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AGRICULTURAL JOURNAL,

AND

TRANSACTIONS

OF THE

Lower Canada Agricultural Society.

VOL. 2.

MONTREAL, NOVEMBER, 1849.

NO. 11.

We have much satisfaction in stating that His Grace the Archbishop of Quebec has addressed a printed "Circular" to the *Curés* of the Diocese of Quebec, of which we give a translation. This "Circular" is a proof of the interest which the Archbishop feels in the prosperity of the rural population. There can be no mistake as to the great advantage the improvement of our agriculture would be to the rural population, and to every interest in the country, and we are happy to state that we have found the Roman Catholic Clergy generally most favorably disposed to forward this necessary improvement. Indeed we have received more flattering and encouraging letters from members of the Catholic Clergy, to persevere in our humble exertions to promote the improvement of agriculture, than from any other class of this community, or from all of them together. This circumstance we conceive highly creditable to this most respectable body, who are always employed in doing good for their parishioners. We have already said so much in reference to the support of the clergy, and the advantages it would be to the Lower Canada Agricultural Society to have this support in their endeavours to advance the improvement of Canadian agriculture, that we may conclude for the present by observing, that, as editor of this Journal, we shall do all in our power to make it worthy the recommendation and patronage of the Archbishop, Bishops and Clergy of Lower Canada. It is our most anxious desire, as it would be our highest ambition, that the Journal should be instrumental in advancing the improvement of our husband-

ry. It is not party questions or doubtful subjects we attempt to discuss, but a subject upon which the very existence of our race depends, and an employment that was practiced by the first generation of mankind, continued up to the present time, and is more necessary now than it ever was, from the vast increase of population all over the world. Perhaps the production of the earth, annually, seldom much exceeds the necessary consumption of its inhabitants, and if such is the fact, we may imagine what a fearful amount of suffering would be the consequence of any great deficiency in the annual produce. We are, therefore, in duty bound to do all in our power to prevent any deficiency, by executing our part properly. Adverse seasons and other casualties may happen in one part of the earth and not in another. The favoured portion should then be in a position to assist and support the country whose crops failed. This is our duty as members of the great human family, to be prepared for contingencies that may occur; and it shows so clearly the decided interest felt by his Grace the Archbishop of Quebec, and by Mr. Cazeau, in the improvement and prosperity of agriculture, that we are proud to be allowed to give it insertion. We have also to acknowledge a letter to us from His Lordship the Roman Catholic Bishop of Montreal, exceedingly kind and encouraging, and indicative of His Lordship's anxious desire to promote agricultural improvement in Canada, which His Lordship has allowed us to publish.

The Bishop's letter, we are happy to perceive, advocates the establishment of Model

Farms, when the most approved system of agriculture might be seen in operation by the farmers, for their encouragement and instruction. This is the right mode of promoting improvement.

The Rev. Mr. Cazeau has kindly permitted us to publish his letter to us in this Journal.

BISHOP'S PALACE, QUEBEC,
17th Oct., 1849.

SIR,—I received the letter which you did me the honor to address to me on the 3rd instant, accompanying your circular letter to the Roman Catholic Clergy of the Diocese. The latter was forwarded immediately on arrival.

His Lordship the Archbishop, hearing that your excellent Journal, should it not meet more encouragement, is likely to be discontinued at the expiration of the present year, addressed a circular letter to his Clergy, inviting them to extend its circulation more and more throughout the country. It is the duty of all friends of the country to further this publication, and to second by this means the patriotic views of the Society, formed for the encouragement of Agriculture in Lower Canada.

With reference to you, Sir, who are the soul of this Society, they owe the highest acknowledgments for your persevering efforts in making known to the people the means for improving their mode of agriculture, and they could not, without being guilty of indifference, neglect to tender you their support for the attainment of an end so eminently useful.

I join with His Lordship, the Archbishop, in wishing you all possible encouragement in your labours for the advancement of Agricultural science in this country, and I remain,

Very respectfully,

Sir,

Your very obt. servant,

C. J. CAZEAU,
Secretary.

Wm. Evans, Esq.,
Secretary to the
Agricultural Society of Lower Canada.

P.S. I send you a copy of the circular letter of the Archbishop.

CIRCULAR ADDRESSED TO THE ROMAN CATHOLIC CLERGY.

BISHOP'S PALACE, QUEBEC,
15th Oct., 1849.

REVEREND SIR,—I have seen with pleasure the Journal published in Montreal, under the direction of the Society, established for the encouragement of Agriculture in Lower Canada, which is received by a great number of the Rev. gentlemen in the Diocese. It is becoming that the Clergy should exhibit in this, as in everything else, that they are far from being indifferent to that which is so decidedly intended to favour the interests of the country.

I learn, however, that the Journal will be discontinued at the end of the present year, if the subscribers do not increase, so as to cover the expense of publication. Permit me, Reverend Sir, to invite you to obviate, as much as may be in your power, this untoward event, by engaging the most influential of your parishioners to subscribe to this publication, which is replete with instruction, so precious to our agricultural population. The zeal of the Clergy, in spreading more and more, by this means, amongst our cultivators, the knowledge of the methods employed here and elsewhere, for the improvement of agriculture, will acquire for them a fresh title to the esteem of their parishioners.

Receive, Reverend Sir, the assurance of my sincere attachment.

† JOS.,
Archbishop of Quebec.

BISHOP'S PALACE,
Montreal, 22nd Oct., 1849.

SIR,—I am happy that your letter of the 20th instant, the receipt of which I have now the honor to acknowledge, furnishes me with a new occasion to felicitate you upon the zealous efforts which you are making for the advancement of agriculture in this country.

In conformity with the desire expressed in your letter, I shall, with sincere pleasure, avail myself of the first occasion which presents itself, to recommend your letter to the attention of the Clergy, which I have already partially done.

Permit me to observe, however, that in the opinion of the Clergy, your enterprise will not

become eminently successful, until there are established, throughout the different Parishes, Model Farms, for the purpose of developing, in practice, the advantages which would accrue from an improved system of husbandry.

With the ardent desire, that your efforts may be crowned with entire success,

I am,
Very respectfully, Sir,
Your very humble servant,
† IG.,
Bishop of Montreal.

Wm. Evans, Esq.,
Secretary, L. C. A. S.

A Special Meeting of the Directors of the Lower Canada Agricultural Society took place at their rooms, in this city, on Friday the 26th of October last. Several members were present.

The President, John Yule, Esq., having taken the chair, the Secretary submitted a number of letters from the Roman Catholic Clergy, in reply to the printed circular addressed to them lately by order of the Directors at the last Quarterly Meeting. In almost every instance their letters offer encouragement to continue the Journal, as an excellent means of promoting Agricultural improvement, and recommend agents in the parishes for obtaining subscribers, and collecting subscriptions. The Secretary also submitted a list of the names of subscribers who have not paid their subscriptions for last year and this, making a very considerable amount of money due for the Journal. The Secretary was instructed to use all possible diligence to collect this money, and to send accounts to the several agents, of the subscriptions remaining due in the parishes, that they may be collected without delay.

The following Resolutions were then proposed, and unanimously adopted, viz :

Resolved, 1.—That the Agricultural Society of Lower Canada, observes, with gratifying satisfaction, the eagerness with which a great number of the clergy, of Lower Canada, have given publicity to the circular which was addressed to

them, by the Secretary of the Society, on the 29th September last, and that it hopes to receive no less favorable accounts from the other members of the Clergy.

Resolved, 2.—That this Society cannot omit to express its sincere thanks to His Lordship the Catholic Archbishop of Quebec, for the circular which he addressed to his Clergy, requesting them to interest themselves in sustaining this Society, in its patriotic and philanthropic work, and this Society entertains no doubt but that the Clergy will respond to the appeal with their accustomed zeal.

Resolved, 3.—That this Society does not believe that it can continue, at its own proper expense and cost, the publication of the Agricultural Journals, (French and English,) unless, between this period and the 15th December next, it receives new lists of paying subscribers, and the prompt payment of the sums now due, for past and present subscriptions.

Resolved, 4.—That this Society will have its first Annual Agricultural Exhibition, in the month of September next, in the neighbourhood of the City of Quebec, and that the place for holding the Exhibition shall be varied each year.

Resolved, 5.—That J. F. W. Johnston, M. A., Professor of Agricultural Chemistry, residing in Durham, England; and Doctor Vincenzo, of the Baroné Amarellé da Rossano, in the kingdom of the two Sicilies, be named Honorary Members of the Agricultural Society of Lower Canada.

The Directors have come to the resolution of having a Cattle Show, and General Exhibition at Quebec in September next, and it is to be hoped that they will be supported, to enable them to have such an Exhibition as shall be worthy of Lower Canada, and fully equal to those that have taken place in Upper Canada.

The Secretary was instructed to write to the gentlemen elected as Honorary Members of the Society, and acquaint them of the circumstance.

The meeting then separated.

By order,

WM. EVANS, Secretary, L. C. A. S.
Montreal, Oct. 26th, 1849.

We hope the proceedings at this Meeting will induce the subscribers to the Agricultural Journal to pay up their subscriptions at once, and endeavour to obtain more subscribers, if they desire the Journal to be continued, or consider it worth supporting. It is unnecessary to state that farmers do not support this Journal, because, if they did, it need not be discontinued. We may be permitted to say, however, that they act upon a different principle from all other classes, in withholding their support. Every other class are always anxious to see and to read any information that relates to their business or occupation; but the agricultural class appear to be too well or too ill informed to contribute a dollar annually to the support of the only agricultural paper published throughout Lower Canada. It cannot be the amount of the subscription that would prevent any farmer from subscribing, and it is difficult to understand what can be the motive, as there can be no question, that a farmer, however well instructed, may derive useful information from even one number, that would amply compensate him for five shillings subscription. This we submit to any competent and candid reader of this Journal to decide. It appears an extraordinary circumstance, that farmers who so frequently complain of neglect, and injustice done to them—who desire grants of public money to encourage agricultural improvement, would, nevertheless, refuse themselves to contribute a dollar annually to support a Journal published for the general dissemination of agricultural improvement, and for the information and instruction of those who may not have had an opportunity of acquiring a perfect knowledge of a good system of agriculture. We confess we cannot understand this apparent inconsistency, and we are anxious to have the matter explained.

We have been as much disappointed as our respected correspondent "Antipas," in not being able to give our subscribers more practical information respecting the "Root or Stump

Extractor," which appeared in our Journal of last year. We can assure him it is not our fault, and we hope his communication will induce the gentleman whose letter appeared in a former number, to give us some further information on the subject of this machine, for the satisfaction of "Antipas," and several other parties who have made enquiry about the machine in question.

(Translation.)

MR. EDITOR,—On glancing over the *Agricultural Journal* for the month of July, 1848, I saw the description of a machine for taking out stumps, which your correspondent, "V. C.," says is expeditious, and very economical. He speaks highly of it, and says it would be an act of patriotism, if those in easy circumstances would purchase one for the use and instruction of cultivators in their particular locality. He does not, however, give the name of the person who manufactures these machines, or where he lives, so as to give those who desire it, an opportunity of seeing it in operation. His letter is written without place or date—to whom are we to apply? because, we cannot from the description form an opinion without being liable to err.

If he wishes his invention to be of any use, let him give at least the maker's name, and the parish where he lives. We can then, if we desire it, apply to him.

ANTIPAS.

NEW OR IMPROVED VEGETABLE SEEDS.—Messrs. P. Lawson and Son have a new pea of great promise, which will likely be brought out next season. *Pillinger's Hybrid Stone Turnip*.—The merit of this variety is smallness of top, by which it stands thick on the ground; it also makes a good sized and well formed bulb in a short time, and is consequently adapted for early crops. *Tiley's Early Marrow Cabbage*.—One of our very best early sorts, and surpassing them all in delicacy and flavor. *New Hybrid Yellow Turnip, called Robertson's Golden Stone*, said to have been raised between the yellow stone and Malta yellow; has all the appearance of being a valuable addition to our garden sorts. *New Hybrid Cabbage*.—Raised between the common globe savoy, and the Sportsborough Cabbage, partaking of the excellent quality and form of the latter with the wrinkled foliage of the former. *New Dwarf Prolific Garden Bean*.—Somewhat like the dwarf fan, or bog bean, but much more productive.

LORD BROUGHAM ON AGRICULTURE.

At the anniversary dinner of the Cumberland and Westmoreland Agricultural Society, at Penrith, Lord Brougham presided. The following is the noble Lord's speech, in proposing the toast of the evening:—

