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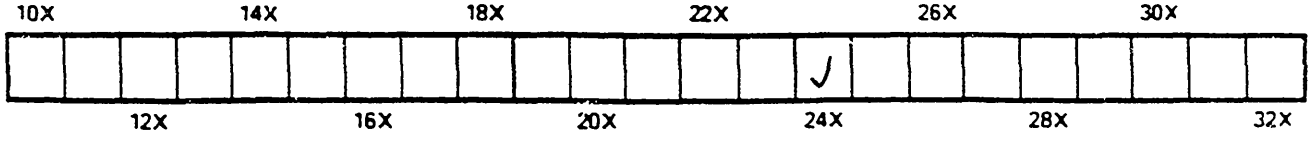

AGRICULTURAL JOURNAL,

AND

TRANSACTIONS

OF THE

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It is impossible to hide from ourselves the general depression of agriculture and every other trade and business in Eastern Canada, but it may not be so easy to understand the causes of this depression. In respect to agriculture, there cannot be any doubt that the principal cause is the generally defective system of husbandry, and the deficiency of wheat for the last fourteen or fifteen years, in consequence of the ravages of the wheat-fly. Previous to the appearance of this destructive insect, there were very few farmers who had not wheat to sell, and many of them a large quantity. Since 1834 or 1835, this resource was nearly cut off, and they have had flour to purchase for their own consumption, instead of having wheat to dispose of. Within the last few years the Black Sea wheat has been grown to a certain extent, but very trifling compared to the period when farmers were able to sow a superior quality of wheat, and immediately after the lands were clear of snow. The cultivation of the Black Sea wheat, the farmers look upon as a poor substitute for the favourable wheats they were accustomed to heretofore, although it is fortunate that they have this substitute. If there were no other cause for the general depression experienced at present, the loss of wheat for the last fourteen years would fully account for it, as we are convinced it amounted to not less than eight or ten millions of pounds currency to Lower Canada alone. If the country were now able to obtain this amount of money, in what a different position it would place every interest in Canada. It may be difficult to convince non-agriculturists that our present condition is mainly to be attributed to the deficiency in the value of our agricultural products for several years past; but the fact is not the less certain, and we may satisfy ourselves further that the country will never have more to expend than the value of her own products, whatever they may amount to. The most valuable benefactors, therefore, this country will ever possess, will be those who shall be the means of improving and augmenting our annual productions. Parties may propose many schemes to benefit the country, but they will all fail, unless supported by a prosperous agriculture, which must be the basis of general prosperity to the Canadian people, and should, therefore, obtain all possible care and attention before any other interest. We have no object in making these statements, except to induce others to consider a subject that has been so long neglected, and we feel satisfied, if the subject is duly considered until it is understood, others will have the same convictions that we have respecting it. Agriculture is despised because it does not appear to make returns to those engaged in it that would support a style of show and expenditure, equal to that which has been introduced in our cities and towns. The consequence is, that all other interests are likely to receive more attention and consideration than the despised profession of the farmer. It is, nevertheless, the farmers' surplus produce that must support the style and expenditure of almost every inhabitant of our cities and towns, and also the means of paying revenue for the support of our Government, Let us "begin at the beginning," and provide for the improve-

ment and healthy condition of our agriculture, as the main source of all the general prosperity we ever can enjoy. It is when adverse circumstances occur to the agriculture of the country that we feel the necessity of a thorough knowledge of the science and art of agriculture, to enable us to apply a remedy to counteract the effects of wheat insects or any other plague that may visit us. The loss of our wheat had something like a similar effect upon this country, to what the loss of the potatoes had upon Ireland, so far as wheat being our staple produce, and losing it, and we have since sustained the loss of potatoes also to a great extent. Can it be a matter of surprise, under these circumstances, that there should be a general depression? Certainly not, to any one who understands the real state of the case, and can attribute effects to the proper causes. We are not without hope, that as wheat was a chief means of support provided for mankind, there will ever be means of producing it. When land was first cultivated it produced abundantly without manure or much trouble, but in after years this land refused to give crops, and man had to apply a better cultivation and manure to produce crops. Had he, on the contrary, despondently given up and starved, there would not now, perhaps, be any human beings in existence. Draining, better cultivation, and selection of suitable varieties of wheat, might, we have no doubt, enable us to produce as good crops of wheat in Canada as we ever did. Experiments should be made continually to ascertain what is the best time of sowing—what the most suitable variety of wheat—and what the most proper mode of cultivation. Of course, farmers without means or skill cannot or will not make these experiments, and unless they are made by men of capital, who have or can pay for skill, or by the Government, we have not much hope that useful experiments will be made. The first capital that ever had existence was the surplus of produce of the land over what was consumed by those who cultivated the soil; but although this is undoubtedly the first source of capital, and must always continue to be the source of capital, yet it could never have had existence among those who commenced the cultivation of land, had there not been a spontaneous production of fruits or animals to support them while raising the first cultivated crop. Thus it is at the present day—farmers are frequently prevented from making improvements for want of means of support while engaged in these improvements until returns can be obtained. Most farmers could improve their lands by summer fallowing, but they think they cannot spare their land to remain idle for a year, or the labour required in fallowing properly. Our whole system is wrong, and we are thereby in a false position, and unable to help ourselves. We know that a remedy is possible, but those whose duty it is to apply it will not do so, and we may go on continually lamenting our condition, without adopting the necessary means to improve it. Until agriculture is estimated as the most important interest in Canada, and receives all the attention that its vast importance entitles it to, we have no hope that our circumstances will improve. It may be very plausible, that as we argue that agriculture is the source of capital, it should provide capital for its own improvement; so it would if the plan of "Associations of Agricultural Credit" were introduced, and allow farmers to create a capital that might circulate amongst them on the security of their land and improvements. This would be affording them something like the advantages that other interests possess. As we before observed, no cultivated crops could ever have been raised, had not the Creator given mankind a spontaneous production which supported our race while employed in cultivating the land, which would not otherwise produce sufficient for an increasing population. This was a species of capital to commence with. The better drainage and cultivation of a field, however certainly it might refund the expenditure, cannot be undertaken here without the means to do so. Men may have succeeded

in creating capital from their own labours alone, but we cannot depend upon this source for the general improvement of the country. All are not gifted alike with energy, industry and skill, to apply them, to enable them to create capital. When we know this to be the fact, we shall have to supply this deficiency in the most judicious way in our power, if we desire to improve the country, and augment the value of its productions. We have had many opportunities of seeing where a trifling amount of accommodation would have enabled the farmer to nearly double the quantity and value of his farm produce, and this would have acted as an encouragement to future industry and improvement. A well drained and properly cultivated field for even one year might be the means of improving the condition of a farmer so much, that ever after he might continue to advance in prosperity. It is most unjust to condemn, in all cases, the farmers for the backward state of their agriculture, when we know that improvement, in very numerous instances, is out of their power. It is our object to bring the state of agriculture, and the means of its improvement, under the consideration of the public, and endeavour to prove that it is a matter of importance to the people of Canada above all other subjects. We may not be able to convince others of the correctness of our views, but our own mind is so made up on the subject, that we shall never cease to advocate the principle, that a prosperous agriculture is the only means that can secure general prosperity to the people of Canada, and that this would secure it more effectually than if we were to discover, to-morrow, the richest mines of gold that ever existed on earth. The lands of Canada are a rich mine to those who can cultivate them skilfully, and without any check from the want of sufficient means. Our winters may be long and cold, but our summers make up for them by the rapid and luxuriant progress of vegetation. The average of our seasons is more favourable to agriculture than in the British Isles. If we had only the same amount of skill and capital employed that they have in Britain, agriculture in Canada would indeed be a different affair from what it is at present. Laws have been lately passed by the British Parliament to authorize landed proprietors to raise loans for the purpose of draining and improving their estates. When this was necessary in England, where there was so much capital, and agriculture in such a flourishing state, how much more necessary would accommodation be in Canada to effect improvement, when our lands are undrained, our system of cultivation most defective, and our stock of cattle of very inferior quality.

