode of paring and burning should, if possible, be dispensed with. If, however, the grub, wire-worm, or larvæ of other insects abound, it must be adopted, taking care to avoid any unnecessary waste of soil. These lands are in general very inferior under grass, but profitable under arable culture with a proper rotation of cropping.

In describing the mode of breaking up and tilling light land, it will be desirable to class the *sandy downs*, *chalky downs*, the light loams, and gravel, and the flinty chalks together, as the *general culture* is of the same kind on each variety of soil. All these varieties are well adapted to the alternate system of husbandry, would be far more profitable under such course, easily cultivated, and therefore ought not to remain under pasture. In breaking up the sandy and chalky downs of Wilts, Hants, and Dorset, the following mode is adopted, and has been found to answer better than any yet discovered. It is thus described by an intelligent friend of the writer, and as it also clearly states the practice of paring and burning, it will not again be detailed. He says:—Pare the sward as thin as possible with the breast-plough, burn in small heaps at equal distances on the land, care being taken that the turf is not too dry, the ashes being much richer when it moulders away than if burnt quickly. When the ashes are well spread the land is *shallow rafted*, and then cut with a breast-plough the part left untouched by the rafter, at about one inch and a half in depth. The land is then dressed, and remains until the autumn, when the wheat is sown broad-cast, and dressed in. By this plan the wheat has a firm bed to receive the roots, and *wire-worm* seldom appears, nor is there any loss of plant. The second year turnips are sown, which are fed on the same, with hay or chaff, sometimes a mixture of both. It is again sown the following spring with rape, and eaten off with the sheep in *August or September*, and sown to wheat, care being taken not in any instance to plough more than two-and-a-half to three inches deep, which is important to the success of the plan adopted, keeping the ashes near the surface, as also bringing the soil gradually to be acted upon by the atmosphere. Grass seed or clover is sown in the following spring, dressed in and rolled off, which produces a large crop of sheep-feed: it is laid two years, but on the very high lands in some cases remaining three or four years, if the sward continues sufficiently productive; or sometimes oats are taken after the second crop of wheat, and then seeded down." Another course which is adopted is, to take rape or turnips after



the paring and burning; 2nd, wheat; 3rd, oats; and then seeds. Many of these downs, in their present state being of little value, would, when broken up, be much improved by a liberal supply "of bones, guano, or other enriching manure, thus laying the foundation for good corn crops to follow." Deep ploughing lands of this texture, when recently broken up, is found to be highly detrimental, as causing in severe frost a serious loss of plant; and has also proved an encouragement to the grub and wire-worm. A firm standing, it is universally acknowledged, is required for the healthy development and maturity of the wheat plant. "The paring, burning, and spreading the ashes varying according to the land, will cost upon the average from 20s. to 25s. per acre. Two horses will rafter\* five roods per day, and the after-cutting 5s. per acre." On lands of this character in Norfolk, the higher parts of Lincolnshire, Yorkshire, and the northern counties, the usual four-field, or four-course and shift, has long prevailed, *i. e.*, fallows well worked, manured with fold-yard dung, and sown to turnips with bones, and chiefly on ridges twenty-five to twenty-seven inches apart, to be fed off; second year, barley; third, grass seeds, or clover, in alternate courses; fourth, wheat. By this plan the clover is only sown every eighth year; the grass seeds to be fed off, the clover mown for hay. This rotation will ensure both cleanliness and fertility. In many districts the grass seeds are allowed to stand two years; latterly many of these soils have been sown to wheat after turnips, which have been either fed or carted off in November. After the wheat, clover, followed by wheat again, or grass seeds instead of the clover in the alternate course, followed by wheat. Beans or peas are occasionally taken after the seeds or the clover, and then wheat; tares or sainfoin may also intervene. These and many other deviations from long accustomed practice have been found to answer. The great thing is to keep within due bounds, so as to prevent exhaustion of the soil on the one hand, or too close an approximation of the same or similar crops on the other; and every intelligent farmer is, or ought to be, a competent judge of these matters. A slavish adherence to any one course of cropping or procedure in culture or manuring, being a limitation of skill and enterprise, is not judicious. Extra culture or management ought and will produce extra benefit; so that, with common attention and care, the better the culture the more numerous and profitable the crops. In the cultivation of these

soils attention ought to be more directed to the use of proper implements; from their light texture it cannot be at all times requisite to use the plough. The writer has seen the old Kentish turn-wrest, drawn by four horses, at work in skeleton or broad-share ploughing very light land. This must be unnecessary; a small skeleton-plough, drawn by one horse, would be nearly as effective, and would on these soils be amply sufficient, with light scaring, to prepare them for beans or peas, which, being tap-rooted plants, will find plenty of nutritive food without deep ploughing: and as the seeds and roots of weeds are thus kept on the surface, it facilitates the growth of the seeds, and the picking off the roots. The U. L. plough, manufactured by the Messrs. Ransome, is admirably adapted for this purpose, and for the many other uses connected with trench-ploughing, or row and ridge culture. The skeleton-plough would on such lands be very effective as a preparation for wheat. By its means a thorough pulverization may be obtained without disturbing the subsoil, and thus leave for the wheat-plant a firm bottom, which is so essential to its yield and quality.

In the application of manure to these soils great care ought to be observed. The dressings should be frequent, and on no account heavy, because much loss would ensue from the porosity of the soil; besides, heavy dressings of fold-yard dung would tend to keep the soil open, and cause loss from drought, &c. The chief application ought to be given to the turnip crop, it being the foundation upon which the subsequent ones have mainly to depend. The ridge system of turnip-culture is far preferable for retaining the full value of the manures deposited. They should be covered in and *thoroughly rolled down within the hour of forming, and drilling the same day.*\*

Bones have become almost indispensable to the good cultivation of these thin soils, and the small quantity of six bushels per acre, drilled on twenty-five inch ridges, will have great effect on the turnip crop. The modern discovery of dissolving them in (or even by) sulphuric acid is of great advantage, both in economy and usefulness. Bone manure is not of much benefit to any soil unless it is well drained and made free and open in its texture.

Rape-dust or cake would be of great value in a cool, moist season, but is on that account uncertain in result. On cold or wet situations it would answer well.

\* To rafter, or plough-rafter the land, as it is termed, is to plough only one-half of the land, turning the furrow ploughed upon the same breadth of land remaining unploughed throughout the field.

\* If the manuring is heavy, the ridges will require rolling again in about a month; they require compressing as the manure decays. The turnip plants will not be materially injured.

The consistency of these soils is surprisingly improved, and their fertility highly enhanced, by the application of clay, marl, chalk, or any heavy earthy matter.

In every application of fold-yard dung care must be observed so as to retain every volatile particle for the soil. The time of application must be well chosen; if for wheat, immediately before ploughing; for spring crops the same; for clovers or the grass seeds, the early part of the winter, as the snows and rains will wash down the constituent parts into the soil, besides protecting in other respects the plants. It must never be applied except to be ploughed-in in the summer, as is commonly practised, because the sun and the heat will destroy its valuable properties.

#### *Clays, or Clay Soils.*

*Loamy Clays, Cold, Heavy, and Thin Clays—Loamy Clays.*—These lands frequently produce a sweet nutritive herbage, and where the pasture is required for dairy farming, or the rearing of young stock, might be kept under grass. It is, however, very questionable if this course is the most profitable. Young beasts and dairy cows may be equally grazed upon the cultivated grasses of mixed variety. The broad red clover, or the white Dutch, may be too luxuriant, or too strong, or too acid; but this may be readily corrected by the other grasses. Rye grasses, timothy-grass, and rib grasses are hardy and of quick growth. Field parsley and chicory would be very healthy additions, or white mustard again; besides, the various pasture grasses producing seed of hardy growth might be introduced, so as to prevent any ill effect to either cattle or sheep. Such being the case, and as by these means a far greater amount of produce is obtained, more cattle and sheep are fed, and, as before noticed, the corn crops are obtained in addition to these. It does then appear that they might without inconvenience, and certainly with great profit, be broken up.

The mode to be preferred is the same as in the preceding case—and in nine cases out of ten is applicable to every soil—by paring and burning. This should be commenced in the month of June, and immediately after the ashes are spread, to be ploughed in, to prevent injury by exposure, and the land sown with rape or turnips. This course will enrich the soil, and also prevent damage, by the destruction of immense numbers of grubs and wire-worm, as also the chrysalis, larvæ, and eggs of others.

The course of cropping may be liberal. First rotation: Oats, wheat, beans, wheat, peas, wheat. Second ditto: Fallows well manured and sown with turnips, oats, wheat, beans, manured wheat,

clover, wheat drilled in with rape cake. By this rotation its condition will be kept up; but it would be further aided by occasionally taking barley after the fallows, next clover, then wheat, beans or peas, wheat; manuring the land for the pulse crop. Potatoes might at long intervals succeed the barley crop. As to its general management, it is sufficient to say that it is all important that it be thoroughly drained, and well worked, broken, or pulverized, at every returning season for putting in the crop. Every kind of manure may be applied with great advantage under ordinary care and judgment, and no kind of land will better repay the occupier for his outlay.

*Cold Heavy and Cold Thin Clays.*—As the management of these must be similar, they may, for the sake of brevity, be taken together. In breaking them up it will be necessary, on the thin clays, to pare and burn as thin as possible, while on the heavy soils it will be right to go deeper. The thin clays will not bear so heavy a rotation of cropping as the strong soils, and the application of dung should be more frequent and in lesser quantities: with slight deviations, however, they may be cultivated in the same manner as the cold heavy clays. Land of this strong tenacious character, when properly underdrained, will make very useful pasture, or good arable lands, and neither without it. This is absolutely necessary to every soil of any degree of tenacity. The strong and most tenacious class may be effectively drained by the mole-plough, worked by a capstan, at a small cost per acre; but every variety of soil would be better and more permanently drained by tiles, pipes, or stone drainage; and, if the outfall is good, any reasonable depth may be obtained. Lands drained at wide intervals, and at the depth of five feet, will be more efficient than at lesser intervals and a shallower depth. The water will always find its way wherever the sun and drought of summer, or the frosts of winter, have opened the soil. The difficulties experienced by clay-cultivators have been surprisingly diminished by good subsoil drainage; and it has had the effect of rendering such soils far more profitable under arable culture. Under pasture they are very uncertain, from their great liability to injury from drought in summer, or water in winter or wet seasons. In both cases the finer grasses are destroyed, and when wet the land receives injury from the treading of stock. Under culture the superior quality and weight of grain yielded will amply compensate for any little difficulty that may arise. There cannot be a more appropriate method of breaking up heavy clay-land than paring and burning, and that at a good and sufficient depth. No land is so infested with grubs, or larvæ in general, and the number thus destroyed

is astonishing; besides, the quantity of ashes obtained, to be spread and ploughed in, or carried on to other old lands, renders the soil open and porous, and is the great means of securing future crops. This operation to be executed in June, or early in July, as already stated. Rape should be first taken, followed by beans or oats; third, wheat; fourth, beans, in rows, to be horse-hoed during the whole summer; fifth, wheat, to be drilled in with seven cwt. of rape-cake dust. Second course: Fallows, to be well dunged and sown to rape; second, oats; third, wheat; fourth, beans or clover, or tares, alternately, as the course comes round; fifth, wheat. A moderate dressing of dung should be applied for the bean crop, or, if clover, laid on in the winter; when the clover comes up for wheat it should be ploughed early, and well rolled down: the bean-land should undergo a thorough tilth before ploughing for wheat. This course of cropping it will sustain, under ordinary management, without injury. The thin clays would require beans after the oats or clover, and then wheat. A field of clay soil, containing twenty acres, in the occupation of the writer's brother, was thus broken up in the past summer, and the crop of rape, or colesseed, as it is provincially termed, he has sold under agistment to bring him in £5 12s. per acre: many of the plants are four feet in height, and of proportionate bulk. Three years since he broke up on the same farm two fields of like character, in the old and too common method, by merely ploughing and sowing to oats: he has lost both the years' crops by wire-worms and grubs. He states that, in the operation of paring and burning in the past summer, thousands upon thousands of these little voracious creatures were destroyed. Every mode calculated to promote thorough pulverization ought to be adopted on these heavy soils. Subsoil-ploughing would be very efficacious, and should be repeated at intervals of about five years, till the land is rendered open and friable: be it remembered, however, that it is of no avail without previous subsoil drainage; deep ploughing and other deep working may then be accomplished without difficulty. This, aided by a liberal application of lime, chalk, or fish-shells, will soon render it mild and convertible. Lime ought to be applied as follows:—At convenient intervals during the winter, lead into heaps, to be laid on a dry spot, as much as may be required for use, of the best well-burnt lime to be met with; the larger the heap the better, taking care that neither air nor rain shall slake the heap before completed, which ought to be done as quickly as possible. The first smart rain will slake sufficient to form a crust over it, to keep out the weather, and also prevent its falling too fast. No lime must be added to the heap, however small it

may be, after rain sufficient to wet it to any depth, as it will cause both to fall and render them unfit for use. When all is collected, and well rounded up, the air or rain will soon make it secure. When the fallows are sufficiently worked and prepared for sowing, open the heaps and *lead on in dry weather*: spread out of the carts at the rate of from three to five chaldrons per acre, and in this way it will be applied in its most caustic state, when, if well harrowed and worked in, it will promote the decomposition of the vegetable matter in the soil faster than by any other mode yet discovered.

The application of chalk should be in the autumn and early part of the winter, and laid upon the land, to be fallowed at the rate of about 500 or 600 bushels per acre, being about 25 or 30 cart-loads per acre, and evenly spread. The air and winter's frost will cause most of it to fall, so as to be with great benefit incorporated with the soil, and the summer following will do much to reduce the remaining.

Fish-shells, such as muscle, do great good, applied fresh from the shore on fallows, or they may be carried to the fold-yard and mixed with the manure.

Of all the various applications of manure tried, none has been found to equal fold-yard dung, when well and richly made, by the consumption of large quantities of cake or green food.

It should if possible be kept in the yard till required for use, only turning it once to promote equal fermentation, about five weeks before leading on the land. It is lamentable to witness the waste occasioned very often by its foolish exposure in making compost heaps and the like. It cannot be kept too close till required, and on clay soils a liberal supply will be retained; but on all light soils smaller and frequent dressings are preferable.

#### *Peat, Moor-land, Bogs, Mosses, Heaths, &c.*

*Peat*.—These lands, possessing a surprisingly rich soil of great depth, are altogether unprofitable under pasture, because the best natural grasses do not readily grow upon them; and, being under proper cultivation, the most productive of all soils, it can scarcely be necessary to remark that all should be converted into tillage. This must be by paring and burning, as before, being cautious lest it burn too deep. Sow rape for feed; second, oats; third, wheat—the wheat stubbles to be well clayed; then fourth, beans; fifth, wheat. Second course:—Well fallowed for potatoes, being liberally dunged; second, wheat; third, beans; fourth, wheat, or alternately, instead of the bean crop; *clover or grass seeds*, followed by wheat: the seeds to be fed off: the clover mown for fodder.

*General Tillage*.—Draining, of course, must be

the first improvement, and both surface and hollow-draining are now practised: the latter is effected in a very simple way and with good effect. The "dead peat," commonly called "bear's muck," is so hard that, when cut into shape and laid across a well-formed narrow-bottom drain, it will soon swell by moisture so large as to form a good hollow drain below it. The dried "peat bats," or brick-shaped turf, used for fuel, will also do well. This subsoil draining has the twofold advantage of consolidating the peat and absorbing the superfluous moisture. Almost upon a par with draining stands the modern improvement of claying. It not only prevents a too rapid evaporation in summer, by giving solidity to the peat, but it also gives a tenacity to it; in fact the admixture is such as to form a new soil, composed of clay and vegetable matter of surprising value, producing every kind of grain, of great weight and excellent quality.

The usual practice is to commence in the autumn, and continue during winter, if possible, to dig the trenches along the whole length of the field. They should be about 4 feet wide and 8 or 10 yards apart. Sufficient clay must be thrown out, so as to cover the whole surface about two inches in depth when reduced and spread minutely; it is, however, more generally left in half-spit lumps to the action of the frosts or atmosphere.

In fallowing, the roller is in constant use, as also drags and harrows, ploughing not being so needed. It is no uncommon thing to obtain from 500 to 700 bushels of potatoes per acre; and in favourable seasons the yield of grain is excessive. A friend of the writer, farming on the edge of *Wittlesea Mere*, had from this cause and exceedingly good management, in the year 1844, a yield of 48 bushels of wheat per acre upon a breadth of 160 acres.

*Moor-land, Bogs, Mosses, and Heaths.*—The moors of the mountains possess such humidity, are so bleak and cold, and so inconvenient to approach, as altogether to unfit them for arable culture. Those on the hills at a moderate and approachable height might be drained and brought into cultivation, and would yield good crops of spring corn and green food for cattle. The soil possesses much inherent value. Soils composed for the most part of decayed vegetation are the most productive of all when properly cultivated.

*Bogs and Mosses.*—These must be thoroughly drained by surface-drainage till rendered compact enough for subsoil-drainage, which must then be at once adopted: superabundant moisture is its great bane. If this can be drawn from beneath, the whole becomes compressed and is rendered available for general cropping, to which it ought

undoubtedly to be appropriated, and would yield abundant supplies of vegetables in the first crops, and would speedily be brought into a fit state for general cropping. Much yet remains to be done in this respect. The bogs, moors, and mosses of this country are numerous, some extensive; but, compared with the sister island, unimportant. Assuredly the most comprehensive and effective steps ought immediately to be taken to reclaim the whole. It ought to be taken up nationally, as one great means for the employment of surplus labour and providing food for the public.

"*The Great Level of the Fens*," comprising upwards of 600,000 acres, four-fifths of which is under arable culture, would average from the harvest of 1844 from 40 to 50 bushels of wheat per acre, of excellent quality and great weight. What other district can equal this? What was it at the commencement of the present century, only 46 years ago?—a swampy morass, partially drained; now a dry, healthy, and most fertile plain, probably the most productive in the world.

*Heaths and Wastes.*—These lands may be, with good judgment, made profitable under culture. The long heath, coarse herbage, fern, &c., should be grubbed up, and the surface pared and burned as before. These soils, being so thin, require much aid by top-dressings of clay, marl, lime, or other material, as judgment may dictate, according to the local circumstances, and the general culture, as already detailed, for such soils.

#### *Good Meadow, or Grazing Grounds.*

Having already made some remarks upon land of first-rate quality, it will be only necessary now to notice the general average of such soils. Good grass-lands will make superior arable lands, and will yield, as previously shown, a far greater produce. This ought of itself to be a sufficient reason for converting them into tillage; and it may be done, and the cultivation carried on, under a careful system of good husbandry, without being detrimental to the soil. Indeed it would be gross folly to impair its powers of production, and which the landlord would do well to guard against.

The most certain and profitable mode of breaking up these lands is to take one or more crops of brown mustard, according to the strength of the land. The usual mode of preparation for this crop is to commence early in the month of March, by ploughing the land at a moderate depth. It should lie three or four weeks, to allow time for the sward to decay and consolidate, or close with the furrow-sole. When sufficiently decayed, about one-fourth of a peck of seed should be sown per acre, and harrowed in as lightly as possible, so that the seed be covered; all loose sods to be gathered into the fur-

rows. It will require hoeing in the month of May, and should be left rather thin in plants, supposing them to be healthy and vigorous. No further attention will be required until ready for cutting, which will be in the early part of harvest. It is wrong to disturb the plant; turnips thrive all the faster for being stirred, but it is not so with mustard; its long taper root is best left alone. When ripening, the pods turn to a deep brown (almost purple) colour, and just as they, the pods lowest on each stem, are turning to a lighter brown, the crop should be cut: the succulence remaining in the plant will fully ripen the seed. The great aim with all growers is to preserve the seed of a bright reddish-brown colour, as all the profit depends upon this being done. Light coloured or grey seed will only fetch about half the price of that of perfect colour. It is the anxious aim of the grower to have it "in pie," or stack, without rain. If cut green it may be tied into sheaves, and set up to dry; but the common practice (and perhaps the best, as it loses much seed if blown down) is to lay it in separate reaps along the stubble. The land should then be cleaned, skeleton-ploughed, and harrowed, and the dropped seeds made to grow.

After the mustard a crop of potatoes might in many cases be taken, followed by wheat. Potato culture is so well known that it is only necessary to observe that the land should be winter-ploughed, and left so till near planting time, then cross-ploughed, well worked, and planted with some unexhausting variety. Beans, well manured, and in rows, should follow the wheat, to be succeeded by wheat again, and then fallowed, and sown—first with turnips, or rape; second, oats; third, clover; fourth, wheat; fifth, barns, manured; sixth, wheat. Third course: First, turnips, after a good fallow, well manured; second, wheat; third, beans, in rows, to be horse-hoed; fourth, wheat. Fourth course: Turnips, oats or barley, clover, wheat, beans, wheat. Twelve tons of manure must be applied to the turnip crop, and six tons to the bean crop, per acre; and with this liberal supply of manure, and this system of alternate cropping, these soils will be kept in good heart and condition, thus producing a greater amount of food; and being kept in such a state as to yield a higher rental to the landlord, will ultimately cause the equalization in price of both *arable and pasture lands*.—Journal of the Royal Agricultural Society.

#### HADLEIGH FARMERS' CLUB.—DISCUSSION ON DRAINAGE.

The monthly meeting of the members of the Hadleigh Farmers' Club was held on Friday, April 30th, at the Lion Inn, Hadleigh; and it may be truly said that it was the largest and most influential gathering witnessed since the formation of the club. There were upwards of one hundred and fifty gentlemen present, many of whom are members of other farmers' clubs in this and the adjoining county, and who were drawn thither to hear a paper read by Mr. Thomas Hawkins, of Assington, upon the important subject of "Drainage;" as also to hear the celebrated agriculturist—Mr. Mechi, of Tiptree Hall, Essex; but Mr. R. Baker, of Writtle, who had promised to be present, was prevented giving his attendance.

The chair was taken by Mr. Robert Kersey, the president of the club, at about half-past six o'clock, and who, in opening the business of the evening, called upon the worthy secretary to transact the little preliminary business necessary to be done, before they entered upon the one great object for which the meeting had been convened.

Mr. W. GRIMWOOD, the secretary, said, two of the judges who had been appointed at their last meeting for the next annual show had declined to accept the office; that being the case they were now left with only two, Mr. Lennard Rinch and

Mr. Geo. Ward. The former said he should be happy to attend; but the latter gentleman, he was now informed by a gentleman on his left, would not accept the office, therefore another gentleman was wanted; but he thought they had better postpone the nomination till some future time. He then alluded to a communication received from Mr. Shaw and Mr. Pusey, on the propriety of the members of their club forwarding a petition to the House of Commons upon the subject of "Tenant-right." An address had been issued from the Committee of the London Farmers' Club, which stated that since the discussion of the subject of "Tenant-right" by that Club in December, 1845, it had occupied the attention not only of the members of that club generally, but also of very many persons practically engaged in agriculture throughout the kingdom; numbers of the local farmers' clubs, after duly considering its merits, had given it their unanimous and uncompromising approval; in fact, wherever introduced, the justice on which it is based, and the necessity for its adoption, were almost universally acknowledged. Mr. Pusey had brought in a bill to the House of Commons for the establishment of an agricultural tenant-right, which, having been read a second time, was referred to a select committee, and which would, preparatory to its being

read a third time, come under the consideration of a committee of the whole House. The original bill, and that altered by the select committee of the House of Commons, had been carefully examined by a sub-committee; appointed for that especial purpose, by the general committee of the London Farmers' Club, and several alterations and amendments recommended by the sub-committee; and a report to that effect having been laid before the general committee on Monday, April 12th, was discussed and adopted. It being considered of the utmost importance that the opinions formed by the members of the London Farmers' Club and the local farmers' clubs on the principle of "Tenant-right" should be made known, and communicated to the members of the House of Commons, the following resolution had been proposed and passed—"That an address be prepared for circulation amongst the members of the club, and the local farmers' clubs throughout the kingdom, requesting them to take immediate steps to secure the support of their representatives in Parliament, to carry out the principle of the 'Tenant-right Bill.'" This resolution was followed by sixteen others, which showed that the tenant farmers' occupation was such as to render it impossible for him to carry it on with advantage without investing capital to be reimbursed at a future period; and hence security of tenure, with compensation for unexhausted improvement, was absolutely necessary.

Mr. THOMAS HAWKINS proposed that the materials necessary for the petition be provided by the club, and that their cost, as well as the sending it up to London, be defrayed by the club.

Mr. JOSEPH RAND, vice-president of the club, said he was exceedingly sorry that the rules of the club prevented any materials being raised in the shape of cash even to forward such a petition; he recollected that a similar question was noted in regard to a petition against the Malt Tax, when it was decided that the money could not be applied for such a purpose.

Mr. EVERETT seconded Mr. Hawkins's motion, and confirmed the opinion given by Mr. Rand—their rules did say that they should not interfere with politics, but they could adopt the petition when the Chairman left the chair.

The CHAIRMAN would, with the permission of the meeting, waive the subject (Hear, hear). He thought he had better at once introduce the subject fixed on for the evening's discussion; but before he did so, he trusted that he might be allowed to make one remark. He thought the subject about being discussed was one—and he believed it to be considered so by all—of vast and vital importance to the agriculturists of this county (Hear,

hear). He looked upon draining in a heavy land district to be a subject of very great importance. It was an important subject to the tenant farmers, and it was an important subject to the landed proprietor; and looking at the present crisis of affairs in this country, it was important in regard to the future interests, the welfare and prosperity of our country. He had said it was important to the tenant farmer, and so it is. He viewed every tenant farmer in this light—that he (the tenant farmer) acted upon the system and principle of economy. When the tenant farmer hired a farm, he usually inquired "How am I to drain my land at the cheapest and on the most economical expense?" Another principle he thought the farmer always acted on was, "How can I do it most effectually and most durably?" Now he thought in regard to the first question, it was an exceedingly important one; for suppose farmers to have a lease of his farm for eight, ten, twelve, or fourteen years, he would be universally anxious to drain that land, and only in that efficient way as would last for the term of his lease; of course it was a matter of uncertainty whether he would be allowed to take the farm for another lease, therefore he would naturally entertain the opinion that it was to his interest to drain the lands in the most economical way. Then again he thought another question must arise as to which is the most effectual way of draining the land; whether the drains are to be laid at the depth of twenty-four inches or thirty inches, or whether to the depth of forty inches, and to have it mole-ploughed. All these questions had a bearing upon the great and important subject of draining. They might lose sight of the tenant farmer altogether, and take a view of the landed proprietor. There was no science of farming, in his opinion, that could be introduced into this country that would so greatly improve a farm as that of draining; for whatever manure was carted upon the land, however highly a state of cultivation the land might be in, the system of draining, in his opinion, formed the grand basis of improving the farm. If they took into consideration the community at large—he would not touch upon the subject in a political point of view, although he must think the growth of corn in this country had become a political question—he thought that taking the position of our country, and taking the position of Europe at the present time, compared with the times of two or three hundred years ago, they would find that never was there a period in the history of our country when so much was grown of what is called the sustenance of man as is grown at the present time. He had heard it many times mentioned that that man is a patriot to his country who makes two blades of grass grow where only one formerly

grew; but what would they say of that man who is instrumental in causing the soil to produce two-thirds more of that grain which is necessary for sustaining life—he meant that of wheat only. They ought to recognize such a man as a patriot indeed, as a great benefactor to the human race. It was for this great and important object that the present meeting had been called, and he would therefore with great pleasure introduce to the meeting his friend Mr. Hawkins, who would address them upon the subject of drainage.