Lord Brougham then rose, and said he had now to propose, as the immediate business of the day, "Success to the Cumberland and Westmoreland Agricultural Society," whose great proceedings of the cattle show had brought them this day together. He ought to approach such a subject as that, on which he was, generally speaking, so ill-informed, and of which he had really no practical experience, with very great distrust of himself; but, nevertheless, he could not help feeling that he should ill-discharge his duty as their president on that occasion if he were altogether to repudiate the subject. They were met certainly to avoid all allusion whatever to political topics, and to unite in that which should further one of the greatest interests of mankind—the cultivation of the soil. His noble friend, the head of the society and Lord Lieutenant of the county, has set him the example of abstaining from any reference to disputed points, such as those connected with the trade in provisions. He cheerfully adopted the principle, and would avoid that contested ground altogether. He would also join him in holding this opinion—that whatever might be the effect of the late very important change in the law and policy of this country with respect to the corn trade, all men must admit that its first tendency, whatever might be its ultimate effects, was rather, upon the whole, he would not say of a kind to press hard upon the producer of food, upon the tiller of the earth, upon the landlord or the tenant farmer, but rather to stimulate him—for that was the moral he drew from it—to stimulate him to all measures of improvement whereby he can make his trade more profitable and his land more productive. He had the misfortune to differ upon the corn laws, as upon many other subjects, in his time, from his noble friend near him, and he was afraid also great numbers of those friends and neighbours he had now the honor of addressing. He did not mean to renew the discussion of the corn laws. He heard it debated till he was sick of the very name of corn—almost as much so as a lame man might be of the word. He was as sick of it as he could be during that tiresome and never-to-be-sufficiently-deprecated session of 1846, owing to the labour it took in that House of Parliament of which he was an unworthy member. God forbid he should renew the discussion now. But, though he had the misfortune to differ with many of them, he always maintained that in the end it would be no damage to neither landlord or tenant. He never denied that the immediate tendency would be

of a kind to press somewhat upon them. He never asserted, as many foolish and thoughtless people, in the giddiness of the moment, did, that repealing the corn laws would make the loaf larger, or the price of the loaf smaller. He never maintained such a proposition—he never would maintain such a proposition; if he had, the evidence would have been against him every hour of every day since. What its ultimate effects would be was a very frequent question; but he never maintained that such would be its immediate effect any more than he maintained, as some other agitators for repeal of the corn laws began by maintaining, that it would lower wages. "O, then, if it would lower wages," said the working people, "God forbid there should be a repeal of the corn laws." "But it will cheapen bread," rejoined the agitator, "and that will more than compensate for any reduction in your wages." "We are not so sure about that," was the reply; and it was a curious fact, nothing more was said on the idea of lowering wages, and from that time forth they held no public meeting except by ticket, because the working people would have come in and overwhelmed them. That was the fact. He mentioned this to show how the wisest of men were very wrong when they came to speculate on futurity. God knows, we are poor limited beings, not always seeing what was around and about us, and never at all what would be in the future. But it always was the opinion maintained by those with whom he associated on this subject—it was the most important lesson that could be drawn from the result of that controversy, and whatever happened to press on the farmer, it was the more important lesson for him to learn—it became doubly and trebly important that he should move all his powers, and put all his energies in force and action for the purpose of increasing the produce of his land and diminishing the expense of his cultivation. That was the ground on which they might all meet, whatever their opinions on local politics or general politics might be. His friend, the High Sheriff, having passed some time in the east, had imported an oriental apologue, for which he did not believe there was the slightest foundation in fact. In that excellent "Arabian Nights'" tale he gave them an account of a fight between a blue boar and a yellow bear, and as the time might come when, as the preachers of peace and arbitration promised, "the lion should lie down with the lamb"—although that was not likely soon to happen—he did not know what progress had been made in Africa towards taming the lion, by paring his claws, and making him submit, with the scissors in hand; but long before that the blue and the yellow boar were certainly at peace with each other, as on the present occasion. If they would allow him to make a somewhat scholastic allegory, on the subject, he

would say that opicians told them that the mixture of the two colours, yellow and blue, made green, so did their mixture here naturally tend towards the object of their present meeting—the improvement of the green earth. He must then be permitted to say, that this improvement, which was every man's interest—the interest of the landlord, of the tenant farmer, of his workmen, and with all the people whether connected with land or not, as consumers, ought to be strenuously, actively, and unremittingly pursued. His noble friend had just adverted to the great importance of draining. It did not require a man to know much of farming to appreciate the importance of that matter. For himself, he hardly knew more than the difference between an ox and a sheep; he scarcely went further in his knowledge of stock than that. He might be able to discriminate barley from wheat. With barley and rye he might, perhaps, be taken in. In short, he knew almost as little as the legislature upon the subject. It was utterly impossible to know less. For instance, they passed a measure—a most important measure, for it was a model act—the Municipal Clauses Act—imposing various penalties for overdriving cattle. They did not know an ox or cow to be cattle; and, in the interpretation clause, which had been very carefully framed, they said—putting forth, no doubt, all the knowledge they possessed—“cattle shall be taken to mean horses” not very likely to be overdriven; “goats,” not very likely to be overdriven; “mules”—hardly ever seen; “swine” not to be driven. They might as well talk of driving the legislature, the only way of driving them was to pull them back. However, the legislature left out oxen and cows as if they were not “cattle,” and very likely to be overdriven. He knew almost as little as the legislature; but without knowing much more, he could easily tell that as long as the earth was a sponge of water, as in some parts of the country—some not far off, he was sorry to say it—still remained, so it was utterly useless in ploughing and putting in manure. He had actually seen people throwing lime into wet ground, making lime-water, very good for a burn, but of no use to make the ground dry. His noble friend near him had taken the judicious course—deep draining. He had drained to an enormous extent, and he would go on draining till he had made his land doubly valuable. From many practical agriculturists he knew that the effect of deep draining had been to double the value of the land. After they had drained it it was of the greatest importance, no doubt, to attend to manure; and a friend of his who had attended very much to that subject, produced a most valuable invention, which had been patented in France, and would have been patented in this country but for his death. It would have been a very great accession to the powers of manure, both

in respect of cheapness and efficacy. But a very great step had been made lately, and approved of by all farmers, not merely speculative but practical, with whom he had the opportunity of conversing. He alluded to the effect of liquid manure. This he knew, that Lord Fortescue, himself a very excellent farmer, stated lately at a meeting of a sanitary association, that manure in a state of liquidity, impregnated with oil, applied to the soil, when the experiment was tried on a moderate scale, raised the value of the land from 7s. to 16s., and when tried on an extensive scale the value was increased by the liquid flow in the proportion of 7s. to 28s. Lord Fortescue gave the details of these experiments, and he hoped they would be printed and circulated. The operation required no apparatus—no expense of outlay. It only required that sufficient water should be applied to the manure—that there should be no sort of hydrophobia, no fear by diluting of destroying its force. The amount of water was most material to the success of the application. Before sitting down he wished to allude to another matter, which he thought very material, relating to machinery. He had been very much delighted to see so good a show of valuable engines, some of them most ingenious and very reasonable in price, for churning, hoeing, thrashing, and so forth. A friend of his, a practical agriculturist, informed him that a very important step had been taken for the purpose of saving labour, and thereby economising the expense of production, an object which, with care and judicious mechanical contrivances, was always in our power, even when we could not increase the fertility of the soil. The most valuable experiments had been made in the application of steam in a small scale. People were apt to suppose that steam could only be employed on a gigantic scale, for locomotion on railways, or in great manufactories of various kinds; and, of course, in proportion to the size of the engine was its expense both in first cost and in working it by means of fuel. But in the town of Glasgow, a person had been able to have a steam-engine not larger than a tea-kettle: he had seen such an one himself. In one instance he had heard of one not larger than a tea-pot, which was quite capable of driving a small turning-lathe on which the cutler could work. Still it might be said this power had only been employed in manufactures; but it might with the greatest possible advantage in saving labour be introduced into agriculture as well as manufactories. Thrashing machines, straw-cutting machines, and various other engines, might be worked most advantageously by the application of steam; and he had the most confident, sanguine hope, that he should live to see this new and most valuable extension of the application of steam. Why not? His noble friend had asked them to cast their eyes back

for thirty years, and most judicious was his reference. Never had he seen such beautiful cattle, such magnificent horses and bulls, as he had seen that day, not to mention their extraordinary exhibition of poultry. Thirty years ago no man could have contemplated such a thing north of the Trent. He ventured to say that as great progress had been made during the last twenty or thirty years in farming stock, through Cumberland and Westmoreland, as in any other part of England. Perhaps one reason was, they had very great occasion for improvement; for, certainly, thirty years ago they were not quite in the state they ought to have been. But with reference to steam, if any one, thirty or forty years ago, had said he would go to London and back in twenty-four hours by steam, they would have been laughed to scorn, as though the thing was utterly, absolutely, physically impossible. Dr. Darwin, indeed, by a most wonderful gift of prophecy, anticipated the day when he said—

“Soon shall thy powers, gigantic steam afar
Push the slow bark, drive the reluctant car.”

But he was supposed to be a visionary. Mr. Canning and other wits laughed at him for his poem; but had Dr. Darwin lived, he might have laughed at them for the ridicule cast on him; for now steam was the greatest locomotive power in the universe. It travelled over the sea and over the land—over the sea in spite of tide, current, and wind; over the land almost in spite of time itself. What reason had they to doubt that the same wonderful engine which Watt showed to be applicable to pump up water from the bowels of the earth, split rocks in pipes, or manufacture the machinery of a watch, should be applied to something between the two—to some of the agricultural works which could now only be executed by dint of well-paid human labour? He could not help thinking that the suggestion was well worth the attention of farmers, that a better system of keeping their accounts, as tending to economy above all, and to regularity—a great source of wealth in itself—should be more generally adopted. He hardly ever knew a great good farmer on a considerable scale, or one on a moderate scale, who did not, to a certain degree, perform the office of his own accountant, keeping a regular set of books, as tradesmen were accustomed to do. It was as necessary for the farmer—the manufacturer of corn—as it was for the manufacturer of cotton twist or steel blades to keep accounts of all the details of his business. He never could tell exactly what state he was in—what was his expenditure, what were his gains or losses, without regular and systematic book-keeping. He, therefore, strongly recommended his agricultural friends, although they might not be so well educated as those he now addressed, and started back from pen and ink, to adopt a good

system of accounts. The noble and learned lord concluded, amidst loud cheers, by giving “Success to the Cumberland and Westmoreland Agricultural Society;” which was duly honoured.

FARM PAPER—No. I.

TO THE EDITOR OF THE IRISH FARMER'S GAZETTE.

SIR—I purpose in a series of papers to attempt to explain, in as simple and concise a manner as possible, the correct principles of farming, not forgetting the experience of our forefathers, nor refusing to accept the advantages which modern science and practice have thrown open to us; and in so doing, I shall endeavour, as much as possible, to divest them of chemical phrases, that I may make them to be understood by the majority of agricultural readers, particularly by landed proprietors and farmers, whose business and interest it is to be acquainted with the subject, as thoroughly as their circumstances will admit of, and then to reduce the principles to practice, not only for their immediate pecuniary interest, but also as an example to their tenants whereby their welfare would be mutually improved. The land has duties to perform, which she owes to the community, and she will find means to make her owner allow her to perform those duties. Amongst the many benefits which land has bestowed upon us, is the employment of labour, without which it is her unalterable law, she will not give forth her increase, and the more labour employed the more increase she gives; this I look on as one of the greatest of the very many blessings which we enjoy. To any one who thinks, as I do, that employment is a blessing, what a pleasure it is to contemplate that just at the time when labourers were becoming plentiful, the earth almost refused to give forth her increase without more labour being employed on her; and what a blessing it is to the owner, that he has labourers to employ; and to the labourers, that the soil requires them; and what a sin it is if those blessings are not accepted—rightly are we served if those blessings are turned into famine, pestilence, and bloodshed.

One of the great sources of employment is the drainage of the ground; this is now found to be as necessary to the well-being of a plant as it is of an animal; without which we have obnoxious gasses, loss of heat (I use this term but electricity would be more correct) and as a consequence disease, with diminished growth and increase; it also so happens that upon many farms the whole of the cost of drainage might be expended in labour now waiting to be employed on the farm, without a penny going to the manufacturer for expensive machinery; the clay for the tiles, being dug on the farm, may be moulded by hand, burnt by peat or wood, and put in by common labourers, under the direction of a foreman or bailiff.

I shall not enter into the plan of making and burning the tiles on the best system of draining, but would refer the reader to Josiah Parke's works on that subject, and content myself with assuring those interested that it is a *sine qua non* in farming, which may be freely translated thus:—drainage makes the soil work easier, and earlier, and, at times, when it otherwise would not at all; makes less seed necessary, and the land more fertile in various ways; and with all these advantages combined, who ought to till the ground without the drainage is perfect? Whoever does so, does it at a great waste of labour, manure and money. Therefore drainage is *economical*.

On small holdings, where it is not worth the expense of forming a tiliary, nor situated within a tolerably easy distance of one, some other substance may be made use of; stones, for instance, which may be frequently picked off the ground, then fir branches, cut in August, will last many years, and even peat itself may be so shaped as to form a drain. Whilst speaking of tiles, it is worthy of note, and curious to reflect on, that the drain tiles which are now being made use of in draining the Phoenix Park, in Dublin, are made in the New Forest, in the extreme southern part of England, where they are burnt with coals from Newcastle, the other extreme part of England. Even under these disadvantages, the prime cost of the one-inch pipe tile does not exceed 5s. 6d. per thousand, and I should think could be delivered at any part of the coast of Ireland, for 7s. 6d. or 8s. 6d. per thousand. A thousand weigh about half a ton, and about 1,500 is the average number sufficient for an acre. This would drain an acre in parallel lines, 25 feet apart; and the cost in England, of cutting and filling in the drains, 5 feet deep, which would amount in length to about 100 lineal rods, would not exceed 9d. per rod; so that, supposing the tiles 1,500, cost 15s., and the labour £3 15s., the total amount per acre would be £4 10s. This is about the average expense, which depends partly on the price of the tiles, but mostly on the nature of the soil. I have known light soils in Surrey thoroughly drained, the drains 5 feet deep and 50 feet apart. This lessens the labour and number of tiles just one-half, and consequently the expense would be reduced to £2 5s. per acre; whilst, on the other hand, I have known strong clay land, in Essex, require the drains from 12 to 15 feet apart, and from 5 to 6 feet deep. The expense of labour alone like this would be little short of £6, and it would take 2,500 tiles; so that the expense varies from £2 5s. to £7 or £8 per acre, depending on the density of the soil.

There is one point which I must mention in regard to draining, and that is, the depth of the drains. Do not be afraid of going too deep, but beware of being too shallow. I have seen land positively injured by shallow drainage: let

it be seldom less than four feet deep, either in the strongest clays or lightest sands; for if you do not lower the bed of stagnant water in the subsoil to that depth beneath the surface, you do little good by draining—for these simple reasons—every plant that we cultivate as farmers requires (naturally) four feet of healthy mould to throw down its roots into: this is the lowest computation. Wheat, parsnips, clover, onions, lucerne, &c., have been known to descend their roots from ten to fifteen feet; but in all these instances the land was drained, either naturally, accidentally, or artificially, to below that depth; and it is a fact, that below the level of the drains, whether they are placed two feet or five feet deep, the roots will not descend, and frequently not so deep as that by eighteen inches, because the soil is so saturated with water, which is held in suspension by capillary attraction, that eighteen inches of the depth, whatever that depth might be, go for nothing. We can afford to spare it out of a five-foot drain, but how could you out of a two-foot one?

I must now conclude these few remarks on draining, but not without strongly recommending every one whose land requires draining to do it without delay, if it is within their power, as no system of farming can be profitable whilst the land remains under that disadvantage, and the improvement arising from it, I feel confident, has never yet been sufficiently valued.—WM. GEORGE GROSSMITH.

SIR,—The greatest fault which rests with the Irish people is, that they do not bring the power of their understandings to bear on all subjects which most concern them; they are in general too prone to follow old customs, and to be guided in all cases by those whom they suppose to be their superiors, in thinking, taking for granted, that God does not endow individuals with superior knowledge, unless they be under the control of long established institutions. The power, therefore, of scientific attainments over brute force is not generally understood.