Before we conclude this article, we may advert to the subject of Model Farms, so well calculated to increase the capital of the country, or give it the very best capital, well instructed farmers, and farm laborers. Either of these would be equal to a money capital, and more useful, as, in addition to their own skill and what it would create, their example to others would be of great benefit to the country. The funds required to establish a Model Farm, conducted competently and judiciously, would be more usefully employed for Canada generally than any that have ever been granted for any purpose, except that for the sick and helpless. No one will deny that instruction is necessary for both farmers and laborers—the young in particular—and if a regular commencement were once made, it would prove what might be done. Colleges and schools are provided for other purposes that are not half so useful as Model Farms would be. We do not hesitate to say, that a well instructed farmer in the science and art of agriculture is not second in usefulness to any other man in this Province, no matter what situation he may hold. No wonder agriculture should lag behind all other professions, when it is so neglected, and when a large proportion of those who receive any education are disposed to despise it. It is only in Canada, however, that this is now the case, and this is the more surprising, with a population nine-tenths of

whom are agriculturists; but we hope a change will take place very soon.

REMARKS ON MANURES.

BY J. E. TESCHEMACHER.

[The following report and remarks were made by J. E. Teschemacher, Esq., at several meetings of the Legislative Agricultural Society, New York, during the month of January last.]

FIRST EVENING.

The important, vast, and almost inexhaustible subject of manures had always divided itself, in his mind, into three great considerations:—

1st; On the nature of the crops required to be raised.

2nd: On the nature of the soil from which these crops were to be obtained. And

3rd, and the most important: On the nature and application of the manure itself.

It was necessary to condense into the briefest form what he had to say on all these considerations.

Every one knows that if clover was wanted, a large quantity of lime, and also sulphur, was requisite; if tobacco, potash and soda. In England, after many years cultivation of wheat, all the barn-yard manure that could be heaped on the ground would not raise any more until bone dust was added, and with this many acres hitherto considered barren had given excellent crops. The size and quality of turnips have been found to be much benefited by the use of the soluble phosphate of lime (vitriolized bones).

One question then is, what does the crop we require abstract from the soil during its growth and progress to maturity? This question is answered by the various analyses of crops, which are to be found in every agricultural treatise. But another, and a much more important question, now arises—What part of the ingredients of these crops puts most bone and muscle in the animals which feed on them? Also, can we by particular manures increase in these crops the quantity of these ingredients? Part of the first question has been answered by Liebig's last treatise. We knew, before Liebig was born, that the bones of animals were chiefly formed of phosphate of lime: but we did not know, before the publication of this last treatise, that the phosphate of other alkalies formed essential parts of the flesh and blood of animals; this he has there completely and satisfactorily proved. In the lime districts in Switzerland the cattle are much larger than in those where lime is scarce in the soil. The great test of the quality of a crop then is, its nutritious action on the animal; this is of more importance than its appearance, or even weight. Now, it is evident that by offering as food to these crops a manure abundantly supplied with these ingredients, combined with others ensuring a luxuriant growth, we enable them to obtain a maximum thereof. It would take too much time to enter into the details of numerous experiments made by him on this subject; the result of them is a difference of thirty per cent. in these ingredients, dependent on the difference of the manure. Thus, if the *ashes* of wheat contain thirty-five per cent. of phosphates, the difference of manure will increase this to forty-five per cent. Hence, the consideration on the nature of the crops is of much interest.

Consideration on the nature of the soil.—All soils are composed chiefly of sand (silica), clay (alumina and silica), lime, magnesia, some organic matters, sources of carbonic acid, and a few oxides of metals; these ingredients in various proportions. The stones accompanying the soil have the same composition, and suffer annually some small disintegration; from such disintegration soils are formed.

Sand (silica), besides lightening too stiff a soil, is chiefly of use to strengthen and stiffen the stems of plants, enabling them to resist the wind; for this purpose, it must be dissolved by contact with an alkali (potash of soda). These are usually found in clay (alumina), which, as an ingredient of the soil, or of the compost heap, is invaluable, although it never enters into the organization of the plant. When the chemist analyzes a mineral containing alumina, it is almost impossible for him to wash it free from the alkaline substances which he has used in his analysis, or which were originally combined with it. It grasps and retains them with the most invincible obstinacy. Clay, in its natural, original state, is formed from the disintegration of felspar, and is therefore always combined with notable portions of potash and soda.

The president had spoken highly, but by no means too much so, of charcoal, as an absorbent of the useful part of manure—ammonia. He himself had experimented many years with this substance in various ways, and could amply confirm all the president had said. Clay appeared to him, however, more retentive than charcoal—certainly, more so as regards potash and soda—and may be had where charcoal is hardly to be procured. Clay, then, well pulverized by frost, is a most valuable addition to the compost heap; and a soil containing a fair proportion of clay may by manuring be rendered the most permanently rich of any. A light soil, besides permitting the ammonia to be drawn up into the atmosphere by the heat of the sun, also allows the valuable salts of the manure to be easily leached through by heavy rains: and a soil with too much clay does not permit them to mix freely, so that the roots of the crop can obtain easy acces to their nourishment. The farmer who studies the nature of his soil, while manuring liberally, will be able to manure much

more economically than one who knows nothing on the subject. It is probable that much of the labour and expense wasted in manuring some lands with lime and plaster, as well as many of the differences of opinion on these manures, have been owing chiefly to ignorance on this subject.

He had time only to allude to the third, yet most important consideration, the nature and application of the manure itself. In some parts of England, where much seed wheat is raised, and where seeds of vegetables and herbs are grown to a large extent, he had seen compost heaps as follows:—a layer of four or five inches of good loam and turf, then about eight or twelve inches seaweed carted up fresh from the beach, then an equal quantity of farm-yard manure, then loam again, and these layers repeated, until the mass was several feet high, the last layer being loam and turf. This is left eight or twelve months to decompose; is turned over and applied to the land. The grains raised are large, plump, beautiful, and heavy. Now, here the ingredients are, clayed loam to absorb, seaweed containing soda and a good proportion of the phosphates, and the barn-yard manure, which, besides its soluble salts, contains ammonia; its solid parts are, by fermentation, converted into charcoal and humus, which absorb the ammonia, and preserve it for the use of the crops; the whole mass being well protected by an ample covering of turf and loam. Here, then, is not only nearly every ingredient the plant requires, but also the storehouses of alumina and charcoal, from which it fetches its food, as wanted. He alluded to a discussion on the subject, whether manure was better used in a green state or after it had been kept a year or more, and had become a black saponaceous mass. The question appeared to be settled in favour of this latter state, and this agreed with his own experience. If a manure heap be fermented under a good cover, it is converted into a black, carbonaceous mass, containing nearly all the ammonia, condensed in its pores, and is a most powerful manure.

SECOND EVENING.

He wished now, in the most concise manner possible, to give his ideas on the separate value to vegetation, of some of the ingredients of manures—and here, as before, he would omit all detail of the various experiments on which he had formed his judgment, merely offering these remarks on his own opinions on this subject, which, however, he could not help considering of much importance.

Ammonia he considered as the great promoter of luxuriant growth of stem and leaves; by its means a large surface of healthy dark-green vegetation is produced, which, exposed to the action of the atmosphere and light, matures the various juices, such as gum, starch, sugar, &c., contained in the plant. But all the ammonia which can be got into a crop, unless there be also abundance of the phosphates, sulphates, and other inorganic substances, will give nothing but a worthless vegetation, and no grain of value. Those who have raised crops by the application of nitrate of soda alone, unless the soil contained of itself a sufficiency of these inorganic salts, have found that, however beautiful they appeared when green, they were comparatively of little value when dried.