Mr. T. HAWKINS then proceeded to read a paper on draining, and observed that having attended a discussion on this subject in 1841, before he became a member of the club, he was somewhat at a loss to know how he might render what he had now to say sufficiently interesting to engage their attention without fatiguing their minds with a repetition of former arguments, as he could only confirm his former experience. If he recollected aright, they then considered the more practical part of the subject, such as the comparative experience between tiles and straw, or other materials most commonly then in use, and the probable advantage of deep over fleet draining. In short, they were then awakening to the enlightened view of the subject now so universally acknowledged. He understood the wish of the club to be that they should now consider the theory, and lay down some practical and scientific rules for their future guidance; with this view he proposed to digress a little, and take a peep at the lord of the soil, as they were commencing a new era by legislative enactment, as well as individual enterprise, and constructing their drains with an almost imperishable material instead of the decaying, half-rotten stuff hitherto used. Especially as the landlord was the more interested party (letting alone who was to bear the expense, which was no part of his subject that evening), to him it was of the utmost importance to have it done scientifically, effectually, economically, and permanently; otherwise the expense in the first instance, of having to do the thing twice over, must either lessen his income, or cripple the tenant. He must confess that if he possessed a large tract of heavy land requiring draining, he should take a comprehensive view of the subject, and drain the land in districts, without reference to any particular farm; as it often happened that 50 or 100 acres might be more profitably drained than the same quantity of land in separate fields or different occupations. The same principle applied to the tenant, who could often facilitate the operations, were it not for the small ill-shaped fields that opposed, and increased the difficulty and expense of the outlay; depriving him of a profitable return for his skill, capital, and

long tedious superintendence of the work. He would now venture to call attention to the imperative necessity for both landlord and tenant to co-operate in laying this foundation of agricultural improvement; for upon this reciprocity of interest and good faith, if he mistook not, depended not merely their prosperity, but their very existence in their present position. Without further prefacing the subject, he begged to discuss it under three different heads: first surface drainage, where the land was either of an argillaceous or aluminous quality, that no springs interrupted the progress of the work; next, that which might properly be termed spring and surface draining, where the different strata cropped out, or the diluvium; and then, those denuded and boggy soils which must be considered as purely spring draining. First, surface draining, by which he understood the means used to rid the land of the superabundant moisture during heavy rains, &c., thereby rendering it more friable, easier tilled, vegetation more vigorous, and the various crops coming early to maturity. In order to arrive at a true judgment upon this subject, they must become properly acquainted with the nature and specific gravity of the soil they intended to drain, as it must be obvious to any one that the greater the tendency of the soil to hold water in solution, the deeper the drains were required to be; on the other hand, the more porous the less necessity for deep draining. His object in that discussion would be to disabuse them of the idle notions now prevalent amongst modern empirics in agriculture, as to fleet, deep, horizontal, longitudinal furrow, or any other system not based upon reason and practical experience, but calculated to mislead the unwary. He thought they might lay it down as an universal principle that the land ought to be drained deep enough, and near enough, that no perceptible difference could be discovered over or between the drains, and so that the atmosphere exerted an equal degree of influence upon the active soil. Next, the greater the specific gravity, or, as they termed it, the heavier the land, the more it would shrink in dry weather; consequently, when rain fell, those cracks or fissures caused by long drought became extinct by the natural expansion of the soil; and when the land could hold no more water, the excess ran off, or stood about the surface in pools until the return of fine weather, when the warmth of the sun evaporated it, and then it contracted again. This he took to be the natural state of clayey soils; and it must suggest to the mind, first, the direction of the drains, so as to have an equal pressure from the centre; and next, to keep the soil sufficiently pervious to be innocuous to vegetation. Upon the proper adjustment of these two principles depended the perfection of the art, and the keys to them

were geology and hydraulics: the former acquainted them with the structure of the earth, and the laws of stratification; the latter taught them the movement and pressure of unelastic fluids—how water might be made subservient to the wants and uses of mankind, or how it might be got rid of when injurious to vegetable or animal life. The first question to his mind was, to what depth did the water require to subside sufficient for all the purposes of a healthy vegetation? In the perfect knowledge of this fact consisted the economy. He must confess himself rather sceptical respecting the unlimited depth of tilled soil required for the most extended yield, and thought two feet would produce as great, if not a greater crop than more, particularly in the eastern counties, where they got much less rain than in the western. If the water were reduced by deep drainage to a greater depth than was necessary for the perfect disintegration of the soil for the purpose of integration, did it not hinder the capillary powers of the earth from supplying plants with moisture sufficient to keep them growing during dry weather? and if kept at a given point below the active soil, did it obstruct their growth during winter, when the vegetable kingdom might be said to be in a quiescent state? He thought it did not. Much value had been attached to the length of the tap-roots of their different crops; he entirely differed with modern theorists upon that subject. They had had some specimens of turnips, weighing about two ounces, with tap-roots two feet long, exhibited by a gentleman who had honoured their club with his support; but they were very small turnips, and very poor ones too, notwithstanding. Nature always accommodated herself to circumstances much more readily than man did; but to her they could only supply a given quantum either of manure or soil. The deeper they drained and tilled the earth, the longer would be the tap-roots, he agreed; but of what use they were was a question to be solved. He maintained that they were of no use whatever, beyond their legitimate one of sustaining the plant in its proper position; they did not nourish the bulb, neither did they exhaust the soil, as was erroneously supposed. He should not, however, digress further on this point, as he hoped to have the opportunity of explaining it at their next discussion, but should assume thirty inches sufficient for every purpose. The next question, then, was what depth and width would most economically effect this object? Experience had always impressed him that from two-and-a-half to three-and-a-half fall to the foot from the centre to the bottom of the drain, varying according to the tenacity of the soil, was requisite, and that they could not with safety go wider than from seven to twelve yards. He knew this was opposed to some modern theorists; but when they

considered that water pressed equally on all sides, that capillary attraction opposed the gravity, and an alluminous soil expanded, as it was saturated with rain, until it became a solid mass, they must at once perceive the sideway pressure was greater than the upward, and unless the draught was quick enough to prevent those artificial fissures caused by the drought from collapsing, a space equal to the opposing force must remain wet until the genial warmth of the sun evaporated it. The next point bearing upon the subject was the comparison between the extra labour of deep drains with extra tiles, and fleet ones. He had drawn out a scale of expenses, which he submitted with great deference, and under correction, because the value of the work must vary upon different soils (and it was a little surprising how practice enabled some gentlemen to economise this sort of work); but if he succeeded in arriving at the relative value upon a given soil, it was sufficient for the present purpose. He had taken an acre of land, and, supposing it twenty-two rods long, and the tiles 20s. per thousand, it would require:—

Fall between drains.	Drains.	Feet deep.	Feet apart.	Rods per acre.	Cost per rod.	Cost of Tile.	Labour.	Total.
					d.	£ s.d.	£ s.d.	£ s. d.
3½	6	3	20	132	3½	2178 2 3	6 1 18	6 4 2 0
3	5	3	24	110	3½	1815 1 16	3 1 12	13 8 4
3	3½	4	32	83	6	1369 1 7	4 2 1	6 3 8 10
3	3	5	40	66	11	1089 1 1	9 3 2	6 4 4 0

This scale, except the first, gave three inches draught to the foot; it might be less upon a free, loamy field, but upon a very stiff soil he thought 40 feet was too wide for the drains to act beneficially, and that they ought to deepen them at a width of 20 or 24 feet, if they would not work at 3 feet deep. They were told that the earth was saturated with water 18 inches above the drain; this, he supposed, must in a measure depend upon the space between, and could not apply to 7 or 10 yards, in the same ratio as from 30 to 100 feet; nor could they reduce the moisture beyond what the soil would hold in solution. Though they often heard the absurdity of reducing the water below that point by deeper drainage, and increasing the capillary powers of the earth by subsoiling on the other, this was a paradox which he could not understand. The Rev. Mr. Clutterbuck found that drains 20 inches deep and 12 yards between, in a ridged field, reduced the water 17 inches below the surface in 48 hours, in a blue clay: this was worthy of observation by drainers with reference to vegetable physiology. One remark he might make, that draining ought



always to be done in fine weather, to prevent the silt and puddle from stopping the perfect filtration of the drain. Another great advantage was, when commencing a field, to have all the mains cut by one man, and the tributary drains turned in half a rod to insure an uniform draught and a perfect joint at the eyes. He would now consider what might be termed both spring and surface draining. The description of lands falling under this head were the declivities of light gravelly hills, and valleys in heavy land hilly districts. Here they could lay down no universal principle as to depth, but must be guided entirely by circumstances, by the alteration of porous with retentive strata, and of the phenomena of springs depending upon this structure. First, the declivity of light gravelly hills, where the different strata are cropped out, such as the clay, marl, chalk, &c. The most proper way to drain this land was by cutting the drains in a vertical direction, deep enough to catch the lower edges of the different springs that anticipated the stratum of stiff soil, and near enough to dry the surface. In some instances 4 feet might do very well, and in others 6 or 7 might be but just deep enough; the same as to width, which, like surface draining, must depend upon the clayey or loamy nature of the soil between the gravelly or sandy. Now, on all denuded surfaces there were two inclinations, and if the horizontal was steep enough to affect the vertical, the drains ought to lie between the two; otherwise, the pressure would drive the water down between, instead of into the tiles, unless they were laid an extraordinary depth to overcome the opposing force. Next, the valleys of heavy land, and the diluvial soils at the bases of mixed loamy hills. These, almost like the tertiary formations near the coast, must be drained through the different layers of sand or gravel into the clay, or the drains would soon fill with a ferruginous, unctuous substance. Now he had never found any drains stopped with this stuff: unless laid too near the surface, and not in the clay, the drains would draw a long way in this land. But there was another description of flat land where the clay formed the surface, except here and there a bed of shingle—a sort of gully filled with wash sand, lying horizontally, as if formed by some disruption of nature, having all the appearance of springs. Here, he thought, the principle of surface draining applied; as, if the stiffer parts of the field were drained, there need be no apprehension but that the springs would dry, they deriving their moisture from the surface of the other. Again, there were large tracts of land, apparently light, but wet. A foot or so beneath the surface was a hard pan—a gravelly clay; next, a porous soil, but not sufficiently absorbent, to get rid of the water resting upon a

stiffer subsoil. Here the capillary powers depend upon the inclination of the land, because the super soil would not hold an excess of moisture were it not forced up by the pressure of inclination; and if not drained sufficiently deep to draw the water from the strata beneath the pan, the surface would always be covered with a stunted vegetation, except in very dry weather. He came now to the last branch of his subject—the spring draining. He thought they would agree with him, that this was the most difficult as well as the most expensive; and no wonder, when such universal medicines were applied to cure both the denuded and tertiary formations. Here they most needed a perfect geological knowledge of the country before attempting to doctor it, and must commence by tracing the different strata, the depth of sand resting upon the lower clay, the undulating surface of the surrounding country, the inclination of the hills towards the valleys; they must take levels from the lowest points, for outlets, and learn to distinguish between a denuded and an alluvial soil—between one where the surface had been washed away, and another where those washings were deposited. These were the main guides for spring draining. If they instanced the vicinity of that town, the landscape presented such a variety of hill and dale, sharp angles and narrow, crooked valleys, that it appeared difficult to discern the course of the water: the clay below undulated nearly as much as the sand and gravel above: on one side of the hill the clay nearly approached the surface, and on the other the sand sunk to a level with, or below, the lowest point marked for the outlet. If they calculated how many wells would be required to dry a few acres, and often a few rods, he thought they would be convinced that the cheapest and most effectual way to drain that district was to cut the drains as near the base of the hills as possible—not exactly athwart the current spring, if it could be avoided, but so that it might assist the flow of water down the drain, preventing the accumulation of sand or any matter that might stop it. And if any irregularities existed, they should cut a leader to the point above where the water broke out, taking care to keep clear of those boggy, blowing parts, where the clay opposed the further progress of the water. A great deal depended upon the skill and expertness of the workmen to accomplish the work with anything like precision; particularly where a vast height of gravel laid above, or the inclinations of the soil formed a large horizontal space above, where the springs broke out. The alluvial soils near the estuary of rivers, or craggy soils near the sea, were much easier and cheaper drained, the crag lying upon a level bed of clay. If an outlet for the water could be obtained, a single drain or well would

often dry many acres. In concluding, he could not help calling the attention of the Club to the state of the meadows adjoining most of their rivers in that county, whether navigable or not; because he was sure that, with a small outlay (he felt confident under £10 an acre), they might be laid dry, and made perfectly independent of the mills or locks which dammed up the water and rendered thousands of acres almost worthless, or of not half the value they would be were a proper system of drainage adopted. Could any practical farmer walk a mile beside the Stour, without being struck with the hundreds of acres lying under water, both in summer and winter, covered with coarse, sedgy grass, meadow break, and all sorts of aquatic plants, requiring only the outlay of a few pounds to make them as fine grazing lands as any in the kingdom? He did not know that he should make any converts that evening, as he had tried sometimes to convince the proprietors of the absurdity of open ditches or dykes, from 8 to 10 yards wide every 20, 40, or 100 rods, but from the arable, across the meadow, into the river, allowing the water to flow out and stand upon the level (indeed, often above the level) of the adjoining meadows. Now, instead of this, he should stop up all those outlets, and cut a trunk drain, parallel with the river, or across where the lowest surface could be found, commencing either below the mill-dam or lock, if a sufficient fall could not be found, and then drain the meadows into it. He felt confident the trunk drain would not exceed a quarter of a mile. Suppose the New River Company, in London, who brought their water upwards of 20 miles, were to allow ditches, how much water would get to London; or what state would the land be in, with the river running above its surface, were it not kept within its proper bounds? This was an example, that a stream of water running through a country, although it might be studded with mills, need not exercise a very injurious effect upon the adjoining land. He would not intrude further upon their attention, as he knew they wished to hear the opinions of many practical gentlemen, who had come from a distance to attend the Club that evening, as well as those of the members present; he begged, therefore, having gone through the outlines of the subject, to turn it over to abler hands.

At the conclusion of Mr. Hawkins' address, which was loudly applauded,

The CHAIRMAN rose, and after thanking Mr. Hawkins for the manner in which he had introduced the subject of "drainage," apologized for the absence of Mr. R. Baker, of Writtle. He said on the previous day he received a letter from that gentleman, stating that his absence on the present occasion was caused from his having received a

summons to appear before the House of Commons to give evidence upon the Poor Law Settlement question. The Chairman said he had no doubt the meeting felt great regret, as he did, at the absence of Mr. Baker; but he hoped that on some future occasion they might have the pleasure of that gentleman's company. He had now the very great pleasure of introducing his worthy and esteemed friend on his left, Mr. Mechi (applause), who would give them his views upon draining, and also upon the general system of agriculture.

MR. MECHE, after making a few preliminary remarks, said, perhaps they would allow him to make a few remarks upon the subject of drainage (Hear). Their friend Mr. Hawkins had read a long paper about drainage, about rivers, about soils, and other similar matters; but he had not told them that he had drained an acre of land—"Hear, hear," and laughter)—on strong clay, five feet deep and fifty feet apart; neither had he told them that he had drained an acre of land five feet in depth and thirty feet apart; or that he had compared drains made upon the new principle with those of the old school principle (Hear, hear). He (Mr. M.) had hoped that Mr. Hawkins would have told them that he had done so; because a few experiments and facts would have been more useful than a great deal of talking and discussion (Hear, hear). He (Mr. M.) considered that the question of deep draining was a settled one. "If," as Mr. Abernethy had said, "you have read my book on the subject, I think that you would then agree with me," because it had been practised by some of the most eminent men in this country. He said, drain deep and drain wide, whether it was for spring water or whether it was for top-water; and in both cases they would find their land to become most effectually dry. This he had proved; for whether the clay happened to be ten feet below the surface, or whether the sand happened to be in a basin of clay, or on a hill of clay, if they cut their drains five or six feet deep, if they could get a fall by putting in inch pipes, water would come in and flow quietly; whether the water came from springs or rain water. If any gentleman should have any question to ask him upon the subject, he should be most happy to reply to him. He would make one remark on the subject of spring draining, and it was this—that there was a great tendency for bodies to flow into strong running springs. He recently had occasion to take up some pipes for the purpose of making an alteration (through these pipes ran a spring of 25 gallons per minute); he was surprised to find thistle-roots from twenty to thirty feet long, all luxuriant in this subterranean drain and rapid running stream: he was not sure that, ultimately, they would not have choked the pipes up altogether—(Hear, hear)—and he therefore thought it pre-

sumptuous in him to say that a spring drain of constant running water would be a durable drain. He was, however, doubtful on that point. It proved that they ought to watch those drains, and to ascertain when there is any deficiency as to their use or supply of water: they should be examined to ascertain whether they be not choked in part or altogether. There was another little fact about drainage. He would mention that although an inch pipe placed deeply in a strong clay will effectually drain the land, chalk under clay, or even a coal-pit under clay, of six feet deep, will not drain that clay; and yet a pipe put into the clay itself will drain it: this was a fact which had recently come to his knowledge from several quarters. To illustrate that fact, he would suppose (as may have been frequently the case) that a pail of water was spilled in the up-stair room, but instead of its running immediately on the floor the water would have a tendency to spread on each side, and a few drops would fall through in various parts, but the great bulk of that water would be absorbed in the flooring. He believed that the same effect takes place in chalk, and in various other bodies, under the clay. So much, then, for draining; which he could say now, as he had before said, was a settled question. There was no doubt that, if they meant to drain profitably, they must drain deeply, and lay the pipes at wide intervals. The cost of that drainage would be from 30s. to £2 per acre. They might see it all written in his book, and therefore it would be tedious to go over the subject in detail. Let them now consider the subject of agriculture. He was sorry to say that, to his mind, the present state of agriculture was a very unsatisfactory one. He considered that the land of this kingdom, in general, is very ill-farmed: that the small portion well farmed bears a very trifling comparison to the mass that is ill-farmed. When they saw in the *Journal of the Royal Agricultural Society*, that the tenants in North Wales are paying but three shillings and sixpence per acre for their lands; that they are in a state of abject poverty; that they make seven crops of oats, and that their last two or three crops scarcely re-produce the seed; when they saw, in almost every district they travelled over, numerous fences, a host of useless pollards and timbers; when they saw miserable farm-houses—no shaft of a steam-engine, nothing but one-horse power, and many other evils—(Hear, hear)—bad roads, narrow enclosures, and great wastes by the sides of the roads; he was sure that they were but in the infancy of agriculture. He admitted there were a few bright examples all over the country; but they were but a sort of *oasis* of the desert—few and far between. Such bright examples did not readily extend. Let them inquire into the cause of this

unsatisfactory state of agriculture; but before doing so he must confess that he had seen considerable improvements going on, especially in this country (Hear, hear). It was extremely gratifying to him to see the improvements which had been made and were being made—(Hear, hear)—but still he must say they were but small when compared with the mass. On his journey that day he saw quite enough to convince him that they were but in the infancy of agriculture. There appeared to him to be four principal causes for this unpleasant and unprofitable state of things. The first, and most important, was the want of what is called a “Tenant-right” (applause). It was one of the greatest mistakes that ever was made to suppose that the landlord and the tenant can have separate interests. He laid down, as a principle, and he thought it to be undeniable, that the better position of the tenant, the more intelligent and respectable he is; and it must of course follow that it was better for the landlord. If they thought different, take the converse of the position, and see if he who has got poor Welsh tenants at three shillings and sixpence an acre is in a better position than the one who has got Suffolk and Norfolk tenants, and who pay twenty-five shillings. There is no doubt that if the lands let at low rents to these inferior tenants were in the hands of such a class as he had described, their value would be increased from two to three hundred per cent. In all matters of trade there is a security for the tenant's improvements (Hear, hear). He (Mr. Mechi), for instance, in his business, in the city of London, had the security of a lease, with permission to make such alterations as he thought proper—provided he did not deteriorate the property: he had a right of alienating that lease at any portion of the time he thought proper, deriving the full benefit of the alterations he had made. He felt quite certain that, if the landlords generally were to grant, or rather to legislate for it, it might be established as a principle to the tenant farmers (Hear, hear). For, if the legislature established the principle of right to improvement on behalf of the tenant farmers, there could be no doubt but the ablevaluers in the different counties would very soon make up their minds what improvements really are. (Hear, hear.) That would be one great benefit arising from the establishing of the principle. They would not then have Mr. Hawkins telling them that two feet six was the best mode of draining, or Mr. Mechi talking about his five feet drainage—(laughter)—no, but it would be tried, and not left for fancy or discussion. It would be the same with other questions. When a man was called upon to pay a certain sum for an improvement, he would ask “Is this an improvement?” If he was asked to pay a person for a sound building of brick or slate, he would know

that to be an improvement; but would it be so if it was a temporary boarded place, thatched, and almost tumbling down? Then would the question be decided by this valuation of "Tenant right," whether one be an improvement over the other, as he had described. If such were to be the case in reference to agriculturists throughout the kingdom, they would derive more benefit from that, than from all the discussion which might take place in all the Farmers' Clubs throughout the kingdom for the next hundred years to come. (Loud applause.) It would then be a matter of pounds, shillings, and pence; for when it touched the pockets, men would begin to look at a question involving the outlay. The effect of a valuation of tenants' improvements would be to turn out a large number of bad, poor, miserable farmers; men who were always ready to offer five shillings per acre more for land that had been improved by some enterprising and wealthy tenant. (Loud applause.) He felt confident it would attract, in place of the men he had described, a class of individuals with capital, who were ready to invest it in the agreeable occupation of agriculture, could they but see that that capital would be secure to themselves and to their families. Was it to be tolerated that if death struck a man when in the midst of his improvements, that his family should be sent adrift, or that the money he had expended in the soil pass into the hands of another without his paying to the deceased's family the value of that money which had been laid out in the way of improvements? (Hear hear.) He considered that a disgrace to the nineteenth century, and he felt sure it acted most unfavourably on the landlord; for the men who hired their farms over the heads of good tenants generally went to work out the improvements which had been made on the farms before they took them, so that at the end of their term the farms were not worth so much by all the additional rent as they were at the beginning. (Hear, hear.) That was a fact well known to them all, therefore the landlord was in no better position, but in fact much worse. (Hear, hear.) And so it was with the tenant. Another great cause of non-improvement to agriculture was the law of entail. (Hear.) Many a noble-minded man was desirous of improving his estates, and of giving encouragement to his tenantry; but what if he had a large family? Why, he knows that the eldest son of that family will have the whole of the estate at his death: he knows that if he spends money in improving that estate, that he is robbing the younger branches of his family, and therefore he does not improve it. He (Mr. M.) admired the aristocracy of this country; they were a bright example to the country at large. So far the law of entail had been useful, but there was an annual and a daily tendency to the increase

of entails. They had evidence that they had more than doubled; and the prospect was, and the likelihood was, that nearly the whole of the land in this country will, in the course of time, be entailed. (Hear, hear.) Could they be all nobles?—No. Could they be all aristocrats?—No. If all the land in the country were entailed, we should become as they are in some foreign parts—ennobled in name, and ignoble in nature. (Hear, hear.) It might be said that the will of an individual ought to be respected as regards his property. He apprehended that, as a principle, the will of an individual could only be delegated when it did not affect the welfare of the nation at large; and he believed it to be an established principle that individual will must be made to succumb to the public welfare; and therefore if entails are injurious to the nation at large, the sooner a bar is placed on them the better. There was another difficulty he would mention, and that was the transfer of landed property. If he had (which he should be happy to have) half a million of money in the three per cent. consols, he could, by going to town, and by walking into the bank, and by paying a broker ten and sixpence per cent., have it transferred, and receive the money. The whole transaction could be settled in two or three hours; but if he held a farm consisting of 100 acres of land, and he was desirous of selling it, there would be a duty of two-and-a-half per cent. to pay at a public auction; then, in addition, there would be an enormous quantity of parchments, letters, and other charges in the way of fees for consultation, &c., &c.; and it would be perhaps six months before he could hope to receive the money for which he had sold the farm, and to have the property transferred. (Hear, hear.) And it was very possible, and not at all improbable, that through his own neglect, or that of some person connected with him, a mouldy, dusty, and musty old will, dated a hundred years ago, might be lost or mislaid, which would be wanted to prove that somebody left the estate to somebody else. (Laughter.) And in that case he should find that after he had sold the property he could not make the title good, and so he should be obliged to keep it, and perhaps mortgage it. He could see no reason why a piece of land should not change hands as well as a hat, a great coat, or a piece of calico,—all were articles of value purchased and sold; and if they admitted the principle that the value of an article was increased by the facility of its transfer, why should not land be bought and sold on the same terms? Take the converse of the proposition, and they would see the more difficult it is to effect a transfer, the less the value of the article. (Hear, hear.) That was a subject which he thought might hereafter occupy the attention of the Legislature, for he

thought if land were as easily transferable as funded property, there could be no doubt that it would increase in value; there would then be made improvements in water-courses, roads, and other things done that would employ labour, which is not now effected. Land is a thing so easily identified: it could not run away. If Government would establish an office similar to the Bank of England, in which maps of the land in all the country could be kept, measured and defined, the first title proved would set aside any future difficulty; the desire of parties to purchase or to sell estates could then be carried out as easily as selling out or purchasing in the three per cent. consols. The identity of persons could as easily be made out in one case as the other, and if a man committed forgery he would be responsible for it; and the transfer of property might be effected with very little difficulty. Another great interference which materially affected agricultural improvement in his (Mr. Mechi's) opinion, is the want of scientific education amongst the agriculturists. He believed that if he had been born and bred a farmer, he should never have attempted one of the many agricultural improvements he had effected; he should have done as other farmers had done; he should have considered that his father had done what was right; that he had done according to the custom of the country or village in which he might have resided; and that as nobody had attempted to deny that what his father had done was right, he should have followed in his father's steps, and so would have known much less about those things of which he did now know—that would have been his feeling. When an apron-stringed farmer commenced, he had no prejudices. No; he (Mr. Mechi) must say that manufacturers and tradesmen were individuals who, being thrown into constant intercourse with large numbers of people from various parts of the world, were more likely to have their ideas expanded, and be less prejudiced, than those confined by the peculiar nature of their occupation. He therefore felt quite sure that if science lent her aid more readily and more constantly to the agriculturists, they would see improvements progress more rapidly, and, as a matter of calculation, they would then be thinking how this or that could be done more effectually and more cheaply (Hear, hear). As he had said elsewhere, he hoped the time would come when they would see an agricultural college in each county in England; but he did not believe that would be the case until they got rid of those things which he had been commenting upon; he, however, hoped that by-and-bye he should see an agricultural college in every county, like the one at Cirencester, and perhaps it would be right for him to tell them something about it (Hear, hear). They had been

like all new beginners, he saw; for they had made several mistakes (Hear, hear). But they were determined to correct them. They had begun by building a noble college, and they paid professors to instruct little boys at the age of 14 (laughter) who never heard the word "science," or who knew not what that word meant—that was a very great mistake. They had begun by inviting students and visitors when the buildings were in an unfinished state (Hear, hear). They had had all sorts of little petty jealousies and local prejudices to contend against; but those evils had all been remedied, and he would wish to impress upon all who were desirous of sending their sons as students to that college, not to send them till they were at the age of eighteen, when their education is so perfect as that their minds are in a condition to receive science, in the fullest sense of the word; because it was quite clear that lectures delivered by men of expanded minds and great talents are completely thrown away upon those whose minds are not in a fit state to receive them. He thought it necessary to explain this opinion, because individuals had sent their sons there at too early an age, to mix with others who are young men. The result had been unpleasant; a dissatisfaction had arisen in the minds of some, who thought the institution would not answer. He admitted that they were open to censure on that score; they were now about remedying some things complained of. The fences were down, and they were now putting up steam engines, and doing all other matters, which he hoped would be for the benefit of the country at large, by being the means of other counties following their example, by having similar institutions. Although they were now under a cloud, the time would shortly arrive when it would be considered an honour, and a difficult matter to get a student placed in that institution (Hear, hear). As one of the council of that college, his idea was, that when they had taken all the students the college could accommodate, they should in the selection of new ones have an especial regard to give the preference to some from each county in England, in order that the views they disseminated should be scattered over the whole country (Hear, hear). He would now revert a little to the practice of agriculture, as that was what they got their living by. What they wanted was a fixed number of agricultural principles; the details could be worked out as each individual might think best. They could never get on until they had an established number of agricultural implements. No farmer was a good farmer who had not a high shaft upon his premises, and a good steam engine below; it was folly and a waste of money to use man's power when you can get horse power (Hear, hear). And