It is not necessary to inquire into the causes which combine to establish such opinions, so hurtful to improvement. It is only necessary to appeal to the public mind for serious reflection, and the exercise of the inventive powers, for the promotion of all those great branches of industry, through the improvements in which the inhabitants of this island alone can become prosperous, particularly agriculture, in which so many are engaged, and which so many, unfortunately, think to be so far improved as to require its present practices to be no further interfered with. This is the opinion of some men of station, as well as that which prevails amongst the great mass of the people, who may occasionally form a portion of your readers.

It is to show the condition in which their ignorance places such people that induces me to

introduce the following facts to your notice, and although there is nothing novel in them to you, or the intelligent portion of your readers, there is something startling and conclusive to those who consider thinking or teaching of no further use in agriculture.

On the 26th March, 1818, a certain agriculturist, employed near the town of Kildare, collected the following ingredients, to exemplify his teaching—2lbs. of bone dust (phosphate of lime), 1 lb. sulphate of ammonia, 1 lb. saltpetre (nitrate of potash), 1 lb. Glauber salts (sulphate of soda), $\frac{1}{2}$ lb. Epsom salts (sulphate of magnesia). By getting them in a crude state generally, he had them for 7d. cost. Those he put into his pocket (and they did not require a large one, as they fit into a small space), and on going outside the town he met a farmer with a loaded cart of farm-yard manure going to the field. "Farmer," said the agriculturist, "I have more manure in my pocket than you have on that cart!" "If so," said the farmer in reply, "my horse carries a great deal of trash." "To prove it to you," said the other, "I will follow you to the field." Accordingly, being arrived at the field, the farmer threw down his cart-load on the space he intended it for—that is, a square perch—the agriculturist then took up the next vacant square perch to it, and having scraped together a heap of clay, which he made fine with his hands, and picked the large pebbles out of it; he then emptied out the contents of his pocket on it, and having mixed the clay and it together, he said, "You see, farmer, my manure is now much increased." "Aye," said the other, "if clay be of any use to you?" "Why not," said the agriculturist, "if carbon and rain water be of any use to you, which nature bountifully supplies without your labour, and of which the great bulk of your load is composed." To end disputes, both parties put their respective manures to trial, by drilling both perches and putting in the manures, with parsnips, turnips, and carrots, and in the end of that season, when the crops—the produce of both perches—were weighed, that of the agriculturist's weighed one and a half times the weight of the farmer's perch, on which the farm-yard manure was placed and seeded alike, and which cost him the sum of two shillings.

Let the sticklers to old customs digest the contents of this paper during the next week, together with their supporters, the sullock-drivers and absentees, and I promise to show them the necessity for agricultural instruction in a few other papers that follow, by exhibiting what manure should be, what farm-yard manure is, and what short modes farmers will follow, as soon as they obtain the necessary information, which I am glad to see none more anxious to forward than he who knows it best,

his Excellency the Earl of Clarendon.—Yours, &c., EDWARD OWENS—*Agricultural Teacher*, September 5, 1849.

No. II.

STR.—We will now suppose that the land has been thoroughly drained; for without this it is useless to think of improving the soil, with any certainty of making a profitable return for your money. You may rest assured that draining is the most economical way of improving land, and one without which, at present prices, you had better have nothing to do with farming. It is hardly too much to say of it, that it *halves* your labour and *doubles* your increase.

The next point we will consider is the tillage, and this is of equal importance, but it cannot be perfectly carried out without the former; in fact, it has often been said, that deep tillage on undrained ground was injurious: therefore, you must drain first; it is, as I said in my last paper, *sine qua non*. The stirring of the ground is what is meant by tillage, and the effect is to be continually exposing fresh surfaces to the action of the atmosphere, which is well known to be capable of dissolving, or rather disintegrating gradually the hardest of metals and stones. This is how the soil was first formed, and having been precipitated in the beds of valleys, has been at various times thrown up, and turned about; and having become settled, the atmosphere decomposes its surface, which becomes fertile, covers itself with vegetable matter, and protects itself, as it were, against the further action of the atmosphere, until it is required for the sustenance of man, when, by tillage and other laborious operations, it becomes still farther disintegrated, and, consequently, more fertile; and this effect seems capable to be produced by the action of the atmosphere alone, although it may be hastened by the use of lime and other artificials; but the atmosphere seems to be the great and natural fertilizer, and we cannot do better than direct our attention to the assistance of nature.

It is very evident that without we expose the soil to the air, it cannot be affected by it, and it also follows that the more we expose it the more it will be affected. Now, how can we expose it more fully than by frequently turning it over, so as to present fresh surfaces to be acted upon? and having done that to the first convenient depth—say, five inches—let the next five inches be served likewise; but that it might not interfere with the annual crops, let one inch only be brought to the surface at a time, and that only once in four years. Draining is also another way of allowing the air to act on the lower surface, by taking the stagnant water out of it (*from the very bottom*), and allowing the air to take its place in the crevices and interstices caused by the rapid

drying of the subsoil, a treat that it, perhaps, has never known since it was placed where we now find it. This will cause it to crumble, to be drier, to be warmer, and, in a word, to be more fertile; and roots will not then refuse to descend into it for food, which they will bring to the surface—first to be used as an increased supply of food, and then as manure for another crop.

The increase we get seems to be proportionate to the amount of tillage we give the land, which may be facilitated by various means; but of all mechanical or natural ones *draining is the chief*; for it not only allows it to be chemically affected by the atmosphere, but mechanically also, by agricultural implements, at times, and with less power than it otherwise could be. So that draining is one of the most effectual and economical processes in the perfect tillage of the land.

Ploughing is an operation so commonly practised, and ploughs are so much improved within these few years past, that it is unnecessary to say anything on this point, except this—to recollect, that because a plough has been drawn over the surface of land once or twice, it does not follow that the land has been sufficiently tilled, more than a coat which has had a brush drawn over it might be said to have been cleaned; for where you only stir the first few surface inches, leaving the subsoil undisturbed, can you be said to be making the most of your land, as you only give your plants five inches, instead of ten inches, to root and gather their food and moisture in. This is one of the reasons why the spade does the work better than the plough, why the garden produces more than the field, and why the gardener gets rich, and the farmer gets poor. I myself never recollect seeing a piece of wheat in a garden whose appearance did not indicate a yield of, at least, twelve sacks to the acre, and frequently fourteen. Mr. Stephens, in his "Book of the Farm," mentions a case where wheat was grown, every year, on land cultivated by the spade; and a Mr. Sargeant, who is governor of the Union at Louth, in Yorkshire, says that he commonly grows sixteen sacks to the acre, by spade cultivation, on land not first or even second-rate, and alternates it with potatoes, which is well known to be an impoverishing crop.

But this deep ploughing or spade digging is not sufficient alone to account for the large crops; there must be food supplied to the plants sufficient to mature so great a crop; either naturally, by stirring the surface, called hoeing, whilst the crop is growing, which will be constantly renewing the supply of food, or, artificially, by giving the ground a large dressing of manure; or it may be done by taking advantage, which is by far the best, of both systems—in manuring and hoeing. But to do this, another point must not be overlooked: the seed must be sown in

lines or drills, at a width apart sufficient to allow it to be stirred without injury to the plant. But before I go on to the width and distance at which plants should stand from each other, I must say a word or two more about the stirring of the soil, *alias* tillage. I have above said that stirring was the natural way of supplying food to a crop, and I wish it to be understood that this, of itself, is sufficient to bring a crop to maturity, although the object may be hastened and the result increased by the application of manure, either chemical, animal, or vegetable. — Yours, &c., W. G. GROSSMITH—Romsy, Hants, Sept. 9, 1849.

SWISS CULTIVATION.—The following is a notice of the farming on the Rhine:—The cultivators of the soil must, in many cases, live more than two miles from the scene of their daily labours. The general aspect of the plain is no doubt monotonous, but it is a monotony of beauty, and a beauty which fills the mind with images of peace and plenty. In this vast plain there are scarcely any fences, but there are innumerable rows of trees, which probably mark the boundaries of property, with many little plantations of copsewood, and some considerable masses of forest. A large proportion of the whole surface is in grass, which is cut for forage, and is in extensive tracts, suggesting the idea of large properties, or large holdings. The face of the land under tillage conveys a very different impression, and would have amazed us, if we had not seen the same thing in France on a smaller scale. Here we find six distinct crops on four or five acres. By the side of an acre of wheat, for instance, on one broad furrow, you find an acre of potatoes; then follow half an acre of tobacco in plants six feet high, half an acre of hemp, an acre of barley, or rye, half an acre of hops or poppies, or clover, and all generally clean and fair crops. A field of five acres in one species of produce is quite a rarity, and this over a range of two hundred miles! These little plots of many colours, standing side by side, give the cultivated land the aspect of a nursery. Do they indicate minutely divided property as in Belgium, or minutely divided tenantry, as in Ireland? These are questions not to be answered without consulting books to which I have no access. I saw no Indian corn, or, at least, nothing which I could recognize as such, for I ought to tell that I have never seen the plant growing, except two or three stalks in a garden. Perhaps it has been superseded by potatoes, of which the quantity raised is very great. I am equally at a loss to account for the vast breadth of land in grass, the whole produce of which would seem to be used as hay, for we did not see a single horse, cow, or sheep, pasturing in the fields. Perhaps the intense heat at this season renders it necessary to feed the animals under cover. Here, in Switzerland, the

cows pasture on the mountain tops all day long, at 6000 to 7000 feet above the sea; but in the low land, where we are living (Interlaken) they are let out only in the morning and evening, and housed during the heat of the day.—*C. M.*

PHILOSOPHICAL ESSAYS.

BY JACOB THOMSON DUNNE.

ESSAY III.—EROMANCY.

(Continued from page 23.)

By means of the barometer, as Mr. Taylor observes, we are enabled to regain in some measure that foreknowledge of the weather which the ancients possessed. Chaptal says it is more to be depended on than all our rural prognostics put together (*Agricul appliquee à chimie, &c.*); but we should not put too much dependence on the words inscribed on the plate—they will not always agree with the state of the weather. A card to the following effect ought to be suspended by every barometer to assist our judgment in predicting the weather by it—viz., the rising of the mercury presages, in general, fair weather; and its falling, foul weather, a rain, snow, or storms, according to the season. The sudden falling of the mercury in hot summer weather shows thunder, more especially if the wind be south; the rising in winter indicates frost, and in frosty weather, if the mercury falls three or four divisions, there will follow a thaw, but its rise in a continued frost shows snow is at hand. When foul weather soon happens after the falling of the mercury, it will not hold long, nor are we to expect a continuance of fine weather when it soon succeeds the rising thereof. If in foul weather the mercury continues rising two or three days before the weather clears up, we may expect a continuance of fair weather. In fair weather, when the mercury continues to fall lower and lower for two or three days before the rain sets in, we may be certain of *much wet*, and perhaps high winds. The unsettled state of the mercury shows changeable weather. When the mercury is rising in the barometer, the centre of the column is convex, when falling, the centre is concave. About the end of March, and the beginning of April, the mercury falls very low in bad weather; after these junctures, it seldom sinks lower than 29 deg. 5 min. till September or October; from October to April, it often falls to 28 deg. 5 min., and sometimes lower, hence it follows that the fall of the one-tenth of an inch in summer is as sure a sign of rain as the fall of two or three-tenths is in the winter.

The words on the dial-plate should be attended to and credited when the mercury removes from "changeable" upwards, or falls from "changeable" downwards. Besides predicting the weather, the barometer will also show the farmer when he ought to buy or sell bulky goods

to advantage; the higher the mercury stands, the greater will be the quantity of the weight in feathers, flax, silk, &c., the lower *vice versa*. When the mercury is low, persons should avoid entering mines, caves, &c., or places subject to fire-damps. On the surprising effects of damps, see Mr. Jessop and Mr. Cook in the "Philos. Transact.," 1733, Dr. Connor in his "Dissert. Med. Phys.," "The Beauties of Nature and Art," vol. i., p. 49, &c.

The perfection of science depends upon accurate measurement, but as we can neither weigh heat, nor measure its bulk, in fact we can only judge of it by the touch or the feeling, but things over hot or cold we dare not touch, it, therefore, becomes necessary to have some artificial means of estimating the presence in bodies of this subtle principle. The thermometer is, therefore, of great use; it is so called from the Greek words, *thermos*, signifying heat or fire, and *metron*, a measure. This instrument was invented early in the 17th century, but whether by Santorio, an Italian physician, or Drebbel, a Dutch doctor, or Galileo the celebrated astronomer, is uncertain. Some give the honour of it to Father Paul Sarpi, a Venetian. Santorio declares himself the contriver.—See his *Comment on Aoi cenna*, pub. 1624, fol. 22. None of the others named, claimed for themselves the honour of its invention.—*Vide Martine's writings.*

There are at present different kinds of thermometers, some for chemical, and more for meteorological purposes—viz., Olaus Romer's (1709), Fahrenheit's, Lord Cavendish's (1757), Mr. Six's (1782), Dr. Rutherford's, Dr. Traill's, Mr. Feilth's, Le Chevelier's, Mr. Blackadder's, Professor Lesslie's (1804), &c. Fahrenheit's is the one generally used here. The principal degrees on Fahrenheit's are as follows:—0 or zero, extreme cold; 32, freezing point; 55, temperate heat; 76, summer heat; 98, blood heat; 112, fever heat; 176, spirits boil; 212, water boils. Mercury boils and goes off in steam at 600 degs., and freezes in a solid metal at 40 degs. below zero, so the whole extent of the mercurial thermometer is 640 degs.

A thermometer hung in the open air shows us the variations in the temperature of the weather; the higher its fluid rises, the warmer the temperature; the lower the colder. Every change in the weather is accompanied with a change in the temperature, and this the thermometer will often show before any alteration is perceived in the barometer. When the thermometer stands above 56 degs., the weather is warm; when under it, cold. A quick and considerable alteration downwards, indicates rain. Should it begin to snow when the thermometer's fluid is below 32 degs., it generally rises to that point, and continues so, during the fall of the snow; if it clears up after, a continuance of cold, severe weather may be expected.—*Lynch's Astron. Note.*—The coldest part of the

24 hours is about an hour before sunrise, and the warmest part is between 2 and 4 in the afternoon, generally speaking.

The hygrometer is of various sorts—some are made of cord, fiddlestring, oil of vitriol, &c. ; a bit of clean, dry sponge makes a good hygrometer, for it will become heavier as the air gets moist, and lighter as the air becomes dry. Beard of wild oats (*Avena fatua*) is excellent for the same purpose ; but all when used for some time become sensibly less and less accurate, and at length undergo no visible alteration from any change of air. De Lue's and Professor Leslie's are much applauded.