So with trees: superabundance of ammoniacal manure will give beautiful looking, thick, long shoots; but they will be spongy, long-jointed, and will neither bear fruit in quantity or quality at all resembling those which are manured with abundance of inorganic salts combined with the ammonia. In these latter the shoots are hard, very short-jointed, and full of fertile blossom-buds; the fruit also has a much better flavour, although perhaps, not quite so large as the other. The reverse of this is also true, that inorganic salts alone, without ammonia to give a healthy breadth of vegetable surface to the maturing influences of the light and air, will afford nothing but barrenness. This he had repeatedly proved, and preserved specimens of various growths. It seems very easy to comprehend that, if a tree or other plant has all the requisite ingredients to feed on, as soon as the light and air induce in the juices the necessary changes of ripening, a bud [blossom or otherwise] is formed, vegetation proceeds; in another short space, another bud is formed. Now, if one or other of these ingredients is insufficiently supplied, vegetation must go on, until from this niggardly supply sufficient thereof is obtained to form a bud. Ammonia increases the vegetable growth rapidly, and this continues until sufficient inorganic salts are procured thereby to form first a leaf-bud, or, if more is procured, a blossom-bud; if in forming a blossom-bud these salts are exhausted, leaf-buds will next be formed, until the supply is again obtained for blossoms. He had made many experiments with flowers and their seeds, which appeared to him to confirm these views thoroughly, but still he merely offered them as his own individual opinions

Dr. Krocker, in Giessen, had analyzed many soils, some from the western parts of this country; in all he had found large quantities of ammoniacal salts, in some as much as eight thousand pounds to the acre, twelve inches deep. From these experiments an opinion had prevailed, and was now held by many, that it was quite unnecessary to put ammoniacal manures on the soil. Now, theory alone, unless confirmed by practice, was not only useless but injurious. Large quantities of inorganic salts were prepared in England, with exact instructions from Liebig, under the idea that they alone were necessary to produce luxuriant crops; but they

had failed in every instance of application. And nearly all the artificial manures there manufactured—and it was now a large business—contained ammonia in some shape or other. It is, however, not to be doubted that large quantities of ammonia came down with the rain and snow, when these fall heavily, some portion of the ammoniacal salts are washed down below the influence of the heat of the sun, and thus become permanently stored in some subsoils; these, when brought to the surface by the subsoil plough, exhibit very luxuriant crops. The ammonia, however, of moderate summer rains, is either used by the crops, or is raised from the surface by evaporation, to return again in the next shower. The variations of soils and circumstances, however, had led him not to trust implicitly in any general scientific theories, unless confirmed by very numerous and very well authenticated experiments.

THIRD EVENING.

At the period of the commencement of the application of science to agriculture, the scientific calculation was as follows:—If the farmer sells annually the produce of his farm, say hay, grain, butter, cheese, calves, hogs, &c., he carries from that land more produce than he can restore to it in the shape of manure from his own farm; and the land must be soon exhausted, unless he buys manure—and the calculation appeared very fair. But practice, as well as theory, had shown it to be erroneous. He had not only to refer to the lucid and interesting statement of the Hon. Mr. Brooks, to show that even with the sale of his produce he had increased his manure to superabundance. How had he done it? He had carefully saved every particle of urine and fæces, and all rubbish and offal on his premises; and, to mix with and absorb this, he had carted loads of stuff from his peat-bog. Now this peat muck, called by chemists under various names, as geine, humus, coal of humus, vegetable mould, is, as far as regards agriculture, *charcoal*—the absorbent, the storehouse of ammonia. Mr. Brook's next process is to pare his meadow, burn these parings, and mix them also with the urine and fæces. Now here is another storehouse, both of ammonia and of inorganic salts; and nothing is lost, as it used to be—all is stored up for use. Every horticulturist who has grown plants in garden-pots, which are nothing but burnt clay, the same as Mr. Brook's burnt parings, knows that the roots of plants leave the soil in the centre of the pot, and push for the sides of the pot itself, and why? Because the salts, dissolved by watering the plants, have been absorbed by the burnt clay, and there the plants go to find their nourishment. These storehouses also absorb the ammonia which comes down in rain and snow, as well as the inorganic salts arising from the annual disintegration of stones and rocks.

A preference has been stated for plaster, as an absorbent of ammonia, because plaster is a manure, which charcoal is not. Plaster may be, and in some cases (not the majority certainly) is, a manure; by the absorption of ammonia, it becomes sulphate of ammonia and lime. Now one hundred parts of sulphate of ammonia contain about sixty parts of sulphuric acid, not very advantageous to vegetation, about twenty-six parts of ammonia, and about fourteen parts of water. Charcoal can condense in its pores about ninety parts in bulk of ammonia. Plaster is an excellent material to strew in stables where many horses are kept, as it destroys all noxious effluvia, and it is then unquestionably a good manure, but it appears far inferior to charcoal as an absorbent; and certainly where plenty of peat muck exists, it is bad economy to purchase it for this purpose.

The notes read by Mr. Newhall, of his observations on his manure composts, are very interesting. If every agriculturist would make such notes, and place them where men of science could have access to them, they would be soon classified, sifted out, and compared. This would unquestionably lead to generalizations of some importance to agriculture.

A desire, in which every one must cordially join, has been expressed for definite experiments in agriculture. In order to have definite experiments, however, it is necessary to work with definite compounds, and this, with the immense diversity of soils, although not absolutely impossible, is difficult. A farmer may year after year, add sea-weed to his manure composts, and always produce excellent crops; if to spare labour or expense for one year, he omits this ingredient, he may still have as good crops—nay, even a second year; then, from this, which he considers a *definite* experiment, he will conclude seaweed to be of no use. The third year another may be in possession of the farm, and having heard of seaweed, determines to try it on half the land, the other half without. From that half manured with sea weed he obtains much better crops than from the other, and he concludes from this *definite* experiment that seaweed is a valuable manure. Now, the probable truth would be, that, from the seaweed put on, there had been a superabundance of phosphates and other inorganic salts, enough to supply the crops for the two years, and that then a fresh addition of them was required. No doubt this case often occurs in the application of lime and plaster, and has caused so much diversity of opinion.

But definite experiments, though difficult, are not absolutely impossible; for instance, that stated by the president, at Sandusky, Ohio, where, on a breadth of twenty or thirty acres, fifty bushels charcoal were spread, per acre, on land hitherto barren, with intervening spaces, where none was used. The spots with charcoal gave

from twenty to twenty-five bushels wheat per acre; those without, from three to five bushels per acre. There is, however, one definite experiment of the utmost importance to be tried; it is the experiment of establishing agricultural schools, and experimental farms throughout this vast and flourishing agricultural country. What is the reason why youth pant after commerce or the learned professions? It is because they require the exercise of the utmost energy of the mind, and this exercise is precisely what youth demands; the want of it drives them into all kinds of foolish excesses; for the desire for it is invincibly strong and will be gratified. Now, is it not possible to divert those energies of the mind to the successful pursuit of agriculture? The experience of other nations answers, yes; but only by a preparation of a previous suitable education of the first order. Young men generally consider a farmer as a mere machine, a plough, a cart, or a hoe, with nothing to do but what their fathers did before them. Will these ideas apply to any other industrial pursuit, or any other profession? Had they been so applied, the railroad, the steamboat, the electric telegraph, had still been unknown—as long as these ideas exist amongst them, so long will the best of our agricultural population flock to the cities, and many a fine mind be irretrievably lost.

THE FOOD OF FARM HORSES.

There is perhaps, hardly any branch of the economy of husbandry in which greater variations occur than in the feeding of farm horses. It is also not seldom, that in the necessary variation of their food great mistakes are committed. It is true that the market value, more than other circumstances, must often regulate the mixture of the food; but then how often is that food given to the horse without any accurate calculation as to its nature, and its nutritive powers. It is also certain that the horse soon feels the effects of such errors, that his altered appearance or his inability to properly perform his work, speedily warns his owner of the error he has committed; but that warning is merely a means of escaping further and needlessly incurred danger. The question of the requisite composition of the food of the horse has been carefully and laboriously pointed out by Professor Lyon Playfair, and still more recently by Mr. W. C. Spooner, in a valuable prize essay (Jour. R. A. S., vol. 9, p. 249); and in examining some of the results of their labours, we are assured that we could not, perhaps, direct the attention of our readers to a more valuable or a more practical theme. It is true that these involve some chemical details, but this is a certain advantage, since we can hardly ever rest upon a more secure foundation.