it was equal folly to use horse power when you can get steam power (Hear, hear). Because a man costs as much to keep as a horse, and which will do four times the amount of labour; a real horse costs twice as much as a steam-horse, and sometimes three times as much (Hear, hear). He knew some gentlemen who were using steam power; he intended to do so himself, and he was sure he had acted with a great want of calculation in not having used it before. Another principle of his was, to use those implements that are (never mind how many) provided for agricultural purposes, that is to say, he never used a hand hoe when he could use a horse hoe. That was his principle, for he thought it was a folly to pay for the use of a hand hoe at the rate of 4s. 6d. per acre, when he could get the same work done by Garrett's horse hoe at 1s. 6d. Another principle of his was to use brick and slated buildings, of iron, which are cheaper to the tenant and the landlord, than buildings composed of boards, thatch, and poles. He could not agree with his friend Mr. Warnes, who made his bullock boxes at 30s. each, because he heard that, in the course of a year or two, the water came into them everywhere, and all tumbled to pieces. Another principle of his was to cultivate deeply, for every hour convinced him that deep cultivation was one of the farmer's greatest profits. He said he had been called by some gentlemen (and he dare say by some in that assembly) an extravagant farmer. But he said he could not afford to farm as a great many gentlemen do in this and other parts of the country; he could not afford to use a machine, which when empty was a load for one horse. He could not afford to have hedge-rows on his farm, for he had removed three and a half miles of them, and a nice little bit of ground he found they had covered. He could not afford to have bad roads, to strain a £30 horse, which he had often seen done. The quantity of seed sown on his farm was next alluded to, which was one of his great and important principles; he said he hoped some of the gentlemen he saw around him would come over and see his farm in the growing season (but when that would be he did not know), and form their own opinions, and then they could say whether a sufficient crop was grown from four pecks of seed wheat per acre. In the last year some individuals in that room saw 80 acres of wheat on his farm nearly the whole of which was produced from one bushel, of seed per acre, and a better crop than that he had could scarcely be wished or expected from such poor land. He had now 40 acres drilled with five pecks per acre, and some with one bushel, and he had every reason to believe that the crop will be a most satisfactory one at harvest time (Hear, hear). What he had stated on the present occasion was to

show gentlemen facts, which he always thought were better than mere opinions (Hear, hear). He had one acre of barley dibbled with three pecks and a half, and every person who had seen it frankly admitted that there was a fair plant, and enough. Now, in so great a national question as this, especially as there were something like 24 millions of acres under corn crops annually, including beans and peas; it was a question of high national importance, especially in these times, to determine whether four millions of quarters of corn should not be wasted in seed (Hear, hear). His beans and peas were sown at intervals of 2 feet 3 inches or 2 feet 4 inches apart, and he must acknowledge that during the spring he had been very much pitted, owing to his crops looking thinner than those of other persons; but somehow or other he always found that at harvest time they were average crops, and so created a very different feeling in the minds of those who had pitied him. The question as to the quantity of seed sown must be some day settled; it, however, remained an open question, and he did hope that, from what he said, some of the gentlemen present would sow an acre on their lands of wheat, barley, oats, beans, and peas, with a moderate quantity of seed, and then compare them with the rest of the crops upon his farm, and then of course he would, as a sensible man, adopt that plan which proves to be the most profitable. The profits made in agricultural pursuits are not very great (Hear). There was not a sufficiency of implements generally used in agriculture ("Hear, hear," from Mr. Allen Ransome, which caused much laughter). He (Mr. Mechi) had been highly censured by numerous individuals for having so many implements; but he could honestly and truly say that he had not one that was not constantly required. He should like to see a number of good instruments let out, the same as drills were, on moderate terms, so that small farmers might have the use of them without investing their capital in the implements themselves. He had been told that his system of farming was not profitable; but when he told the gentlemen he saw around him that he had grown on a farm of 170 acres 300 quarters of wheat in the past year, and he hoped to do so this year, they would not then think that it looked very much like unprofitable farming. The price of wheat this year, he said, had helped him; and he also said that, as a landlord, he had derived only 3½ per cent., and an interest as a tenant farmer of 10 per cent. for the money laid out (Hear, hear). He might be able to conduct the business of his farm at a much less expense than many of his neighbours; he had very few weeds, which he attributed to the fact of having subsoiled his land; that was the way to get rid of weeds (Hear, hear). There would be a great faci-

lity of communication if each point of a farm was attainable by good roads, as he had on every part of his farm. The roots of trees and fences cost him very little, for he had none (Hear, hear). He thrashed out his corn with a machine, and he found that it was the cheapest mode. He carted to market six quarters of corn in a one-horse cart; that was much cheaper than sending three or four horses in a line in the front of a waggon. He saved a bushel of wheat on every acre in seed, and in oats and barley he saved three; these were all matters of consequence, and he was certain there were many wastes in other ways. He did not approve of the washing and mangling and drying of dung heaps. He made no dung heaps, but ploughed the land, and put upon it the manure, and by means of a scarifier interwove the manure with the soil. He did not chop any haulm, or mash or break any weeds, for they were useful to burn (Hear, and laughter). They only stocked the stubbles, which he scarified and harrowed to prevent his having a stock of weeds, which, if he did not do, would employ a labourer for the next seven years to clear away. It was a gross neglect of farmers to allow stubbles to remain upon their lands; although, fond as he was to see a nice high stubble for partridges, he never allowed any upon his farm; it was wrong to allow them, for the weeds only dropped their seeds, and afforded a stock for years to come. If the remarks he had made as to the manner he managed his farm were open to censure, he was open to conviction (Hear, hear). He did not presume to set himself up as a better farmer than other persons, but he was always anxious to impart to others the benefits he had himself received, and was always ready to find out what they were doing; and if they pursued better plans than his own, he was always ready to adopt them (Hear, hear). In the course of the last autumn he had burned 1,600 loads of earth, and by the wheats and clover which had received its benefit a remunerative proportion of profit had been returned to him. He had now concluded his very long story, and he would beg to thank them for the very great patience with which they had listened to him; he should be most happy to hear their various opinions on different points—particularly on “drainage.” In his mind that was an essential question. Mr. Mechi concluded by saying he had given them many facts which he considered to be worth more than any opinion he could offer. (Applause, which lasted for several seconds).

After a short time had elapsed,

Mr. MECCHI again rose and said, if any gentleman present had tried his principle of deep drainage, he should very much like to hear their opinions upon it, whether they succeeded or not.

The Rev. JAMES COOK, Semeur, rose and said it had succeeded, most decidedly, with him.

Mr. EDWARD COOK, land-valuer and auctioneer, from Stratford St. Mary, alluded to that part of Mr. Mechi's speech where he spoke of the tenant's rights, and said sufficient had already been said upon that point to induce every person present to sign the petition after the meeting was over. He had had great experience in the transfer of property from one tenant to another; and he had often seen the widow of a man, who had been left with a family, and in almost abject circumstances, owing to the fact that her husband had employed all his surplus capital upon the farm in improvements. He agreed almost *in toto* with Mr. Mechi's speech; but he would ask him, when they had got rid of all the fences, and used machinery, as recommended by that gentleman, what they were to do with all the labourers? (Hear, hear.)

Mr. MECCHI said his (Mr. M.'s) bailiff, who had been on the farm for a great many years, told him that he has had sixpence change out of £2 after paying for the week's labour on that farm; but now the average working labour on the same farm for the last twelve months has amounted to from £7 10s. to £8 10s. per week. It had been proved in the House of Commons by the most practical men that the more machinery was used, the greater is the amount of labour employed (“I don't believe it,” from Mr. Cook).

The PRESIDENT next introduced

Mr. ALLEN RANSOME, who, in the course of one of his humorous and talented speeches, bore out the statement of Mr. Mechi, as to the question that where the most machinery was used upon a farm, there the labour increased in proportion. He admired the speech of Mr. Cook, especially as he was the first to take into consideration the comforts of the agricultural labourer, who had a right to derive his support from the land he helped to till (Hear, hear). If gentlemen would take the trouble to make inquiry into the subject, to ascertain whether or not, in their immediate neighbourhood, the greatest manual labour was used upon farms where the most machinery was used (Hear, hear), he thought they would find such to be the case. He did not wish to put out of sight Mr. Cook's objection to the use of machinery, and he therefore hoped that gentlemen would make inquiry for themselves; and after their having done so, he should be very glad to hear, at a future meeting, their opinions upon the question, who, he doubted not, would find the result of their investigation to be just as he had stated (Hear, hear).

The PRESIDENT proposed that they should again turn to the subject of drainage, and he called on Mr. H. Sallows to address the meeting.



Mr. H. SALLOWS, of Semer, said he did not think with Mr. Mechi that the drainage question was a settled one; and that was also the opinion of many gentlemen at his end of the room (Hear, hear). Several of his friends who were sitting around him said they had drained at a depth of 24 inches, 30 inches, and others at 40 inches, all of whom told him that each of those depths laid the land dry (Hear, hear). It was not an exactly settled question with him (Mr. Sallows) as to whether draining to a depth of 30 inches was not so good as draining a depth of five feet.

Mr. BOBY said he felt deeply interested in the subject of drainage, but he must admit that he thought, with Mr. Sallows, that the question was by no means a settled one. After thanking Mr. Mechi for the information he had given on the subject, he said he was in favour of deep draining, but still he remained sceptical on that point.

The PRESIDENT asked Mr. Boby at what width his drains were made?

Mr. BOBY said that was a question he could not answer, for that depended entirely upon the nature of the subsoil (Hear, hear). The greatest distance, he believed, was twelve yards; and he believed he might have gone a greater distance to advantage.

Mr. MECHE asked what was the size of the pipes used?

Mr. BOBY answered that he had used 1½-inch pipes, known by the name of "donkey-proof."

Mr. MECHE: What is the price of pipes in your neighbourhood?

Mr. BOBY: Twenty-one shillings per thousand.

Mr. CALEB KERSEY spoke in favour of fleet-draining, and ridiculed the notion of some people, who allowed pollard and other trees to stand upon their farms. He considered that every tree upon a farm cost the farmer a shilling a year; so that if he lived upon one farm for 25 years, and there were a thousand trees upon that farm, if they were to calculate the interest and compound interest upon the cost of these trees to the farmer for the time he had mentioned, that would amount to no small sum (Hear).

Mr. H. MOORE had drained on his farm to the depth of 32 and 42 inches, at 12 yards' distance; but he could not tell which drain would answer the best. The system he had pursued for the last 12 years had been to lay his drains at a depth of 32 inches, and 12 yards apart. It was only during the present year that he had drained to a depth of 42 inches, so he could not tell which would answer the best.

Mr. BLOOMFIELD, of Monewden, said he had been induced to adopt Mr. Mechi's plan. He had laid drains in a hill from 40 to 42 inches in depth. It had cost him a great deal, on account of having

to use a pickaxe to get through the gravel; they knew they could not use the pickaxe without great cost. In making the drains they had to break through gravel, after which they had found clay, and then a bed of gravel again; but although he had drained at great cost, he thought he should be remunerated for his outlay. He had land which had produced little or no grain; but since it had been drained, he thought it would produce corn as well as any other part of the land (Hear).

Mr. MECHE said he had cut 80 miles of drains upon his land, 2 feet 8 inches deep, filled up with pipe and stones, 12 feet apart. The expense had been £10 per acre; but then he had to cart stones some miles; and he said he had recently drained land 5 feet in depth, or upon an average of 4½ feet, 50 feet apart, by which his lands had been drained quite as dry, and had cost him only 30s. per acre, reckoning the cutting of the drains at 6s. per score, the pipes costing 12s. per thousand. The flat land which he had drained was in a very unsatisfactory state, but was now rendered perfectly dry, at an expense of 30s. an acre.

After a few remarks from Mr. BOBY,

Mr. J. RAND said his talented friend had been courting questions, and he would take the liberty of putting a question to him. They knew, from what they had heard, seen, and read of Mr. Mechi, that he was a good friend to the agricultural labourer, whose interest he had at heart; but he would ask that gentleman how he managed to get his draining done from 4 to 5 feet in depth for 6s. a score, and how the labourer could get bread at that rate was a puzzle to him (Hear).

Mr. MECHE said upon an average men earned 12s. per week, and frequently in draining 13s.; the men worked by the piece. The average depth of his drains was 4 feet—that is to say, 5 feet at the hills, and 3 feet at the ditches. The men opened the drains 16 inches wide at the top, the bottom of which was not under more than 1½ inches, so that but little earth had to be removed from the bottom, which was one of the great mistakes made in draining. His men had small beer given them, and the customary wages of the country, which he had already stated.

Mr. KERSEY commended the new system of draining, and spoke of a peculiarity in the soil of one part of his farm, which he described, and wished some gentleman to explain.

Mr. RICHARDS, engineer on the Bentley to Hadleigh line, said in reply, he once had to contend with a stream of water which was as large round as his head, and which so overflowed the works in which he was concerned, that he had thought of resorting to steam-power to get rid of it; all manual labour had been abandoned. The



earth was examined to see if they could not find an absorbent. After a little examination they found a stratum of sand at a short distance; they tapped the earth, and the flow of water by that operation was diverted. The field in the occupation of their president, which that gentleman said he had not been able to drain, might, he thought, be drained by pursuing the same plan which had been adopted in the case he had spoken of.

Mr. HAWKINS then rose to reply to the speech made by Mr. Mechi, who, he said, had been talking about one kind of soil, while he (Mr. H.) had been talking about another. Both had advocated different depths for drains to be laid; and he contended that, although five-foot drains might be required to effectually drain some lands, that was no reason why other lands could not be drained, and effectually so—at half that depth.

After a short time had elapsed,

Mr. HAWKINS again rose, and spoke at some length in no very high and flattering terms of the Agricultural College at Cirencester. No boy of his (he said), of 18 or 20 years of age, should ever be sent to an agricultural college, for they had been that evening told that they were to educate their children before they sent them to that college, and that their sons were only to go there to be taught "science." That he thought an extremely strange idea; for they might get as much science for two shillings and sixpence or six-and-eightpence at home as a boy would learn there in six months. At agricultural colleges they could

not be taught how to buy and to sell (Hear, hear); and at the age he had spoken of, a young man wanted to know the economy of the world. Mr. Hawkins proceeded to argue with much force that a home-education was to be preferred.

The PRESIDENT said, as they had one of the representatives of the College of Cirencester present, he would ask him to enlighten their minds upon this educational question.

Mr. MECHE rose, and was received amidst loud applause, which having subsided, he proceeded to answer the objections made by Mr. Hawkins; but from the length to which we have already gone, we shall be compelled to refrain from pursuing this topic.

Mr. A. RANSOME followed, supporting the College with "faint praise."

The PRESIDENT having passed a high eulogium upon Mr. Mechi, Mr. Hawkins, and other gentlemen, for the part they had taken in the discussion of drainage, of entail, of "Tenant-right," and of education, he said he was extremely happy to see present the rector of Semer and the curate of Haddleigh (Hear, hear); and he would beg leave to propose the health of the Rev. Mr. Piggott, whose support and patronage the agriculturists of the neighbourhood were always willing to receive (Hear, hear).

The Rev. Mr. PIGGOTT briefly returned thanks.

The health of Mr. Mechi was drunk, and that gentleman acknowledged the compliment.

The meeting broke up shortly before 11 o'clock.—Yarmouth Chronicle.

## HOUSE-FEEDING SHEEP.

I have two houses for feeding sheep, the one containing 140 stalls, and the other 150. My system has been now several years in operation, and answers my fullest expectations.

The great principle upon which I relied, when I commenced it, was that safe and certain one, that in proportion as an animal is kept warm, clean, well fed (in other words, comfortable in every respect), it will improve in flesh and in fat, and will be likely to repay the attention of the feeder. This principle had been safely applied to other animals—to the ox, the swine, the horse, the dog—to many of the wild animals—and what furnished a still stronger illustration, to birds, for the careful housewife invariably coops her poultry. The ordinary process of reasoning assured me that the same causes which were operative upon other animals would be as certainly operative upon the sheep, and the result has fully justified the opinion.

My sheep are confined in stalls, the dimensions of which I need not give, because it is obvious that they must be regulated by the ordinary size of the breed to which they are to be appropriated. It is enough to say that they should not be so large as to enable the animal to turn round and dirty the trough. Each sheep is confined by a leathern collar, attached to a slight chain (of the size of a small dog-chain), furnished with a couple of swivels, sufficiently long to secure comfort to the animal, but not long enough to hang back beyond the division of his stall, and to interfere with his neighbour. At the head of each sheep is a trough, for the purpose of holding turnips, at one end of which is a division for chaff, bruised corn, linseed-cake, or other food of the kind. Above the trough is a small rack for vetches, clover, or other long food.

In one of my houses a small cast-iron water-trough is appropriated to every two sheep, the en-

ture number of troughs being laid upon a level, and supplied from a tank furnished with a ball-cock.

Under each row of animals is a receptacle for the manure, formed of brick laid in cement. It is about two feet deep, and as much in breadth, and is covered by an oaken grating. A receptacle of these dimensions requires emptying about once in ten weeks. The sheep stand back to back, with an interval between the rows sufficient to allow the barrows, for feeding and for carrying away the manure, to pass freely through the house; and this passage is laid so far below the level of the gratings as to admit of any dirt dropped in the path being swept into the manure-tanks on either side.

The whole of the openings in the stalls are secured by shutters, which in cold weather are closed entirely at night; and which are opened, more or less, according to the weather, during the day.

Gypsum is occasionally scattered along the paths, and swept into the tanks; and, in the absence of gypsum, peat or other vegetable ash, which we find answer a good purpose.

So essential do I consider warmth, that, if I was in a coal country, I should be inclined to regulate the heat of my ox and sheep houses, as we do that of our conservatories—by artificial heat; and I think it probable that the feeder would be repaid by glazing the openings left for light.

My sheep are generally very healthy, and thrive fast; but in this respect they differ very much. In some very rare instances individuals have gained a pound a day live weight. In many instances the average gain, upon a large number, has exceeded three pounds a head per week, but the more general average is about two-and-a-half pounds. It is obvious that the breed and quality of the sheep,

the age, the sex, the season, the weather, the food, are all involved in this question. And so in reference to the time occupied in making out the sheep for the butcher. Upon this point it is enough for me to say that the advantage of stall-feeding over the open fold is immense; and it will be of course greater or less in proportion as the farm is one in which the soil and the exposure are more or less favourable to the well-doing of stock, and to the feeding-off the turnip crop.

The manure is of first-rate quality, and especially valuable for the drill; not inferior, as I think, to the best guano, made as it is under cover, and containing as it does all the chemical properties of the urine, in admixture with the solid manure. My usual custom has hitherto been to use it with the addition of some bone, either in the raw state, or recently in that of superphosphate. I may add that under this system the growth of wool is very rapid, fully corresponding to that of the carcass.

I have thus told you everything which occurs to me as useful to be known by those who may wish to carry into effect my method of feeding.

RICHARD SIMEON.

Swainston, Isle of Wight, Feb. 22.

W. C. Spooner, Esq.

There are now before the public the details of three methods of shed-feeding sheep—the system of box or pen-feeding adopted by Mr. Huxtable, the method of stall-feeding practised by Sir Richard Simeon, Bart., and the plan of having moveable houses in the turnip-field recommended by other gentlemen. Each system seems to have peculiar advantages as well as disadvantages, but all agree in the economical manufacture and expenditure of the manure.

W. C. SPOONER.

—Gardeners' Chronicle.

#### MARTOCK DISTRICT FARMERS' CLUB.

At the last monthly meeting the President being absent, Mr. T. Clark was voted to the Chair.

The SECRETARY stated that he had received from Mr. Shaw, of the Strand, a copy of Mr. Milner Gibson's Bill, for the collection of agricultural statistics, with a request that the club would consider the same at the earliest opportunity. The bill provided that the Registrar-General of births, deaths, and marriages should have the management of the concern, and the appointment of agricultural enumerators; that on or before the 10th of July next, and on or before the 1st day of June in every succeeding year, a blank form should be left at the house of every occupier of more than three acres of land, which he would be obliged to fill up with a detailed statement

of the uses to which the whole of his farm was applied, the description of crops growing on it, and the number of bullocks and sheep in his possession; that any one neglecting to fill up this paper should be fined £1 for each offence; and that the expenses of the scheme should be paid out of the poor rate, which he thought unfair towards agriculturists; for the whole of the community would be benefited by the information which the collection of agricultural statistics would afford. He was sorry Mr. Francis was not present to introduce the question he had given notice of on that subject, and in his absence he thought it would not be right to discuss the advantages of the Bill.

After a few observations, it was agreed that the

question proposed by Mr. Francis, and the discussion of the Bill, should take precedence of all other matters at the next meeting.

#### MANAGEMENT OF THE TURNIP CROP.

Mr. J. D. CAVE then introduced the question he had given notice of—"On the management of the turnip crop." He was precluded from taking a very elaborate view of the subject, as he had not known until very recently that it would occupy their attention that evening. He thought it a very interesting and important one, when they considered that by the introduction and large cultivation of the turnip thousands of acres that were before merely barren wastes, capable of affording only a scanty herbage to a few half-starved sheep, had been turned into some of the most productive land in the kingdom. When they considered that in Norfolk, where formerly they grew only some miserable crops of rye, the land was now made to produce alternately excellent crops of wheat, barley, and green crops; also that in Lincolnshire, which was once a barren heath, where a land light-house was erected, to guide travellers over the dreary waste, were now located some of the most intelligent, wealthy, and prosperous farmers in the world—when they considered that these things had been brought about by the spirited and successful growth of the turnip, he thought they would all admit that the cultivation of that useful root was an important subject for discussion. He should divide his subject into four parts: first, the preparation of the soil; second, the manuring and sowing; third, the hoeing and subsequent management; fourth, the feeding or storing of the crop.

First—The preparation of the soil. A great many farmers, especially on light soils, grew a crop of rye or vetches after wheat, previous to swedes. Now he thought that might answer well on soils that were easily pulverized; it would not do for others of a heavier description; and his opinion was, that if the system was followed in their neighbourhood, what would be gained in the feed of the vetches would be lost in the crop of turnips, as it would delay the season for working the land to too late a period in the spring. The best method for them was, he thought, to plough the stubble at a good depth as soon after harvest as possible, and let it remain until thoroughly dry in the spring; then to cross-plough the land, if level enough, and use the scarifier and harrow upon it. He considered that harrowing and scarifying was preferable to too much ploughing, as it pulverized the soil without exposing it too much to the drying influence of the sun, which was the sure effect of turning it about in warm weather. It was safe to grow a crop of vetches previous to the common turnip, and that was the general and best mode.

Second—The manuring and sowing. He should

recommend that, except for a distant field, or where manure fell short, a pretty good sprinkling of farm-yard dung should be applied to all land intended for turnips; and that, in addition, a small quantity of guano, or bones dissolved in sulphuric acid, should be applied by the manure drill with the seed. He considered it a good plan to apply the dung to the land previous to the winter, where practicable; but when this was not done, it should be ploughed in with the last furrow. Drilling was much to be preferred to broad-cast sowing, because the manure could be applied directly under the seed, which would push forward the young plants at the earlier stages of their growth, and which was a point of great importance. He preferred drilling swedes one foot nine inches apart, because they could then be horse-hoed; they were much behind other districts in this particular—they did not use the horse-hoe enough. In Scotland, and in the northern counties, they invariably put their turnips on the ridge, as mangold wurtzel was grown in that neighbourhood; but he did not recommend that practice: it might answer very well in that part of the kingdom, where a much larger quantity of rain always fell in the summer than they were accustomed to; but he thought drilling on the flat best for their neighbourhood. He should say nothing concerning broad-cast sowing, as he believed that practice was now nearly exploded among all who were desirous of growing heavy crops; for if they had no pulverized manure to apply, he still thought it preferable to drill, as they could be hoed with less trouble. Any workman could clear the land between the rows if a horse-hoe was not used, and an experienced person would only be required to single out the plants. Swedes should be drilled at least eighteen inches apart; and if common turnips were required to be drawn for cattle, or fed off early, they should be placed at the same width; but where turnips were grown after peas, flax, &c., and were intended for spring feed, they should not be put in wider than fifteen inches, for if they came too large, they were apt to rot. While on this part of the subject, he begged to draw their attention to an interesting fact, which had been elicited by experiments where bones dissolved in sulphuric acid had been applied for turnips. It was a singular but undoubted property of that mixture, to bring turnips to maturity from a fortnight to a month earlier than any other manure tried against it. Such being the case, he apprehended that by drilling turnip seed into pea stubbles, with a fair dressing of this manure, they would get roots equal in size to those sown after vetches, and even after wheat; if the land was well pulverized, he thought they would get them equal to those grown at present on pea stubbles; and if so, it would certainly be more advisable to grow turnips rather than

vetches after wheat on land intended for swedes, as they would be fed off sooner in the spring. This was one great point which Mr. Huxtable dwelt on at the late Sturminster meeting; he said that by applying a large quantity of manure by the drill, he could grow a crop of wheat-stubble turnips, of twenty tons of tops and bulbs per acre. Now, if they could only grow half that quantity, it would be a very valuable addition to their spring feed.

Third—Hoing and subsequent management. In their neighbourhood it had been the custom, until within the last three or four years, to sow all the turnips broad-cast, and then they were hoed by experienced hands once, and sometimes twice. Within the last few years, however, drilling had been practised; but farmers had not made use of that system to alter the old plan of hoing. Now, he thought it would be much better, as he had before said, to drill them wide enough to admit the use of the horse-hoe. The turnip hoeing came generally at a very busy time, and it was not uncommon to see a crop much injured, because labourers could not be spared to attend to them; but if the horse-hoe was used, the principal part of the weeds could be destroyed by it, and the remainder hand-hoed at convenience. He had purchased a horse-hoe, which he had used advantageously this season for beans and peas, and which he intended to use for turnips.

Fourth—The feeding or storing of the crop. It was his opinion that whether turnips were given to bullocks at home, or to sheep in the field, they should go through the turnip cutter. With regard to storing, he had always found the best plan to be that of putting them between two rows of hurdles, and thatching them over.

Mr. JOB HALLETT observed that Mr. Cave had not exactly given them the history of the turnip; he had not informed them of the difficulties the noble lord who introduced the swede into England had, in persuading his tenantry to cultivate it. It was introduced first into Norfolk, and from thence into Devon, and he thought it had flourished as much in those counties as in any part of the kingdom. His experience was contrary to Mr. Cave's respecting the growth of a green crop previously to swedes; he could generally get his land to work quite as well, if not better, after tares or rye, as where it had been fallowed all the winter. The land in his neighbourhood was often too wet for a winter fallow to do it any good. He generally grew a green crop previously to mangold wurtzel; but this year he had not done so; he had fallowed the land all the winter, and the consequence was, he had not until that very day got it to work so as to please him, although he had given it five ploughings. He did not think that what was gained by the tares, was lost in the succeeding root crop. A good crop of tares on his

land was almost as valuable as a crop of swedes. If he could grow good tares and middling swedes, it was better for him than a good crop of swedes alone. Mr. Cave had observed that it was a good system to haul out the dung from the stall fresh, and plough it in; but he would maintain that the best plan of managing farm-yard dung was either under cover, or in a bank; it would often be injurious to his land in the winter to haul dung on it. Drilling was much better than the old fashion of broad-cast sowing; but there was another method, which he thought could be used to advantage on a small scale—he alluded to dibbling. By dibbling they had all the manure under the plant, and they could put any of their workpeople pulling out the plants and hoeing the land, and could do without experienced hands altogether. One man and three boys could pull out and hoe an acre and a-half per day. He considered the plan not expensive at all for small growers. He had tried many different ways of storing turnips, but he had been led to adopt the method of putting them between hurdles as best. His plan was to put two wreath hurdles on each side, long ways, and then connect them with one across, to keep them together. He also thought that by placing hurdles across at intervals, the air was admitted into the heap, and there was not so great a likelihood of the turnips rotting. He covered them over at the top with straw, and thatched them.

After a few observations from Mr. W. DARBY and Mr. J. D. CAVE, the discussion was adjourned, and a vote of thanks having been given to the Chairman, the meeting separated.

PRICE OF GRAIN IN 1800.—By the returns of Newbury market in the month of July, in the above year, and which appeared in the Reading Mercury at that time, we find that a most extraordinary fall in the price of grain then took place. It will be seen by the following quotations that in the course of one month the inferior descriptions of wheat fell from 120s. to 40s. per qr.; other sorts from 163s. to 92s. per qr.