Rain guages are of different kinds ; Dr. Alston's is long esteemed.

THE TOULOUSE GOOSE.—There are two prevailing colours amongst our domestic geese, white and grey. We have a large, white variety, usually termed Embden geese, which are very superior from their extra size, and additional value of the feathers. If you wish a grey goose, by all means cross with the Toulouse, than which nothing can be finer. One gander is sufficient for five or six geese ; the goose lays from ten to twenty eggs at one laying ; but by removing the eggs as fast as they are laid, and feeding her well, you may increase her laying to fifty eggs. If well cared for, you may have three clutches in the year. The care necessary is good housing and feeding.

You will readily perceive when a goose is about to lay, she carries straw to make a nest ; when that is observed, she should be confined, lest she lay out. If you induce her, by confinement, to lay her first egg in any particular place, she will be sure to deposit the remainder of her clutch in the same nest. Her inclination to hatch is indicated by her remaining in the nest longer than usual after laying. The nest to be of straw, with a finer lining, say dry hay, or moss, and be sure it is sufficiently deep to prevent the eggs rolling out. About fifteen eggs is thought a sufficient clutch. The less the goose and her eggs are tampered with the better ; she sits from twenty-seven to thirty days. The gander never molests her on the nest, but acts as a sentinel to repel intruders. It will be necessary to see that the goose be fed while hatching, as if she find a difficulty in providing food, she may be kept too long off her nest, and perhaps at length desert it. The goslings will not require food for twelve hours after leaving the shell ; their food may be bread soaked in milk, porridge, curds, boiled greens, or bran, mixed with boiled potatoes, given warm, but not hot ; do not allow them to be subject to rain, or cold wind ; keep them for at least forty-eight hours, after hatching, from the water, which would be likely to bring on crumps. Geese do much better where they have access to water,

and from feeding on aquatic plants, the expense of keeping is comparatively light. Although so fond of water, if you wish to keep your geese well, you will have to house and bed them at night, clean, dry, and comfortably. Grass is essential to the well-keeping of geese, their favorite being the long, coarse, rank grass, rejected by cattle, of which little use could otherwise be made, and therefore, through the goose, is turned to profit. The stubble geese are long in estimation, from feeding on the dropped corn, and various herbage, amongst the stubbles. The goose is easily kept, but if intended for market, they require, in addition to green food, some boiled potatoes, mixed with bran, given warm, but not hot ; and will be found a profitable portion of the farming stock. To fatten goslings for market, give potatoes, or turnips, bruised with barley or oatmeal, at least twice a day.

Mr. Cobbett says, the refuse of a market garden, would maintain a great many geese, at a very small cost, but in addition to the green food, they would require boiled or steamed potatoes, given warm ; or oatmeal, peas, beans, or maize, beat up with boiled potatoes, carrots, or turnips. An objection has been made to the droppings of the goose on the farm, which, though acrid, when fresh, when mellowed will much enrich the soil.

Buckwheat, or ground oats, mashed up with potatoes, to geese, after being cooped in a dark, quiet, cool place, will render them fat in three weeks ; cleanliness is essential.

CHINESE EDICT AGAINST THE SLAUGHTER OF BULLOCKS.—The *China Mail* contains the following edict of Yih, prefect of Canton :—Bullocks are animals which in heaven are represented in the stars (Taurus), and on earth are useful as they injure none, prohibitory regulations were long ago enacted against the killing and skinning of this industrious creature. Since I have held the office of prefect I have sought out the benevolent-hearted, and therefore thus speak of kindness to dumb animals. Considering that our government never without sufficient cause puts any one to death, how dare the lower classes clandestinely slaughter these animals, although it is strictly forbidden ? The more so because, for stuffing your mouths and filling your bellies, you have fat sheep and portly pigs ; and when you give a feast for the entertainment of your guests, there are the delicacies of the sea and the necessities of the lard, which you reject and will not eat, but wish to injure this hard-working, industrious servant of agriculture. This conduct is unaccountable. Wherefore I issue a severe prohibition, in which I address myself to the military and people for their information. If after this any without fear open shops for the sale of beef, or establishments for the slaughter of bullocks, I

allow the local officers to inform me of such, that they may be instantly seized and punished according to law. A special edict."

We extract the following truly scientific mode of raising land-fast boulders, which must be of surpassing interest to those engaged in land improvement.

"The lifting and removal of large landfast boulders is a principal operation in the reclaiming of some waste lands, and has sometimes been found perplexing and very difficult. An excellent apparatus for lifting the stones is a striped machine described upwards of twenty years ago, by Professor Low, in the Edinburgh Philosophical Journal and in the Transactions of the Highland Society. This consists simply of a set of sheerpoles, about 14 feet in length—a powerful tackle of pulleys, suspended from the head of the poles—an iron plug, comprising a ring, a flat part, and a cylinder of about an inch in diameter and two inches in length, hooked to the lower block of the tackle—and a windlass six feet or more long, worked by levers, and having at each end a winch. It is placed over the stone, to be raised by extending the poles on the three sides, and then the windlass is attached. If only a very small part of even a huge stone appear above the surface, it is enough; a circular hole must be drilled in it, with a mallet and a common steel-boring chisel of masons, about a sixteenth part of an inch less in diameter than the cylinder of the iron plug, and about two inches deep, and as nearly perpendicular as possible; the plug must be driven into the hole, to the depth of an inch or so, with a stroke or two of the hammer; and with no other fastening than this simple plug, the turning of the winches by as many persons as may be requisite will tear up the boulder, no matter though it be of the utmost weight which a wagon can carry, through every opposing obstacle. The secure holding of the plug seems to result principally from the friction produced by the elasticity of the stone between the surfaces of the plug and the bore, and is so far exactly similar to the firm holding of a pin driven into a block of timber, with the difference that the elastic power of stone is incomparably greater than that of any timber; and perhaps it also arises partly from the circumstance that a line passing through the axis of the cylindrical plug will seldom, if ever, coincide with the vertical line passing through the stone's centre of gravity when suspended by the plug, so that the plug's resistance upon the sides of the bore is oblique, and occasions difficulty or impossibility of disengagement so long as the suspension. But when the stone is let down again, either on a cart or on the ground, the plug is loosened and let out simply by a stroke or two of a hammer near the edge of the bore. 'We shall often be surprised, in trying the experiment on large pieces of rock,' says Professor Low, 'to observe with how slight a seeming hold of the

stone the masses will be torn up. Sometimes the iron pin is driven above the fourth part of an inch into the stone before it becomes immovable, and capable of raising a weight of many tons from the earth. When we consider the greatness of the elastic power of the harder stones, as shown by this simple experiment, we may perhaps wonder that the ingenuity of man has not hitherto more applied so surprising a property to practical uses. It appears that, with a little piece of iron driven into a stone, with a force which a child might exert, the largest vessels might be moored—that, by the same means, masses of granite might be nailed as it were together, with a force that could be hardly overcome, and rocks suspended as by a touch in the air.

"Another facile contrivance for both lifting and removing large land-fast boulders is a modification of the well-known sling cart—a machine which seems to have been first brought out at Woolwich, and was long ago used there for the removal of heavy ordnance, and was afterwards employed at Arbroath for the removal of the large stones used in the erection of the Bell-rock lighthouse, and has of late years become common in the constructing of all sorts of huge masonry and great public works. The modification of this machine used for lifting and removing land-fast boulders, and invented by Mr. W. F. Robertson of Hazlehead in Aberdeenshire, is described as follows:—'The carriage wheels are about 7½ feet in height, being freely suspended under the axle, and are defended by two or three concentric slender rings of iron, attached to the inward face of the wheels, to prevent the stone from chafing the spokes. The chaffs are connected by cross frame-work, after the construction of the common open cart, with the exception of the main bar, which in this case is made very strong, and to which the axle of the carriage is attached. On the upper side of the main bar is placed the frame-work of the crab; this constitutes two cast iron cheeks, strongly bolted to the main bar, and carrying a toothed wheel, with a drum or barrel, on which the purchase-chain is coiled. The wheel acted upon by a pinion, which is turned by the application of manual power to winch-handles. The proportions of the machinery of the crab are such as to enable two men at the handles to raise a stone of three tons weight. A small platform is attached to the main bar on which the two men stand who work the crab. The purchase-chain having one end fixed to the barrel of the crab, and a hook at the other end, completes the working parts of the machine. The auxiliary parts consist of a pair of common stone-shears, together with a sling chain of three or four yards in length, a pick-hammer, mattock, spades, &c. When the stone is to be raised the only preparation necessary is to expose, by digging, as much of it as will admit of the stone-shears getting hold, and, for this purpose, a small indentation is made on each side of the stone with a pick-ham-

mer. The machine is then brought over the stone, the shears hooked on to the purchase-chain, and their hooked extremities brought to take hold of a stone, at the indentations made for that purpose; a rest or prop is also put under the shafts, to ease the horse, and keep the machine steady while loading. The crab is then worked by the two men at the handles, until the stone is raised from its bed, and to such a height that the sling-chain can be passed under it; the purchase-chain is then eased off; the shears disengaged, and the sling-chain being now brought to embrace the stone, is hooked to the purchase; and, by again working up the crab, the stone is elevated till it swims clear off the ground. The substitution of the chain for the shears is necessary, in order to allow the stone to be raised sufficiently high; for, though the shears must be used in the first place to raise the stone from the ground, their length prevents it from being raised so high as to admit of transportation. The stone being in this manner suspended, its removal from the field is easy and expeditious. Mr. Robertson found that, when the stones are prepared by being dug about and marked for the shears, he was able to remove from 50 to 60 blocks, each weighing from one to three tons, to the boundary of a field of eight or ten acres in one day, and at an expense not exceeding one-half of what he incurred by any other method. The use of the simple plug-levers and tackle instead of the stone-shears and chain would perhaps be an improvement; and the drilling of the hole for the plug might not, on the average, cost more than the digging and hammering of the stone-shears—one of the most obvious of the common methods of dealing with large landfast boulders, as well as with slight, occasional, rocky protrusions, as to blow them to pieces with gunpowder, and remove them in fragments."

THE USE OF WHEAT FOR FOOD.

Much useful instruction appears from time to time respecting the preparation of the soil, and the cultivation of the various crops that the soil produces. It is important knowledge to be acquainted with the best modes of cultivation, and how the greatest amount of return may be obtained; but our inquiries should not stop there. The best manner of preparing what the land produces as food for man and beast should not be lost sight of: the chemistry of the kitchen and the bake-house should be better understood by those who prepare their own food.

It is said, that scarcely any nation lives without bread, or something as a substitute for it. The Laplanders have no corn, but they make bread of their dried fishes, and of the inner rind of the pine, which seems to be used not so much on account of the nourishment to be obtained from it, as for the sake of having a dry food. In Norway

they make bread that will keep 30 or 40 years; and the inhabitants esteem the old and stale bread in preference to that which is newly made. For their great feasts particular care is taken to have the oldest bread; so that at the baptism of a child, for instance, they have usually bread that has been baked perhaps at the birth of the father, or even grandfather. It is made from barley and oats, and baked between two hollow stones. We are also informed that the President de Goyet, has endeavoured, with his usual sagacity and learning, to trace the successive steps by which it is probable men were led to discover the art of making bread; but nothing positive is known on the subject. It is certain, however, from the statements in the sacred writings, that the use of unleavened bread was common in the days of Abraham; and that leavened bread was used in the time of Moses, for he prohibited eating the Paschal Lamb with such bread. The Greeks affirm that Pan had instructed them in the art of making bread; but they no doubt were indebted for this art, as well as for their knowledge of agriculture, to the Egyptians and Phœnicians, who had early settled in their country. The Macedonian war helped to make the Romans acquainted with the arts and refinements of Greece; and Pliny mentions that public bakers were then for the first time established in Rome. The conquest of the Romans diffused, amongst many other useful discoveries, a knowledge of the art of preparing bread, as practised in Rome, through the whole south of Europe. The use of yeast in the raising of bread, seems, however, to have been practised by the Germans and Gauls before it was practised by the Romans, the latter, like the Greeks, having leavened their bread by intermixing the fresh dough with that which had become stale. The Roman practice seems to have superseded that which was previously in use in France and Spain, for the art of raising bread by an admixture of yeast was not practised in France in modern times till towards the end of the 17th century.

It deserves to be mentioned that, though the bread made in this way was decidedly superior to that previously in use, it was declared by the faculty of medicine in Paris to be prejudicial to health, and the use of yeast was prohibited under the severest penalties. The species of bread in common use in a country depends partly on the taste of the inhabitants, but more on the sort of grain suitable for its soil. But the superiority of wheat to all other farinaceous plants in the manufacture of bread is so very great that wherever it is easily and successfully cultivated, wheaten bread is used to the nearly total exclusion of most others. In "McCulloch's Dictionary of Commerce," we are informed that a very great change for the better has, in this respect, taken place in Great Britain during the last century. In the reign of Henry VIII. the gentry had wheat sufficient for their own table; but their

household and poor neighbours were usually obliged to content themselves with rye, barley, and oats. In 1596 rye bread and oatmeal formed a considerable part of the diet of servants, even in great families in the southern counties. Barley bread is stated, in a grant of a monopoly by Charles I, in 1626, to be the usual food of the ordinary sort of people. At the Revolution, the wheat produced in England and Wales was estimated to amount to 1,750,000 qrs. About the middle of the last century hardly any wheat was used in the northern counties of England. In Cumberland the principal families used only a small quantity of wheat at Christmas. The crust of the goose-pie, with which almost every table in the country was then supplied, was, at the period referred to, almost uniformly made of barley meal. Every one knows how inapplicable these statements are to the condition of the people of England at the present time. Loaf-bread is now universally made use of in towns and villages, and almost universally in the country.

The produce of the wheat crop has been at the very least tripled since 1760; and if to this immense increase in the supply of wheat we add the still more extraordinary increase in the supply of butcher's meat, the fact of a very signal improvement having taken place in the condition of the population in respect of food, will be obvious. But great as has been the improvement in the condition of the people of England since 1760, it is but trifling compared to the improvement that has taken place, since the same period, in the condition of the people of Scotland. At the middle of the last century, Scotch agriculture was in the most depressed state;—the tenants were destitute alike of capital and skill; green crops were almost wholly unknown, and the quantity of wheat that was raised was quite inconsiderable.