"Food," observes Mr. Spooner, "it is well known, consists of two kinds, one carboniferous and devoid of nitrogen, whose use it is to keep up the animal warmth; the other kind possessing nitrogen, and thus supplying the muscular system with the requisite nourishment The usual forms of the latter are albumen and gluten; those of the former, starch and sugar. It is essential, therefore, that the food of the horse should contain both these classes of elements. Unless the nitrogenised elements are supplied, the expenditure of muscular vigour cannot be replaced; and unless the carboniferous portion is furnished, there will not be sufficient fuel to keep up the animal temperature. We must therefore endeavour to ascertain how far the various articles of horse provender supply the essential ingredients required by the system. Now, according to Professor Johnston, and other good authorities, the following little table will represent the nutritive qualities, in 100 parts, of the various articles used for horse food:—

Articles of food.	Water.	Husk or woody fibre.	Starch gum, and sugar.	Gluten, albumen, &c.	Fatty matter.	Saline matter.
Oats	16	20	45	11	6	2.5
Beans	14	8 to 11	50	26	2 5	3
Peas	14	9	50	24	2.1	3
Indian corn	14	6	70	12	5 to 9	1.5
Barley	15	14	52	13.5	2 to 3	3 3
Meadow hay	14	30	40	7.1	2 to 5	5 to 10
Clover hay	14	25	40	9.3	3 to 5	9
Pea straw	10 to 15	25	45	12 3	1 5	4 to 6
Oat straw	12	45	35	1.3	0.8	6
Barley straw	12 to 15	0	30	1.5	...	5
Carrots	85	3	10	1.5	0 4	1½ to 2
Swedes	90	3	14	2	0 3	5
Linseed	9.2	8 to 9.2	35.2	20.3	20	6.3
Bran	13.1	13.1	2	19.3	4 7	7.3

"From the table," continues Mr. Spooner, "it will be perceived that the nutritious part of food consists of three portions—the nitrogenous or flesh making elements; the fat; and the gum, sugar and starch. In estimating the relative value of horse food let us consider separately the value of each of these kinds, and in so doing take clover hay as the standard of comparison. Clover hay then consists of—

Starch, gum, and sugar..... 40 lbs.
Fat..... 4
Albumen, &c..... 9

Making of nutritious elements 53 parts in 100. If we value these 53 lbs. at 1d. per lb., we shall find that it will bring the value of the hay to 4s. 5d per 100 lb., or £5 per ton, which is pretty nearly the truth for the best hay. It does not, however, seem fair that the starch, &c., should be valued so high as albumen, as if we seek for a larger proportion of the latter in any food we are obliged to pay a higher price for it. Let us therefore assume that the value of albumen is 50 per cent. higher than that of starch; and as fat is also a rare and costly product, and of much value in food, I shall place that at the same rate as albumen, so that estimating in this way we

bring the hay to £5 12s. 6d. per ton. It must be borne in mind that the amount of nourishment extracted from hay varies extremely with the digestive powers of the horse, for whilst some with great digestive powers will extract the greater part of the nutriment, in others, with weaker capabilities, not more than one-half will be assimilated. All herbiverous animals, however, require a tolerable amount of bulk in their food so as to distend the stomach and bowels to a certain degree, by which the digestive processes are properly carried on; so that whilst a horse can not only exist but perform a moderate amount of work with hay only, he could not do so if kept entirely on oats and beans. If a horse is to be kept in idleness it is no doubt cheaper to feed him on hay alone, for he will be able to eat a sufficient quantity, so as to extract from it the requisite amount of nutriment. When, however, he is called upon to work he requires at least double or treble the proportion of the muscle-making elements of food; to obtain which, if hay was his only diet, he would require far more than the power of his digestive organs would dispose of, besides which such a mass of food would produce such mechanical pressure on the chest as to obstruct respiration, and would also demand a much greater amount of nervous energy to be devoted to the functions of digestion than he would be able to supply, for the less concentrated the food the greater is the demand on the digestive functions. When labour therefore is required we must have recourse to more concentrated food, though we shall have to purchase it at a dearer rate. The food principally used for this purpose in this country, and which appears to agree best with the constitution of the horse, is oats. Now if we refer to the analysis of oats we find that in 100 parts there are contained, of

Starch, &c	46 lbs.
Fat	5
Albumen, &c	11

We may consider the value of oats to be about 3s. per bushel weighing 37 lb., or 3s. 4d. per bushel if of 40 lb. weight, which will bring the cost of 100 lb. to nearly 8s., then if we value the constituents at the same ratio as in hay, we find—

				s.	d.
Starch, &c.		46lb. at 1d.		3	10
Fat 5lb. / Albumen, &c., 11	16	at 1½		2	0

Which sums will be insufficient. If, however, we add one-third—1s. 11d.—we have 7s. 9d., or nearly sufficient. Thus it appears that the nutriment contained in oats is one-third dearer than that in hay, to compensate for which extra expense, the food is more concentrated, easier of digestion, and its nutritious properties consequently likely to be *more perfectly extracted.* Again, with regard to beans we find that 100 parts contain of—

			s.	d.
Starch	40lb. at 1d.	...	3	4
Albumen, &c., 26lb. / Fat, &c., 2½	28½ at 1½d.	...	3	6¾
Together amounting to			6	10¾
It will therefore be necessary to add ¼ or			1	8¾
Making together			8	7½

For we find that one bushel of beans, weighing 64 lbs., is worth on an average—

	s.	d.
At 44s. per qr.	5	6
37 lb. more, ...	3	1
Making altogether, ...	8	7

for 100 lb. of beans. So that it appears that though the nutriment contained in beans is one fourth more than that contained in hay, yet when the flesh-making constituents are required, it is a somewhat cheaper source than oats, and still more concentrated. If, however, beans are given very freely they have a very heating, or stimulating effect; the blood abounds too much in fibrine, and inflammatory swelling of the limbs and absorbent vessels occur, so that the beans require to be given with moderation and caution, and are principally of advantage where horses are severely worked, in which case they are given with advantage in combination with oats, and in the proportion of one-third or one-half the weight of beans. When oats are very dear, and beans are moderate in price, there is, of course, a disposition to substitute the one for the other, and it is thought that if combined with bran their injurious effects may be obviated. This, however, is the case only to a certain extent; beans are very astringent in their nature, whilst bran, from its mechanical effects, is relaxing, and so far these substances supply each other's deficiencies; also with regard to fat, with which bran abounds and beans are deficient. In other respects beans and bran closely resemble each other, both abounding with albumenous elements, whilst beans, as compared with oats, are deficient in starch, &c., and in bran scarcely any exists—so that these two substances are not capable of supplying each other's deficiencies. The writer of this experienced this fact during the last year, when, in consequence of the excessive price of oats, he endeavoured to substitute a bushel of beans and a bushel of bran for two bushels of oats, but it was soon found that the horse did not do so well on this diet.

"All food then," remarks Dr. Playfair (Jour. R. A. S., vol. 6, p. 560), "has two distinct purposes—the formation of flesh, and the sustenance of animal heat. The substances in vegetables destined for the formation of flesh are perfectly identical with it in composition, and are known by the names of gluten, albumen, fibrine, or casein; those which are suited for the

support of animal heat are not all similarly composed to flesh, and consist of starch, gum, sugar, &c. Knowing these facts, it becomes a money question as to the value of particular kinds of food for the support of the frame. We know how much of flesh-giving principle each variety of food contains, and therefore we can at once estimate how much of each it will be necessary to consume to obtain one pound of real nutriment, and what the cost of that pound will be to the consumer. The following table is constructed on this principle, but as prices vary in different localities, these may be altered to suit the peculiar case: in the table they are given at the rate at which the respective substances might be purchased in London, under favourable circumstances—

Quantity of food necessary to produce one pound of flesh, and the money-cost of its production.			s.	d.
25 lb. of	milk furnish one pound flesh, and cost	...	3	1
100 "	turnips "	...	2	9
50 "	potatoes "	...	2	1
50 "	carrots "	...	2	1
4 "	butcher's meat, free from fat and bone, furnished one pound of flesh, and cost	...	2	0
9 "	oatmeal "	...	1	10
7 1 10 "	barleymeal "	...	1	2
7 4-10 "	bread "	...	1	2
7 4 10 "	flour "	...	1	2
3½ "	peas "	...	0	7
11 9-10 "	beans "	...	0	6½

In the same way Professor Playfair valued the carbonaceous, or heat-producing portion of food of animals. He adds in a subsequent page—"Let us look at the various kinds of food with reference to their value as fuel, and we shall perceive that the potatoe takes its proper rank. Such a table as the following is, however, a mere rough approximation, for the carbonaceous matter or fuel is of very various kinds, and some of them give more heat than others by their combustion. The table, therefore, must only be taken for as much as it is worth—a rough approximation to truth.