July 3.	per qr.	July 31.	per qr.
Wheat ..	120s. to 163s.	Wheat ..	40s. to 92s.
Barley ..	52s. ,, 64s.	Barley ..	26s. ,, 36s.
Oats ....	50s. ,, 55s.	Oats ....	22s. ,, 32s.
Beans ..	70s. ,, 80s.	Beans ..	68s. ,, 72s.

The Newbury corn-letter of July 31 contains the following remarks: "The market on Thursday was very large, and wheat £10 a load cheaper. A farmer not five miles from Marlborough has declared that he shall now lose upwards of £500 by having withheld his wheat from market, and absolutely refusing an enormous price for a great part of it. He has now by him two ricks, seven loads and five bags of old wheat. He has sworn never again to dine at an ordinary, but carry his crust in his pocket to market, there mumble it quietly under a pent-house, and for ever deplore his folly, avarice, and extortion."—Reading Mercury.

MR. OSBORN'S PATENT SYSTEM OF STEAM PLOUGHING.

(FROM THE MECHANICS' MAGAZINE.)

The practicability of applying steam power to the plough has formed a problem of some thirty or forty years' standing, and has engaged the attention of many ingenious men; but to this day it remains unsolved; ploughing by steam is practised nowhere. Yet, to assume that the thing is impossible, would be to admit a limitation to the powers of steam and the resources of mechanical art, strangely at variance with the all-subduing character of their past triumphs. No! it cannot be that the thing is impossible; it can only be that the day of its success has been deferred.

The same mighty power that has bid defiance to the winds and waves, cannot be destined to be forever set at naught by either turf or clod. As it has ploughed the seas to their farthest bounds, so will it yet ere long very surely plough the land throughout its length and breadth, over valley and plain, up to the highest hill-top.

That there would be a real and great gain to the country from the substitution of steam for horse power in ploughing, is capable of easy demonstration. But perhaps we cannot do better than quote what has been said on this head, by the author of the invention we are about to bring under the notice of our readers, in a paper lately addressed by him to the council of the Highland Society:

"At this moment, when a scarcity of food is spreading dismay, and actual famine is abroad in many places, it may not be thought an impertinent inquiry, What are the most efficient and cheapest modes of tilling the soil? or, whether there has yet been applied that amount of skill which the advanced state of science has introduced in the sister arts?

"It will, I apprehend, be found that the art of tillage has not kept pace, from whatever cause it may have arisen, with other branches of manufactures produced from raw materials, the earth being of all raw materials that which should claim the deepest consideration in its mode of treatment, as affecting the interests of mankind most nearly.

"As in most of the arts of life we find there have been progressive steps, so, in the art of cultivation, we find the circumstances are parallel, the first step being limited to human labour; the second, that of animal power; but the third, that of mechanic power, being wanted to complete the parallel.

"The circumstances under which steam power appears applicable are those in which, from the in-

efficiency of the present agents, land, cultivated by horse-labour, or exclusively by human-labour, does not remunerate the occupiers; and the conditions, a surface free from rocks and stumps, such as are met on lands reclaimed from the sea, rivers, lakes and fens, meadows and commons, and generally where the inclosures are sufficiently large to admit extended operations.

"In offering any new system, it is requisite to prove it better than the old.

"1st. The fact will generally be admitted that where steam power has been employed, and where there are facilities for obtaining fuel, it supersedes all other agents for effect and cheapness.

"2nd. But in comparison with horse-labour this is especially the case; for if we consider the period of productive labour, set against that of rest and unproductive labour, most startling results will be exhibited. Thus, horses are fed and tended 365 days of 24 hours, or 8,760 hours a year; but they work only 300 days of 8<sup>h</sup> hours, or 2,400 hours a year.  $8,760 - 2,400 = 6,360$  hours unproductive. Assuming McCulloch's numbers, there are about 1,200,000 agricultural horses employed in Great Britain, which, at 25*l.* per head for maintenance, is 30,000,000*l.* sterling per annum paid by the agricultural body for horse-keep, the portion of which unproductive will be found to be 21,785,306*l.*, or, as 8,760 hours : 30,000,000*l.* : : 6,360 hours : 21,785,306*l.* Here, then, is one item of the farmers' stock, on which they sustain a palpable loss of 21,785,306*l.* per annum, expended for the production of manure! Is it not, then, worth inquiring whether other less costly agents can be substituted?

"3rd. The economy of time does not claim that degree of attention on the part of agriculturists which it would seem to merit. The hours of daylight in each month are as follows:

	hrs. m.		hrs. m.
January . . . . .	230 46	July . . . . .	497 9
February . . . . .	285 54	August . . . . .	449 37
March . . . . .	366 46	September . . . . .	377 49
April . . . . .	405 6	October . . . . .	328 43
May . . . . .	485 15	November . . . . .	260 50
June . . . . .	494 19	December . . . . .	235 42

Total 4,419 hrs. 21 m.

"Of these 4,419 hours' daylight, horse-labour is

\* I assume eight hours as a mean throughout the year.

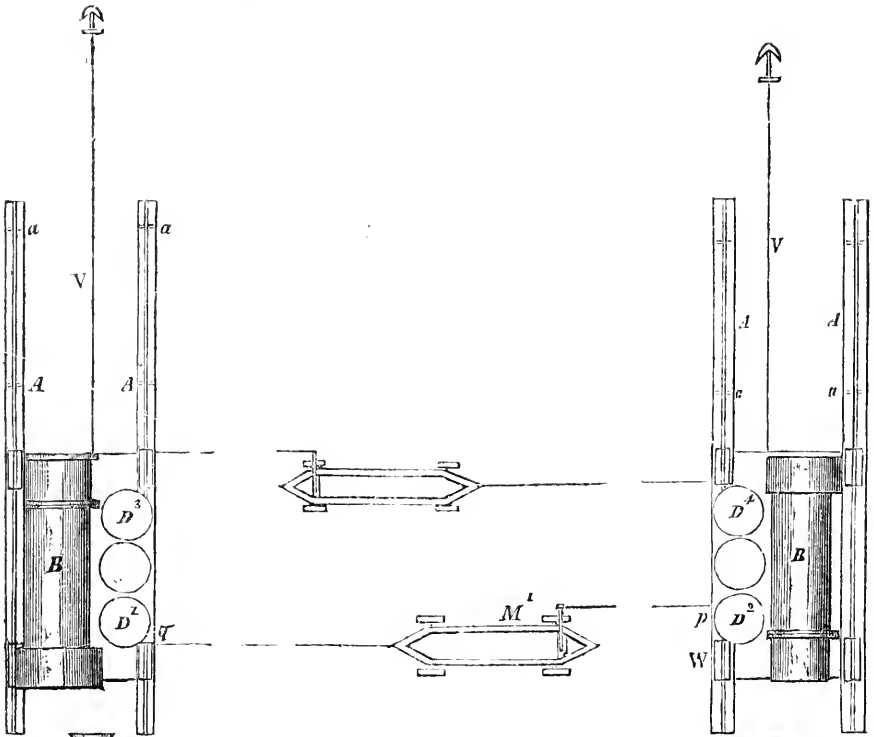
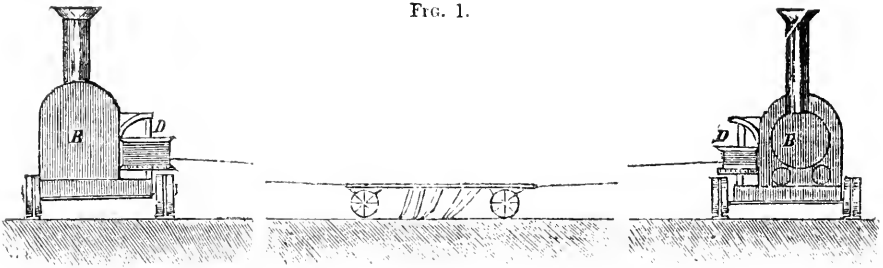
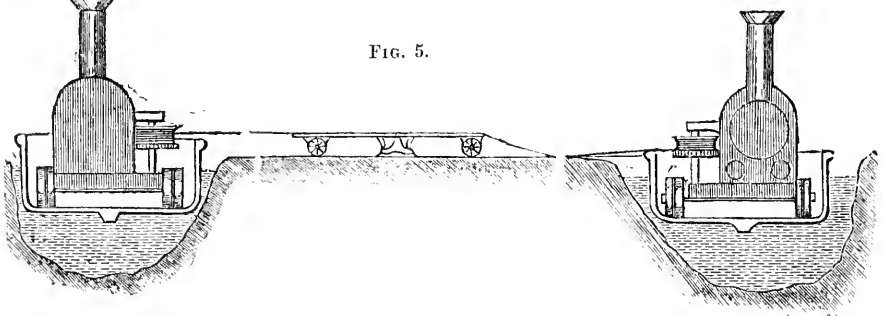


FIG. 5.



MR. OSBORNE'S STEAM PLOUGH.

FIG. 3.

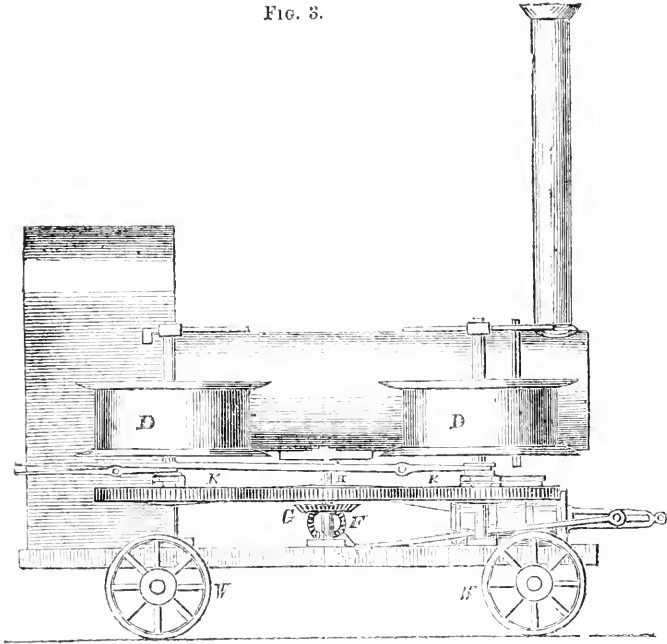
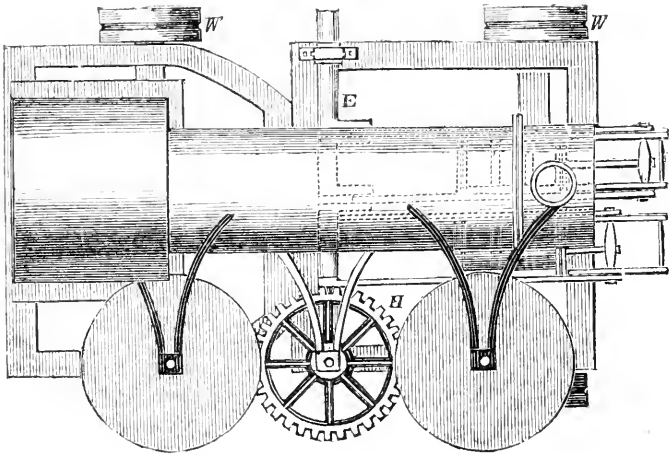


FIG. 4.



only available for 2,400 hours, and human-labour the farmer cannot afford to employ as a substitute. In the long days of summer, spring, and autumn, he has not often sufficient animal power to occupy the time; but in winter, three-fourths of that period he is feeding stock, producing no return but manure. These are insuperable difficulties attending the employment of vital power; but mechanical power puts forth its energy when called for: it can be regulated, and, at pleasure, stopped.

“If it is desired to occupy the entire hours of

daylight—to extend the field of operations—to work up more raw material—the energy of the animal ceases after the time, but not so that of the machine. The longest hours of summer may be advantageously employed.

“The capacity of a pair of steam engines is equal to 1,000 acres of land.

“Were the whole period of daylight industriously employed in the most effective manner—that is, by the employment of machinery—the demand for human labour would be augmented in the exact ratio

of the increased time, multiplied by the augmented force of machinery. And this is demonstrated in the power manufactories, where, since the employment of machinery driven by steam, the employment of human labour has increased a hundred fold.

"In extending the field of operations and augmenting the demand for human labour, production would augment with accelerated pace. We might then expect to see the supplies of the necessaries of life in profusion, and to hear no longer the agriculturist exclaiming against the ill success of his speculations, and the oppressiveness of the burdens on land, the weight of the poor's rates, &c.

"Then, in short, we might fairly expect to see agriculture assuming that elevated rank in the sciences and industrial pursuits which, from its immense importance to the welfare of the country, it ought to fill."

The plan of steam ploughing, proposed by the author of these sensible and striking observations, seems chiefly distinguishable from those which have preceded it in the employment of two engines and two ploughs for each course of ploughing (instead of one of each); each engine being fitted with two drums and ropes or chains, which cause a simultaneous and reciprocating progression of the two ploughs in opposite directions. The following details we extract from Mr. Osborne's specification :

*Firstly.*—To till, by means of steam or other power, an open field or piece of land, not intersected by roads or canals, or wide ditches, I make use of two locomotive engines, similar to those used on railways, except that the power of the pistons is differently applied. I place them on the land to be tilled, at distances of from 100 to 200 yards apart, and exactly opposite the one to the other. I cause them to traverse the land on temporary rails, laid for the purpose in parallel lines, at right angles to the direction in which the land is to be tilled, that is to say, in which the furrows are to run; and I employ the pistons of each engine to produce, by means of intermediate gearing, a continuous revolution of two drums, placed on the near side of each engine, or that side which faces the opposite engine, and on the same framework as the engine, which drums have attached to them chains or ropes, by means of which two ploughs, or other tilling machines, are simultaneously drawn in opposite directions from one side of the field to the other. Fig. 1 exhibits a transverse elevation, and fig. 2 a plan of a combination of arrangements of this description. A A are the temporary rails, which consist of hollow circular tubes of iron, or other suitable metal, of from  $1\frac{1}{2}$  to 2 inches diameter, and of from 12 to 15 feet in length, which screw endwise into one another, and rest on moveable chairs,

*a a*, which are supported by moveable wooden planks or sleepers, *b b*. B B are the engines, an elevation and plan of one of which are given separately, on an enlarged scale, in figs. 3 and 4. The bearing wheels, W W, are made with broad flat tires, having semicircular grooves in the centre, of the same diameter as the circular tubular rails, so that the engine may be moved or drawn on common roads to the place of operations, and then shifted on to the tubular rails.  $D^1, D^2, D^3, D^4$  are the drums; E is a crank shaft, worked by the pistons P P, which has on one end of it a vertical pinion, F, which takes into a horizontal bevil wheel, G, which works a horizontal cog-wheel, H, which turns in opposite directions two spur-wheels, K K, attached respectively to the axes of the drums.  $M^1 M^2$  are two ploughs; each plough is worked to and fro by means of one of the pairs of opposite drums,  $D^1 D^2$ , or  $D^3 D^4$ , and the chains or ropes attached thereto. Supposing, for example, the plough  $M^1$  to commence operations at *p*, there are two chains or ropes,  $r^1 r^2$ , attached to it, one ( $r^1$ ) in front, and the other ( $r^2$ ) behind; the former being the chain or rope belonging to the drum  $D^1$ , from which it is almost wholly unwound at starting, and the latter being the chain or rope belonging to the drum  $D^2$ , round which it is, at the same stage of the operations, nearly all coiled. On the engines being set to work, the drum  $D^1$  winds up the chain or rope  $r^1$ , and draws forward the plough  $M^1$ , while the plough  $M^1$ , as it advances, unwinds the rope  $r^2$  from the drum  $D^2$ , and brings it along with it forward to the point *q*, in order that it may be there ready for the return operation of the drum. The rear chain, or rope,  $r^2$ , is not attached directly to the plough like the other, but to an outrigger, O, in order that it may be always laid down on the outside of the plough, at a distance from it equal to the breadth desired to be given to the furrows. While the plough  $M^1$  is thus working in one direction, and laying down the chain or rope, by which it is to be worked back to the side from which it started, the other plough  $M^2$  is performing a similar course of operations in the reverse direction. When both ploughs have each traversed the ground once, the engines are moved forwards the breadth of one furrow by means of a chain or rope, V, one end of which is attached to an anchor laid out a-head, as shown in fig. 2, and the other to a drum (not seen in the drawings) connected with the crank-shaft. When again the plough  $M^1$  has ploughed up to the part where the plough  $M^2$  commenced working, the engines are moved forwards a distance equal to the entire space (say five feet), between the outerpost points of each pair of drums, so as to bring the drums  $D^1$  and  $D^2$  to the breadth of one furrow beyond the point where the plough  $M^2$  has just pre-



viously ceased its operations. And in order that the ploughs and ropes, or chains, may be correspondingly advanced, the following arrangements are adopted. Each plough is provided with an extra outrigger (laid loosely on two crutches affixed to the plough frame) of a length equal to the breadth tilled by each plough in each entire remove of the engines, and the breadth of one furrow more, which extra outrigger is substituted for the other, when the plough comes to its last course of work (in each remove), so that it shall lay down the chain or rope for the next return course on the advanced line, at which that plough has to resume operations.

Each plough again, when it comes to the end of its last course of work, is directed by the person superintending its operation on to an inclined plane, attached by hinges to the near side of each engine, which gradually raises it free off the ground, and on which it is held till the remove of the engines has been effected. And so the work goes on till the whole field has been ploughed. Rails may be laid down at once for the whole distance which the engines have to travel over, or two lengths only may be made use of, one to be always employed in

sustaining the engine, and one to be taken up from behind at each entire remove forward of the engine, and rescrewed into the front ends of the rails left on the ground.

*Secondly.*---Where the field to be tilled is bounded on the two sides along which the engines have to travel by canals or ditches filled with water of depth enough to float boats or punts, I place the engines in such boats or punts, and make the drums to slide on their axes, so that they can be raised or lowered to suit the relative levels of the ground and water. An arrangement of this description is represented in fig. 5 of the annexed engravings. Or should the field, though thus bounded on two sides by canals or wet ditches, happen to be of too great a width to be mastered at one ploughing or tilling, I make use of each canal or ditch as a substitute for one line of rails only, and lay the other on the ground, as in the case first hereinbefore provided for.

Mr. Osborne concludes by describing in his specification several sorts of ploughs proper to be used in combination with power engines on the preceding plan.

#### THE ECCLESFIELD FARMERS' CLUB.—LECTURE ON THE GROWTH OF TURNIPS.

At the last Monthly meeting of this club, after the disposal of the financial part of the business, Mr. Haywood, whose lectures on agriculture have afforded much interest and gratification to large and highly respectable audiences, was introduced by the chairman, John Jeffcock, Esq., and immediately proceeded to deliver a lecture on the growth of turnips.

Professor Haywood commenced by observing, that he proposed to offer some observations upon the growth of turnips. He had previously told them that the elementary constituents of plants were derived either from the air or from the soil; and before the latter class could be of any assistance in the growth of plants, it was strictly necessary that they should all be rendered soluble. This object was to be attained by making the soil light and porous, so that it might be freely permeated by the atmospheric air; and in the cultivation of the turnip—a vegetable substance which grew with great rapidity—it was requisite that the soil should be as light as possible, in order that its various ingredients might readily become decomposed. Some soils were naturally light and porous, as, for instance, those in the neighbourhood of Sherwood Forest; while other soils were so retentive of moisture, that air could scarcely penetrate them at all,

and consequently the decomposition was stopped. Other soils, again, might be rendered light by proper management. One way of effecting this was by deep ploughing, and bringing the clods to a fine state of disintegration. The principal compound produced by the action of the air on the constituents of the soil was carbonic acid gas, which was generated from plants in a state of decay, and which was highly important, inasmuch as it greatly assisted in the decomposition of the other ingredients of the soil. After noticing the advantage of the soil being light and porous in order to the production of carbonic acid gas, and describing the way in which carbonic acid gas rendered the constituents of the soil soluble, Mr. Haywood went on to state, not only was the potash, which was one of the most important constituent elements of plants, rendered soluble by means of carbonic acid gas, but also the phosphate of lime produced from bones. In the course of preparing fallows for turnips, it was customary to prevent the formation of carbonic acid gas by burning the twitch and so forth; but it was quite possible to gain as much by burning as was lost from the absence of carbonic acid gas, for the action of each was the same; and when the vegetable refuse was burnt, as much potash was thereby rendered soluble in water as would be by the

carbonic acid gas, the formation of which was thus prevented. After burning, the ashes of the vegetable matter were left; and the ashes being the only portion that was not drained from the soil, the whole remained as manure. The lecturer was certain that in clay soils the advantage gained by burning was very great; and when burnt in large heaps, the ashes so produced might be converted into a valuable compost for the growth of turnips, by mixing it with the urine of cows and horses. But even when soils were rendered as porous as possible, the turnip plant grew with such rapidity that it absorbed the nutritive constituents of the soil faster than they could be produced; and hence it became necessary to resort to artificial means, and to apply manure to the soil. Lime was a manure highly important in the growth of turnips. The ways in which these matters were added artificially to the soil were various. Farm-yard manure was composed of a variety of substances, and its value depended upon the substances of which it was formed, and the quantity of liquid preserved. If it was made only from straw, it contained none but the elements of that straw; if from straw combined with the refuse of turnips, cabbages, and other green crops, the straw would become saturated with the elements of these ingredients. Mr. Haywood then noticed that the elements which formed the constituents of green crops were materially different from those which formed the constituents of white crops, and hence would be seen the importance of manure being produced from vegetables of a similar character to the crops to which they were applied. It was much better to apply farm-yard manure made simply from straw, to white crops; and make use of artificial manures to turnips, similar to the constituents of which turnips were composed. He then stated that bones were the principal matter which had raised the growth of turnips to such a high state of perfection in Nottinghamshire, and it remained to be seen whether bones could not be of still further service in the growth of turnips. If bones were applied in a very minutely divided state, the organic matter began to decompose at once; and the reason why dissolved bones appeared to act so much more powerfully than when in a more consolidated form was, that being minutely divided, they readily came in contact with the plant. From bones two constituent elements were produced, namely, phosphate and ammonia; but another means of applying the phosphates to plants was by the use of guano, which was phosphate in a minutely divided state, and even soluble in water. Nothing perhaps, however, varied so much in its composition as guano, and from the application of no other artificial manure had such disappointments been experienced. This arose

from the guano being of an impure quality, or even of a fictitious kind. There were three or four descriptions of guano in the country at present. That brought from Peru was the best, and cost about £4 per ton before shipment. That brought from Africa was got gratuitously. The guano brought from the Peruvian coast had seldom been acted upon by the rain, and therefore it had not suffered decomposition at all. Now, as soon as guano comes in contact with the moist soil, it begins to undergo decay; so that, if good, it immediately facilitates the growth of turnips. The quantity of guano required to produce crops was 2 or 3 cwts. per acre. There were, however, a great number of constituents required for the growth of turnips. One very important ingredient was sulphur, which being very soluble, and liable to be washed away, should be added to the soil in very small quantities. Another extremely useful material was common salt, and being likewise exceedingly soluble, great care and precaution was required in its application. Mr. Haywood then lucidly showed that the best season for applying manure was the time of sowing; for during the summer months a much greater quantity of moisture was absorbed from the earth than descended in the form of rain, and thus there was a current upwards; while in winter far more rain fell than moisture was absorbed, and thus the loss of manure was great, a considerable portion of it being washed away; the same was the case with lime, which should be added just before seed time. After some further remarks the lecturer said, that in order to ensure a crop, it was important to have a mixture composed of phosphates, sulphates, chlorides, and all the ingredients of useful manures. This might be made of the following materials, in the proportions mentioned:—2 cwts. of bones, dissolved in 1 cwt. of sulphuric acid, and then to be mixed with about  $1\frac{1}{2}$  cwts. of common salt, 1 cwt. of gypsum,  $\frac{1}{4}$  cwt. of soot, and a small quantity of sawdust. In a compost thus formed, there would be all the elementary constituents of the turnip plant, and in the best possible form. As to the method of applying a manure of this character, it is found that the nearer the elements are to the place where the turnip is growing, the larger will the bulb become. He then related experiments confirmatory of this, and also proving the advantage resulting from planting by the hand, thus placing the manure close to the plants. There was great benefit likewise from placing the manure in with the drill; but there was some disadvantage in this method, as in hoeing some portion of the seed would be pulled out. It is a well known fact, that rootlets of all vegetable substances pass to any place where the appropriate nutriment is to be found; and the nearer the manure is to the plant,

the less difficulty there would be. There would be no loss from the manure being placed directly under the plant. There were other ways of sowing, such as by ridging-up the field first, and then spreading the soil on broadcast with a shovel. In this method there was some advantage, as the manure was not so liable to kill the seed; whereas when the manure is drilled along with the seed, the seed is frequently destroyed. The cost of the mixture above described would be about 27s. per acre. In cases where farm-yard manure was used, it would generally occasion a much greater expenditure of money both in manure and in labour, and probably there would not be so large a crop. But even if the crop were quite as good, there would be a considerable loss to the next year's crop of barley or wheat; for the portion of manure that remained for the future crop of barley would most likely not be more than one-quarter of the quantity which had originally been brought and put on from the farm-yard. Under these considerations it would be seen that it was more important to use artificial manures for turnips, and not use yard manure at all, but reserve it for such crops as those from which it had been produced; though if produced from cows feeding on turnips, of course it would be useful for the growth of turnips. The lecturer next proceeded to remark upon the value of turnips as food for cattle; and said, that in plants there were two compounds, the one called the nutritive, and the other the respirative compound—both of which were easily absorbed. In the latter were sugar, starch, gums, oils, and so forth; while the former always contains nitrogen. Thus, then, there were two classes of compounds, the one containing nitrogen, and the other containing none. In addition to these there is in plants another compound, called the woody fibre, and which is of no use whatever in the animal growth. Starch is the first constituent produced from the growing plant; and as starch is the most important constituent in the turnip—that which produces fat in animals—it is important to preserve it as much as possible. Also of the nutritive materials a considerable amount was expended in the growth of the plant. From some experiments, made with considerable care, it was found that 18 tons of Swede turnips, with chopped straw, would fatten a good short-horned heifer in twenty-four weeks. The increase in the sheep was about in the same proportion; and in this animal the increase of value, making a slight reduction for labour in attendance, must be estimated entirely as profit, on account of the quantity of manure produced therefrom; and the profit would generally amount to about £5. This was mentioned to show the real value of a crop of turnips, if it were for nothing else than food for cattle. The

value of turnips in this respect was also greatly increased by the use of linseed cakes; because in turnips the quantity of fattening material was very large compared with that producing flesh; and, therefore, if they increased the quantity of material producing flesh, the value of the turnip crop would be increased to a great extent. Now linseed cake produces a great amount of fleshy material, and thus increased the value of the animal, as well as of the manure produced from it. The lecturer then entered into some further details, showing the importance of linseed cake, in conjunction with turnips, as a food for animals, and also the quantity of butchers' meat which might be produced from one acre of turnips. He next noticed the difference of value between the butchers' meat produced from sheep and that from stall-fed beasts; and said, that when animals were allowed to run about, a great portion of starch was spent in respiration; but if they were kept at rest, very little was thus expended, and the rest went to produce fat. So that if sheep were kept up close, there would be an increase of fat produced with a less expenditure of material. Heat too was very important in producing decomposition of these materials, and taking away the matter which constituted and formed the fat of animals. Mr. Haywood then noticed that there was a mistaken idea abroad as to the increase in value of manure arising from the use of linseed cake: it was true that the advantage in this respect was great; but the principal increase of value derived from using linseed cake was to be found in the production of butchers' meat. Thus, from what had been said, it would be perceived that the value of the turnip crop was much greater than was generally imagined, provided it was properly applied; and it would also be seen that it was wasteful for farmers to let their turnip crops out for sheep feeding, &c., at so low a rate as they usually did. With regard to consuming these turnips on the land, if by adult sheep, all the constituent elements would be naturally secreted in the urine and dung, and left on the soil at the particular time of feeding; but as the constituents were left in a soluble state, nearly all would be lost before another crop was sown. It would therefore be best for the turnips to be taken home and consumed there, and the manure derived from the sheep to be afterwards applied to the land. Another advantage from taking the turnips home would be that from the sheep being at rest in the stall a large amount of fat would be procured from the animals remaining still, and not being exposed to the cold. He next noticed the laws of the materials which went to the formation of fat, and then said that if the turnips were left in the soil during the winter, when warm weather commenced early the tops would begin to

grow, not from anything derived from the soil, but from what was contained in the bulb, and this rendered the turnips much less nutritive. The quantity of starch consumed in the growth of stems was very great, which was a considerable loss to the fattening of the animals. Farmers ought not to allow the starch and sugar to be expended in the growth of the plants; but it was very important to collect the turnips the moment they arrived at complete growth, and not to allow them to remain in the ground lest the growth of the tops should consume the starch. Mr. Haywood then recapitulated the heads of his admirable lecture, and concluded by saying, that if his suggestions were carried out, there would be no more complaints about the loss sustained from these fallow crops.