A field of eight acres sown with this grain in the vicinity of Edinburgh, in 1727, was reckoned so great a curiosity, that it excited the attention of the whole neighbourhood. But even so late as the American war, the wheat raised in the Lothians and Berwickshire did not exceed a third part of what is now grown in them; and taking the whole country as an average, it will be a moderate estimate to say, that the cultivation of wheat has increased in a tenfold proportion since 1780. At that period no loaf bread was to be met with in the country places and villages of Scotland—*oat cakes* and *barley bannocks* being universally made use of. But at present it is widely different. The upper, and also the middle and lower classes in towns and villages use only wheaten bread; and even in farm-houses it is very extensively consumed. There is at this moment hardly a village, however limited in extent, that has not a public baker. In many parts of England it is the custom for private families to bake their own bread. This is particularly the case in Kent and in many parts of Lancashire.

In 1804 there was not a single public baker in Manchester, and their number is still very limited.

As the use of wheat for food is still on the increase, the following remarks, from "Studies in the Science and practice of Agriculture as connected with Physics," on the principles of bread making, may be useful to some of your readers:—

The most complete method hitherto discovered for bursting all the globules of fecula, is the usual process of making bread, or, as the chemists term it, *panification*. This arises from the presence in wheat flour of a substance called gluten, associated with the globules of fecula, and constituting in the unbroken grain its cellular texture or framework. It would lead us too far from our present object to go into the history of this important substance minutely, but it may be necessary to state that the gluten may be procured by kneading, and washing a piece of dough made with wheat flour in a stream of water till all the globules of fecula are washed out. The gluten thus obtained is a greenish mass, elastic like India-rubber when moist, and incapable of being dissolved in water. It is these two properties which render it so important in bread-making.

When a loaf is put into the hot oven, the steam and gasses expand within it, and raise up the elastic gluten into bladder-like vesicles, and by this means expose the globules of fecula in the dough more uniformly to the heat than could be effected without such agency. In consequence of this they burst; and in a well-baked loaf of bread, not a single unburst globule of fecula can be found. On the Continent this is practically understood in the districts where they feed their horses chiefly on bread. The bread thus given to horses is coarse, dark-coloured, and rather sour, from leaven being employed instead of yeast; but the partial fermentation caused by the leaven must assist in bursting the globules, and setting free the dextrine from the action of the acid thus developed.

It is well known that home-made bread and baker's bread are two very different things: the former is usually sweeter, lighter, and more retentive of moisture; the latter, if eaten soon after it has cooled, is pleasant and spongy; but if kept more than two or three days, it becomes harsh and unpalatable. The cause of this difference may perhaps be obvious, from the following details of the operations of the wholesale bakers:—

In making his dough he takes the water, or part of it, which he intends to use, and having slightly warmed it, dissolves in it a certain portion of salt; then he adds the yeast, and then a certain quantity of flour. This mixture is set aside in a warm place, where it soon begins to ferment. This process is called setting the sponge; and according to the relation which the water in it bears to the whole quantity to be used in the dough, it is called whole, half, or quarter sponge.

The exhalation of carbonic acid causes the sponge to heave and swell, and when the surface bursts it subsides, and then swells again, and so on; but the baker is careful to use it before this fermentation has communicated sourness to the mass. He then adds to the sponge the remaining quantity of flour, water, and salt, which may be required to form dough of proper quality and consistence, and incorporates the whole by long and laborious kneading, till the entire mass acquires uniformity, and is so tough and elastic as to bear the pressure of the hand without adhering to it. It is then left for a few hours, during which fermentation goes on, and the inflated mass is again kneaded, so as to break down any lumps or portions which had accidentally escaped diffusion in the first operation, and to confer perfect uniformity on the whole. The dough is then weighed out into loaves, which are shaped and put aside in a warm place for an hour or two, during which they swell up to about double their original size; they are then put into the oven and baked, during which operation they again enlarge considerably in bulk, in consequence of the dilatation of the previously generated carbonic acid pent up in the dough; for as soon as the mass is exposed to the heat of the oven, the fermentation is put an end to.—*P. M.*

Agricultural Journal

AND
TRANSACTIONS
OF THE
LOWER CANADA AGRICULTURAL SOCIETY.

MONTREAL, NOVEMBER, 1849.

The Roman Catholic Clergy of Lower Canada deservedly possess a great influence over the rural population, and we have no doubt that any recommendation coming from that most respectable and influential body, would be received with attention, and acted upon without hesitation, by their parishioners. From our first publication on the subject of agricultural improvement in this country, our principal hope of doing good was through the influence of the clergy—that if they approved of our suggestions, they would be recommended to the attention of farmers; so far as we are concerned, our chief reliance for being able to effect any good by this Journal amongst the Canadian farmers of French origin, is upon the influence

of the clergy, and their favourable disposition towards it. We find that in every parish that the clergyman does not subscribe to the Journal, there is scarcely one copy taken, and this circumstance is to our mind, a convincing proof, that all we can write will be to no purpose, if the Curés of the parishes are not disposed to favour the Journal by their countenance and support. We cannot admit that the saving of a dollar annually would be an object to any party to withhold them from subscribing for the Journal. The poorest farmer in the country, might in one number of the Journal, find some information that would much more than compensate him for the payment of five shillings. We cannot suppose that any man would be so opposed to his own interest, that he would shut his eyes, and close his ears to all the information, suggestions and instruction that it might be in his power to obtain. We never contended, or wished it to be understood, that any farmer should adopt our suggestions upon our recommendation, without due consideration, and comparing their own practice with that we proposed for their adoption. Any man acquainted with the cultivation or management of land, would be perfectly competent to estimate the utility and expediency of the suggestions proposed to them, and if they found them not likely to prove advantageous to them, they might reject them. But, on the contrary, if they see that the suggestions are reasonable, and would probably prove beneficial to them, we cannot think they would refuse to adopt them. All the general improvements in every art practised by mankind, has been introduced in this way. An individual makes the first discovery in an art—it becomes known, and is soon adopted by all others who practice the same art. It is inconsistent with a due regard for their own interests, that farmers alone should be backward in introducing any practicable and profitable improvement in the art they practice, and we conceive it a very poor excuse for rejecting a system, because it is new to them, and was not known to their fathers. If the Agri-

culture of Lower Canada is now in such a flourishing and prosperous condition, that it cannot be improved, and does not require it, there is no want of an Agricultural Journal. We hope we may be pardoned for stating, however, that our Agriculture does much require improvement, and that there is not a parish in Lower Canada, whose produce is not capable of being *doubled, and more*, and without any extraordinary additional expenditure. We do not make this statement without due consideration, and the means of proving it satisfactorily. Admitting the correctness of this estimate, can it be doubted that it would vastly contribute to the comfort and happiness of the rural population, and to every other class of this community, that the production of the country should be doubled? Next to the duty due to the Creator, no man can be better employed than in endeavouring to produce the improvements required in our Agriculture. By the judicious cultivation of our lands, we shew that we value them, and duly appreciate the gifts of a bountiful Creator, in providing us with fertile soil, and a favourable climate that will yield us all the necessaries of life, in proportion to the skill and care we employ in cultivating it. We humbly conceive that it is almost, if not altogether, a *religious duty*, to cultivate the land properly, according to our means, and not suffer "thorns and thistles" to overcome or injure the useful plants. We have ventured to advance this proposition, and if it would only be admitted to be correct, that the proper cultivation of the land was a religious duty, and a duty we owe society,—we would be entitled to the support of the clergy of every denomination in recommending it, and we hope they will not consider this support in any way inconsistent with their religious duties. The soil the Creator has provided for mankind will generally produce fruits in proportion to the care and skill employed in its cultivation and management. We have ever heard it condemned as sinful to allow the fruits raised from the earth to be injured or lost by neglect. We

conceive it not less sinful to occupy lands, which by our indolence or neglect, do not produce half a crop. The proportion of mankind engaged in agriculture, is not, perhaps, more than one half the population of the earth, but they have not only to provide for their own wants, but for the portion not agriculturists, so far as food is required. If they neglect to do this, they do not fulfil their duty to the community, and have no right to keep possession of the lands, and subject other parties to suffer by their neglect. This subject does not receive the consideration it is entitled to from the highest to the lowest in every country, and every expedient is resorted to, for promoting the prosperity of a country, rather than the right one, an improved agriculture. It is by a new creation obtained from the soil, that the constant wants of mankind can alone be supplied, and when we know this to be the case, it is astonishing that it is not the first care of every country, that every thing possible should be done, that this new annual creation should be abundant, and fully sufficient for the human family. Parties will not be persuaded that agriculture, because generally practised by the most plain and unassuming portion of the community, can be of any great importance to them or to the world, and therefore, requires no consideration or attention, but allow it to take care of itself. These parties will not believe that there can be no real source of wealth to a country, and particularly to Canada, but the production of her soil. What do they expect to be brought into the country, or to flow into it, without producing it from its own soil. England, that is certainly the richest country on earth, derives her chief wealth from her own soil, and though extensive her manufactures, they do not produce annually much over half the amount that is produced from her agriculture—and it is from the produce of her agriculture that two thirds of her manufactures are paid for. With a prosperous agriculture, we would be sure to be able to establish manufactures, and support them by our surplus pro-

duce. We believe there is not less than £100,000,000 worth of British Manufactures purchased and paid for annually by the produce of British husbandry. While a country yields only a scanty produce, the rural population are not able to give much encouragement to other domestic manufacturers, or to commerce. All true friends of Canada cannot employ their talents to a better purpose than by endeavouring to forward the improvement of her agriculture, and no man in Canada, however exalted in rank or place, can confer so much real benefit upon the people, as he would by means of introducing the required improvement in the agriculture of this naturally fine country.

AGRICULTURAL REPORT FOR OCTOBER.

The month of October has been very favourable for taking up the root crops, and securing them in good condition. As we suspected, there is disease appearing in the potatoes, in many instances, and particularly where the crop was large. It is necessary that they should be carefully stored, have good ventilation, and not be in too warm a temperature. If diseased potatoes appear, they should be separated at once from the sound. The potatoes are so exceedingly good in quality this year, that it would be a pity to lose them—indeed we have never seen them better. Unless where the soil was well prepared this year, the season was so very dry that roots could not increase in size to such a degree as in a more moist season. The year, however, taken altogether, was one of the most favorable for farmers we have seen for the last thirty years. No doubt some crops have partly failed in consequence of drought, but in most of these cases it was from late sowing, and on soil not the *best* suited for that particular crop. But we might as well expect to obtain “grapes of thorns or figs from thistles,” as expect to grow good crops constantly from late sowing, and on soil not the most suitable for them. When we do our part well, we are

seldom disappointed by the seasons, and this is the great advantage of understanding perfectly the science and art of agriculture. Fine weather farmers, instead of preparing for adverse seasons, attribute their disappointment in bad crops to adverse seasons and not to their own neglect or want of skilful management. In some seasons, and under certain circumstances, the best farmers may be disappointed in crops; but as a general rule, the fault is more our own than we have bad crops, than the seasons. The yield of the wheat crop is excellent in quality, although there are some complaints of the quantity not being very large per acre. When the ear of wheat is short, and the grains not closely set upon it, the yield will not be large, however full the grain. When the soil is suitable and well prepared, the ear of wheat will be long and full, provided the variety is a good one. We have often been delighted to see a full-eared crop of wheat in the old country, bending gracefully to the wind with the weight of grain, and scarcely one short or defective ear to be seen in a whole field. This, however, was invariably only the result of good husbandry, and we may have the same results in Canada from proper management. In this country we generally see a very considerable proportion of the ears of wheat in a field short, and every way inferior, and this will account for the deficient yield. In a country such as this, where labour is high, and produce low in price in proportion, the only chance for the farmer is in producing good crops. We do not recommend any extravagant expenditure, but we believe that lands might be very well prepared for crops by skilful management, without any extraordinary outlay. We are aware, a certain amount of capital, or command of labour, is necessary in every case to enable a farmer to farm to advantage, and we regret to say that these requisites are in numerous instances, not forthcoming; but improvement to the extent of our means is always in our

power, and if we were to act upon this principle to the full extent, we would soon find our agriculture in a better condition. We offer these observations now, as the proper preparation of the soil this fall, so far as it can be effected, will have a considerable influence upon the quality of the next year's crop. It may be too far advanced in the season to do much, or all we would wish to do; but there may be something in our power to do, and we should not neglect the opportunity. We may not be able to raise so large crops here as in England, but we can unquestionably raise much better crops than we generally do. Barley is of good quality this year, but it has not been grown to the same extent as formerly, and if the price does not range higher than at present, few farmers will sow any next year, as wheat will be much more profitable. The price of wheat now is more than double that of barley, and the quantity of each grain that may be grown upon an acre of soil of the same quantity and cultivation, will not vary so much as to make up the deficiency of price in the barley to make it equal to a crop of wheat. Perhaps at this moment 20 bushels of good wheat will sell for as much as 50 bushels of barley, in Montreal; and we are perfectly convinced a farmer will more readily and cheaply produce the former than the latter, under ordinary circumstances. Oats is a fair sample, and there has been a considerable quantity raised this year. The exportation to the United States will not allow the prices to range so very low as it was expected. The price of hay will also have an effect in maintaining the price of oats. We have seen some crops of oats this year almost a total failure, from the drought, but we have not been able to ascertain to what extent these failures occurred. They are not likely, however, to produce any effect on prices. Peas have been raised in considerable quantity, and we have seen very good samples; the market price is not high. Indian corn was

a better crop than we have had it for some years past. It is a profitable crop when it succeeds, and by careful cultivation on suitable soil, it will generally succeed, unless in a wet, cold season. We have already adverted to root crops; we are sorry they are not more cultivated here, as root crops are so necessary to keep the land in condition. In the fall is the time to prepare the soil for root crops, by manuring, draining, &c. By doing this, the soil will be in the best condition in spring and ready for early sowing, which is of so much importance for root crops. Hay is selling at a good price, but not over what is remunerating. We have frequently recommended to Canadian farmers to be careful of the Canadian breed of horses, by keeping them as pure as possible from mixture with other breeds. If they had done this, the value of their horses now would be more than double what it is. There is a constant market at Montreal and other places for the sale of Canadian horses of all descriptions, and at fair prices, to parties coming here to purchase them from the United States, and if our horses were only of the pure Canadian blood, they would sell on an average for double the prices paid for those now selling. This is a market likely to continue. The difference of the quality of the horses in New York and in Montreal is very striking, and we believe very much in favour of our horses, for carting or ordinary purposes. Our horses may not stand so high on their limbs, but their shape and capabilities for work we conceive to be much superior to those of New York. If farmers were able fully to supply this market, it would form a very considerable item of the value of our annual productions, and a production that would not cost more, in proportion to what it would bring, than any other we raise. Our long winters cannot be any objection to raising horses, however strongly they may be urged, (although we conceive very unreasonably,) against neat