"This table attempts to show the approximative value of various kinds of food fuel to sustain animal heat.

			s.	d.
4 lb. of	potatoes contain 1 lb. of carbonaceous fuel, and cost	...	0	2
10 "	carrots "	...	0	2
1½ "	flour "	...	0	2 8-10
1¼ "	barley meal "	...	0	3
11 1-10 "	turnips "	...	0	3¾
1½ "	oatmeal "	...	0	3¾
1 9-10 "	beans "	...	0	3¾
1 9-10 "	peas "	...	0	3 8-10
2 "	bread "	...	0	3
11 9-10 "	milk "	...	1	5"

The owner of live stock may, we feel assured, often refer with advantage to the results of these laborious examinations into the nature of food, and the varying demands of animals which that food is called upon to satisfy. It is needless to repeat, that practice will often find these things out by a different mode, but the practice of that farmer will assuredly be the most safe and the most profitable who best understands the true objects for which he is striving. That knowledge, by the aid of the chemist is not only rendered more certain, but by his help we are still further advanced; since we not only perceive the nature of the nutriment required, but we further find out the kind of food from which it is for our purpose the most economically obtained.—*Bell's Weekly Messenger.*

PHILOSOPHICAL ESSAYS

(Written for the Irish Farmer's Gazette.)

BY JACOB THOMPSON DUNNE, CULLENAGH, MARYBOROUGH.

ESSAY I.—THE ATMOSPHERE.

"If I were to tell you what I mean by the word *air*, I may say it is that fine matter which we breathe in and breathe out continually, or it is that thin fluid body in which birds fly, a little above the earth; or it is that invisible matter which fills all places near the earth, or which immediately encompasses the globe of earth and water.—Watts' Logic.

Air is a French word, derived from the Greek *aer*, or *aemi*, to breathe. The term *air*, in its common signification, means that compound of aëriform fluids by which our atmosphere is constituted.

The ancient philosophers were very ignorant respecting the nature of air, and so were the modern till chemical experiments unfolded its component parts. Aristotle, *Lib.* 2, *cap* 2, *de Generatione et Corruptione*, defines air as *Elementum calidum et humidum*—that is, *a hot and moist element*; a later writer calls it, *liquidum et siccum, liquid and dry.* Quintus Lucillius Balbus, a noted Stoic philosopher, maintains, *aeram ex respiratione acquarum oriri*—that is, *that air arises from the steam of water.* Cicero, *Lib.* 2, *De Nat. Deor. quasi vapor quiedum, aer nabendus est*—that is, air is to be considered as a kind of vapour. Cartesius asserts, that it consists of very thin filaments, which appear to float in æthereal substance, *ex paribus, longe tenuoribus, quasi filamentis, quæ in ætherea substantia fluitare videntur. Princip. 4 Par N.* 45, *and Institut. Philos. vol.* ii., *c.* 11, *p.* 172. Plutarch and Stobæus quote Aristotle, as maintaining air to have weight. Aristotle himself says, Empedocles was of the same opinion, and that he remarked that its heaviness forced it into our lungs, and caused our respiration; the same were the sentiments of Asclepiades, as we learn from Plutarch.

Among the moderns Galileo, and his disciple, Thoricelli, in 1643, proved the ponderosity of air. Messrs. Pascal and Petit, in France, continued the investigation on the Torricellian principle of the pressure of the air; several experiments confirmed it; and the barometer was invented, which shows by the rising and falling of its contained mercurial fluid, a corresponding change in the density of the atmosphere: at the surface of the earth; the mean density or pressure of the air is equal to the support of a column of quicksilver thirty inches high; the air becomes lighter the higher we ascend in it, so the higher the barometer is taken up the more quick-

silver will necessarily fall; it sinks about the tenth of an inch for every 100 feet we ascend, or one inch for about 330 yards. By this means the height of mountains is easily ascertained by the barometer; Pascal, about the year 1647, was the first who discovered it; and it is now generally known, that at 1,000 feet above the surface, the Mercury falls to 28.91 inches in the barometer—

	Inches.
At 2,000 feet it falls to	27 86
" 3,000 "	26 85
" 4,000 "	25 87
" 5,000 "	24.93
" 1 mile it falls to	24.67
" 2 "	20.29
" 3 "	16 68
" 4 "	13.72
" 5 "	11.28
" 10 "	4.24
" 15 "	1.60
" 20 "	0.95

Air, by means of its elastic quality, expands and contracts; at 3½ miles above the surface of the earth, it is twice as rare as at the surface; at 7 miles it is four times rarer, and so on, according to the following table, viz.:—

At the altitude of	Miles above the earth's surface, the air is	Times lighter than at the earth's surface.
3½	2	
7	4	
10½	8	
14	16	
17½	32	
21	64	
24½	128	
28	256	

At 500 miles above the surface of the earth, a cubical inch of such air as we breathe would be so rarified as to be capable of filling a hollow sphere, equal in diameter to the immense orbit of the planet Saturn. Were the air in all places above the earth equally as dense as at its surface, it would not be above 5½ miles high.

The elasticity of the air is a quality distinct from its density, or it is, as it were, opposed to it. The greater the density, the greater the elasticity; action and reaction must balance one another—that is, the gravity of the air and its elasticity or expanding quality, will prove equal. Dr. Hales, by means of a press, condensed air into 38 times, and afterwards into 1,551 times less space than that which it naturally occupies.

Dr. Halley, from his experiments at London and at Florence, says, that it is impossible to reduce air 800 times less than its usual bulk or volume; however, Mr. Boyle dilated air 13,679 times its natural space, without the aid of fire.

It is even stated that the air we inspire is compressed, by its own weight, into the 13,679 part of the space it would occupy *in vacuum*. The compression and expansion of air is almost incredible; all the air in St. Paul's Cathedral could be compressed into a nutshell; and what would fit in the eye of a needle, could be made to fill a house. But although air is thus capable of great condensation and expansion, yet still it cannot ever be so compressed as to be congealed as other fluids may: no degree of cold has ever been able to destroy its fluidity.

MANAGEMENT OF CATTLE.

NO. II.

LINCOLNSHIRE BREED.

The Lincolnshire short-horns are coarse about the head and horns, large boned and high on the leg; the loins and hips wide and rugged; their colours are frequently black, blue, dun, and black and white; they are not in much favour in the London markets. They are great consumers of food, and carry a bad description of flesh. They have been considerably improved of late, and the colours now generally seen are red and white; but in the neighbourhood of Folkingham a few duns may be found, this colour having been introduced some years back by Sir C. Buck, of Hanby Grange. Fine herds of the improved short horns are now found in some parts of Lincolnshire.

THE SHORT HORNS, OR HOLDERNESS BREED.

This breed about ninety years ago turned out the long horns. They have large shoulders, coarse necks, and deep dewlaps, but have been much improved of late by crossing with the improved short-horn. The short-horns, as they are called, are a mixture of the Holderness or Teeswater, and they are in great request for the London dairies. The colours should be red or white, or the two combined into a roan or strawberry. They are remarkable milkers, consequently the most essential part is the udder, which is larger in proportion to the animal than in most other breeds. It should be sufficiently large and capacious, broader and fuller before than behind, but not too thick lest it becomes overlaid with fat: the teats should be of a good size, but not too large, placed at equal distances; milk veins large.

The quantity of milk given by some of these cows is truly astonishing; some of them given as much as 32 quarts per day. At the same time their milk does not produce as much butter in proportion as many other breeds. I have always been of opinion that this breed are great consumers of food, but others differ with me in opinion; but when compared with Teeswaters it will be found so in nine cases out of ten.

THE TEESWATER, OR IMPROVED SHORT-HORN BREEDS.

This splendid breed is the pride of Britain and the envy of foreigners. Why should it be otherwise when there is none to compare with it in point of value, early maturity, and perfection of form. Let the objector view the splendid herds of Messrs. Booth of Killerby and Walerby, which are undoubtedly the first in Britain, though others may be more extensive; no breeders have been more steady and persevering in obtaining the enviable situation they enjoy. I have no interest in flattering those gentlemen, but justice demands the assertion; and their success as public exhibitors proves it.