We understand that the company present, amongst whom were Edward Jeffcock, Esq., F. Dixon, Esq., Wm. Fowler, Esq., John Willis, Esq., Mr. J.

Machen, Mr. Winks, Mr. Fisher (of Sheffield), &c., testified their obligations to the lecturer by moving a vote of thanks to Mr. Haywood, for his highly interesting lecture; and the chairman, in putting it to the meeting, expressed his conviction that if the professor's suggestions were adopted, the cultivators of the soil would have better crops at less expense.—In acknowledging his thanks, Mr. Haywood said that he was sorry to observe a certain degree of apathy as respected the application of science to agricultural operations. He was sure that if farmers would give themselves a little trouble, they would soon see the advantages to be derived from following his advice; and it would be well if they would come forward at these meetings, and state the results of experiments they had made.—After a vote of thanks to the Chairman, the club separated at ten o'clock.

#### INSTRUCTIONS AND RECIPES FOR THE USE OF INDIAN CORN.

The following are extracts from a pamphlet published for the Government at Dublin, and show the various modes of cooking Indian corn in America:—

*Method of Grinding Indian Corn.*—The grain Indian corn is sometimes very hard, and is called flint corn, but all the mill stones used for grinding other grains may be used for Indian corn. This grain being larger than wheat, it is necessary that the stones should be kept wider apart and not driven too rapidly, for when the motion of the stones is too rapid the meal becomes heated and injured, and the cause of injury to the meal is its being ground too fine—"it kills or deadens the meal."

##### VARIOUS MANNERS OF USING INDIAN CORN AS HUMAN FOOD.

Suppawn, or porridge, that is to say, boiling milk, broth, or water, thickened with Indian corn meal, in the same way that people in the south of England thicken them with wheat flour, and that people in the north thicken with oatmeal. Put into water, this is a breakfast, supper, or dinner for little children; put into milk or broth, it is the same for grown people. It is excellent in all disorders arising from bad digestion. In milk or broth it is a good strong meal, sufficient for a man to work upon.

It takes about three pounds and a half of Indian corn flour to make porridge for ten persons, less than half a pound of corn flour for a meal for one man, and a warm comfortable meal that fills and strengthens the stomach. Three pounds and a

half of wheaten flour would make four pounds and a half of bread, but it would be dry bread, and bread alone, and not affording half the sustenance or comfort of the porridge.

*Mush.*—Put some water or milk into a pot and bring it to boil, then let the corn meal out of one hand gently into the milk or water, and keep stirring with the other, until you have got it into a pretty stiff state: after which let it stand ten minutes or a quarter of an hour, or less, or even only one minute, and then take it out, and put it into a dish or bowl. This sort of half-pudding, half-porridge, you eat either hot or cold, with a little salt or without it. It is eaten without any liquid matter, but the general way is to have a basin of milk, and taking a lump of the mush you put it into the milk and eat the two together. Here is an excellent pudding, whether eaten with milk or without it; and where there is no milk it is an excellent substitute for bread, whether you take it hot or cold. It is neither hard nor lumpy when cold, but quite light and digestible for the most feeble stomachs. The Indian corn flour is more wholesome than wheat flour in all its manners of cooking. It is a great convenience for the workman in the field that mush can be eaten cold. It is in fact, moist bread, and habit soon makes it pleasanter than bread. It is a great thing for all classes of persons, but particularly for the labourer. He may have bread every day, and he may have it hot or cold, and there is more nutrition in it than you can get out of the same quantity of wheat flour. It is eaten at the best tables in America almost every day; some

like it hot, some cold, some with milk, some to slice it down and eat it with meat; some like it best made with water, others with milk, but all like it in one way or another. Some put these cold slices again into the oven, and eat them hot, or they might be heated on the griddle. It is believed in America that the Indian corn, even used in this one single manner, does more as food for man than all the wheat that is grown in the country, though the flour from that wheat is acknowledged to be the best in the world.

*Hominy* is made of the broken grain, broken by the steel mills described above. It is soaked over night in warm water, changed in the morning to clean cold water, and boiled gently an hour and a half. Warm it over when cold; eat it with milk, or molasses, or salt, or bacon, or alone. The weekly allowance to a working man is ten pounds of the flint corn, or twelve pounds of the golden corn. Judge what a nutritious food this must be, for twelve pounds of it to be sufficient to maintain a working man seven days.

*Samp*, though not in such common use as porridge or mush, is very much used. The husk or skin of the corn is scalded off, or dipped in hot lye, or beaten off as we do the skin of oats. This is put into a pot with pork or fat, and boiled just in the same manner as the people in the country make pease porridge, but the samp is more wholesome and more nutritious.

Wheaten bread with one-third Indian corn meal, is decidedly improved by it, and is preferred at all the tables of the first American families. It acquires by this addition a sweetness in flavour and a freshness that we in vain look for in bread made entirely of wheat.

*Indian Corn and Wheat Flour Bread.*—Take one quart of corn meal and a little salt, and one quart of boiling water. Wet the meal, let it stand until it be blood-warm, then add two quarts of wheat flour and a half a pint of yeast, and let it rise. This quantity will make two loaves. Bake it one hour and a half.

*Brown Bread.*—Take one quart and a pint of Indian meal, one quart and a pint of rye flour, and a little salt. Mix well together; then take half a pint of yeast, a quart and half a pint of blood-warm water, and let it rise; Bake it in an iron stand in the oven all night.

*Rye and Indian Corn Bread another way.* Scald three pints Indian meal in boiling water, one quart rye meal, a little molasses, salt, scalded altogether, not to be made stiff: yeast put in when cold.

*To make an Indian Meal Pudding.* About four table spoonfuls of Indian meal, a pint of milk, one egg, and two full table-spoonfuls of treacle, mixed

well together, put into a basin tied down, and boiled an hour.

*Indian Cake, or Bannock.* This, as prepared in America, is cheap and very nice food. Take one quart of Indian meal, dressed or sifted, two table-spoonfuls of treacle or molasses, two tea-spoonfuls of salt, a bit of "shortening" (butter or lard) half as big as a hen's egg, stirred together; make it pretty moist with scalding water, put it into a well greased pan, smooth over the surface with a spoon, and bake it brown on both sides before a quick fire. A little stewed pumpkin, scalded with the meal, improves the cake. Bannock, split and dipped in butter, makes very nice toast.

*Indian Corn, or Maize Pudding, baked.* Scald a quart of milk (skimmed milk will do), and stir in seven table-spoonfulls of sifted Indian meal, a tea-spoonful of salt, a teacup full of molasses or treacle, or coarse moist sugar, and a table-spoonful of powdered ginger or sifted cinnamon: bake three or four hours. If whey is wanted, pour in a little cold milk after it is all mixed.

*Boiled Maize Pudding.* Stir Indian meal and warm milk together "pretty stiff;" a little salt and two or three "great spoonfuls" of molasses added; also a spoonful of ginger, or any other spice that may be preferred. Boil it in a tight-covered pan, or in a very thick cloth; if the water get in, it will ruin it. Leave plenty of room, for Indian meal swells very much. The milk with which it is mixed should be merely warmed; if it be scalding hot the pudding will break to pieces. Some chop suet very fine, and warm in the milk; others warm thin slices of apple to be stirred in the pudding. Water will answer instead of milk.

*Rye and Indian Bread.* There are many different proportions in the mixing of this bread. Some put one-third Indian with two of rye; others like one-third rye and two of Indian; others prefer it half and half. If you use the largest proportion of rye meal, make your dough stiff, so that it will mould into loaves; when it is two-thirds Indian, it should be softer and baked in deep earthen or tin pans after the following rules:

Take four quarts of sifted Indian meal: put it into a glazed earthen pan, sprinkle over it a table-spoonful of fine salt; pour over it about two quarts of boiling water, stir and work it till every part of the meal is thoroughly wet: Indian meal absorbs a great quantity of water. When it is about milk-warm, work in two quarts of rye meal, half a pint of lively yeast, mixed with a pint of warm water; add more warm water if needed. Work the mixture well with your hands: it should be stiff, but not firm as flour dough. Have ready a large, deep, and well buttered pan; put in the dough, and

smoothe the top by putting your hand in warm water, and then patting down the loaf. Set this to rise in a warm place in the winter; in the summer it should not be put by the fire. When it begins to crack on the top, which will usually be in about an hour or an hour and a half, put it into a well-heated oven, and bake it three or four hours. It is better to let it stand in the oven all night, unless the weather is warm. Indian meal requires to be well cooked. The loaf will weigh between seven and eight pounds.

There is another mode which many persons think preferable. Scald a quart of rye and another of Indian meal with a small quantity of boiling water. Boil a tea-spoonful of salt in a pint and a-half of milk, mix the rye and Indian meal together, and pour the milk over them: add half a pint of fresh yeast, but not before the meal is cooling. The mixture must be well kneaded and placed in a deep pan by the fire to rise. When it has risen sufficiently, take it out of the pan, make it into any shape you like, and put it into an oven well heated. If the fire is too brisk, the crust will brown and the inside remain heavy. It should bake from two to three hours.

*To make excellent Bread without Yeast.* Scald about two handfuls of Indian meal, into which put a little salt, and as much cold water as will make it rather warmer than new milk; then stir in wheat flour, till it is as thick as a family pudding, and set it down by the fire to rise. In about half an hour it generally grows thin; you may sprinkle a little fresh flour on the top, and mind to turn the pot round, that it may not bake to the side of it. In three or four hours, if you mind the above directions, it will rise and ferment as if you had set it with hop yeast; when it does, make up in soft dough, flour a pan, put in your bread, and set it before the fire, covered up, turn it round to make it equally warm, and in about an hour it will be light enough to bake. It suits best to bake it in a Dutch oven, as it should be put into the oven as soon as it is light.

*Hasty Pudding.* Boil water, a quart, three pints, or two quarts, according to the size of your family; sift your meal, stir five or six spoonfuls of it thoroughly into a bowl of water; when the water in the kettle boils, pour into it the contents of the bowl, stir up well and let it boil up thick, put in salt to suit your own taste, then stand over the kettle, and sprinkle in meal, handful after handful, stirring it very thoroughly all the time, and letting it boil between whites. When it is so thick that you stir it with difficulty, it is about right. It takes about half an hour's cooking. Eat it with milk or molasses. Either Indian meal or rye meal may be used. If the system is in a restricted state, nothing

can be better than rye, hasty pudding and West India molasses. This diet would save many a one the horrors of dyspepsia.

Be careful to observe that Indian corn in all its preparations requires thorough cooking. If not sufficiently boiled or baked it loses its flavour and becomes indigestible.

The following recipes are extracted from Dr. Bartlett's admirable pamphlet:—

*Griddle Cakes.* Use milk altogether and no water. Two eggs yellow and white to be allowed for a pint of corn meal, the milk to be a little warmed, and the whole to be well beaten up with a spoon. There must be milk enough used to make the whole so liquid that it will pour out of the sancepan on the griddle, one spoonful of wheat flour and lard (pure butter is better) the size of a walnut.

The griddle is a flat round iron concern, standing on three legs, and of any size; it must be made not very hot, as it would then burn the cakes, and it must be well cleaned and greased while warm, that it may be perfectly smooth, so that the cakes may be easily turned, that they may be done brown (not burnt) on both sides; to promote their turning easily, is the object of adding the wheaten flour. The dough, or rather the batter, must be well beat up, and prepared directly before being cooked, though it might set an hour, but it would not bear to be mixed over night. The cakes are usually poured on, until they spread on the griddle to the size of the bottom of a breakfast plate.

*Egg Pone.* Three eggs to a quart of meal, no wheat flour, to be made also with milk, as water would make it heavy, a spoonful of butter, all well beaten together, and made up of a consistence thicker than the cakes, too thick to pour out, but just thick enough to require to be taken up with a spoon: may be baked like cakes, immediately after being mixed, must be baked in a tin pan, which must be placed in a Dutch-oven, not too hot at first, but the fire under it to be increased. The object is to have it begin to bake at the bottom, when it will rise in the process of baking, become brown on the top, and when put on the table and cut, resemble what we call pound cake. Salt, of course, add as usual to your taste in both cases.

*Indian Meal Breakfast Cakes.* Pour boiling water into a quart of corn meal; stir it until it is wet; then add two well beaten eggs, and milk enough to make it a thick batter; measure a small tea-spoonful of dry saleratus, and dissolve it into some warm water, and put it into the batter with a small quantity of salt; butter square tin pans, fill them two-thirds full, and bake it in a quick oven; when done cut it in squares, and serve hot.

*Indian Muffins.* Pour boiling water into a quart of corn meal, stir it well, let it be a thick

batter; when it is cooled a little, add to it a table-spoonful of yeast, two eggs well beaten, and a tea-spoonful of salt; set it in a warm place to rise for two hours; then butter square tin pans, two-thirds fill them, and bake it in a quick oven; when done serve hot or cut in squares, or bake as wheat muffins.

*Johnny Cake.* It is prepared from the corn meal scalded and the dough rolled or pressed out to half an inch in thickness, is cooked one side at a time in front of the fire, after being put on a board, sheet of tin, or plate, or any other material of suitable shape.

*Ash Cake.* is prepared from the Indian meal dough made as above, and is cooked as follows:—Make a bed by scraping away the ashes on all sides, roll the dough after being made into form, between two cabbage leaves, place it in the bed, and cover it up with the previously removed ashes and embers. A little practice will determine the length of time requisite for cooking. The process resembles that of roasting potatoes.

*Corn Cup Cake.* Take two cups of corn meal and one of wheat flour, or in that proportion, make them into a thin batter with milk and eggs, and cook them on a griddle.

*Hoe Cake* is prepared by wetting up corn meal with boiling water, is made into a cake and cooked in front of the fire on a board or plate. This resembles the johnny cake.

*Baked Indian Pudding.* One quart of milk boiled, stir in seven spoonfuls of meal while it is boiling hot, mix it quite thin, when it is moderately warm add molasses, a little ginger and salt, four eggs, a lump of butter the size of an egg.

*Boiled Indian Pudding.* One tea-cup of molasses, one piece of suet the size of two eggs, chopped fine, three spoonfuls of meal, scald the meal with boiling water or milk, mix it quite thin, when it is nearly cold add four eggs well beaten. It requires three hours boiling in a strong cloth.

*Indian Gruel.* To one quart of boiling water, stir in two table-spoonfuls of Indian meal, mixed with a little cold water, boil fifteen or twenty minutes, add a little salt.

In conclusion, it will be found on trial that everything which can be made with wheaten flour may be made with Indian corn meal, and that the latter is more wholesome and more nutritious.

The following are recipes and instructions which are at the present time extensively used, and with great advantage and economy, in the town and neighbourhood of Carlisle, and were furnished to us by Mr. Jonathan D. Carr, of that town.

*Plain-boiled Hominy, or Indian Corn Shelled.* Tie one pound of crushed hominy in a cloth, allowing plenty of room to swell, and boil three hours. This pudding may be eaten with sugar and melted butter or treacle sauce. One pound of hominy will make a pudding sufficient as a meal, for five or six persons, at a cost of not more than 2d. when Indian corn is selling from 5s. to 6s. per quarter.

*Hominy Milk.* Soak half a pound of crushed hominy in water twelve hours, and then boil it in milk over a slow fire two hours. It must be about the consistence of rice milk when brought to table.

*Rich Hominy Pudding.* Mix the hominy, which has been previously boiled, either in milk or water, with eggs, a little sugar and nutmeg, a little suet, and with or without currants and raisins, as preferred. Tie up in a basin, and boil two hours. It is excellent, either boiled or baked.

*Pancakes.* Take a pint of flour, one egg beaten light, a pint of milk and a little salt. Stir all well together, and bake on a hot gridiron in small cakes. Butter and send them up hot.

*Indian Flour Pudding.* Mix a pint of flour with a qr. of a lb. of fine shred suet, stir into it a quart of boiling milk; when cool stir into it six beaten eggs, a little nutmeg, lemon, and half-pint of treacle; tie in a cloth that has been dipped in boiling water; boil four hours, and eat hot with treacle sauce or butter.

To prepare hominy as a vegetable, boil whole hominy in plenty of water four hours, and strain it through a colander for the table. This is a beautiful looking dish, and forms an excellent substitute for potatoes.

Equal parts of Indian and English flour make excellent household bread and cakes.

#### WAKEFIELD FARMERS' CLUB.—REPORT FOR THE YEAR 1846.

The Wakefield Farmers' Club has now been in existence for five years, and your committee have great pleasure in having to report to its members generally that it continues to receive that pecuniary support which they deem it eminently to deserve. The object of the club being to promote

and encourage the strenuous efforts of its members, and of agriculturists generally, to increase the resources of the country, by the plentiful supply of human sustenance, may, in the most extended sense of the word, be considered as patriotic; and your committee therefore conceive the society to be

most peculiarly worthy of the continued support of its members, not merely by pecuniary contribution, but by each endeavouring, as much as lies in his power, to diffuse good, sound, and practical information on any subject connected with agriculture; if not by actually introducing subjects for consideration, at least by attending the monthly meetings, and joining in the discussions which naturally arise, on any proposed subject, when a company of intelligent individuals assemble together for their mental improvement and advantage. It was an observation of that celebrated divine and philosopher, Dr. Paley, that he made a point of entering into conversation with every person with whom he might accidentally be thrown into company; and that he never met with any individual, however unlearned or obtuse he might be, who could not give him information on one subject or another, of which he was not previously aware. Surely this may be considered as encouraging and gratifying both to the contributor and the recipient: to the one on the pleasure of being the means of imparting information; and to the other in the profit of adding to his store of knowledge. And applying this remark to the proceedings and discussions of the Wakefield Farmers' Club, your committee trust that it may act beneficially, in causing more numerous meetings of members than have hitherto taken place. That the meeting together of individuals to interchange their ideas, and to communicate their experience, on any given topic, must be eminently conducive to the spread of sound information, there can be no doubt; and in the present times, when the country is suffering from a scarcity of food for the people, producing in many parts of the kingdom the most lamentable distress, it seems peculiarly the duty of each farmer (to whose labours the country must look for an adequate supply of human sustenance) to lend a helping hand, in urging forward improvements, and both by precept and example, attempting to create increased productiveness in the soil of our native land. One great means of accomplishing this desideratum is the diffusion of agricultural knowledge, practical and scientific; and the establishment of Farmers' Clubs, where various subjects connected with agriculture, and the means of insuring the economical production of food, are freely and fully discussed, is, in the opinion of your committee, one of the most efficacious methods of bringing about this praiseworthy object.

It is well remarked by the editor of the *Gardeners' Chronicle* and *Agricultural Gazette*, in a late number of that most useful journal, applying his observation not indeed to farmers' clubs, though equally applicable to them, that "nothing can be

more instructive than the comparison which arises of its own accord between the views which suggest themselves to minds regarding the same subject from different points of view: and if it be true that discussion is the many-meshed net that fishes up truth, let it lie ever so deep in that damp hiding-place which Democritus assigns to it, namely, the bottom of a well, the science of agriculture bids fair to derive no trifling illumination from the rays that dawn upon it from so many quarters." It has pleased Divine Providence, during the last two years, but particularly during the year just closed, to visit Great Britain and Ireland (the latter especially) with a lamentable disease in the potato—that most valuable resource of a poor man—and there probably never was a time when the strenuous exertions of the agricultural body were more needed, or more loudly called for. Let us then be up and doing, and strive to our utmost to compensate for the present scarcity, not only by endeavouring to obtain increased production, but by devoting part of our land to such crops as come early to maturity, and which may at the same time be available as food for man, thus verifying the Latin proverb—"Bis dat qui cito dat," that is, "he gives twice who gives quickly." A lapse of six months, at the very least, must take place before any new corn can be produced at market; and if any other crops, suitable for human sustenance, could be introduced, which would arrive at maturity even a month earlier, the boon to the country would be of incalculable value. Your committee cannot but hope that some member of the club will bring forward this subject at the earliest opportunity; or, as no time should be lost, throw out some suggestion at the present meeting, so urgent is the case. It is a trite, though true saying, that "good comes out of evil," although much individual suffering must unavoidably take place during the process; and your committee are willing to hope that this law may, in the present case, be verified, in rousing the sluggish to permanent exertion—stimulating the already industrious to still more strenuous endeavour, and inducing those whose knowledge and experience are more extensive, to communicate, out of their store, to those who have not been so highly favoured. The eyes of the whole country are upon the farmer, and look to him for the necessary supply of food. Let him then view the occupation of land as a trust committed to his charge, not for his own emolument only, but for the public weal. Let him endeavour by all the means in his power to fulfil that trust conscientiously and vigorously; and he may rest assured that, in obedience to a wise and beneficent law, whatever exertions he makes for his own benefit, in the high cultivation of his farm, will



ultimately likewise confer a benefit on his fellow-men. He has no churlish, unwilling, or ungrateful coadjutor to deal with in the soil, but one which will amply repay him for any kindness and attention that he may bestow, and will cheerfully and abundantly yield her increase, when treated kindly and liberally.

Since our last annual meeting, very important legislative enactments have taken place with regard to the importation of agricultural produce from abroad. Whether these alterations were politic or otherwise, or will eventually prove detrimental to the agriculturist, your committee will not endanger the unanimity and peace of the meeting by pronouncing an opinion, well knowing that strong feelings are entertained on both sides of the question. We are all well aware, however, that with a population computed to be increasing at the rate of 300,000 in each year, increased supplies of food must be absolutely necessary; and as it is stated that each individual consumes equal to about one quarter of corn per annum, the required increase of production, each year is equal to the yield of about 70,000 acres of land; that is, we must, in order adequately to feed our population, either bring into cultivation, each year, 70,000 additional acres; or, each year render the land already under cultivation so much the more productive. It may then well be said that the agriculturist is a public character; and with our rapidly increasing population, it may also with apparent justice be said, that the community has a right to demand that every effort shall be made by him to meet the requirements and wants of the people; whilst, at the same time, a ready market is insured for the increased produce by the increased number of mouths to consume it.

The life of the farmer is truly a life of continued effort and anxiety, as each revolving season has its appropriate work of requirement; no sooner one crop being gathered in than the preparation for a succeeding one commences; but it is equally true that in no calling is each well-directed and judicious effort more sure of meeting with an ample reward. During the past year, the question of tenant-right has been extensively mooted and much discussed in the farmers' clubs in the South of England, and your secretary has received letters from the leaders in that movement, urging the consideration of that question by the Wakefield Farmers' Club, and requesting the co-operation of its members, in attempting to bring about a more equitable adjustment of the relative position of landlord and tenant. In reply, your secretary forwarded a report of the transactions of the club for the year 1845, directing attention to the proceedings and discussions which took place on the reading of Mr. Stringer's paper on the subject of

leases and corn rents; and he at the same time stated that in this part of the country the tenant already enjoys many of the rights and privileges for which our brethren in the South are contending; but that the subject of leases, with equitable clauses, is still one which extremely interested the members of the club.

The communications at the monthly meetings during the past year have been seven in number, the discussions upon two of which occupied the members each during two meetings. The subjects brought forward, and the resolutions passed at the close of the discussions, will appear in the detailed report of the monthly proceedings.

The time having now arrived when the committee must resign their trust into your hands, they cannot retire without offering their sincere congratulations to the members of the club generally, upon the very prosperous position in which it now stands; and they trust that, in proportion as it possesses the means of usefulness, in the improving state of its finances, so it may each year become more and more the vehicle through which is extended good, sound, and practical information, on every subject having a tendency to encourage good husbandry; and that all who have been hitherto, and may in future time be, benefited by the perusal of the books in its library, or by attendance at its monthly discussions, may join in hearty wishes for increasing prosperity to "The Wakefield Farmers' Club."

#### MONTHLY PROCEEDINGS OF THE WAKEFIELD FARMERS' CLUB DURING THE YEAR 1846.

January 29th, 1847. The general annual meeting took place, when the members and their friends dined together in the Saloon of the Corn Exchange, Wakefield, to the number of sixty-four, at which meeting the officers for the ensuing year were chosen; and a silver tea-service was presented to Mr. Henry Briggs, the honorary secretary, as a testimonial for his services during the past four years.

February 13th, 1846. Mr. Briggs introduced the subject for discussion:—"On the amount of capital per acre necessary for a tenant or occupier of land to possess, in order to secure the proper cultivation of his farm," which he commenced by observing that he considered the subject as one of national and vital importance, inasmuch as our population is annually increasing by 300,000 individuals, who have to be provided with food; and as the quantity of land cannot be increased, therefore increased production must be looked to for supplying that desideratum, which increased home production he greatly preferred to import from abroad, and expressed an opinion that by the proper and judicious expenditure and application

of capital to agriculture, the amount of production in Great Britain and Ireland might be so increased, and the cost of food so reduced, as successfully to compete with the foreigner, should the measures then proposed in parliament with regard to the importation of corn, be carried into effect. He said that he considered every one who by proper cultivation increased the food of the country, as a national benefactor; and on the contrary, he viewed the occupation of land by any one who either would not or could not improve its productiveness, as a national misfortune. But this improvement, he stated, could not be brought about without the expenditure of capital, and the question therefore arose—What amount of capital is requisite to insure proper cultivation? Opinions on this head vary from 5*l.* per acre up to 10*l.*, 12*l.*, or even 15*l.* per acre; but the precise minimum amount per acre must of course differ according to whether the occupation be more or less a grazing farm, and in a great degree also according to the nature of the soil and the mode of cropping. As an example, Mr. B. instanced a farm of medium quality of land, already drained, and conducted on the common rotation of cropping, say 160 acres in extent, one-fourth, or 40 acres, being in permanent grass, and the remaining three-fourths, or 120 acres, being arable, and cultivated on the four-course system, of turnips, barley, clover, and wheat, 30 acres of each per annum. In the first place the occupier, on entry, would have to pay a valuation to the outgoing tenant, which, according to the custom of this part of the country, he estimated, would amount to at least 3*l.* per acre; as follows:—

30 acres, turnip fallow, once ploughed, performed by previous occupier, at 8 <i>s.</i> .....	12	0	0
30 acres barley, after turnips (drawn), half manure and tillage, say—			
	£	s.	d.
3 dressings, at 12 <i>s.</i> each, or 36 <i>s.</i> per acre.....	54	0	0
Lime, 3 dozens per acre, at 12 <i>s.</i> , or 36 <i>s.</i> per acre..	54	0	0
Manure, 10 loads per acre, at 7 <i>s.</i> , or 70 <i>s.</i> per acre.	105	0	0
Bones, 1 quarter per acre, at 16 <i>s.</i> .....	24	0	0
One-half.....	237	0	0
30 acres clover, seeds and sowing, at 12 <i>s.</i> per acre	18	0	0
One-fourth of tillages of the turnip crop, two years previous, as before	59	5	0
	77	5	0

30 acres wheat, say to yield 9 loads per acre, or 270 loads, at 20 <i>s.</i> .....	270	0	0
Deduct rent, taxes, and tythes, 50 <i>s.</i> per acre...	75	0	0
	195	0	0
20 acres pasture, no tillage			
20 do. meadow, half of ten loads of manure per acre, at 7 <i>s.</i> , or 35 <i>s.</i> per acre.....	35	0	0
Sundry manure on the premises, say.	50	0	0
160 A. Total valuation....	487	15	0

Mr. B. considered this a low estimate, as when he entered upon the Flockton Hall Farm, the valuation for crops and tillages only, on 122 acres, was 578*l.*, or 4*l.* 14*s.* 9*d.* per acre; and on Kirkby Farm, 67 acres, which was much dilapidated and worn out, it was 208*l.*, or 3*l.* 5*s.* per acre.