cattle and sheep. We wish we could persuade every inhabitant of Canada to think as we do—that our country is one of the finest, if not the *very finest* on earth. If we do not estimate our country highly, we are apt to blame the climate and soil for our own neglect in doing it justice. Other parties may be of a different opinion, but for our part we do not think that Canada is inferior to any portion of the American continent, of equal extent, and that it is capable of affording as large a portion of the necessaries and comforts of this life, or the means of procuring them, to an equal population. Other countries may have advantages that we have not, so we may have, (and there is no doubt we have,) advantages that they do not possess. Our opinion of agriculture, to recommend it to us, must be equally favourable, or we will not be sufficiently attached to it, to be anxious for its improvement. Agriculture is the first of professions, and undoubtedly the most honorable that man can be engaged in; and until this is the general opinion of farmers, a successful agriculture is hopeless. In every country but this it is estimated as an employment, honorable, above all others, even above that of the Statesman. In this country, however, who would forego the chance of being a Statesman for that of being an agriculturist, or the promoter of agricultural improvement amongst his countrymen? This may be considered very unsuitable matter for an Agricultural Report. The object of all our Agricultural Reports is to advance the improvement of agriculture, and we imagine we cannot do this more effectually than by recommending it to the notice of all classes, and endeavouring to persuade them that there is no degradation in their becoming agriculturists, or in promoting its prosperity. Any man in this community, however high his position, cannot confer a greater benefit upon the country, or do more honor to himself, than by devoting his talents to the

improvement of our agriculture. There may be mistakes upon the expediency of other matters, but there cannot be any upon this. There is one cause that agriculture does not offer the same inducements that other employments hold out to the ambitious—namely, that few agriculturists acquire wealth sufficient to enable them to live and appear in the same style that is kept up by parties in cities and towns. There are many circumstances that prevent the acquiring of much wealth by farming in Canada. The high price of labour, in proportion to the service rendered, and the market value of the produce, prevent the accumulation of capital, and the proper preparation and improvement of the soil, so as to yield good crops. These difficulties may, however, be overcome to some extent by the skill of the farmer and the instruction of the laborer. While agriculture is viewed with indifference by the educated and the wealthy, and considered only an employment fit for the uneducated and poorest portion of the community, measures are not likely to be adopted that will secure the improvement and prosperity of agriculture, notwithstanding that the prosperity of the whole country, and every inhabitant in it, depends upon our agriculture, and the produce obtained from it. The wealth of the farmer and his respectability, is not to be estimated by the amount of money in his possession, or the fine clothes of himself and his family; but by the state of his farm,—his stock and the annual produce created by his skill and industry. This is what makes him wealthy, respectable, and a valuable member of the community, to whose support he largely contributes, although not perhaps directly.

Oct. 31st.

We had the pleasure of meeting, at Montreal, Professor Johnston, of Durham, England, on his way from Syracuse and Upper Canada to New Brunswick. We were sorry we had

not a longer opportunity of enjoying his society than his short stay at Montreal admitted. From our short intercourse with the Professor, we are convinced he is well entitled to the high character he has acquired in the British Isles, and in all other countries where his works on agriculture have been read. From having seen the many useful works of Professor Johnston previous to our pleasure of meeting him, we had formed so high an estimate of his character, that it could only be confirmed by our intercourse with him, which it certainly was to the fullest extent. Mr. Johnston appears to understand perfectly the subject of his lectures and publications, and this is a great advantage to those who have an opportunity of hearing or reading them. Parties who are not thoroughly acquainted with the subject to lecture or write upon, are likely to fall into many errors, and lead others also into error. With Professor Johnston there is no danger of this; so far as we are capable of judging, we have never met a gentleman so well qualified to advance the improvement of agriculture. Farmers may condemn what is published on agricultural improvement as nothing more than what they term "Theory," but we can tell them that most of the improvements introduced lately in agriculture have been produced by suggestions, and the results of experiments that have appeared in print, and that very few of these improvements owe their origin to uneducated farmers who do not read. It is ungenerous and unjust for farmers who read works on agriculture, and profit much by them, to deny that they do so, and pretend that all their good practice is the result of their own untaught ingenuity. If the most ingenious of these parties, who pretend to learn nothing from anything ever published on agriculture, was to be settled in a remote situation, and not have an opportunity of reading these publications, or seeing the practice of those who did read them, we should then be able to judge better of their pretensions to be naturally perfect in the science and art of agriculture. Professor Johnston has

done more to forward the improvement of husbandry than ten thousand of those parties who call themselves practical men, who never could see any useful information on agriculture in any work ever published. Practical men are highly useful, certainly, to practice what is proposed to them, but their usefulness to a country and to the world is not to be compared to those who think and propose what proves to be of vast benefit to mankind. Who would compare the celebrated inventors of machinery, and the manner of employing them, with the workmen who now manage them? We are disposed to give full credit to working, practical men, but we wish also to see justice done to others who think and who write, and who, though they may not work, understand their subject, and are as practical as any working farmer. A man who writes is not thereby disqualified from being practical, if he wished or required to be so. It is easy to discover, however, by a man's writings, if he does practically understand his subject. No farmer can read the works of Professor Johnston without profiting by them, unless he commences to read, resolved that he will not be instructed by the most convincing arguments, or adopt any suggestions proposed, however reasonable they might be. For our own part, we have been engaged in farming from our boyhood, and have had ample opportunities of seeing the very best systems of husbandry in active operation; but we have been always most anxious to read every work on agriculture that came under our notice, and we have the same desire now to read any book published on the subject that we ever had, and solely from the hope of profiting by what we read, either for our advantage or for that of others. We hope Professor Johnston will long continue his useful labours, for the advantage of all farmers and others who wish to see the science and art of agriculture properly understood, and profitably practiced; and we do expect the pleasure of seeing him again in Canada to make a longer stay with us than his late passing visit. We have not

the slightest doubt that he would find the natural capabilities of Canada for successful agriculture equal to that of any part of Her Majesty's dominions, out of the British Isles, and perhaps we need not make even this exception. If it possesses these capabilities for agriculture, it must also be capable of supporting an immense population, who, if possessing skill, industry, and capital, might make this one of the most flourishing countries on earth. There may be objections to our long winters, but making a fair estimate of our climate throughout the year, it is not, in our humble judgment, inferior to that of any country we are acquainted with, and certainly not to the neighbouring States. We have no patience with those who make a low estimate of the capabilities of Canada for population and wealth. Indeed we can only excuse them by believing that such parties are not competent to make a just estimate, because they do not understand the subject.

We have attended the County of Mon'real Cattle Show held at St. Laurent on the 8th October last, and although there were several good animals on the ground, we did not think the Exhibition by any means what we might reasonably expect to see in the first County in Canada. Of implements, we only saw one iron plough which appeared to be of good construction for work. There was not a large assemblage of farmers or others present, and it was manifest that the Show had not created much interest or excitement, which we conceive to be the principal advantage of Cattle Shows. Annual Cattle Shows, to make them interesting to the public and useful to the farmers, must have a good collection of animals of every species and variety, and of all ages, up to the period they are at full maturity, to show the comparative merit of each in the several stages of their progress to maturity. The produce of crops, and of the dairy, should also be exhibited. The first, by samples of each, with a clear statement of the mode of cultivation,

manure applied, if any, quality of the soil, time of sowing, harvesting, &c., and the expense and produce per acre. The dairy produce should be prepared in the best manner, either for consumption at home or for exportation. Every information should be afforded respecting the management of the dairy—the manufacture of butter and cheese—the sort of cows kept—the quantity of milk given by each on an average throughout the summer season, or the year—the produce of milk, either in butter or cheese—the use made of the butter-milk or whey—the sort of churn made use of—the sort of pasture on which the cows are kept, and what sort of food fed upon in winter. All this information might be obtained, and it should be one of the conditions upon which premiums should be given, that answers should be given to all these queries. There should be a good collection of farm implements if possible, and to show them would be as advantageous to the maker as to the farmers. Of domestic manufactures, samples of every one should be exhibited. If we were to have shows of this description they would be sure to have numerous visitors, as they have in the British Isles, and in the neighbouring States. We cannot expect parties to lose time and money in going to Cattle Shows, where there is nothing superior or any great variety to be seen. If Cattle Shows once have the character of being worth seeing, there will be visitors in abundance to them. The desire to obtain a few premiums should not be the principal motive to parties to compete at Cattle Shows, but rather an endeavour to advance the improvement of agriculture by showing the results of an improved system. If to obtain money as premiums be the ruling principle of exhibitors at Cattle Shows, we would not estimate them as of much value to the country, as a means of promoting improvement where most required. We do not object to a great Cattle Show and Fair, such as we witnessed at Syracuse; but we object to little Shows, where there is not much to be seen to instruct or encourage farmers in a better system of hus-

bandry. As editor of this Journal, we conceive it to be our duty to submit these observations. Only make Cattle Shows really interesting exhibitions, and they shall have the support of this Journal, and whenever they are now calculated to advance the improvement of husbandry, they have our best wishes. The premiums paid for good crops, and well managed farms, when adjudged on proper conditions, must be very beneficial, as it cannot fail to encourage good farming. Chance good crops, however, should not have premiums unless the other crops on the farm were properly managed. We think that two or three premiums in each parish for the best managed farms and stock, and for the best dairies, would do better than giving them on crops alone. It might also be a judicious regulation to disqualify all those awarded first prizes for the best managed farms or dairies from competing again. This would extend encouragement to others to improve. If public money is granted for the improvement of agriculture, it is absurd not to employ it where it is likely to produce the most of general and profitable improvement. Model farms, under competent superintendence and judicious management, we conceive, would be productive of immense benefit to Canada. It would be showing an example that might be followed by farmers, and it would be affording means of instruction in the science and practice of agriculture, and every work upon the farm. We do not propose that any expensive experiments should be made, but that a plain good system of husbandry should be carried on, such as every farmer might adopt, and that animals should be kept that would be most suitable to the keeper and climate, and that would make the best returns for their cost and consumption.

We have frequently stated that there is no means whereby a worn-out Canadian farm could be sooner or more effectually brought into fertility, and capable of producing good crops, than by summer-fallowing it in a proper manner, even without applying any manure.

It thoroughly breaks up the soil in a manner it never was broken up previously. All weeds and worthless grass may be destroyed, and converted into a manure, by burning or rotting in a compost heap. Some of the soil might also be burned or charred to manure at very trifling expense. Those who have not made the experiment of summer-fallowing will not credit the good effect it will produce. We are fully persuaded that a judicious fallowing will fertilize and prepare the soil better for producing a crop of wheat than it can be prepared by a green crop. It would be difficult, we believe, to convince parties coming from the well cultivated sections of the Old Country of this fact, but we are convinced that a fair trial will prove it. Summer-fallow is more necessary now, that potatoes are not so much cultivated, than heretofore. We are surprised that this practice is so much neglected, and when attempted, very imperfectly executed. Land should be ploughed in the fall, intended for summer-fallows, and then it might be left in that state until the spring crops were sown, before it would be again ploughed. A supply of green manure might be provided for it, by growing rape, vetches, buckwheat, or some other plants upon it, and ploughing them in. We see thousands upon thousands of acres of land nearly useless, while this means of improvement is in the power of almost every farmer in the country.

“Introduction to Professor Johnston’s Elements of Agricultural Chemistry and Geology.”—“The scientific principles upon which the art of culture depends have not hitherto been sufficiently understood or appreciated by practical men. Into the causes of this I shall not here inquire. I may remark, however, that if agriculture is ever to be brought to that comparative state of perfection, to which many other arts have already attained, it will only be by availing itself, as they have done, of the many aids which science offers to it; and that, if the practical man is ever to realize upon his farm all the advantages which

science is capable of placing within his reach, it will only be when he has become so far acquainted with the connection that exists between the art by which he lives and the sciences, especially of Chemistry and Geology, as to be prepared to listen with candour to the suggestions they are ready to make to him, and attach their proper value to the explanations of the various processes, which they are capable of affording." The first paragraph of this work is the following, and it is well worthy the attention of farmers:—"The object of the practical farmer is to raise from a given extent of land the largest quantity of the most valuable produce at the least cost, in the shortest period of time, and with the least permanent injury to the soil. Chemistry, Geology, and Chemical Physiology, throw light on every step he takes or ought to take, in order to effect this main object." The Professor was so good as to make us a gift of a copy of this work, and we value it highly, as it contains much interesting and useful information relating to agriculture. Every farmer should have a copy of the work.

From the large quantity of agricultural seeds disposed of this year to farmers by the seedsman of the Lower Canada Agricultural Society, Mr. George Shepherd, we hope that farmers are becoming aware of the advantage of sowing clover and grass seeds, and cultivating root crops, such as parsnips, carrots, beets, mangel-wurtzel, and turnips. By careful cultivation and early sowing, we are convinced that as large crops of all these roots, except, perhaps, turnips, might be grown here as in the British Isles. Parsnips, carrots and beets may be produced in astonishing quantity, and these may be preserved in winter without much difficulty; indeed, in dry soil, the two first will keep in the ground perfectly safe until the spring, and this is an excellent plan to adopt with a part of the crop, as they will be found extremely useful to stock in the spring, when other food begins to fail, or as a variety. In the fall the land should be prepared and manured for these

crops. Any soil, by proper preparation, manuring in the fall, and sufficient draining, may produce any of these crops. Of course they will not succeed in stiff clay soil, if not loosened by manure and properly drained, but all this may be done. We have heard parties complain of disappointment in growing these crops, but we believe whenever this occurs it is their own fault, in not cultivating judiciously. We could not expect to raise good root crops in soil not properly pulverised and drained, and which becomes almost as hard as stone in a dry warm season. While these crops are growing, the more the soil is stirred and kept loose between the rows and plants, the better, and this will be found greatly to increase the bulk of crop. We do not say that root crops can be grown here *advantageously* to the same extent as in the British Isles, in proportion to the quantity of land in cultivation, but every farmer should cultivate some, and in proportion to his means of keeping them safely in winter. Farm stock becomes very low in condition here during the winter, and if they could only be supplied with a small quantity of roots daily, it would prevent this. We are in favour of hay and grain for feeding in this country, but one acre of roots will produce much more food than an acre of grain, particularly for feeding store stock. We give in this number an extract from Professor Johnston's "Agricultural Chemistry," on the values of different kinds of food, which we consider very interesting and useful, and we hope he will pardon us for making use of his work. In stall-feeding, in such a cold climate as this is in winter, grain or cooked vegetables will be found most profitable to employ. Mixing food is of great consequence, and will produce a better effect in feeding than by making use of only one kind of grain or vegetable with hay. Our agriculture is certainly in a backward state, but we may improve it when we choose to do so. If half the attention that is given to politics were to be applied to the study of agriculture, and to the promotion of its improvement, the country

would derive a thousand per cent more advantages from it than from politics. The improvement of our agriculture is of a thousand times more consequence to every interest in Canada than any political subject that has ever been discussed in this country, no matter how highly estimated by those who have discussed them.