The counties of Durham and York, particularly

the former, have been celebrated for their Teeswaters; and near a century has now elapsed since the cattle on the banks of the Tees took the lead, having assumed a very different character from those described as short-horns; this improved breed is generally called the Teeswater or Improved Shorthorns.

Their early history is involved in much obscurity; as few of the successful breeders will disclose the secrets of their success, and clothe their proceedings in as much mystery as possible. It is generally believed that they arose from the best breed of the district, and by some means or other obtained a cross of the *white wild breed*, which accounts for the great number of self whites found among them. I do not believe that this has been the case; I think that the black tipt horns would have shown themselves, as well as the red tipt ears; the two leading characters of the white wild breed.

Others assert that the native breed was crossed by the bulls which were imported from Holland.

The first improvers were Sir William St. Quintin and Mr. Milbank, of Birmingham; but it was left to Mr. Charles Collins to complete the task.

Few men were better able to perform the task, possessed of excellent judgment, great perseverance and industry; careless and independent of public opinion, he carried out his views, at the same time was always disinclined to throw any light on his proceedings.

There is very little doubt that the bull Hubback was the animal that did his stock the most good; but his title to purity of blood is very doubtful, as he was bred by a person of poor circumstances who grazed his stock on the highways. It is right here to observe that Mr. Waistell, of Alihill, was the first to discern the merits of Hubback, and purchased him under a year old, for £8. He afterwards became a partnership concern with Mr. Robert Collins, who afterwards sold him to Mr. Charles Collins, who reserved him exclusively for his own herd.

Hence all our "improved shorthorns" trace, or profess to trace, their pedigree down to Hubback, as our racehorses trace their's down to the Godolphin Arabian.

Mr Collins tried several crosses to improve the the breed, and that with the polled Galloway proved of the greatest benefit. Many of the possessors of pure herds ridiculed the idea, but he determined to pursue it, and the result of his sale a short time afterwards satisfied the breeders of the correctness of his system. It appears from one of the catalogues of the sale which I have now by me that—

	£	s.	d.
47 Cows were sold for	2802	9	0
7 Heifers	942	18	0
5 Heifers Calves	321	6	0
11 Bulls	2361	9	0
7 Bull Calves.	687	15	0
77 in all.	£7115	17	0

At this sale the bull Comet, 6 years old, was sold for 1000 guineas; and at the same time the cow Lady, from whence sprung this improved breed, was sold for 216 guineas, at 14 years old; her two daughters, Countess, aged 9 years, for 400 guineas, and Laura, aged 4 years, for 210 guineas; and her two sons, Major and George, the former aged 3 years, and the latter a calf, fetched respectively 200 and 130 guineas. Thus Lady and her family of four produced 1146 guineas, which was considerably more than any other family obtained, which clearly proved that the contamination with Scotch blood was not detrimental, and the ALLOY, as they were termed, of the most value.

At the sale of Mr. Robert Collins, which took place eight years afterwards, 62 head of cattle sold for £7,853, which clearly proved the estimation in which these breeders' herds were held.

It is generally believed that the "Improved Short Horns" were first brought into notice by the production of the "Durham Ox:" this ox was the produce of a common cow, by the celebrated bull Favourite; and clearly showed what a single cross of improved blood would effect.

Mr. Collins sold him, at 5 years for £140, in February, 1801, to Mr. Bulmer, (his weight being computed at 216 stone, 14lb. to the stone,) who travelled with him five weeks, and sold him with his carriage for £525 to Mr. John Day. On the 13th of June, the same year, Mr. Day refused £1,000 for him, and on the 8th of July, £2,000. Mr. Day travelled with him nearly six years, when an accident happened which obliged him to be slaughtered.

The extraordinary animal, known by the name of the Lincolnshire ox, bred by Lord Yarborough, was a pure Improved Short Horn, both on the side of the dam and the sire.

The Teeswater has a head small in proportion, but rather long; horns short, fine and crumpled; neck rather thin, expanding as it approaches the shoulder; breast wide, projecting before the legs; dewlap rather small; ribs well filled up to the loins, giving rather a globose appearance; depth behind the shoulders great; hips broad; rump rather long; tail thick and tapering; thighs rather thin and slightly bent; legs short, bones small in proportion; eye bright, with a peculiar quiet expression; *nose white*; colour self red, or self white, or red and white often broken into the most beautiful roan or strawberry, the colours being of the brightest description: any other colour proves impurity of breed;—skin rather thin; hair fine, short, moss-like; flesh *mellow*, and of the best description; constitution good.

To these may be added a great aptitude to fatten, and much earlier maturity than in any other breed.

The early maturity which this splendid breed attain, has been the admiration of all lovers of stock; early maturity is, as the late Rev. Henry Berry observes, "the grand and elevating characteristic of the improved short-horns and their

capacity to continue growing, at the same time attaining an unexampled ripeness of condition at an early age, has excited the wonder and obtained the approbation of every looker-on not blinded by prejudice."

Many persons maintain that the Teeswaters are large consumers of food. In some instances this may have been true; but on an average I do not believe they are: there is no other breed that will make such good use of what they consume, and in so little time.

As milkers they are above an average; and some particular herds are celebrated for this property. I have been connected with breeding these animals all my life, but never considered them the best dairy cows.

It must be admitted that the Teeswaters are rather tender animals, and require much attention and care. (but none pay better for the extra trouble.) How should this be otherwise? They are the handiwork of nature's journemen; and as dame nature never produced anything of the kind herself, she has left the management of their productions to those that formed them. They require warmth and dry layers; at the same time, when their artificial character is taken into consideration, few breeds suffer less from disease than the Teeswaters.

This breed are universal intruders on all other breeds of cattle, and are fast treading on the heels of the far-famed Herefords. They are in universal estimation, and found in almost every county in Britain; much sought after by our continental neighbours; and to my surprise, during my travels in Australia and New Zealand in 1836-7, I discovered them there and duly appreciated.

A SUBSTITUTE DUNG-HEAP.

But while such effects are produced, as farmers will hardly believe, by a good proportion of green crops and economising the essence of manure, instead of allowing it to run waste and be washed out by the rain: still dung is heavy carriage; and there are out-lying distant fields, hilly and rough roads, and a variety of other cases, where it would be convenient to the farmer to have a cheap compost made on the spot capable of answering the purposes of the dung-heap, without the charge of carting from the homestead; and of helping it out where deficient. 1. The basis of such a compost must of course be vegetables collected on the ground; but as vegetables ferment sour, there must be lime to correct the acid; and as there will be roots and seeds of weeds, they must be killed by the salt. 2. Sods and turf, from hedges, ditches, and headlands, will also carry in vermin; but they and their eggs will be killed by the salt and lime. 3. The potass and salts required for vegetable growth will be well supplied in the vegetable matter; but the phosphates, for encouraging seeding and bulbing, will be deficient, and must be supplied by bones, either in the compost or at the time of sowing. 4. And while the substance of the heap is constructed of these materials, ammonia, or nitrogen in some form is necessary, to give it the activity of good dung; and the great point is to effect this by the cheapest and readiest means.

1. Of the vegetable matters, to form the basis, it may not be altogether superfluous to remind the farmer of roots harrowed up, hedge clippings, fallen leaves, weeds, fern, heath, moss, rushes, vegetables growing in and on the banks of pools and streams, and sea-weed when at hand; in fine, every sort of vegetable substance, leaves, stalks or roots, burning none, except in extraordinary cases.

2. Then seeds and turf from hedges, ditches, and headlands, and paring of the soil; sawdust, spent bark from the tan pit, peat turf and bog earth, mud from ponds, ditches, cess-pools, rivers, or the sea, and even way soil where at hand; coal tar in small quantity (say 3 or 4 gallons to the ton), has been found useful in vegetable compost; and may be mixed with coal ashes or sawdust, for loose cartage (where not too far), or carried out in tar barrels, and mixed with sawdust, leaves, spent bark, or any of the ingredients on the spot, or even with earth to disperse it through the heap, and prevent its clotting together.

3. When there is plenty of fish the phosphates will be sufficient without bone; but whenever bone is required it will generally be better applied to the soil, at the time of sowing.