Next comes his live and dead stock, which Mr. B. estimated as follows:—

*Live Stock.*

	£	s.	£
4 horses .....	at 25	0	each .. 100
1 pony .....	5	0	.. 5
3 milking cows .....	15	0	.. 45
8 heifers or steers.....	10	0	.. 80
8 calves, average .....	5	0	.. 40
60 sheep .....	2	2	.. 126
4 pigs .....	3	0	.. 12
			408

*Dead Stock.*

	£	s.
Thrashing machine and dressing machine..	70	0
3 one-horse carts, at 8 <i>l.</i> .....	24	0
2 two-horse do., at 12 <i>l.</i> .....	24	0
1 waggon .....	18	0
4 ploughs, at 3 <i>l.</i> .....	12	0
1 double mould-board plough.....	3	10
4 sets of harrows, heavy and light, at 2 <i>l.</i> 10 <i>s.</i>	10	0
1 drag or scuffler, 8 <i>l.</i> 1 presser, 4 <i>l.</i> .....	12	0
1 heavy roller, 5 <i>l.</i> 1 light do. 3 <i>l.</i> .....	8	0
1 straw-cutter, 2 <i>l.</i> 10 <i>s.</i> 1 turnip-cutter, 2 <i>l.</i> 10 <i>s.</i> .....	5	0
Cart and plough geers, saddle, bridle, and halters .....	25	0
Sacks, 2 <i>l.</i> Forks and shovels, 1 <i>l.</i> 10 <i>s.</i>		
Rakes, &c. 1 <i>l.</i> 5 <i>s.</i> .....	4	15
Wheel-barrows, riddles, nets, scythes, &c. say	20	0
	236	5

But before an in-coming tenant can convert any produce into money, he will have various other demands to meet, say—

	£	s.
Two-thirds of a year's rent, at 30 <i>s.</i> per acre, or 240 <i>l.</i> per annum .....	160	0
Sundry rates, assessments, and taxes, say.	20	0
Sundry wages, average 3 men, 40 weeks, at 12 <i>s.</i> each, 72 <i>l.</i> Do. do. 3 women, 40 weeks, at 5 <i>s.</i> each, 30 <i>l.</i> .....	102	0
Keep of horses and cattle, over and above the produce of the farm.....	50	0

Bones for turnip crops, and guano, say 20s. per acre . . . . .	30	0
Clover seed, 30 stone, at 9s. 6d., 14l. 5s.		
Turnip seed, 60 lbs., at 1s., 3l. . . . .	17	5
Barley seed, 15 qrs. at 38s. . . . .	27	0
Sundry expenses—hedge wood, oil, mar- keting, &c. say . . . . .	20	0
	<hr/>	
	426	5

*Recapitulation.*

	£	s.
Tillages . . . . .	487	15
Live stock . . . . .	408	0
Dead do. . . . .	236	5
Sundry expenses and payments . . . . .	426	5
	<hr/>	

Capital required (being very nearly 10l. per acre) 1558 5

Independent of household furniture, or any allowance for expenses of living, previous to a return being realized.

If a tenant enters upon a farm that requires draining, which the landlord refuses to perform, or where other improvements must be made, in order to carry on the farm with success, of course additional capital would be required; and when he does not possess the means of incurring that necessary further outlay, Mr. Briggs considered it in the light of a national misfortune, that such a man should be in the occupation of the land. Capital laid out in draining is perhaps the most profitable, and at the same time the most patriotic mode of appropriating it. For instance, supposing an occupier of cold, wet, and stiff land, should drain it thoroughly, say thirty inches deep, and five yards apart, at an expense of about 7l. 10s. per acre, that land, which could with great care and difficulty be made to produce only seven loads per acre, and at great expense, delay, and disappointment, would afterwards, at considerably less cost, produce nine or ten loads of wheat per acre, with an increase of straw in proportion, and an improvement in the other crops of the rotation after the same rate. In such a case Mr. Briggs maintained that the capital expended would yield an annual interest or return of at least 20 per cent. To accomplish such an improvement, should the landlord object to incur any portion of the expense, the tenant ought to possess at least 240l., or 1l. 10s. per acre additional. Land is one of the most grateful of recipients, and Mr. B. expressed an opinion that by judicious expenditure of capital upon it, the produce of the country might still be increased by one-half, and render us, for years to come, independent of foreign aid for the support of our increasing population, and at a price lower than what has prevailed for some time past; for, said he, let it be considered that a produce of twelve loads of wheat per acre, at 16s. per load, would pay the farmer as well as eight loads at 24s.,

as the increase of straw, and the saving in the more easy working of the land, would pay fair interest and remuneration for the outlay required to obtain the increase. Not that all land is capable of being so improved; but a great portion might: some upon which the crops might be doubled, and other wet and boggy land, upon which, by draining, a threefold increase might be obtained. Mr. B. concluded by again calling the attention of the members to the grateful nature of the soil for all favours bestowed upon her, and urged them to put her to the test by vieing with each other who can obtain the greatest return; but at the same time he begged them to consider that she is very churlish to those who will not seek and court her favours, and that if she be slighted, will not only refuse her support, but will bring forth arrant and noxious weeds to render the ruin of those who scorn her, still more signal and disastrous. Mr. Johnson said that as to amount of capital required by a tenant, much would depend upon whether he breeds his own stock or buys it; that in the former case less capital would be required than in the latter; that he himself sometimes has as much as 20l. per acre invested in his farm; and thought that 12l. per acre is as little as any occupier ought to possess. Mr. Barratt gave it as his opinion that Mr. Briggs's estimate is rather too low, and that 12l. per acre is little enough to insure proper cultivation. Mr. W. Brown said that valuations vary in different localities; that in some parts the manure belongs to the landlord, and it is not paid for by the on-coming tenant, and in other parts tillages and half-tillages are not paid by the on-coming to the off-going tenant, which materially reduces the amount of capital required by the farmer; that he feared the farmers as a body now possessed less capital than formerly, chiefly owing to the alteration in the currency; that merchants and manufacturers raise capital by a system of bill-drawing, which does not prevail amongst agriculturists; he thought that 10l. per acre should be the minimum capital possessed by a farmer, though he feared many had not near that amount at command. Mr. John Wood thought that Mr. Briggs's estimate is rather too small; and said that he has frequently valued farms where the tillages, half-tillages, and growing crops, independent of live and dead stock, have amounted to more than 5l. per acre: he was of opinion that 12l. per acre is as little as a tenant ought to possess; and at the same time expressed a fear that the contemplated government measures with regard to the importation of corn would check improvement. Mr. Millthorp thought that 10l. or 11l. per acre would be sufficient on good drained land, but that on undrained land a tenant ought to have at command 14l. or 16l. per acre. Mr. John

Brown said that the capital required depends much on the nature of the land and the mode of management; that it may vary from 10*l.* to 15*l.* per acre, according to these circumstances, and that he now employs as much capital on 300 acres at Wrangbrook, as he formerly did on 500 acres in the East Riding. Messrs. Charlesworth, Tweedale, John Farrar, T. Wordsworth, and Shaw, also took part in the discussion, expressing their opinion that it is advisable for a tenant-farmer to possess a capital of about 12*l.* per acre previous to entering upon his land.

The following resolution was then unanimously passed:—"That in the opinion of the meeting 12*l.* per acre is the minimum amount of capital that a farmer ought to possess on entering upon a farm in this locality that has been previously drained; but that in many cases even 15*l.* per acre is as little as an in-coming tenant ought to have at his command.

March 13th.—Mr. John Brown brought forward, according to notice, the consideration "On the best mode of making and applying fold-yard manure."

He commenced by observing the immense importance to a farm of making and economising manure as much as possible, and allowing nothing that is, or may be made valuable as a fertilizer, to be wasted; that in the management of a manure-fold, he should say nothing against the formation of tanks to collect the liquid, but that he considered them unnecessary when the centre of the fold is made about two feet deeper than the other parts, and impervious to water, and the buildings surrounding the yard effectually spouted. By this means he maintained that all the liquid manure or urine running from the cow-houses and stables would be absorbed by the litter in the yard, by which fermentation and decay would be much assisted, and the manure rendered rich and exceedingly fertilizing. He also recommended that no twitch-grass or weed should be burnt on a farm, but that all should either be collected into heaps in the fields and left for decay, or carted into the folds to be rotted along with the yard manure. In corroboration of his opinion as to the value of rotted twitch-grass and weeds, he stated that he has obtained as good turnips by the application of that description of manure, as of fold-manure. He deprecated the formation of manure heaps by the sides of roads, as much waste of valuable liquid which oozes out of the manure is often thereby occasioned; and stated that he is in the habit of leading his manure in summer from the folds, and making it into heaps in the fields to which he intends to apply it, at the same time mixing gypsum with it, in order to fix the ammonia, and afterwards

covering the hills effectually with earth or sods from the hedge-bottoms or elsewhere. He recommends the plan of applying manure copiously to seeds, or sheep-pasture, in the winter, and not afterwards manuring, except with bones for swedes, by which means he maintained that he had been able to keep two or three sheep more per acre than by the common mode of proceeding, and his after turnips were exceedingly good. Manure partially decayed, he considered more efficacious than when it is fully rotted; and in corroboration of this opinion he stated that on some swede turnips, his men, through misunderstanding, spread some fresh manure on part of a field, in winter, and the remainder was made into a heap, and used in spring; and the result was, that the former mode produced by far the better turnips. He deprecated the practice of turning manure. Mr. Charnock, in conformity with the opinion expressed by him on a former occasion, still maintained the idea that all manure should be applied in a liquid state, and fully anticipated the day when fold-yard manure would be so decayed and reduced to a pulpy state, as to be dissolved by water, and so applied to the land, which he maintained would be the most efficacious, and eventually most economical mode. Mr. Stringer agreed with Mr. Brown in opinion as to the great benefit and use of decayed twitch and weeds, and particularly recommended all buildings surrounding a farm-yard or straw-fold to be spouted, in order to keep the rain-water as much as possible from the manure. Mr. E. Sykes expressed surprise at Mr. Brown's plan of applying manure to sheep pasture, and said that he had tried that mode of proceeding, but that he had now come to the opinion that the reserving of all manure for the turnip crop was the most effective and economical. Mr. T. Wordsworth much preferred well-rotted manure to long litter. Mr. Charlesworth also preferred rotten manure, and expressed an opinion that the gases which are evolved from manure, during fermentation, are rather injurious than otherwise to vegetation. He said that on preparing wheat fallows he had found the practice of applying lime at Midsummer, and afterwards manure at Michaelmas, to be eminently efficacious in producing a crop. Mr. Johnson said that he always keeps his manure until it is a year old, and for turnips applies it in winter, spreading it on the surface, and ploughing it in, in spring. Mr. Briggs said that theory would lead him to suppose that partially decayed or fresh manure must be more nutritious to vegetation, and more durable in its effects, inasmuch as a great supply of ammonia must be formed and dispersed during the fermentation and decay, and if the application is delayed until the manure is quite rotted, this valuable fertilizer is thereby lost to the plant.

The process of decay and formation of ammonia, he conceived, must be more economically conducted in the soil, particularly in stiff land, as the effect must be both chemically and mechanically good: first in yielding to the plant the ammonia as generated; and secondly, in more effectually lightening the soil. He said that Mr. Brown's plan of manuring his seeds, in preference to his turnip fallow, was quite new to him, but thought it might answer on light land. He strongly recommended the application of gypsum, or sulphuric, or muriatic acid to manure heaps when in a state of fermentation, in order to fix and preserve the ammonia then generated; and stated that the loss of fertilizing power by omitting to do so was greater than any one would at first imagine. As an instance of the superior effect of fresh litter on the turnip crop, he mentioned that on one occasion, in Lincolnshire, when the farmer fell short of old manure, two or three acres were manured with litter fresh from the stable, and the turnips on that part of the field were not only better, but the after-crop of barley was also superior.

The following resolution was then passed:—  
 "That in the opinion of this meeting, the treatment of manure recommended by Mr. Brown is highly judicious, and that on light soils the mode of applying fold-yard manure to the one year's seeds, during winter, is preferable to applying it to the after turnip crop."

April 9th.—Mr. Bayldon brought forward the subject for the evening's discussion by stating that various opinions prevailed as to the most profitable method of cultivating land, and the most advisable system of rotation; but he said he would that evening confine his observations to the question whether it is advisable and profitable to introduce into the rotation a crop of beans, or to omit that crop altogether, and substitute either rape or seeds. With regard to red clover, he conceived that it was not good policy to attempt to grow it more frequently than once in eight or ten years, as no doubt every member then present had experienced many instances of its failure, if attempted during each rotation of four or five years. The course which he adopted he stated to be as follows:—1st, turnip fallow; 2nd, barley; 3rd, sheep pasture, or seeds one year; 4th, wheat; 5th, rape; 6th, wheat; then 7th, turnip fallow; 8th, barley; 9th, red clover; 10th, wheat. Thus having red clover only once in ten years. The system of growing beans which he had attempted was as follows:—1st, turnip fallow; 2nd, barley; 3rd, beans; 4th, wheat; 5th, turnip fallow; 6th, barley; 7th, red clover; 8th, wheat. Now, the question he proposed to ask at that time was, which of these two systems is the most profitable? and whether the wheat crop is generally better after beans or after seeds? also,

after which crop is the land left in a better state? From his own experience he stated that the adoption of the seed crop is the more profitable, and that he could obtain a better crop of wheat by one-third after seeds than after beans; and he should say that the after condition of the land is also proportionably better. To illustrate his ideas on the relative productiveness of the two systems, and the proportional profit attending each, he exhibited the following calculations:—

*Seeds, per acre.*

	£	s.	d.	£	s.	d.
Value of the crop of seeds..	3	0	0			
Deduct seed.....	0	10	0	2	10	0
Crop of wheat, 4 qrs. per acre, at 56s. ....	—————			11	4	0
				£13	14	0

*Beans, per acre.*

	£	s.	d.	£	s.	d.
Value of the crop of beans, 4 qrs. at 35s. ....	7	0	0			
Deduct seed, four bushels, at ....	1	0	0			
„ Labour ..	1	2	6			
„ Reaping..	0	12	0	2	14	6
Crop of wheat, 3 qrs. 56s. ..	—————			8	8	0
				£12	13	6

Leaving a balance of 20s. 6d. per acre, for the two years, in favour of the seeds, besides leaving the land, according to his experience, in a much better and cleaner state. Mr. W. Belton coincided with all that Mr. Bayldon had said. Mr. Hislop observed that beans are not applicable to light soils, and strongly recommended their omission, agreeing with Mr. Bayldon that the wheat crop after seeds is generally one quarter per acre more than after beans. Mr. Scarth said that he preferred seeds to beans, as the latter crop, from his experience, left the land not so clean. Mr. Nicholson gave the same opinion, and remarked that he had generally obtained a better crop of wheat after red clover, mown twice, than when eaten off with sheep. Mr. Stringer considered beans a hazardous crop, particularly on dry land. He thought that rape after seeds was a good plan on high and dry land; but on low land, he considered two years' seeds preferable. Mr. Heanly said that on strong land beans might be advantageously grown; but, upon the whole, he preferred seeds. Mr. Charlesworth preferred two years' seed. His plan is to apply lime in June in the second year, then has wheat for two years, and finds the second crop of wheat generally the better. Mr. Webb observed that in the south they generally grow beans on land that is in the highest condition. Mr. Johnson said that he sows beans as a fallow crop, drills nineteen inches apart,

and keeps down the weed by well horse-hoeing and hand-hoeing; but he did not think beans so good a preparative for wheat as seeds.

The following resolution was then passed:—“That seeds either for one or two years are preferable to beans as a preparation for wheat, not only as the after crop of wheat is generally far superior, but as the land is, by that means, left in a much richer and better condition.”

May 8th.—Mr. Bayldon resumed the subject which he brought forward at the last meeting, by observing that the question having been determined whether the cultivation of beans or seeds is preferable in a rotation, he would now proceed to consider whether the introduction of a crop of rape, or allowing the seeds to remain two years, was the more profitable. He said, formerly he used to adopt the latter plan, but that he now finds the introduction of rape to be the means of obtaining an additional crop of wheat, and of greater yield. He stated his former rotation to be,—1st, turnip fallow; 2nd, barley; 3rd and 4th, seeds two years; 5th, wheat; 6th, turnip fallow; 7th, barley; 8th, red clover; and 9th, wheat: and his present system to be,—1st, turnip fallow; 2nd, barley; 3rd, seeds one year; 4th, wheat; 5th, rape; 6th, wheat; 7th, turnip fallow; 8th, barley; 9th, red clover; and 10th, wheat—thus obtaining three crops of wheat in ten years, and repeating the red clover only once in ten years. With regard to the crop of rape, he cleans the land thoroughly, sows in June, and turns in his sheep the first week in September. The comparative value of the two systems, he stated to be as follows, taking the labour in each case the same:—

RAPE SYSTEM.		£	s.	d.
Wheat, 11 loads, per acre, 20s. ....		11	0	0
	£ s.			
Rape crop .....		3	0	
Deduct seed .....		0	1	
		2	19	0
Wheat, 11 loads at 20s. ....		11	0	0
		£24	19	0
TWO YEARS' SEEDS.		£	s.	d.
Value of second year's seeds .....		1	10	0
Wheat, 10 loads, at 20s. ....		10	0	0
Barley crop after turnip, 5 quarters, at 34s. ....		8	10	0
		£20	0	0

Thus making the rape system more profitable by £1 19s. per acre, and leaving the condition of the land also better. Mr. Scarth highly approved of Mr. Bayldon's rotation; but took the opportunity of condemning the attempt to grow wheat after wheat, without the intervention of a green crop, or of barley after wheat. Mr. Charnock also con-

demned the successive growth of white crops, and thought that the longer the time which intervened between each white crop the better. Mr. Wooller preferred two years' seeds to rape, and said he thought that after two years' seeds, red clover answers better, as he always found red clover to grow luxuriantly after the breaking up of grass land. Mr. Charlesworth said that having always found two years' seeds to answer with him, by his system of liming them the second year, and obtaining two good successive crops of wheat after them, he should adhere to that system, instead of the introduction of rape. Mr. W. Belton said he highly approved of Mr. Bayldon's plan of one year's seeds, and rape crop. Mr. E. Sykes said that he had always found two years' seeds to answer with him; but that he still did not condemn Mr. Bayldon's recommendation of introducing rape. Mr. Briggs said that he would merely advert to the observations which had fallen from Mr. Charnock and Mr. Scarth, on the subject of growing successive crops of corn, by stating that he condemned as much as any one the attempt to carry that system into effect, unless the means of accomplishing it profitably were adopted: that is—by fully restoring to the soil the ingredients which each crop exhausts. He considered the theory perfectly rational, and said that in practice, for four years, he had found it to answer, the chief difficulty being to keep the land clean. After the close of the discussion,

The following resolution was proposed:—“That in the opinion of this meeting, the system of growing one year's seeds, then wheat, afterwards rape, and then wheat again, is the best and most profitable rotation that can be adopted on dry land.” As an amendment to which it was proposed—“That the system of having two years' seeds is preferable to the rotation recommended by Mr. Bayldon,”—but the former resolution was carried by a majority of three to one.

(To be concluded in our next.)

#### THE RHINS OF GALLOWAY FARMER'S CLUB.

At the March meeting of this club, which for the short time it has as yet been in existence has conducted remarkably to the improvement and stimulation of agriculture in the Rhins, some important statistical information was laid before the members by Mr. John Gibson, factor to Sir Jas. Hay, Bart. The question for discussion was—What is the best course of rotation, or cropping, for this district?

Mr. Gibson said that the improvement of the rotation of crops was just the history of the improve-

ment of the county. Thirty years ago there were few or no properly fat bullocks or sheep sent from Wigtownshire, but since then the rotation of crops and the cultivation of turnips had vastly increased, and improved the stock of cattle and sheep, both fat and lean. In the Rhins, some fifteen years ago, the course of rotation was usually nine years—often two white crops being taken in succession, sometimes three, and only one green crop in the course, but gradually the system had been improved to a six and seven course. About two years ago the land in Wigtownshire under tillage was 60,000 acres, 20,000 green and 40,000 white crop. The green crop consisted of 12,000 acres of potatoes, and 8000 acres of turnip. There were fed at that time in the county 20,806 fat sheep, 5887 lambs, 3505 fat cattle, sent to Liverpool, Glasgow, and Belfast; heavy leans, sent in droves to the Forth, 4101. Had the turnip crop been good last year it would have fed 20,000 fat sheep, allowing each  $1\frac{1}{2}$  ton; 10,000 fat cattle, allowing each  $6\frac{1}{2}$  tons; and 4000 heavy leans, giving each 4 tons; 4000 cows at 5 tons each; and 14,000 young cattle at 3 tons each.

After considerable discussion the meeting unanimously resolved to recommend the adoption of the soiling and varied green crop system for the first class of soils in the Rhins; and the meeting expressed a favourable opinion of the rotation condensed upon in Mr. Gibson's address—namely, a four or five-course shift, as soil and circumstances may warrant.

## REVIEWS.

### A TREATISE ON MANURES.

By W. C. SPOONER.

London: Longman and Co.

We can confidently recommend this clever pamphlet, by the Author of the "Essay on Superphosphate of Lime," as a practical help to the Farmer. We extract the following as a specimen:—

"Many methods have been advised for the treatment of dung, so as to economise and retain its volatile elements; amongst others, it has been recommended to sprinkle weak sulphuric acid over the heap, and also sulphate of iron. Now, if we consider the high cost of this acid—viz., 10*l.* per ton or upwards, it is extremely doubtful whether the benefit will repay the great expense of the cost. A few years since, some extensive experiments were instituted by Professor Henslow, in order to test the advantages of employing gypsum for this purpose. The result of these trials I will not say was altogether unsuccessful, but at any rate they fell short of the anticipated effect. The plan adopted was to scatter a given quantity of gypsum, in the state of fine powder, on successive layers of the manure heap; and it was expected that the sulphuric acid, which forms upwards of one-half the gypsum, would leave the lime and unite with the ammonia, for which it had a

stronger affinity, and fix it in the more durable form of sulphate. An essential quality, however, was overlooked—viz., that it was necessary that the sulphate of lime should be in a state of solution, and that it required 500 times its weight of water to dissolve it, which quantity it could never meet with in the dung heap, and consequently very little was dissolved. Now it should be borne in mind that sulphate of lime, at 2*l.* per ton, is five times as cheap as oil of vitriol; consequently its sulphuric acid must be at least  $2\frac{1}{2}$  times as cheap, allowing nothing for the value of the lime. Its use must, therefore, be far more economical; and what can be easier than to supply a sufficient quantity of water to dissolve the gypsum, and to shower the solution from time to time over the dung heap. Or I would suggest, as being more economical, to have a tank, or a simple excavation in the centre of the farm-yard, capable of receiving the washings from the manure, and to keep this pond always saturated with gypsum, and by means of a wooden pump to raise and sprinkle the solution over the dung-heap."

### PRACTICAL INSTRUCTIONS IN THE DRAINAGE OF LAND. Fourth Edition.

By SIMON HUTCHINSON.

London: Groombridge and Sons.

Without entering into the merits of the questions of deep or shallow draining, we can confidently recommend this little pamphlet to the attentive perusal of the agriculturist as containing much valuable information. It professes to be a practical digest of all works necessary to accomplish perfect and permanent drainage. It is illustrated with wood engravings, giving sections of tiles, receiving grates, discharging grates, &c.

**HEDGE ROWS.**—Mr. N. Tuckett has thrown four fields into one by cutting down the trees and levelling the hedges, and he has thus gained an acre of land on his farm at Heavitree. The land there is worth 3*l.* an acre. The old hedges cost 1*l.* a year in repairs, and 30*s.* in taxes. The injury done to the land by the shade and roots of the trees was 5*l.* a year upon 14 acres. So that about 9*l.* a year is gained by this judicious step in the right direction. We have heard that between Shaldon and Torquay, there are a thousand fields not averaging more than an acre each, and where 250 acres might be gained, of beautiful land—worth 500*l.* a year, by removing the trees and hedge-rows and making the land into ten-acre fields. Besides this, 500*l.* a year worth of damage now done by the trees and hedges would not be sustained: 800*l.* a year to be saved!—Western Times.

### PROGRESS OF AGRICULTURAL MACHINERY IN SUSSEX.—RARE OCCURRENCE.

—A respectable farmer, residing about a mile from Rotherfield, has now four thrashers constantly employed at a barn belonging to a farm, of which he was the tenant until Michaelmas last, two of the men working *by day*, and two *by night*, a candle being placed at each end of the floor.—Sussex Express.

METEOROLOGICAL DIARY.

BAROMETER.			THERMOMETER.			WIND AND STATE.		ATMOSPHERE.			
Day.	8 a. m.	10 p. m.	Min.	Max.	10 p. m.	Direction.	Force.	8 a. m.	2 p. m.	10 p. m.	
April	21	29.95	29.97	37	53	49	Every way	gentle	fine	sun	cloudy
	22	30.02	30.02	42		46	E., N.E.	gentle	fine	sun	fine
	23	30.03	30.—	37	54	44	E., N.E.	gentle	fine	sun	fine
	24	30.—	30.—	37	55	47	Easterly	lively	fine	sun	fine
	25	29.99	29.99	42	58	45	W. by South	gentle	fine	sun	fine
	26	29.80	29.70	36	54	47	South	lively	cloudy	sun	cloudy
	27	29.60	29.72	47	56	47	Westerly	strong	fine	sun	fine
	28	29.70	29.63	43	56	46	W. by South	brisk	fine	cloudy	cloudy
	29	29.70	29.60	42	57	46	West	variable	fine	cloudy	fine
	30	29.67	29.73	40	56	39	Westerly	variable	fine	cloudy	fine
May	1	29.86	29.68	30	50*	46	S. by E.	variable	fine	cloudy	cloudy
	2	29.65	29.75	45	57	41	S.E., N.	variable	fine	cloudy	fine
	3	29.80	29.80	36	48	44	N. N. by W.	brisk var	fine	cloudy	cloudy
	4	29.88	29.88	41	52	44	N.E., East	variable	fine	sun	fine
	5	29.80	29.80	42	60	45	N. East	gentle	cloudy	sun	cloudy
	6	29.74	29.68	40	62		Southerly	gentle	fine	sun	fine
	7	29.68	29.55	44	60		Southerly	brisk	fine	cloudy	cloudy
	8	29.61	29.45	48	60		S. by East	variable	cloudy	cloudy	cloudy
	9	29.70	29.83	44	65		South	brisk	cloudy	cloudy	fine
	10	29.81	29.72	54	66	61	W.W. by S.	gentle	fine	sun	cloudy
	11	29.68	29.72	59	62	56	S. West	gentle	cloudy	sun	fine
12	29.76	29.80	50	62	56	S. West	gentle	fine	sun	fine	
13	29.91	29.90	50	65	57	S.W., S.E.	lively	fine	sun	cloudy	
14	29.90	29.93	51	61	55	W. by S.	gentle	fine	sun	fine	
15	29.98	29.97	51	65	59	W.S.W.	gentle	fine	sun	cloudy	
16	29.72	29.73	57	63	56	W.S.W.	lively	cloudy	sun	fine	
17	29.74	29.95	52	62	57	Westerly	lively	fine	sun	cloudy	
18	29.87	29.88	54	70	58	S. by East	gentle	fine	cloudy	cloudy	
19	29.96	29.96	51	65	56	S. West	brisk	fine	sun	fine	
20	29.97	30.06	52	62	57	W. by N.	lively	fine	cloudy	fine	
21	30.18	30.18	54	70	58	N.W., S.W.	gentle	fine	sun	cloudy	

ESTIMATED AVERAGES OF MAY.

Barometer.		Thermometer.		
High.	Low.	High.	Low.	Mean.
30.38	29.161	70	33	54

REAL AVERAGE TEMPERATURE OF THE PERIOD.

Lowest.	Highest.	Mean.
45.62	59.22	52.42

WEATHER AND PHENOMENA.