Some estimate may be formed of the interest that is felt in the improvement of agriculture in the United States, when at the late great Fair and Cattle Show, held at Syracuse, for the State of New York alone, it was supposed there were near 200,000 persons present, and we believe there must have been, from what we saw. On the first day of the show, 5000 dollar tickets were sold for admission, and although the members of the Society and many strangers had badges which entitled them to free admission, 60,000 tickets at 7½d. each, were sold for admission during the Fair. Hence the sale of tickets for admission produced 12,500 dollars, an amount that we believe would pay the whole of the premiums, and other expenses of the Fair. How different it is at Canada Cattle Shows—and how few persons attend them! The money expended in travelling to this Fair, and while there, we imagine would amount to from 500,000 to 600,000 dollars or over—however incredible this may appear; some may be disposed to question whether this expenditure of time and money was advantageous to the parties. At all events, we wish with all our heart, that the people of Canada would have such a Fair and Cattle Show, and as many persons to attend it. It would prove that some interest was felt in agriculture and its improvement, and that every implement that was necessary for the proper cultivation of the soil was obtainable by the farmer at a moderate price. A large show of implements will induce farmers to purchase and use implements that they never thought of before they saw them. Great shows got up on the plan of the Royal English Agricultural Society, and that we have lately witnessed in

the State of New-York, could not fail to have a beneficial influence, if the farmers would only attend to see it. A show of this kind, must, however, be a *great one* in reality, to make it useful, or it would be better to have none. The arrangements should be unexceptionable, and every effort should be made to have a large show of cattle implements, &c.

RUST OR MILDEW IN WHEAT.—This most destructive disease prevails, to a certain extent, in most countries; produced, we believe, by late sowing—want of proper drainage—low situations—a long continued damp atmosphere, when the crop is in the most luxuriant state of its growth—and when grass and weeds are allowed to grow with the crop. All these causes induce the disease of rust and mildew. It is supposed, also, that certain ingredients in the soil, that may be rendered harmless by the application of lime, produce mildew and rust. Heavy manuring, we know, has the same effect. Several causes of the disease are in the farmer's power to correct, indeed, all of them except that produced by a damp atmosphere, at the critical period of the crop's growth. Drilling in the seed at nine to twelve inches apart, and hoeing the crop, will have some effect in preventing the ill effects of a damp atmosphere. In Flanders they do not sow grass seeds with wheat, in order to give it a better chance to escape from rust and mildew, as they suppose the young plants of clover and other grasses keeps the lower portion of the straw of the crop wet and damp for a longer time after rain, heavy dew, or fogs, than if there was no clover or other grass plants growing with it. In England, where a good system of husbandry is carried out, all their grain, excepting oats, is sown in drills, and they seldom have to complain of rust or mildew affecting the crop. Where sea-weed is applied as manure to the crop previous to wheat, rust is never known to injure the crop. The application of salt here would, perhaps, have the same beneficial effect. Rust and mildew pro-

duce immense loss in Canada, but we are not aware that the farmers have ever adopted any means whatever that would be likely to prevent it, with the exception, probably, of one in forty thousand who may have applied lime occasionally. In the old countries they would not attempt to carry on arable culture without applying lime. Our own experience of rust and mildew is, that after continued rains and warm and misty weather, either at the latter end of July or the beginning of August, the disease propagates very rapidly, particularly in low situations and in sheltered places. Too great a supply of moisture, under these circumstances, appears to be imbibed by the stems of the plants, and with this excess of moisture it is said that the plants take in the sporulus of a certain fungus that are so light and minute as to be wafted by the winds, and then grow upon the leaves and stem as mildew. Another opinion is, that large doses of manure, or moist warm weather, causes an over-luxuriance of the crop, and supplies an excess of nutriment and moisture, that clogs the pores of the plants, stops the circulation of the sap, and thus produces the disease of mildew. We have examined the straw affected by mildew with a powerful magnifying glass, and could distinctly perceive that all circulation of the sap or nutriment must have been stopped; and this will account for the crop or the grain making no improvement after the straw is attacked by rust or mildew. It is one of the most serious and injurious diseases to which grain crops are liable, but we conceive that the farmer has it in his power to remedy or check it to a considerable extent. Early sowing, and, as regards wheat, obtaining that variety that is the most hardy and least liable to rust, will be a prudent precaution. We hope these observations may induce more competent parties to consider this subject and give their opinion, as it is a matter of great importance to the farmer.

EXHAUSTING EFFECTS OF LIME. IS LIME NECESSARILY EXHAUSTING?

The exhausting effects of lime have been remarked from the earliest times. It causes larger crops to grow for a certain number of years, after which the produce diminishes, till at length it becomes less than before lime was applied to it. Hence the origin of the proverb that "Lime enriches the fathers and impoverishes the sons."

Two interesting questions, therefore, suggest themselves in connexion with this circumstance. How is this exhaustion produced? Is it a necessary consequence of the addition of lime?

It has already been stated that lime promotes those chemical changes of the organic part of the soil by which it is rendered more servicable to the growth of plants. But in consequence of this action, the proportion of organic matter in the soil gradually diminishes under the prolonged action of lime, and thus the soil becomes less rich in those substances of organic origin on which its fertility in some degree depends.

Again, lime acts also on the mineral matter of the soil, and prepares it for more abundantly feeding the plant.

Now, as the crops we reap carry off not only organic but mineral matter from the soil, any thing which prepares that mineral matter more abundantly for the use of the plant must cause also a more rapid diminution of those mineral substances on which, as well as upon its organic matter, the fruitfulness of the soil is dependent.

By this mode of action, therefore, arises the exhaustion which universal experience has ascribed to the use of lime.

But without reference to the chemical process by which it is brought about, a common sense view of the question sufficiently explains how the exhaustion arises.

It is conceded that the crops we grow rob the soil both of organic and organic matter. A double crop will take twice as much, a triple crop three times as much, and so on. And the more we take out in the year, the more rapidly will the land be exhausted. Now, if lime, by its mode of action, enables us in the same time to extract three or four times as much matter from the soil in the form of increased crops, it must so much the more rapidly exhaust the soil, in the same way we should drain a well sooner by taking out fifty than by removing only five gallons a-day.

But we can restore to the soil what crops carry off. By farm-yard manure, and by saline applications, we can return every thing which lime enables us to extract, and we can thus preserve its fertility unimpaired. Manure, therefore, in proportion to the crops taken off, and lime will cease to be exhausting. There is much wisdom in the rhyme,

"Lime and lime without manure
Will make both land and farmer poor."

OF THE QUANTITY OF OIL IN PLANTS.

The proportion of oil contained in 100 lbs. of some of our commonly cultivated plants is as follows:—

Wheat flour (fine),	2 to 4 lbs.
Bran,	3 to 5 lbs.
Barley,	2 to 3 lbs.
Oats,	5 to 8 lbs.
Indian corn,	5 to 9 lbs.
Beans and peas,	2 to 3 lbs.
Potatoes and turnips,	$\frac{1}{2}$ lb.
Wheat straw,	2 to 3 $\frac{1}{2}$ lbs.
Oat straw,	4 lbs.
Meadow hay, ..	2 to 5 lbs.
Clover hay,	3 to 5 lbs.

ON THE ABSOLUTE QUANTITY OF FOOD YIELDED BY AN ACRE OF LAND UNDER DIFFERENT CROPS.

If we suppose an acre of land to yield the following quantities of the usually cultivated crops, namely—

Of wheat,	25 bushels, or	1500 lbs.
Of barley,	35 ..	or 1800 ..
Of oats,	50 ..	or 2100 ..
Of peas,	25 ..	or 1600 ..
Of beans,	25 ..	or 1600 ..
Of Indian corn,	30 ..	or 1800 ..
Of potatoes,	12 tons,	or 27000 ..
Of turnips,	30 ..	or 67000 ..
Of wheat straw,	—	or 3000 ..
Of meadow hay,	1 $\frac{1}{2}$..	or 3400 ..
Of clover hay,	2 ..	or 4500 ..

The weight of dry starch, sugar, and gum—of gluten, albumen, casein, &c.—of oil or fat—and of saline matter, reaped in each crop, will be represented very nearly by the following numbers:—

	Husk or Woody Fibre.	Starch, Sugar, &c.	Gluten, Albumen, &c.	Oil, Fat.	Saline matter.
Wheat,.....	225	285 lbs.	180 lbs.	45	30
Barley,.....	270	1080	230	50	50
Oats,.....	420	1050	300	100	75
Peas,.....	130	800	380	34	40
Beans,.....	160	640	420	40	50
Indian corn... 10 +	1260	220	130	30	30
Potatoes,.....	1080	4800	540	45	240
Turnips,.....	1340	6000	1000	200	450
Wheat straw, 1500	900	40	80	150	
Meadow hay, 1020	1360	240	120	220	
Clover hay, ... 1120	1800	420	200	400	

IMPORTANCE OF A MIXED FOOD.

The principles above explained show that various substances are necessary to the healthy sustenance of the animal body. The value of any vegetable production, considered as the sole food of an animal, is not to be judged of, therefore,—cannot be accurately determined—by the amount it may contain of any one of those substances, all of which together are necessary to build up the growing body of the young animal, and to repair the natural waste of such as have attained to their fullest size.

Hence the failure of the attempts that have been made to support the lives of animals by feed-

ing them upon pure starch or sugar alone. These substances would supply the carbon consumed by respiration, but all the natural waste of nitrogen, of saline matter, of earthy phosphates, and probably also of fat, must have been withdrawn from the existing solids and fluids of their living bodies. The animals, in consequence, pined away, became meagre, and sooner or later died.

So some have expressed surprise that animals have refused to thrive, have ultimately died, when fed upon animal jelly or gelatine alone,—nourishing though that substance, as part of the food, undoubtedly is. When given in sufficient quantity, gelatine might indeed supply carbon enough for respiration, with a great waste of nitrogen, but it is deficient in the saline ingredients which a naturally nourishing food contains.

Even on the natural mixture of starch and gluten which exists in fine wheaten bread, dogs have been unable to live beyond 50 days, though others fed on household bread, containing a portion of the bran—in which earthy matter more largely resides—continued to thrive long after. It is immaterial whether the general quantity of the whole food be reduced too low, or whether one of its necessary ingredients only be too much diminished or entirely withdrawn. In either case the effect will be the same—the animal will become weak, will dwindle away, and will sooner or later die.

The skill of the feeder may often be applied with important economical effects to the proper selection and mixture of the food he gives his animals generally, and at various stages of their growth.

It has been found by experiment, for example, that food, which when given alone does not fatten, acquires that property in a high degree when mixed with some fatty substance, and that those which are the richest in the muscle-forming ingredients produce a comparatively small effect unless they contain also, or are mixed with, a considerable proportion of fatty matter. Hence the reason why a stone of linseed has been found by some to go as far as two stones of linseed cake, and why the Rutlandshire farmers find a sprinkling of linseed oil upon the hay to be a cheap, wholesome, and fattening addition to the food of their cattle and horses.

A sheep of 55 lbs. contains about 20 lbs of fat, but four-fifths of any subsequent addition consists of tallow,—hence the profit of oily food in fattening sheep. To pigs the same remark applies; and fat of any kind, animal or vegetable, forms a profitable addition to the food of these animals when they are to be fattened off.

INFLUENCE OF CIRCUMSTANCE IN MODIFYING THE PRACTICAL VALUE OF FOOD.

The value of food in producing an economical effect upon animals that are fed either for work or for the production of flesh or milk, is modified

by many circumstances which it is of money value to the practical man to bear in mind.

1st. *Warmth and Shelter.*—The same amount of food has been found to produce double the weight of mutton when the sheep were sheltered and kept undisturbed, and in the dark. It is probably from the beneficial effect of warmth that in the North American States a difference of 25 per cent. is observed in favor of the spring and summer over the winter feeding of pigs.

2nd. *The breed or constitution,* every feeder knows, has a great influence on the apparent value of food. A tendency to fatten will make one animal two or three times as profitable to the farmer as one in which the tendency does not exist.

3rd. *The form in which it is given* is of no less importance. Grass newly cut goes farther than when it is made into hay; and the opinion is now becoming very generally prevalent that steamed, boiled or otherwise prepared food, is more wholesome to cattle, and more economical, than the same food given in a dry state.

4th. *The malting of barley* is by very many practical men considered to increase its nutritive qualities. Mixed with boiled potatoes to the extent of 3 or 4 per cent, and kept warm for a few hours, bruised malt produces a mixture which is relished by milk cows, and is a very profitable food; and there is reason to believe that, in similar admixtures with other kinds of food, it would produce a like beneficial effect.

5th. *The souring of food* of all kinds has, by almost universal experience, been found to make it more profitable in the feeding and fattening of pigs.

Many other circumstances, also, modify the theoretical and practical values of food, to which I need not here advert.

OF THE PRACTICAL AND THEORETICAL VALUES OF DIFFERENT KINDS OF FOOD.

From what has been stated in the preceding sections, it appears that, for various reasons, different kinds of food are not equally nourishing. This fact is of great importance not only in the preparation of human food, but also in the rearing and fattening of stock. It has, therefore, been made the subject of *experiment* by many practical agriculturists, with the following general results.