4. If refuse fish is to be had cheap (say 1s to 2s. per ton), it is the cheapest and readiest supply of ammonia; and carrion, or any animal offal, is little inferior. Or if a gas work is at hand, the gas liquor is excellent for the purpose, and may be carried in casks, or loose, absorbed in sawdust and next to these are woollen rags, which are light carriage; but work slowly unless steeped in urine or night-soil. And if ammonia is still deficient, it may be made up at any time by sulphate of ammonia or nitrate of soda, dissolved and sprinkled in when turning over the heap.

The compost should be made in a part of the ground the most sheltered, by trees or walls from both rain and sun; and a bed of earth, a foot or more deep, laid down; upon this a layer of green vegetables and sea-weed (1), dusted with slaked lime (say ½ cwt. to a ton), then a layer of stalks, roots, spent bark, sawdust, sods, turf, and mud (2), with salt (also about ½ cwt. to the ton, less rather than more): and so on limed vegetables, and salted stalks, roots, sods, &c., until as high as convenient, say 4 or 5 feet.

The heap can be made up by degrees as the materials are procurable; and the thickness of the layers must depend, more or less upon the abundance of each kind, perhaps 6 to 9 inches for the green layer, and 3 to 5 inches for that of roots, turf, and mud, &c., would be about the best for

equal fermentation. The fish, woollen rags, gas tar, or gas liquor, soaked in sawdust (4), should be applied in thin layers between the others, but always covered by the turf and mud, to save the ammonia. The heap will need turning over a few times, to finish the fermentation and make it alike all through; and may then be used as dung, with the addition of nitrate of soda or sulphate of ammonia, as above said, if needed. But perhaps a still easier and cheaper method of enriching outlying lands is green manuring.—*J. Prideaux.*—*Agricultural Gazette.*

THE WHEAT FLY.

As the season is now at hand when that tiny and delicate insect, the wheat fly, or, more properly, the wheat midge, makes its appearance, it may be interesting to direct particular attention to its habits. About twenty years ago the attention of agriculturists was drawn towards this insect, because of the vast destruction to wheat which then resulted from its operations. The extraordinary deficiency in the crop of 1827 induced much attention to everything connected with the wheat crop of the succeeding year, especially at the time when wheat was at that stage which is termed "coming into flower." Living in a district where wheat is the farmer's staple article of growth, we, along with our neighbours, were on the alert, and held frequent meetings for investigation. In examining the ears in an early field, some yellow maggots were found. This led to the conclusion that some fly or other had deposited its eggs within the glume, where the maggots were discovered; and, by examining the ears with a microscope, numbers of apparently newly laid eggs were observed in clusters near the embryo grain. This, of course led to further research; and, on a later field of spring sown wheat, just as the one side of the ear had opened the sheath, we observed, as was anticipated, as many as 12 or 14 midges on the exposed part of each ear, busily employed in depositing their eggs within the glume, which, we remarked, were glued to the inside of the glume by a gummy substance exuded at the same time with the eggs. One of our party remarked that he had seen the same fly deposit eggs in the same way on a panicle of grass; on examining which we found it to be the common couch grass, the *Triticum repens* of Linnæus, shewing that the Swede was a more correct botanist than those of modern times who have assigned it another genus than that of *Triticum*, or wheat. We have not heard that it has been ever observed to deposit eggs on any other grass. Having so far found out the cause of what went under the convenient name of blight in wheat, we applied to Kirby and Spence, who had previously written concerning this little gnat, and who knew it by the name of *Tipula Tritice*, but who still left us in ignorance as to its winter quarters.

Our attention was then directed to find out anything we could about its transformation; and we placed some ears in a glass runner with the stalks inserted an inch in sand, through a paper perforated with holes to let the stalks downwards into the sand. This paper covering the sand was intended to let us observe more readily when the larvæ left the ear; about three weeks thereafter, on examining wheat ears in the field, we found many of them quite empty of the larvæ, and the embryo grain quite dead where the larvæ had been. We then examined the ears in the runner, and found them also empty, without any appearing on the paper below, on lifting of which carefully, we found that the larvæ had descended, and found their way down through the perforations made for the wheat stalks, now in the dormant pupa state, of a semi-circular shape, and copper colour. This led to further observations in such fields as had been somewhat later; when it was observed that the outer parts of the glume were inhabited by smal black beetles in great numbers, and we found that as soon as the larvæ escaped from the glume, the beetle, led apparently by the smell, moved about with rapidity, making much use of its feelers; and whenever a feeler touched the larvæ, it instantly darted an egg into its body, making in it the nidus of its future progeny. This beetle is called by naturalists *Ceraphron Destructor*, and seems one of those means by which the Wise and Beneficent Ruler of all things gives a check to creatures that might otherwise prove seriously hurtful. Such investigation to which farmers were led, soon made them quite familiar with everything connected with the habits of the fly. It was found that it came into the fly state when the mean temperature of the preceding ten days was about 56 degrees Fahrenheit. It was also perceived that it was too delicate to be exposed to the sun's rays throughout the day, when it continued amongst the shady wheat foliage; and it could only lay its eggs in a calm evening when the temperature was at or about 56 degrees, betaking itself to the shelter when the temperature fell to 53 or 54 degrees; nor could it deposit eggs except the air was perfectly calm, and its work of mischief it was found could only be performed during three days, at the most, of the plant's growth, just as the one side of the ear appeared. Various plans have been devised for preventing its depredations, but hitherto, so far as we know, these have been all ineffectual. All that seems to be in the farmer's power is just to notice if the temperature has been such as to bring into the fly state at the time that the wheat ear begins to appear, and if the weather for a few days thereafter is favorable for encouraging its work of destruction. The farmer will thus soon see the extent of his loss, or be freed

from anxiety when no less has been incurred. The pupa can be forced into the fly state in a hot bed any time in winter or spring.—*North British Agriculturist.*

ON WATER AS THE MOTIVE POWER OF AGRICULTURAL MACHINES.

WATER, wherever it can be obtained, has great advantages over other motive powers. Steam is too expensive and too hazardous for common use. Wind is too uncertain. The Lisbon windmills, however, appear to have some advantage over both the common and horizontal English ones. These mills have a long axle and eight arms, four some distance in advance. Instead of four sails as the English, four large ship sails are so fixed each to a hind and fore arm, by ropes, that they may be tightened or slackened at pleasure, and have what inclination the miller pleases according to the force and direction of the wind. The advantage of these mills is the greater ease in shifting the sails, and the far greater surface for the wind to act on them. Water-weeels are, however, by far the cheapest power; in these the gravity and momentum of water are made use of—gravity or weight alone in the balanced wheel, where the water is received in buckets on the same level as the axis of the wheel—gravity and momentum in the overshot wheel where the water falls above the level of the axis, and momentum only in the undershot wheel. In the breast wheel, that is, when the wheel is placed in a channel or "race," formed by masonry, shaped so as almost exactly to fit the lower quadrant of the wheel, the water acts both by momentum and gravity. There is one point in undershot wheels rarely attended to, and that is that the floats ought to be set, not perpendicularly to the centre of the axis of the wheel, as is common, but so that they should be perpendicular to the surface of the water when they emerge from it.

But the most powerful and economical application of water is the Turbine wheel. This is a French name for an American adaptation of an English invention, for it is merely an adaption of Barker's mill. The water is brought down in pipes into a circular chest, with apertures all turning in the same direction through which the water flows in streamlets; and it is the height of the pipe (the water in which acts in the same manner as in the hydrostatic paradox and Bramah's press) which gives the power, and not the size of the chest, for one about two feet diameter may have the power of 8 or 10 horses. These mills are used in a few places in Scotland and Ireland, but could not be employed in a level country unless an hydraulic ram were constantly used to lift up the water to a highly elevated reservoir, to work the Turbine when necessary.

In the first class wheels, as overshot, pitchback, and Turbine, both gravity and momentum being employed, only one-third or one-fourth of the whole power of the water is lost.

In second class wheels, as ballast wheels and breast wheels, and all which receive the water below the axis, about one-half is lost.

And in third class wheels, as the undershot tub wheels, and flatter wheel, more than two thirds of power is lost, as these act by momentum only.