April 21, very dry, and wind fluctuating. 22—25, brilliant sun. 26, rainy forenoon. 27, rain early, windy. 28, gusty, some showers. 29, showers, a roll of thunder, changeable wind. 30, a roll of thunder, showers.

LUNATIONS.—First quarter, 22nd, 9 h. 9 m. morning. Full moon, 30th, 1 h. 26 m. afternoon.

May 1—3, changeable, clouds and showers. 4, keen, but fine drying day. 5, rain, wind fluctuates.

6, change of wind, quite fine. 7, genial spring morning, cloudy and wet afternoon. 8, cold and gloomy. 9, rain, warm air predominates. 10, 11, warmer nights, 12, zephyral breeze, and perfectly fine day. 13, shower, fine. 14, quite fine. 15, 16, small showers, spring weather, after rainy night. 17, again quite fine. 18, close, oppressive, rainy evening. 19, starchy, cirro-stratus, fine. 20, short showers, lively, fine air. 21, very warm, genial weather.

LUNATIONS.—Last quarter, 7th, 10 h. 40 m. afternoon. New moon, 14th, 3 h. 23 m. afternoon.

REMARKS REFERRING TO AGRICULTURE.—The first point we shall notice is the relative condition of the oak and ash trees. Till the 6th they appeared to have advanced nearly together; but as soon as spring and soft breezes gained the ascendancy, the oak more decisively took the lead: and as it is an undoubted fact that the weather became incomparably more favourable than it was in



1846, we may reasonably expect that it will remain highly favourable—warm, showery, with a preponderance of *maturing*, but not of burning sun. All the crops improve beyond expectation. Having seen and examined great breadths of land in several counties, conversed with farmers, farm-labourers, and observant gentlemen, received written testimonials, and so forth, I can assert that there is

scarcely a single dissentient from the healthy view here maintained. While I offer apology for the rather defective state of the table, in consequence of my removal to this beautiful locality, I congratulate the agriculturist upon the encouraging facts it nevertheless demonstrates.

JOHN TOWERS.

Park-lane, Croydon.

## CALENDAR OF HORTICULTURE.—JUNE.

**RETROSPECT.**—On the 6th of May inst., or early in the morning of the 7th, the wind quitted its north-eastern quarter, and veered direct to the south; a little rain had previously fallen, but that morning awoke “with song of earliest birds,” sweet as the sweetest spring. The sun rose in tempered splendour, the air was inexpressibly balmy, and all was life. A most delicious change had taken place, with a feeling also, that it gave a pledge for the future. Ere noon, clouds formed, cirro-stratus covered the heavens, and with a temperature of 60° rain fell. Subsequently to the 18th, there had been alternations, many and sufficient showers, warm gleams, cool but yet growing nights, varying between 51° and 59°. The effects of this last fortnight have been magical; the bloom of trees an absolute garland, profuse and dense: the effects no doubt of the thorough ripeness of the buds, occasioned by the dry heat of last August and September; and we are much mistaken if the fruit correspond not in abundance with that of the blossom.

After a residence of seventeen years to the east of Maidenhead, I have changed my abode, and with it my sphere of observation, for a rich country district south of the metropolis. There I hope to collect fresh hints, and obtain sources of information, which cannot fail to yield and convey instruction. I already observe vegetables of fine quality, and a rich promise of abundance in garden and field; time must develop results, and these shall be faithfully reported. On the subject of vines, those on the open wall are very tardy; in the vinery, deficiency of colour is complained of. The cause must, I conceive, be traced to lack of aeration, and to the diminution of solar power by its passage through the refractive medium of glass. Of potatoes we have two reports; some talk of disease. I visited Ashstead Park, near Epsom, on the 12th, and there heard that none had been discerned, neither had the crop suffered in that site so much as in many other situations. In the markets good tubers can readily be obtained, but the retail is 1s. per gallon.

### OPERATIONS IN THE VEGETABLE GARDEN.

*Cucumbers and Vegetable Marrow*, raised in pots, may be planted out in raised ridges of light soil, over a barrow or two of manure placed some inches beneath the earth. Cover with a bell-glass for a time; sow seed also on similar beds, under bell-glasses, for succession. Cucumbers for girkins are so treated; but the work must be done early.

*Celery*.—Plant out in deeply-prepared trenches; but the plants themselves should not be deep. Remember never to earth up celery plants till they be a foot or more high, and the central grow firm and elevated.

Sow lettuce, endive, salading, round spinage, repeatedly: manure with reduced sheep dung, if procurable; it is nice manageable dress, and incorporates freely with the earth, and a crop acts upon it at once.

Transplant young cabbage and cauliflowers; the latter succeed admirably in asparagus alleys, where the custom prevails of digging out, and filling them, annually, with very rich manure.

Sow a few carrots; clean and thin the previous crops, and also the parsnips and beet-roots of spring. Sow a bold crop of turnips.

Clean hoe the *onions*: hoeing and loosening the surface does good everywhere; they are vital operations to plants in parching seasons, when water is scarce: the loose ground and fibrous matters therein attract dew and atmospheric moisture.

Transplant leeks by the long dibble in rich soil a foot deep; leave the cylinders, so formed, open; the plants will fill them up.

Prick out young brocoli, borecole, kail, and all brassicas.

*Stop early peas* so soon as the first pois appear, as the check will force out lower laterals: this is little thought of, yet *runner beans* (which now ought to be above ground) benefit amazingly by it.

Sow peas and beans once more, and repeat French beans.

Keep down weeds: let the hoes, or a light broad-edged mattock, (some call this useful instrument a

"tomahawk,") be called into constant action. If any curious persons have dwarf maize growing, deep hoeing, and guano water, will produce wonders; our experience teaches us the beauty of this fine garden plant; but it may be positively asserted that it will never answer in the field.

#### FRUIT DEPARTMENT.

If the wall-trees were properly disbudded in May, they may not require much attention in June; otherwise, every wild, irregular, useless shoot ought to be taken clean away, and redundancy of fruit picked off. Leave plenty of the best young wood for autumnal selection, keeping the great principle in mind, that for peaches and nectarines a lower shoot on every fruit-bearer of the present season ought to be retained; thus a tree is kept in due limits, and remains "green all over."

Apples, pears, plums, cherries, are frequently cut or broken back at this season: I do not dispute the practice of those able men, whose skill and assiduity repay them for this double trouble; but assert, that one good spur-pruning, made much later, will secure a good figure, and ample supply of fruitful buds upon all the wall and espalier trees. If there be vacancies, and new wood be required, then indeed a prudent use of the knife, early, may cause the development of two or three new shoots.

*Strawberries.*—Water freely in dry weather: the scorching heat and aridity of last June destroyed half the fruit: lay short grass on the vacant surfaces.

#### VINERIES.

The ripening fruit will demand plenty of dry air, especially at an early hour, screening the fruit and foliage by some light covering; the later vinery may have moisture by flooding the floor; give occasional supply of air, watching the development of laterals, and rambling growth, so as to keep both in check, without taking off one original leaf.

Admit air with prudence to melon and pine pits, but close with a warm vaporous atmosphere by four o'clock.

*Peaches* in pits or houses must have plenty of air: stop the luxuriant shoot, and remove laterals: if the aphid attack the leaves, recourse must be had to fumigation; and mildew will require sulphuret of lime in solution.

The *Plant Stove* will become rich in the *Gesneræ*, *Hibiscus-Stephanotis*, *Brunfelsæ*, and a whole tribe of lovely or fragrant plants. Give air freely, and retain a moist atmosphere; pot every plant when flowering is passed, and growth commences, which appears to require more space: make cuttings, and try which plants will strike in water, as

thereby time is saved, and much knowledge acquired.

#### GREENHOUSE AND CONSERVATORY.

Air, water, and cleanliness: these are the three essentials; for as to particularising, it would be a vain attempt. But there is one remark which we would urge home. Persons in general remove all their plants, leaving only a few capsicums, balsams, and such semi-succulents, as furniture to the houses: in the meantime the removed plants—placed forsooth at once, exposed to the elements, from every one of which they had been more or less defended—languish at once; their flowers become battered, their foliage changed in tint by the unrefracted agency of all the rays, their soil soaked and beat into holes, or parched to aridity. Great wisdom is here displayed! and the results are, a poor, unsatisfactory condition of the whole stock, and a partial attempt at recovery about September, a fortnight or so before the plants must be taken back to their winter habitations. Such things as are to decorate the parterres may justly be removed, and they thus are made to serve two good purposes, for a crowding stock is taken away, and people are well contented to witness a little discolouration and flagging, which they know will speedily be exchanged for luxuriance and bloom. Let then the parterres, the borders, the plots, the lawns, and shrubberies, be attended with the utmost assiduity; observing that cleanness and order be maintained in every part; that the flowers be grooped, with attention to height, position, and tints; but by all means let the barbarous custom of turning out the petted plants, carnellia, heaths, epacris, and the whole of the hard-wooded subjects, and the best pelargonias, &c. &c., be abandoned. Rather, substitute a house, shaded, and with a north aspect; or if that be absent, let a light canvas covering screen the root. Reduce the stock, if crowded; do anything but injure and mutilate those plants which for months have been the subjects of lively and deserved interest.

#### ANSWER TO AGRICULTURAL QUERY.

SIR,—Your querist, "An Old Subscriber," may easily destroy his hassocks. Peck or dig them all up by the roots, and burn, or bury them in any old ditch or pond, with which most old swards abound; they will never trouble him again. This is from extensive practice.

ONE OF YOUR CONSTANT READERS.

P.S. If the meadow is wet, it should be drained as well; water being a strong supporter, if not altogether the first cause of hassocks.

April 29, 1847.

## AGRICULTURAL REPORTS.

## GENERAL AGRICULTURAL REPORT FOR MAY.

Taken as a whole, the weather experienced during the past month has been exceedingly fine and vegetative; hence the progress of the growing crops has been both rapid and gratifying. Its rapidity will be best inferred when we state that, in many of our forward districts, wheat and barley are rapidly coming into ear; and the gratification is deduced from the fact that harvest work, under the present auspices, is likely to be commenced quite as early as at the corresponding period in 1846; consequently, the wants of the consuming classes are likely to be met with home-grown produce somewhat earlier in the season than was anticipated a month or six weeks ago; the necessity for unusually large importations of foreign corn after the close of July will be rendered unnecessary; and, further, that the prices of most articles are likely to assume a more moderate range than we have had to note for some months past. These opinions are of course offered in the expectation that the forthcoming crops, not only of corn, but likewise of potatoes, will be good ones. Should a reverse state of things be experienced, of course it would be out of the question to expect a low, or even a moderate, range of value.

With scarcely a single exception, the accounts which have reached us from all parts of England respecting the general appearance of the wheats, barleys, and other produce, are very flattering. As to the ravages committed by the wire-worm and other insects, we may state generally that they have been to a very trifling extent; and our correspondents, one and all, speak in the highest terms of the present aspect of the fields.

Notwithstanding the severe losses which most of the potato growers suffered last year from the long-complained-of disease in that esculent, and the very high prices at which it has been selling in our various markets during the whole of the present year, we have every reason to believe that a fair average quantity of land is under potato culture this season, not only in England, but also in Ireland and Scotland. It would, of course, be premature on our part to offer any positive opinion as to the growth this year; but the result of the inquiries we have caused to be made lead us to hope that the disease is presenting itself in a very mitigated form compared with that of the two preceding years.

The fine rains, aided by warm sunshine, have had a most beneficial influence upon the grass crop,

which promises to be a most abundant one. This, together with the fact that the growth of hay last year, as well as in 1845, was very large, and as the supplies now on hand are very extensive, the time of year considered, has had a very depressing influence on demand and value in the metropolitan as well as the large provincial markets, with every prospect, should the weather continue fine, of lower prices.

A most important question now presents itself for consideration, viz. the stocks of wheat held by our growers. On this subject many conflicting accounts have reached us; yet we have not the least hesitation in saying that they are much smaller than has been known at this time since 1840.

The show for fruit in the various districts is very large: in fact, we may safely state that a finer or more promising one was never known. The rapidity with which vegetation has progressed has tended materially to prevent any material ravages of the insect tribe.

The scarcity of stock in some parts of England, together with the high prices of corn, have produced a very active demand for both live and dead stock in London and elsewhere, and the quotations have assumed a very high range—higher, indeed, than for a long series of years. This will be evident on looking at our comparison of supplies and prices inserted elsewhere. The abundance of pasture herbage and the heavy stocks of hay have caused the stock to fare remarkably well; yet several instances in which the epidemic has made great ravages have occurred since our last. The imports of live stock have again been on the increase, and of excellent quality.

Our advices from Ireland and Scotland are to the effect that considerable activity has prevailed in the corn trade. The supplies of all articles have been small, and prices have considerably advanced, notwithstanding the imports have been good.

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 REVIEW OF THE CATTLE TRADE DURING THE PAST MONTH.

The month just concluded has been marked by more than ordinary features of interest in connexion with the cattle trade of this country. From its commencement until quite its close, Smithfield, as well as most of the country markets, have been seasonably well supplied with beasts, both as to

number and quality; yet, owing chiefly to the great advance which has taken place in the price of bread, and the unusually small supplies of potatoes on offer, the beef trade has been in a very excited state, at an advance in the quotations of from *eight-pence to tenpence* per slbs., and at which amount of improvement, buyers, both town and country, have purchased eagerly. Although the supplies of sheep have been somewhat less than at some previous corresponding periods of the year, they have been moderately extensive, and a large business has been transacted, at a further improvement in value of *fully eightpence per slbs.* Lambs have also participated in the advance, with a very active inquiry: and both calves and pigs have produced a rise of quite 4d. per slbs. This unusually large amount of improvement has taken place in spite of the increasing arrivals of live stock from abroad, which, as will be seen from the following statement, have considerably exceeded those during the last two years:—

IMPORTS OF FOREIGN STOCK INTO LONDON.

	Head.
Oxen .....	659
Cows .....	1,569
Sheep .....	3,324
Lambs .....	224
Calves .....	499

Total..... 6,275

At the outports, 2,940 head of various kinds of stock have been received in excellent condition, chiefly from Holland and Germany.

The supplies of fat stock on offer in Smithfield have been as under:—

	Head.
Beasts .....	17,175
Cows .....	601
Sheep and Lambs .....	109,670
Calves .....	1,727
Pigs .....	2,816

At the same period in 1845 and 1846, the annexed numbers were exhibited:—

	May, 1845.	May, 1846.
Beasts .....	14,117	14,287
Cows .....	520	541
Sheep and lambs .....	130,930	123,970
Calves .....	1,436	1,267
Pigs .....	2,501	2,380

The following is a comparison of prices during the month of May in the present and two preceding years:—

Prices per slbs. to sink the offals.

	May, 1845.		May, 1846.		May, 1847.			
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.		
Beef, from 3	0 to 4	6	2	6 to 4	0	4	2 to 5	6
Mutton . . . 3	4—5	0	3	4—4	4	5	0—6	4
Lamb . . . 4	10—6	0	5	0—6	0	6	0—7	0
Veal . . . 4	0—5	2	3	10—5	0	4	4—5	4
Pork . . . 3	0—4	2	3	8—5	0	4	2—5	4

The epidemic has not made so many ravages as we have had occasion to notice in some previous reports; nevertheless, several losses have been sustained in some of our large districts. The stock, owing to the abundance of pasture herbage, has fared extremely well.

Newgate and Leadenhall markets have been tolerably well supplied with meat slaughtered in the metropolis; but the arrivals from Scotland and various parts of England have been very small. The general demand has ruled active, at higher prices.

SURREY.

Opportunity has been afforded during the month to pass over and view a comparatively large extent of country. Journeying from the east of Berkshire on the 7th, that day may be recorded as the advent of spring. The characteristic of the previous twenty weeks were alternations of severe frost, cold black easterly wind, vast predominance of gloom, with a few pleasant sunny intervals, scuds of snow, and a few gentle showers. Winterly was, in fact, the prevailing weather; but nature was still silently preparing for a change; and on the day above recorded, with a decided alteration of the wind, and a fall of soft rain, vegetation broke into full activity. We noticed the beautiful fields of Buckinghamshire, where the operations of the farmer may rival those of the gardener; and saw all nature in life: growth was established, and torpor had ceased. Entering Surrey at the Croydon station, a few minutes sufficed to bring to view the masses of fruit-trees covered with dense blossom—one immense garland. This phenomenon owes its origin doubtless to the dry heat of August and September, which, by condensation of the cambium or vitalized matter of the proper juices, produced the immensity of flower-buds that every account tells of. Some say that plums will be scarce; but all agree that apples and pears will be abundant, and therefore the cyder and perry counties may hope for a very profitable return. Quitting the market gardens, and approaching the clays which abound about Anerley, and stretch along the low ground towards the Thames, the tillage was seen conducted upon the narrow ridge and furrow system, that proclaims the lack of proper subsoil drainage. What an immensity of fine land would the operation, effectually performed, redeem from barrenness, and restore to agriculture! Landlords and tenants! what is it that ye might not effect, did you but truly and mutually understand each other's interest, and the duty you owe to a patient and enduring community! Spring was fully established on the 7th; and subsequently we, in Surrey, have enjoyed the richest gleams,

the sweetest showers, on about fifteen occasions, that the most fastidious meteorologist could desire. Saving that the supply of rain is certainly below the required average, the weather of the three last weeks has been magnificent; and the results are a consistent, extensive promise of seasons, fertile and plentiful in the extreme. Three days after the opening of the Epsom railway, the writer inspected the adjacent country so far as Ashstead, the seat of the Howards; all the fields were richly covered—wheat, barley, oats, grass, and artificial crops, verdant and amazingly forward. Subsequently, growth has advanced with double strides. At Ashstead we heard good report of the potato, and, though no pledge can be given, hope of a cure presents itself; at all events, Mr. Jasper Rogers's papers on cause, cure, and prevention, ought to be read with the deepest interest. Visiting the vicinity of Reigate, a few days since, the same magnificent promises revealed themselves—hill and valley—everywhere abounded; rain, however, is the one grand desideratum, especially in sites so underdrained by gravel, sand, and chalk, as are the lands in Surrey. On Sunday a little thunder was heard east of Reigate, but at a great distance; the heat then had ranged between 80 and 72 degrees. This day (27th) thermometers mark 75 degrees in the shade, with lively wind, fluctuating between E.S.E. and S.W., indicative of an electric disturbance. Some most interesting facts remain. The writer has twice inspected the agriculture of Mr. Hewitt Davis, at Haling Park Farm; all the land has been deeply subsoiled, in some places sufficiently so as to bring up the chalky base, so that the surface appears *as chalk*. The wheat is drilled, apparently at ten inches apart; but such is the profuse tillering of single plants, so clean and effective the hoeing between the rows, and so luxuriant yet strong the plant, that it is difficult to discern spaces. Less than one bushel of seed—instead of two bushels and a-half—was sown; yet here is proof positive that the surface is more densely covered with plants than it generally is when six or seven seeds fall in a space not so large as that of a penny-piece. And where are the blanks or patches in these fields, whether under crop of wheat or of spring-corn?—the latter, sown in drills twelve inches asunder. Has wire-worm taken advantage of the paucity of seed? No; there are here and there a few little spaces where plants have failed, as in the most scientific garden culture; but we have seen hundreds of fields wherein seed has been profusely squandered, that have exhibited patches and marks of devastation in a tenfold proportion. At present, then, we repeat that, after a week's intervention, Mr. Davis's fields have given evidence of improvement (and they were then in fine con-

dition) so striking as to surprise and delight. Our evidence shall be more particular, if we be permitted to write another report, as we then hope to have seen Spring Park, &c., &c. As it is, weather only is wanting to perfect the beautiful crop of beans and peas (in twenty-seven inch rows), which are now undergoing the second or third horse-hoeing, and clean as a garden. We flatter no one; we hail improvement: England's good, its prosperity in peace, and peace-giving operations, are our hope and aim; and, viewing Mr. Davies's practice as founded in fact, and believing that by the saving of seed-corn only, *half the farmer's rent would be saved to him*, we cordially bid him welcome, and add our feeble testimony to the truth of his statements.—  
May 27.

#### BEDFORDSHIRE.

We can hardly wait till the end of the month to report the very delightful change we have experienced in the weather, and consequently in the general appearance of the crops. When our last left us, it was extremely cold for the season, which did not abate its severity till about the 6th of May; when all at once some fine rains set in, followed by a warm forcing atmosphere, which, in a few days, caused all nature to resemble a new creation. This timely and most delightful change, under the peculiar circumstances of the country, cannot fail to impress all right-minded people with a feeling of devout gratitude to Almighty God. And for ourselves, we feel no sympathy with the man who could survey his fields and meadows within the last three weeks without catching the inspiration of the beautiful poet, where he says—

"He makes the grass the hills adorn,  
And clothes the smiling fields with corn!"

Never, perhaps, was the transition from gloom and dismay, to that of joyous hope and anticipation, so sudden and simultaneous as within the last twenty-one days. We had got a week into May, and within three months of the usual time of harvest. The stock of potatoes saved from disease was pretty well exhausted; the supply of the corn markets every week falling off, with an unusually cold and backward spring, and the growing crops not covering the ground; and all this occurring while continental corn merchants were found in our principal markets, purchasing for exportation, were, taken together, enough, we admit, to create great alarm in the public mind. And nothing, it seems, but the merciful interposition of God could have removed it. But let us not be misunderstood in our congratulations; for although the crops at large have made recently the most astonishing progress, and for the most part have assumed a

healthy and vigorous appearance, the harvest now cannot be a forward one; we can hardly expect it before the middle of August, it may be very much later; so that at least twelve long weeks more must pass away before the people can be fed with the produce of the forthcoming harvest. Regarding this as an indisputable fact, and looking, on the other hand, to the manifest deficiency of corn in France, Holland, and Germany, as well as in Ireland, we consider it not very probable (notwithstanding the seasonable check that the markets have sustained, and the large reduction in price within the last week or ten days) that corn can rule low for the present; and in the event of a recurrence of unfavourable weather, it may, before the harvest is secured, go up still higher. We sincerely hope, however, it will not. For while we wish to make no secret of the fact that we have always advocated remunerative prices for British-grown corn as most conducive to the welfare of the country, we have never wished to see it extravagantly dear; and we mistake greatly if the policy we have pursued is not that which, in the long run, is most calculated to prevent such a calamity. One thing is certain: the future prospects of the country within the last two or three weeks have greatly improved. The wheat in this county, in many situations, is superb, and the failures, upon the whole, are few and far between; and although later than common, we think so far it bids fair for being a full average crop, and it may be even more than that. The barley also never was put-in in a better state, and (with few exceptions) looks remarkably promising. The same, we think, may safely be said of the peas, beans, and oats. At the same time, whatever may be the future destiny of the potatoes, they are coming up well, and the mangel wurzel never better; while the turnip fallows, under good management, are in a forward state, and many of our farmers have commenced putting in their Swedes under very hopeful circumstances. The great scarcity of sheep and cattle food has also, happily, passed away; and our pasture lands are generally presenting a beautiful verdure. The mowing grounds also, both of clover and grass, bid fair to yield a tolerably good crop; while the sainfoin is fast approaching maturity: the giant kind, or new variety, will in most instances be cut next week, and produce an excellent swath; after which it will mow a crop of seed by the time the harvest is gathered in. So that, taken altogether, we have rarely seen this part of the country presenting a more enchanting or lovely appearance. The eye seems to linger on every object, while the ear cannot fail to be delighted by the melody of the feathered songsters, who by day and by night, in our woods and groves, seem to be vying

with each other to charm creation with their warbling notes. Surely, then, under these circumstances it becomes us all, while we strive to do our best, to be thankful, and trust God for the future.

#### BERKSHIRE.

May came in with occasional night frosts; that is to say, there was rime upon the herbage, although the thermometer marked no degree lower than 35° Fah.: the days were ungenial, with some cold rain, and wind at N. N. E., till the 6th: then the winter passed away, the wind veered to S., and the morning of the 7th brought its sweetest welcome—the first really mild rain fell; and as we journeyed to a distance the effects of the change, recent as it was, became manifest during a course of forty miles. Subsequently our accounts are contradictory and perplexing; for while neighbouring districts to the east, though little remote, have enjoyed showers on nine days, interchangeably with glorious sun, a growing temperature by night (50° to 60°), and a really high average as a maximum by day; in Berkshire the weather has been gloomy, occasionally stormy, without one bright shiny day. Sun, also, is very much wanted. The wheat, notwithstanding, has improved very much lately, is of good colour, and although there are many acres thin in plant, it has tillered well; on the whole, it is thought backward, and very little of it can be seen in ear, by what is yet called “old May day” (13th May). The barley is fast recovering from the effects of the late protracted frosts, and it promises to prove an abundant crop where the land is well farmed. Oats are looking well, yet the wireworm has been busy with both the latter; though, with genial weather, it is hoped they will soon outgrow the effects produced by their destructive enemy. Beans and peas are well planted, and the hoe is busy among them. There is every probability of another abundant crop of hay, as all the grasses are growing most rapidly. Sainfoin is much more promising than in 1846, but the plant of clover does not appear to be so good. Tares are backward; and the little of rye that is left is shooting rapidly into ear. Hay, so great was the yield of last year, is a *complete* *drug*. This abundance may, perhaps, partly account for the scarcity of beef and mutton—both commanding high prices; the former 8d., the latter 9d. per lb. to the butcher. Store sheep are very dear; there has been an epidemic, which has taken off many of the small stores. Little is doing in pigs, and that little at low rates. Horses of all descriptions are very dear. Potatoes are coming up strong; the *spring plantings* are in *advance* of those put in during autumn. There is much complaint of parsnips—that they come up badly—a circumstance much to

be regretted, as many of our poorer brethren were induced to sow them in their gardens instead of potatoes. The high price of the seed (in fact seed was exhausted early in March) brought out so much old rubbish, that there is little doubt one half of it was useless, and could not germinate. A much larger breadth of carrot and mangold has been sown, and both are coming up remarkably well. The fallows are in a forward state, and Swede sowing will soon commence, should the weather become dry. The stock of wheat in the hands of the farmers is much short of the usual average; 30l. per load was made in several instances, and prices are rapidly becoming higher. The apple-trees are full of bloom, and promise an abundant crop. Oak-stripping is nearly over; there has been but little in our neighbourhood, as there is difficulty in selling the bark even at a low price. We again allude to the oak meteorologically, when viewed in comparison with the ash. Prior to the 6th their course, though somewhat in favour of the oak, was pretty equal; on the

19th that tree had been in leaf a full week, whereas the ash had scarcely put forth its buds! Sheep-shearing has scarcely commenced, excepting with fat animals, that are sent to market as soon as shorn. The wool trade is quite stagnant. About Reading and Maidenhead there was much complaint concerning the quantity of charlock. Another grave cause of complaint is the injury done to tenants by the roots of hedge-row trees; this is now perceptible, and is very sensibly felt. Landlords love ornament and park-like scenery. Tenant-farmers prefer, and justly too, fair open fields, like those so much recommended by the late Sir John Sinclair, and wisely adopted by our canny northern brethren: noble expansive squares, or oblongs (compactly hedged) of ten, twenty, or more acres! Give us room, plenty of air and sunbeam, in lieu of ill-shaped patches full of elm-roots, and bounded by wandering discursive brooks, with broad foul hedges, and England's agriculture will soon become effective.—May 25.

## AGRICULTURAL INTELLIGENCE, FAIRS, &c.

**ANDOVER FAIR** was very scantily supplied, the quantity of cheese being so trifling that quotations of the price would be superfluous. Some good cows with calves were offered, and a few horses, which were readily disposed of. The attendance of visitors was small, and no more business seemed to be doing than upon an ordinary market day.

**BANBURY FAIR.**—In cattle and sheep the supply was less than an average, and beef and mutton both made high prices: the former sold for 7½d., and mutton, clean shorn, 7½d. to 8d.

**BARNSELY FAIR.**—The show of horses was very scanty, but as the day progressed the numbers increased up to an average show. Good draught horses sold readily at very high prices, but for second-rate and inferior animals the demand was not quite so active as had been anticipated, and prices had rather a downward tendency. The show of saddle horses was limited in number, and deficient in quality, and attracted very little attention. The show of neat cattle was very good, and met with brisk sale at high prices, especially drapes, which realized enhanced prices.