1. If common hay be taken as the standard of comparison, then to yield the same amount of nourishment as 10 lbs. of hay, experiments on feeding made by different persons, and in different countries, say that a weight of the other kinds of food must be given, which is represented by the number opposite to each in the following table:—

Hay,.....	10	Carrots,	25 to 30
Clover-hay, ...	8 to 10	Turnips,	50
Green-clover, ..	45 to 50	Cabbage,	20 to 30
Wheat-straw, ..	40 to 50	Peas and beans	3 to 5
Barley-straw, ..	20 to 40	Wheat,.....	5 to 6
Oat-straw, ...	20 to 40	Barley,.....	5 to 6
Pea-straw,	10 to 15	Oats,.....	4 to 7
Potatoes,	20	Indian corn, ...	5
Old-potatoes, ..	40 ?	Oil-cake,	2 to 4

It is found in practice, as the above table shows, that twenty stones of potatoes, or three of oil cake, will nourish an animal as much as ten stones of hay will, and five stones of oats as much as either. Something, however, will depend upon the quality of the sample of each kind of food used—which we know varies very much, and with numerous circumstances—and something also upon the age and constitution of the animal, and upon the way and form in which the food is administered. The skilful rearer, feeder and fattener of stock knows also the value of a change of food, or of a mixture of the different kinds of vegetable food he may have at his command, a subject we have considered in a previous section.

2. The generally nutritive value of different kinds of food has also been represented *theoretically*, but supposing it to be very nearly in proportion to the quantity of nitrogen, or of gluten, which vegetables contain. Though this cannot be considered as a correct principle, yet, as the ordinary kinds of food on which stock is fed contain in general an ample supply of carbon for respiration, with a comparatively small proportion of nitrogen, these theoretical determinations are by no means without their value, and they approach in many cases very closely to the practical values above given, as deduced from actual trial. Thus assuming that 10 lbs. of hay yield a certain amount of nourishment, then of the other vegetable substances it will be necessary, according to theory, to give the following quantities, in order to produce the same general effect in feeding:

Hay,.....	10	Carrots,	35
Clover-hay	8	Cabbage,	30 to 40
Vetch-hay,*.....	4	Peas and beans	2 to 3
Wheat-straw,	52	Wheat,	5
Barley-straw,	52	Barley,	6
Oat-straw,.....	55	Oats,.....	5
Pea-straw,.....	6	Rye,	5
Potatoes,	28	Indian corn, ...	6
Old potatoes,.....	40	Bran,.....	5
Turnips,.....	60	Oil-cake.....	2

If the feeder be careful to apply his stock with a mixture or occasional change of food—and especially, where necessary, with a proper proportion of fatty matter—he may very safely regulate, by the numbers in the above tables, the quantity of any one which he ought to substitute for a given weight of any of the others—since the theoretical and practical results do not in general very greatly differ.

* Both cut in flower.

3. As has been already stated, however, it is not strictly correct that this or that kind of vegetable is more fitted to sustain animal life, simply because of the large proportion of nitrogen or gluten it contains; but it is wisely provided that, along with this nitrogen, all plants contain a certain proportion of starch or sugar, and of saline or earthy matter—all of which, as we have seen, are required in a mixture which will most easily sustain an animal in a healthy condition—so that the proportion of nitrogen in a substance may be considered as a rough *practical* index of the proportion of the more important saline and earthy ingredients also.

4. It is very doubtful, however, how far this proportion of nitrogen can be regarded as any index of the *fattening* property of vegetable substances. If the fat in the body be produced from the oil in the food, it is certain that the proportion of this oil in vegetable substances is regulated by that of the gluten or other analogous substances containing nitrogen. The stock farmer who wishes to lay on fat only upon his animals, must therefore be regulated by another principle. He must select those kinds of food, such as linseed and oil-cake, in which fatty matters appear to abound, or mix, as I have already said, a due proportion of fat or oil with the other kind of food he employs.

But large quantities of fat accumulate in the bodies of most animals, only when they are in an unnatural, and in some measure, an unhealthy condition. In the state of nature there are comparatively few animals upon which large accumulations of fat take place. A certain portion, as we have seen, is necessary to the healthy animal; but it is an interesting fact, that as much as is necessary to supply this is present in most kinds of vegetable food. In wheaten flour it is associated with the gluten, and may be extracted from it after the starch of the flour has been separated from the gluten by which the starch of the flour has been separated from the gluten by washing with water. In so far, therefore, as this comparatively small necessary quantity of fatty matter is concerned, the proportion of nitrogen may also be taken without risk of any serious error, as a practical indication of the ability of the food to supply the natural waste of fat in an animal which is either growing in general size only, or is only to be maintained in its existing condition.

While, therefore, it appears from the study of the principles upon which the feeding of animals depends, that a mixture of various principles is necessary in a nutritive food, it is interesting to find that all the kinds of vegetable food which are raised either by art or natural growth, are in reality such mixtures of the several substances—more or less adapted to fulfil all the conditions required from the nutritious diet, according to the state of health and growth in which the animal to be fed may happen to be.

An important practical lesson on this subject, therefore, is taught us by the study of the wise provisions of nature. Not only does the milk of the mother contain all the elements of a nutritive food mixed up together—as the egg does also for the unhatched bird—but in rich natural pastures, the same mixture uniformly occurs. Hence, in cropping the mixed herbage, the animal introduces into its stomach portions of various plants—some abounding more in starch or sugar, some more in gluten or albumen—some more in fatty matter—while some are naturally richer in saline, others in earthy constituents; and out of these varied materials the digestive organs select a due proportion of each and reject the rest. Wherever pasture becomes usurped by one or two grasses—either animals cease to thrive upon it, or they must crop a much larger quantity of food to supply from this one grass the natural waste of *all* the parts of their bodies.

It may indeed be assumed as almost a general principle, that whenever animals are fed on one kind of vegetable only, there is a waste of one or other of the necessary elements of animal food, and that the great lesson on this subject taught us by nature is, that by a *judicious admixture*, not only is food economised, but the labour imposed upon the digestive organs is also materially diminished.

SOOT AS A MANURE FOR POTATOES.—We saw a few days ago, a few miles from this city, one of the *finest fields of potatoes* that we have met with since the rot appeared some years since, and we are told by the intelligent occupier of the farm that the manure used was soot, and that he had tried it both with early and late potatoes with great success, the crop being large and very healthy. From another field, which had been manured with soot, one root alone produced eighty-seven potatoes, and the most of them good sized and perfectly sound, as all the rest of the crop were, some being forty, others fifty to each root.—*Gloucester Chronicle*.

CLOUTED DEVONSHIRE CREAM.—The milk being put into tin or earthen pans, of ten or twelve quarts, the evening's milk is placed next morning, the morning next evening, on iron plates, heated by a small stove, until the whole body of cream is formed on the surface, which being gently examined with the edge of a spoon or ladle, till small air bubbles, denoting the approach of a boiling heat, begin to rise; the pans are then removed, and the cream remaining on the milk till quite cold, is transferred into a churn or open vessel, and moved by hand with a stick about a foot long, and a peel of six inches diameter at the end. The cream before churning is the celebrated Devonshire cream; but the butter from it is found to separate more freely and sooner coagulate into a mass.

POETRY.

EARLY TO BED, AND EARLY TO RISE.

"Early to bed, and early to rise"—
 Aye, note it down in your brain,
 For it helpeth to make the foolish wise,
 And uproots the weeds of pain.
 Ye who are walking on thorns of care,
 Who sigh for a softer bower,
 Try what can be done in the morning sun,
 And make use of the early hour.

Full many a day for ever is lost
 By delaying its work till tomorrow;
 The minutes of sloth have often cost
 Long years of bootless sorrow.
 And ye who would win the lasting wealth
 Of content and peaceful power—
 Ye who would couple labour and health—
 Must begin at the early hour.

We make bold promises to old Time,
 Yet alas! too often break them;
 We mock at the wings of the King of Kings,
 And think we can overtake them.
 But why loiter away the prime of the day,
 Knowing that clouds may lour;
 Is it not safer to make life's hay,
 In the beam of the early hour?

Nature herself ever shows her best
 Of gems to the gaze of the lark,
 When the spangles of light on Earth's green breast
 Put out the stars of the dark.
 If we love the purest pearl of the dew,
 And the richest breath of the flower—
 If our spirits would greet the fresh and the sweet,
 Go forth in the early hour.

Oh! pleasure and rest are more easily found
 When we start through Morning's gate,
 To sun up our figures, or plough up our ground,
 And weave out the threads of Fate.
 The eye looketh bright, and the heart looketh light,
 And man holdeth the conqueror's power,
 When, ready and brave, he chains Time as his slave
 By the help of the early hour.

ELIZA COOK.

IMPORTANT DISCOVERY IN VENTILATION.—At a time when cholera, with an appalling voice, calls the most earnest attention to house ventilation, and dreadful explosions and loss of life in mines demand no less anxious efforts to devise means for the prevention of these calamities, we have much satisfaction in anticipating that human residences may easily be supplied with a conti-

nuous circulation of wholesome air, and the most dangerous subterranean works be preserved against accidents from foul currents or fire-damps. Dr. Chowne has enrolled a patent for improvements in ventilating rooms and apartments, of the perfect efficacy of which, we believe, there cannot be a doubt, and on a principle at once most simple and unexpected. Without going into details at present, we may state that the improvements are based upon an action in the syphon which had not previously attracted the notice of any experimenter, viz., that if fixed with legs of unequal length, the air rushes into the shorter leg, and circulates up, and discharges itself from the longer leg. It is easy to see how readily this can be applied to any chamber, in order to purify its atmosphere. Let the orifice of the shorter leg be disposed where it can receive the current, and lead it into the chimney (in mines, into the shaft), so as to convert that chimney or shaft into the longer leg, and you have at once the circulation complete. A similar air syphon can be employed in ships; and the lower holds, where disease is generated in the close berths of the crowded seamen, be rendered as fresh as the upper decks. The curiosity of this discovery is, that air in a syphon reverses the action of water, or other liquid, which enters and descends or moves down in the longer leg, and rises up in the shorter leg. This is now a demonstrable fact; but how is the principle to be accounted for? It puzzles our philosophy. That air in the bent tube is not to the surrounding atmosphere as water, or any heavier body, is evident; and it must be from this relation that the updraft in the longer leg is caused, and the constant circulation and withdrawal of polluted gas carried on. But be this as it may, one thing is certain, that a more useful and important discovery has never been made for the comfort and health of civilised man. We see no end to its application. There is not a sanitary measure suggested to which it may not form a most beautiful adjunct. There is not a hovel, a cellar, a crypt, or a black, closehole anywhere, that it may not cleanse and disinfect. We trust that no time will be lost in bringing it to the public test on a large scale, and we foresee no impediment to its being immediately and universally adopted for the public weal. We ought to remark that fires or heating apparatus are not at all necessary; and that, as the specification expresses it, "this action is not prevented by making the shorter leg hot whilst the longer leg remains cold, and no artificial heat is necessary to the longer leg of the air-syphon to cause the action to take place." Extraordinary as this may appear, we have witnessed the experiments made in various ways, from tubes from less than an inch to nearly a foot in diameter, and we can vouch for the fact being perfectly demonstrated. Light gas does descend the shorter leg when heated, and ascend the longer leg where the column of air is much colder and heavier.—*Literary Gazette.*

THE EFFECT OF CHARCOAL ON FLOWERS.—About a year ago, I made a bargain for a rose-bush, of magnificent growth, and full of buds. I waited for them to blow, and expected roses worthy of such a noble plant, and of the praises bestowed upon it by the vender. At length, when it bloomed, all my hopes were blasted. The flowers were of a faded colour, and I discovered that I had only a middling multiflora, stale-coloured enough. I therefore resolved to sacrifice it to some experiments which I had in view. My attention had been captivated with the effects of charcoal, as stated in some English publications. I then covered the earth in the pot in which my rose-bush was, about half an inch deep, with pulverised charcoal. Some days after, I was astonished to see the roses, which bloomed of as fine a lively rose-colour as I could wish. I determined to repeat the experiment; and therefore when the rose-bush had done flowering, I took off the charcoal, and put fresh earth about the roots. You may conceive that I waited for the next spring impatiently, to see the result of this experiment. When it bloomed, the roses were, as at first, pale and discoloured; but by applying the charcoal as before, the roses soon resumed their rosy-red colour. I tried the powdered charcoal likewise in large quantities upon my petunias, and found that both the white and violet flowers were equally sensible to its action. It always gave great vigour to the red or violet colours of the flowers, and the white petunias became veined with red or violet tints; the violets became covered with irregular spots, of a bluish, or almost black tint. Many persons who admired them thought that they were new varieties from the seed. Yellow flowers are, as I have proved, sensible to the influence of charcoal.—*Horticultural Review.*

SINGULAR HABITS OF MENAGERIE BEASTS.—A writer in a Cincinnati paper describing a midnight visit to the animals of Raymond and Waring's menagerie, in the winter quarters in that city, with Driesbach, the famous keeper, says:—"It was a sight worth walking ten miles." We found, contrary to assertions of natural historians, an elephant lying down. It has always been asserted that these animals sleep standing. The different caged animals were reposing in the most graceful and classical attitudes. The lion and the tiger, the leopard and the panther, were lying with their paws affectionately twined about each other, without regard to species and nativity. In cages containing more than one animal, it is the never failing custom for one to keep watch while the others sleep. The sentry is relieved with as much regularity as in a well regulated camp of soldiers, although not probably with as much precision in regard to time. The

sentinel paces back and forth, and is careful not to touch or do anything to arouse his comrade. Occasionally he lies down, but always with his head towards the front of the cage, and never sleeps until he is relieved. This singular custom, Herr Driesbach informs us, since his connexion with the menagerie, he has never known to be violated. Thomas Cart, who is now the night watch of the establishment, and who is also the oldest showing master in the United States, confirms his statement.

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Montreal, July 20th, 1849.

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THE Subscriber, who has been long known as a MANUFACTURER of THRASHING MACHINES, would intimate to Farmers and the Public generally, that he is now prepared to furnish MACHINES of a COMPLETELY IMPROVED MAKE, which are constructed with not only all the latest AMERICAN IMPROVEMENTS, but also with some important inventions of his own, by which much labour will be saved, less power will be required to drive them, and they will not so easily get out of repair; in short, he will warrant these Machines, and guarantee that they will, when tried, prove themselves far superior to any which have heretofore been in use in the Provinces. Apply at the Office of the Agricultural Society, or to

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Montreal, 7th June, 1849.

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WE, the undersigned, certify that we have carefully inspected a variety of Farming Implements manufactured by Mr. A. Fleck of St. Peter Street, and we feel great pleasure in recording our qualified opinion that they are very much superior to any article of the kind which we have ever manufactured in the country, and equal to any imported.

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Montreal, April 1849.

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