**BENENDEN FAIR** was well supplied with stock of all kinds, which went off rather slowly at first, but a considerable quantity exchanged hands before night.

**BLACKBURN FAIR.**—The show of cattle was meagre, if we except a few good heifers, which were quickly picked up at high prices. Drapes and young cattle were a good deal inquired after, and the probability of there being plenty of grass, sellers were not anxious to sell, except at rates which the buyers did not seem inclined to give, but taking the fair altogether, there was a good amount of business done at higher prices. A good show of sucking pigs, which sold well; but there were only few stock pigs, but quite sufficient to meet the demand.

**BODMIN FAIR** was not so fully supplied with cattle as usual. There were not many eastern buyers; and the sale in the morning was dull. About the latter part of

the day the farmers relaxed somewhat in the prices demanded, and a great many bargains were effected, but rather at a decline. Good fat cattle realized from 63s. to 65s. per cwt.; cows and calves 60s. per cwt. Two splendid fat cows, the property of Mr. Stephens, of Hengar, St. Tudy, were sold for about £3 10s. per cwt. There were but few sheep penned on Tuesday. Fat ewes were sold at about 8d. per lb.

**CHIPPENHAM FAIR** was a large one for lean cattle: the prices of some best Herefords were up to £16 each; Devons, £14 to £15; short-horns nearly as much; some one-year-olds, £8 to £9. There were others sold at less money. Of the Welsh and Scotch, nearly all of good and fair quality sold at remunerating terms, but the inferior ones hung on hand. Very superior cows and heifers, in calf, made £16 to £20 each; moderate, £14 to £15; cow and calf, £17 to £21; for best weaned calves from 21s. to 35s. each; small, 10s. to 16s. There were a few fat beasts, which were soon taken at 12s. per score. Fat calves made about 9s. In the sheep fair a great falling off as to number, though in quality first-rate; the best tegs fetched from 55s. to 58s. each; inferior, 50s.; some horns made 65s.; couples of best pure downs, 60s. to 63s.; moderate do., 55s. to 58s.; Dorset, 55s. to 62s.; horns, 60s. to 66s. There were a few pens of fat two, four, and six tooth, which made full 9d. per lb.; Wethers, 6s. to 6s. 6d. per stone of 8lbs.; best large fat lambs from 35 to 2 guineas each: moderate, 30s. to 34s.; small, from 24s. to 28s. The supply of horses very fair; best made great prices; common sold low, very few finding purchasers. For fat bacon hogs high prices were given, at least averaging 12s. per score; or small porkers, 11s. to 11s. 6d. do.

**ELSTOWE FAIR.**—The trade was brisk for every description of stock, and everything was sold very dear. Grass is plentiful, and lean stock in particular fetched remarkably high prices.

**GARSTANG FAIR.**—The description exhibited was

for the most part confined to calvers, for which the demand was not brisk, and such as changed hands were sold at prices ranging from £14 to £16 per head. In other kinds, the few that were disposed of fetched about the same prices that have ruled at late fairs.

**HEREFORD FAIR.**—The number of cattle was not large, though it was quite equal to the supply of former years. A great number of sheep was penned, and for fresh animals, of which there appeared to be many very prime ones, the demand was brisk at advanced values; indeed, fat stock of all descriptions sold well. The following may be quoted as the average prices: Sheep in the wool 8½d. per lb. shorn sheep, from 7d. to 7½d. per lb.; lambs, 7½d. to 8d. per lb.; calves 6½d. to 7d. per lb. The demand for lean stock was exceedingly dull, which may be attributed to the lateness of the spring and the consequent scarcity of keep in this advanced season of the year. Sheep and lambs were sold at various prices, according to their quality, ranging from 35s. to 50s. per couple. There was a large supply of pigs in the fair; but the demand was not very brisk, and they experienced a reduction in price, compared with the rates at which they had been selling in our late markets. In the horse fair, there was a moderate supply of good horses, which, especially those for agricultural purposes, were much sought after, and obtained good prices.

**HUDDERSFIELD FAIR.**—We never remember a more wretched show of cattle or horses in our lives, both as regards numbers and quality. High prices were, however, asked, which checked purchasers from buying, and little or no business was done.

**LISKEARD FAIR.**—There was a good supply of all sorts. In the early part of the day business was very dull, but in the afternoon a good many bargains were made. Fat bullocks were sold from 55s. to 60s. per cwt.; cows and calves from 46s. to 52s.; fat sheep from 6¾d. to 7½d. per lb.; lamb from 6½d. to 7½d.

**LOUGHBOROUGH FAIR.**—Scarcely a fat beast was shown, and very few store cattle, which realized good prices. Good horses were in demand, and but few offered.

**LYNN FAIR.**—There was a small show of horses, but pretty good show of neat stock: high prices demanded for both, with very little business done.

**MAIDSTONE FAIR** was pretty well supplied with stock and sheep, many of the latter selling well. The horses were rather numerous, but the trade dull.

**MILNTHORP FAIR** was well attended and well supplied, and the prices realized for good stock were in proportion.

**NEWARK FAIR** was well supplied with store stock of all descriptions, but very little fat meat. Stores sold at great prices; wool sheep sold well; milking cows much looked for. The horse fair a very indifferent one; good horses sold well.

**ROSS FAIR.**—There was the smallest supply of fat cows we ever remember, which sold readily at 7d. per lb. Fresh steers and barren cows realised an advance in price; but poor store cattle met with a dull sale, at low prices. There were very few fat or store sheep penned; there was a brisk sale for the former kind, and shorn fat sheep sold at 8d per lb., and had a brisk sale. Good horses, of which there were very few, commanded high prices; inferior ones met with a dull sale. The fair was thinly attended, and business was very dull.

**RUGBY FAIR** was not so well attended as usual, nor was the supply of beasts or sheep near equal to what we have been accustomed to see at these fairs; this however may, in a great measure, be attributed to Leicester, Northampton, and Warwick markets being held on the same day. A dull trade was consequently done at the following prices: Beef, 7d. to 7½d.; mutton, 7d. to 8d.; lamb, 9½d. to 10d. per lb. Stores went off at an im-

proved rate, fetching from 20s. to 30s. per head more than last month. The showers that fell during the week having put the graziers into better spirits, speculation was more in the ascendant than it has been for some time in this branch of the trade.

**SHAP FAIR.**—The show of cattle was good and prime animals were sold high. On the whole, however, the business was transacted at a lower figure than usual.

**STRATFORD-ON-AVON FAIR** was well attended with beasts of all descriptions; and although the beef offered for sale was excellent in quality, the demand was rather dull, the butchers being unwilling to give the advance demanded. The prices may be quoted, for beef, 7d. per lb.; mutton, 6½d. to 7d., with a ready sale. About 2,000 sheep were penned during the day.

**STRATTON (CORNWALL) FAIR.**—The quantity of stock exhibited was much below what is usually shown. There was a considerable number of buyers from the eastern counties, also from the western parts of this county. The sale for cattle was exceedingly brisk, at an advance say of £2 on £20 for store cattle generally. Cows and calves sold at an average of 60s. per cwt., and fat cattle, of which few were offered, realized from 60s. to 65s. per cwt., and all sold. Fat sheep, in their wool, quite 8d. per 8lbs., and couples from 45s. to 60s. There was a lot of Irish hoggets in the fair, which found buyers at 20s. to 22s.

**STURMINSTER FAIR** was abundantly supplied with barreners and other store stock, the greater part not of a very superior quality. On the whole, there was a tolerably ready sale. There were a few lots of excellent fat stock, which were soon bought up at high rates. Pigs were not so plentiful as usual, and of sheep but a small number were penned.

**TOTNES FAIR.**—The number of fat bullocks driven in was small, and some prime and well-made-up articles fetched still higher prices; indeed, not short of 70s. per cwt., or 12s. 6d. per score; and the quotation for prime beef was from 60s. to 70s. per cwt., or from 10s. 6d. to 12s. 6d. per score. Second-rate, as also a fair description of bullocks, were from 53s. to 58s. per cwt., or from 9s. 6d. to about 10s. 3d. per score, and it is believed that all were sold. There were also some foreign bullocks shown, and these too found a sale. Cows and calves likewise sold well at from 42s. to 58s. per cwt., or from 7s. 6d. to 10s. 3d. per score. Store bullocks were from 34s. to 42s. per cwt., or from 6s. to 7s. 6d. per score. Fat sheep were from 6¾d. to 8d. per lb.

**WAINFLEET FAIR.**—The show of beast and sheep was only of a very limited and poor description, especially the beast. There was, however, an exception in the sheep market; a pen of twelve two-shear wether sheep, the property of Mr. Thomas Heanley, Croft, were generally admired. For the amount of business done fair prices were obtained.

**WARSOP FAIR** was considered, upon the whole, a very poor one, there being the smallest supply of beasts and sheep ever seen in this fair on any former occasion. The few that were in good condition and for sale did not readily find purchasers, owing to the exorbitant prices asked for them by the dealers.

**WARWICK FAIR.**—The cattle fair was well supplied with both beef and mutton, which fetched from 7½d. to 8d. per lb., sinking the offal. Milch cows were plentiful, but very dear.

**WISBECH FAIR.**—The supply of cattle was most abundant, and sales were effected at very high prices, buyers being eager to secure what was in the market. As to quality, there was plenty of what was good, but nothing extraordinary. The number of horses was small, and good ones fetched high prices, at which sales were moderately brisk.



## REVIEW OF THE CORN TRADE DURING THE MONTH OF MAY.

Though a reaction has taken place from the extreme prices, still the value of all kinds of grain is considerably higher than at the close of last month. We appear, however, now to have arrived at a point where the upward movement is likely to be checked. In looking back over what we have written during the last six or seven months we find that the opinions we have at various periods ventured to offer have, on the whole, proved correct; and as this may perhaps have had the effect of inspiring some of our readers with confidence in our judgment, we feel the greater responsibility in venturing on remarks relative to the probable future course of the trade.

So many new elements now come into operation, the working of which it is utterly impossible to foresee, that prediction can be of very little real use. It may, however, be worth while to point out a few of the circumstances by which the position of affairs has been altered for the better. Having long ago satisfied ourselves that the stocks of home grown corn in the country were not sufficient for the consumption up to harvest, we consider that the recent rise in prices must be viewed as beneficial, inasmuch as it is calculated to draw the surplus growth of America and Russia (nearly the only countries having much to export) to Great Britain. Until lately, the French, the Dutch, and the Belgian markets offered better chances of profit than the English; and so long as that continued to be the case, there was great danger of England going short; and we are therefore of opinion that it was absolutely necessary for our safety that wheat should be higher here than in any other European country. Such being now the case, shipments from hence to the continent (which previously took place on a large scale) have nearly, if not wholly, ceased; whilst the probability is, that a portion of the American and Russian supplies, originally intended for other places, will find its way to our shores. One source of uneasiness—an inadequacy of supply—has therefore been removed. The next point of importance, as likely to influence the future range of prices, is the great improvement which has been effected in the growing crops by the extraordinarily fine weather experienced since the commencement of the month of May. After rather a heavy fall of rain the temperature rose gradually, and the moisture and warmth combined have wrought an amazing alteration in the appearance of

the country. The spring-sown crops stand as well as could possibly be desired. The wheat plant, though still backward, wears a healthy and vigorous aspect, and promises far better than could have been hoped, considering the extreme length and severity of the winter. Grass has grown amazingly, and all the green crops are luxuriant. As far, therefore, as a judgment can be formed at this early period, the harvest promises to be abundant. This is the bright side of the picture. On the other hand, we have short stocks of grain in Great Britain, France, the Netherlands, and a large portion of the interior of Germany. The position of Europe is, therefore, in the highest degree critical; everything depends on how the harvest may turn out; bad, or even threatening weather during the blooming time, or indeed at any subsequent period until the corn is all secured, would be sure to give rise to speculation and high prices. Situated as this country is at present, more than ordinary importance must be attached to the forthcoming crops. There can hardly be a doubt that before these can be ready to cut, not only the grain we now have, but all that may in the interval reach our shores, will have been pretty closely used up. A defective harvest or a recurrence of the potato disease would consequently entail such an amount of distress as is fearful to reflect upon. The weather will therefore be watched with the utmost anxiety, and we must expect considerable fluctuation in prices; and it will behove farmers, and indeed all parties engaged in the trade, to exercise more than ordinary caution and foresight in their operations. The chances are more in favour of a high than a low or even a moderate range of prices. Still, under certain combinations of circumstances, wheat might easily decline 20s. or even 30s. per qr.

The difference between the lowest and highest points attained during the month has been fully a pound a quarter; and it is perfectly within the range of probabilities for a fall to occur, as great as has been the advance. As all speculation relative to the future must necessarily be exceedingly vague, so much depending on contingencies of which nothing can at present be known, we shall here drop the subject, and devote the remainder of our space to the less hazardous employment of describing what has actually been done since we last addressed our readers.

The most important feature in connexion with the wheat trade is the fact that the deliveries from the growers have hardly kept pace with the consumptive demand; indeed, so inadequate have the home supplies been in many parts of the country, that buyers from distant quarters have flocked to the ports where any stocks of foreign wheat were to be found; and it was in consequence of the large purchases made by country buyers at London, Liverpool, and other places, that prices ran up so rapidly in the early part of the month.

As the fluctuations at Mark-lane have, as usual, influenced quotations at most of the other markets, we shall confine our remarks principally to what has there taken place. The first important advance occurred on Monday, the 3rd of May, the whole of the English wheat then exhibited being cleared off at rates 4s. to 5s. per qr. above those current on that day week. This, however, was only the commencement, a much greater rise having subsequently taken place. On the following Monday the millers were under the necessity of paying a further enhancement of 10s. to 12s., and on the 17th these rates were again exceeded by 6s. per qr. The total rise in three Mondays' markets was, therefore, from 20s. to 23s. per qr. The highest price realized for the best runs of white wheat was, we believe, 116s. per qr.: from that point a reaction commenced. The beautiful weather experienced the week following, some slight increase in the quantity of wheat brought forward by land-carriage samples from Essex and Kent, and the appearance of a few cargoes about the same time from Lincolnshire, caused the trade to open languidly on the 24th. For some time the millers refused to purchase at all on the latter occasion, and it was not until factors consented to submit to a decline of 6s. to 7s. per qr. that any business was done. Even at the reduction named buyers were shy, and a portion of the supply remained unsold, which has since been placed with difficulty at a further abatement of 5s. to 6s. per qr.

The rise in the value of foreign wheat was quite as rapid during the first three weeks of the month as on English; as much as 108s. per qr. was at one time paid for superior qualities of Lower Baltic red, and corresponding rates for other descriptions. Within the last week or two we have received rather larger supplies than were supposed to be close at hand; which circumstance, together with the fall on wheat of home growth, has occasioned prices to recede 8s. to 10s. per qr. from the extreme point. Importers have, however, up to the present time, manifested considerable firmness; the total exhaustion of the granaried stocks, and the belief that the Baltic supplies will not be followed up by further arrivals from thence, having tended to inspire confidence.

The value of flour rose with that of wheat. The top price of town made was, at the close of April, 68s. per sack, and the millers were then barely realizing a profit on the manufacture of the article. The first step upwards was on the 3rd inst., when it was advanced to 75s.; and during the two succeeding weeks the price was risen successively to 80s. and 85s. per sack. The reaction in the wheat market on the 24th of May enabled the millers to supply their customers at lower rates, and the top quotation is now settled at 80s. per sack. Whether it will remain at that point, or be again lower, will, of course, depend on the position of the wheat trade. Norfolk and other descriptions of ship flour have sold at rates in proportion to town-made flour, and the value of the latter has also regulated that of American. The highest price obtained for the best brands of Western Canal has been 52s. to 54s., and the same kinds may now be had at 42s. to 44s.: the article is therefore still higher than it was at this time last month. The stock of American flour in London has been much reduced, and the greater proportion of what is left is of secondary quality; the arrivals have recently increased, but it will be some time before any supplies of importance can reach us from the other side of the Atlantic.

Barley of home growth seems to be very nearly exhausted, and the receipts into London have been on a limited scale throughout the month. The quantity which has arrived from abroad has also been moderate; and having had a good country demand, prices have steadily tended upwards. The bulk of the purchases has been for shipment to the west of England and to Wales; but some quantity has also been taken to go into Kent, a quarter whence London usually draws supplies. Comparing the existing prices with those current at the close of April, we find that all kinds are 2s. to 3s. per qr. dearer; low qualities of foreign being at present worth 44s. to 46s., good sweet grinding parcels 48s. to 50s., and superior samples of English 58s. to 60s. per qr. That these rates will be maintained is more than probable, the high price of wheat having caused barley meal to be more extensively used than in ordinary seasons, both here and on the continent.

In the early part of the month malt met with a good deal of attention, and rose nearly in the same proportion as barley: latterly, however, the demand has fallen off, and a slight reaction has taken place in quotations. The alteration in the distillation laws permitting the use of sugar has certainly had the effect of lessening the consumption of malt; still the article has become scarce, and cannot be expected to fall much in price.

That there are hardly any oats remaining in the

hands of the farmers is proved by the almost total cessation of supplies coastwise and by railway into London, only a few hundred quarters of English having been received weekly since our last. The arrivals from Scotland and Ireland have not been much more extensive; and though rather a liberal quantity has reached us from abroad, the market is at present by no means over-stocked. In addition to the consumptive demand of London and the suburbs, to satisfy which requires about 20,000 qrs. per week, considerable quantities have been bought at Mark Lane for transit into the country: the sales have therefore been on rather a large scale, and though the principal dealers have acted with great caution, prices have risen several shillings per qr. Good feeding qualities, whether of British or foreign growth, cannot be bought at present below 33s. to 35s., and for the finer kinds 40s. is demanded. Scotch potato oats have become extremely scarce, and are held at 43s. to 46s. per qr. We are inclined to think that no further supplies of moment will reach us from the near continental ports, and the market is therefore likely to remain in a very bare state until the Riga and Archangel arrivals come forward in July, until which period prices are more likely to advance than recede.

Till within the last eight or ten days beans have been in lively request, partly for grinding and partly for shipment to the north. The falling off which has taken place in the inquiry has hitherto failed to effect the value of the article, and the rise of about 5s. per qr., established on the rates current at the close of last month, has been firmly supported. Egyptian beans rose at one time to 50s., but are again down to 44s.

Owing to the extreme scarcity of peas, and their extended use in consequence of the dearness of all articles of food, an advance of 4s. to 6s. per qr. has been realized on both boiling and grinding qualities.

The want of supplies has prevented much business being done in rye. This article was, in the early part of the month, eagerly sought after for export to Holland and Hamburg, and the few lots which have come to hand have met ready takers at 65s. to 66s. per qr.

About the middle of the month a very lively demand sprung up for Indian corn, and parcels which a few weeks before had been pressingly offered at 52s. to 54s. rose rapidly to 70s. and 75s.: indeed, for one lot of superior white, 80s. per qr. was paid in retail. These rates are now no longer obtainable; but the reaction from the highest point does not much exceed 5s. per qr., good qualities being still held at over 70s. per qr.

The certainty that a large importation of foreign

grain will be required, renders all information relative to the probable quantity each country may have to spare for shipment a matter of much interest, and we shall therefore lay before our readers all the intelligence we have been enabled to collect.

America will be called upon to furnish bread stuffs not only for Great Britain, but for France and the Netherlands; and we feel considerable doubt whether the quantity the United States may have for export will be equal to the calls which are likely to be made on that country by Europe. The best informed American merchants give a much more moderate estimate of the probable extent of the surplus for exportation than the parties who have ventured on the random opinions so freely indulged in on this side.

Of flour it is confidently stated that the total shipments from the beginning of May to the commencement of September would not exceed one million barrels, and that that quantity would have to be divided between the different countries requiring supplies.

The probable extent of the supply of Indian corn is not so confidently spoken of, and it was thought that the very high rates obtainable in England and Ireland might lead to more being sent away than could really be spared; but the highest estimate we have seen does not compute the probable shipments at over 1,000,000 qrs. The stocks at the different ports on the sea-board had been quite exhausted, and the supplies from the interior had, at the date of our latest advices, scarcely begun to arrive. The want of available stocks had put a temporary stop to shipments; and a large fleet of vessels having arrived out, a considerable fall had occurred in the rates of freight.

The flour market at New York had remained in a quiet state at about 7 $\frac{3}{4}$  dollars per barrel; all parties holding off, in expectation of large receipts from the interior. At Baltimore, Philadelphia, and other principal towns business was also dull.

Upon receipt of the English advices of the 18th inst., a very great rise took place in prices at all the leading Baltic ports; and corn is higher on the continent than has been the case for a great number of years.

Stocks appear to be almost exhausted in the interior of Germany, and also at many of the Lower Baltic ports; and the scarcity and dearness of provisions had led to serious riots.

Danzig seems to be almost the only place where any wheat worth naming remains on hand. Letters from thence of the 18th May, state that the operations during the preceding week had been on a restricted scale, little or no speculation having taken place. A couple of hundred lasts only had changed hands, at 78s. to 79s., for 60 to 61lbs.

high mixed, and 80s. to 81s. per qr. free on board, for fine high mixed.

At Stettin, Rostock, and neighbouring ports, 85s. up to 90s. per qr. was asked for moderately good red wheat, with however very little doing at these exorbitant rates.

In France and Holland, prices have begun to decline; and we have no doubt that the next advices from the Baltic will also be of a more subdued character.

**CURRENCY PER IMPERIAL MEASURE.**

MAY 24.			
WHEAT, Essex and Kent, new, red	95	White	90 109
Old, red	90	Do	90 98
RYE, old	63	New	62 63
BARLEY, Grinding 50 58 Malting 60	64	Chevalier	53 64
MALT, Suffolk and Norfolk	71	Brown	76 80
Kingston and Ware	73	Chevalier	80 -
OATS, Yorksh. & Lincolnsh., feed 56	37	Potato	39 41
Youghall and Cork, black	31	Cork, white	35 36
Dublin	34	Westport	34 36
Waterford, white	32	Black	28 32
Newry	34	Galway	27 30
BEANS, Tick, new	54	Old, small	52 54
PEAS, Grey	60	Maple	60 63
White	60	Boilers	64 -
FLOUR, Town-made 80 85 Suffolk	74	per sack of 250 lbs.	-
Stockton and Norfolk 70 74	Irish	-	-

FOREIGN.				
WHEAT, Dantzic	95 96	100	Fine	100 165
Hamburg	90 96	90	Rostock	94 98
BARLEY, Hamburg	54	62		
OATS, Drew	36	38	Feed	31 36
BEANS, Grey	44	50	PEAS	56 60
FLOUR, American, per brl.	48	50	Baltic	- -

**IMPERIAL AVERAGES.**

Week ending	Wheat.	Barley.	Oats.	Rye.	Beans.	Peas.
April 10th	74 5	49 8	32 7	54 10	59 10	56 0
17th	74 1	48 4	29 7	56 1	49 10	59 7
24th	75 10	48 5	29 7	53 6	49 11	52 4
May 1st	79 6	49 6	30 11	55 6	51 10	52 11
8th	81 10	51 0	31 6	58 3	53 0	54 11
15th	85 2	52 7	32 11	58 7	54 7	55 0
Aggregate average of the six weeks which regulates the duty.	78 6	49 11	31 2	56 1	51 8	53 7
<b>Comparative Average.</b>						
Same time last year	56 0	30 2	23 1	33 7	35 0	34 1

**PRICES OF SEEDS.**

MAY 24.			
Cloverseed met with very little attention; and, in the absence of transactions of importance, quotations remained nominally unaltered. Prices of other sorts of Seeds were also about the same as on this day week.			
Rapeseed, 31l.	33l.	Irish, -l.	-l.
Linseed, Baltic, 48	50	Odessa, 47	50
Mustard, per bush., white	8	10 brown, 9	10
Caraway, 41	43 new, 42	44	Coriander, 18 21
Hempseed, 35	38 per qr.	Trefoil, 17	19
Canary, 69	62 fine, 62	66	Tares, Spring, 7s. to 7s. 6d.
Linseed Cakes, English 13l.	13l.	10s. per 1000	
Linseed, English, sowing 50	00	crushing 46	40 per qr.

**HOP MARKETS.**

**BOROUGH, May 24.**

A moderate business is doing in our market at fully as much money as on this day week.

**POTATO MARKETS.**

**SOUTHWARK WATERSIDE, May 24.**

This market remains much the same; the supply is very limited, but it appears quite sufficient for the demand at the present high prices; yet the best samples are sold readily, and there is a somewhat better sale for secondary samples. The prices are as follows:—

	s.	s.	s. s.
Yorkshire Reds	240	to 260	
Ditto Regents	260	to 280	
Ditto Shaws	220	to -	
Dutch	100	to 140	
Lincoln and Cambridgeshire Regents	260	to 280	
Ditto Kidneys	180	to 220	

**WOOL MARKETS.**

**BRITISH.**

LEEDS, May 21.—We have not any change to notice in this market during the present week. Sales are very flat, and prices have a downward tendency.

**LIVERPOOL, MAY 22.**

SCOTCH.—There is little doing in Laid Highland Wool. The state of the money market has nearly put to a stop to all business. White Highland is not much inquired for. There is still a demand for anything good in either good Crossed or Cheviot; inferior quite neglected.

	s.	d.	s. d.
Laid Highland Wool, per 24lbs	7	0	7 0
White Highland do	10	6	11 0
Laid Crossed do	8	6	9 6
Do. do. washed	9	6	10 6
Do. Cheviot do. unwashed	8	9	12 0
Do. do. washed	12	0	15 6
White do.	20	0	22 6

**PRICES OF MANURES.**

Subjoined are the present prices of several sorts of Manure:—

Agricultural Salt, 30s. per ton	Muriate of Ammonia, 21s. per cwt.
Alkalies, 28s. and 42s. per cwt.	New Bristol Manure, 8s. per qr.
Boast and Co.'s (Bow) Inorganic Manures, from 6s. to 11s. per cwt., according to crop	Nitrate of Soda, 19s. per cwt.
Boast's Guano, 9l. 9s. per ton	Nitrate Potash (saltpetre), 47s. to 28s. per cwt.
Carbon, 12s. per qr.	Patent Disinfected Manure, 9l. per ton
Chie fou, 21s. per cwt.	Petre Salt, 2l. per ton
Chloride Lime, 28s. per cwt.	Potter's Guano, 9l. per ton.
Clarke's Compost, 3l. 12s. 6d. per hhd., sufficient for three acres	Preparation for Turnip Pl., 10s. 6d. per pakt., sufficient for three acres
Fothergill's Gypsum, 35s. per ton.	Rags, 4l. to 4l. 10s. per ton
Fothergill's Phosphate of Lime, 8l. 10s. per ton	Rape Cake, 7l. per ton
Graves, 6l. 10s. per ton	Rape Dust, 7l. 7s. per ton
Guano, Peruvian, 10l. 10s.; Bolivian, 10l. 10s.; African, 6l. 6s. to 7l. 10s. per ton, according to analysis and quantity	Soda Ashes, 10s. per ton
Gypsum, 28s. per ton	Soda Ash, 14s. to 14s. 6d. per cwt.
Highly Concentrated Manure, 30s. per qr.	Sulphate Soda, 6s. per cwt.
Humus, 14s. per qr.	Sulphur for Destroying Worm on Turnips, 12s. per cwt.
Bone-dust, -s. per qr.	Sulphuric Acid, 1 1/2d. per lb.
Half-inch Bone, -s. per qr.	Superphosphate of Lime, 7s. 6d. per cwt.; 7l. per ton
Hunt's Staff Graves, 3s. 6d. cwt.	The Liverpool Abattoir Company's Animalized Manuring Powder, 2l. 10s. per ton
Hunt's new Fertilizer, 13s. 4d. per qr.	The Urate of the London Manure Company, 4l. 4s. per ton
J. T. Hunt's Artificial Guano, 9l. per ton	Willey Dust, 4l. 4s. per ton
Manure Powder, 16s. per qr.	Wolverhampton Compost (Alexander's), 12s. per qr., subject to carriage to London, or forwarded from Wolverhampton
Muriate of Lime, 6s. per cwt.	











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