When there is less than 4 feet of water, an undershot wheel is cheapest; from 4 to 10 feet, a breast wheel: and above 10 feet, an overshot or first class wheel; and in this last the water should flow upon the wheel or about 52½ degrees below the top. For further information on this subject the works of Penslow, Morren, and Hocksley, should be consulted.

Horizontal watermills were in use in the Isle of Man about a century back. An author of that date says, "Many of the rivers, or rather rivulets, not having water sufficient to drive a mill the greater part of the year, necessity has put them upon an invention of a cheap sort of mill, which, as it costs very little, is no great loss, though it stands idle six months in the year The waterwheel, about 6 feet in diameter, lies horizontal, consisting of a great many hollow ladles, against which the water brought down in a trough strikes forcibly and gives motion to the upper stone, which by a beam and iron is joined to the centre of the waterwheel." This cheap mill would be worth erecting, when water was precarious, for minor purposes; it probably would not be powerful enough for thrashing. In Young's *Annals of Agriculture*, 1792, page 364, there is a description of a thrashing machine turned by water, which appears even now very superior. A Mr. Mordaunt, of Halsall, thus describes his machine for preparing corn for the mills to grind or make bread, &c., "so contrived as first with its beaters, fixed in the cylinders, to completely separate the straw and grain at 300 rotations per minute; secondly, to shake by means of a new invented sieve, the grain from the longer straws, which sieve delivers the grain with its short straws into a hopper or cone, which cone delivers it with its short straw into a large winnowing machine, which machine delivers it to the floor; from the floor it is put into another winnowing machine which completes the dressing, working all at one, and the same time at the rate of 300 bushels per day on an average. The main obstacle is getting away the straw; this often stops the work for several hours, and I cannot prevail on the farmers to join teams and mutually assist one another. I take only one-twentieth of the grain; my men or children feed the engine; the farmers find all the men, &c., on the floor. If I remember right, a large room of 70 by 27 feet, and 9 feet high, is cleared in

about 10 hours, and the sacks stand filled in the outer room ready to cart away. It is universally allowed to be a capital piece of machinery, doing the work of 100 men in the day of 12 hours. All the different movements are put in motion by a 12-foot waterwheel only 3 feet wide, with 9 feet head of water, with 15 rotations per minute."

Could our modern machines equal this day's work with an equally small water power? I think not. And although corn could not be thrashed for seed or malting by this machine, yet the great power would still make it a useful machine for feeding or grinding purposes. Can any of your correspondents inform me of the principle of this machine, and whether this or any similar to it are still in existence. The taking in corn to thrash seems a very good idea. The employment of two boats moored with an undershot wheel between, so as to take advantage of river currents or tides, has not been ventured on in England. Yet when we look upon the weight, the plenty, and the power of finding its own level in water, it is easy to imagine that it might be pumped up and stored in reservoirs, so that every house in a town might have water power in household concerns, as turning spits, cleaning knives, &c., merely by turning a cock; that as we use currents of air in our winnowing machines to separate light bodies into different classes and fineness, so currents of water will come to be employed for heavier bodies, as they are now for washing earth for brick; and that as we have currents of water used in irrigating, so by previously saturating these currents with earths and manures we shall manure and give a new coating of soil to our barren lands without the expensive labour of carting.—*W. R.*

Preparation of Strawberries for forcing. There are two methods in use for preparing strawberries for forcing. We will first state the one in general use, as less time is required. The pots generally used are number twelves; these require one or two inches of broken pots for drainage; the pots are then filled with good rich strong loam. As soon as good rooted plants can be obtained from the runners of the present year, they are taken off and planted in the pots. The small-fruited varieties, as the Alpines, Scarlets, and Roseberry, may be planted three in a pot of this size; but the others, as Keen's Seedling and the British Queen, only two. As soon as planted they should be well watered and placed in an open situation. They will require watering daily in dry weather, and when it is very hot twice a day. It is advisable to plunge the pots to save them from the influence of the sun, as its powerful rays at this season of the year often burn the roots. Some persons are in the habit of pinching off the runners as they appear, but to this practice we strongly object, as it causes the plants to make fresh runners, and exhausts them by causing them to expend the *true sap* which they have collected for the production of blossoms and leaves in the following spring. The better plan is to let them grow till late in the autumn, and cut all away together. The other method is to prepare a piece of good ground in the spring, and plant good runners of last year in rows, twelve inches apart in the rows, and eighteen inches row from row, keeping them free from weeds. The runners may be pinched off as they appear; also all blossoms as they shew themselves. In August the plants may be taken up with balls of earth, and planted in pots for forcing. Strawberries will force well a second year, if the pots are top-dressed with good rich soil. Perhaps the best use that can be made of them is to turn them out of the pots (as soon as the fruit is gathered), and plant them in a warm border where they will produce a good second crop in the autumn.

Sawdust.—Its use is more or less easy according as it is the sawings of hard wood or pine trees. That of the former is more absorbent, more easily fermented, and more easily charred. With this premised, 1. Sawdust may be charred with quicklime by being made into a compost with it alone. 1. It may be smother-burned as it is called, with earth or soda, as clay is done in some of our English counties. This, however, is a difficult process, and a workman will make several failures before he gets into the way of burning the heap regularly black. 3. It may be most effectually, certainly, and easily charred in an oven, at a heat below redness, and which does not cause it to take fire. When thus charred it may be laid on the ground directly, may be mixed with manure of all or any kind, or may be used as an absorbent for liquid manure—the drainings of the stable or the foldward. 4. But sawdust may also be fermented. For this purpose it may be mixed with earth, with or without lime, and in this way made into a compost, which, upon light soils, or such as are deficient in vegetable matter, will be very valuable. Or, it may be previously employed as an absorbent for liquid manure by spreading in stables, byres, or piggeries, or in the neighbourhood of the foldyard manure, to as large an extent as it can be thoroughly moistened, when the whole will ferment together and form a valuable manure. Whether any of the above methods can be adopted so as to be largely useful, will depend upon circumstances; but the method of mixing with earth into a compost with more or less lime, and with or without liquid manure, can be easily adopted, and there are very few soils indeed which would not be in some degree benefited by such a compost.—*Report of Agricultural Chemistry Association.*

Agricultural Journal

AND

TRANSACTIONS

OF THE

LOWER CANADA AGRICULTURAL SOCIETY.

MONTREAL, SEPTEMBER, 1849.

AGRICULTURAL REPORT FOR AUGUST.

The month of August has been very favourable up to this time for the growing crops, and harvesting either hay or grain. Perhaps we never had a better time for securing hay without injury than the present year, and we believe it could not be better saved. This will greatly add to its value, and make up in some degree, for decidedly a short crop. We would prefer 20 lbs. of good well saved hay, to 30 lbs. ill saved, and we are confident the former quantity would be more valuable than the latter, as food for animals. A considerable proportion of the wheat came to maturity in August, and perhaps all the barley. The wheat has filled much better this year than last, and will produce a superior sample. It has not suffered materially by the fly or by the rust up to this time, although there has been some damage from each cause. Wheat has been sown to a great extent, and if the crop was heavy in proportion, we should have a large surplus, but we have observed that a considerable proportion stands very thin in the field, owing, we suppose, to the soil not being in the best state for seed when sown, and the weather subsequently being very dry. We cannot see from what other cause the crop could be so thin, as there is generally as much seed sown where the crop is the thinnest, as where it is thick, and a good crop; consequently it would appear that much of the seed did not come up, or that the young plants perished after they had appeared. A field of wheat or other grain may be poor and head badly, but it may stand sufficiently thick in the ground—but the thin crops we have noticed could not have one-third of the plants they should have from the seed usually sown, and this we are certain is often the case in Canada, that much of the seed perishes and never produces a crop—and it may readily be understood what a great loss this must be to farmers—the seed forming a considerable item of the expenses of the crop of whatever kind. There cannot be any cause for this, in most instances, but the imperfect preparation of the soil and insufficient draining. When the soil is ill ploughed, some of the seed is buried so deeply that it cannot come up. If the soil is too wet when sowing, some of the seed rots, or, if it do happen to come up, the plants are feeble, and do not come to maturity, when the soil becomes hard by heat where before it was so wet. The last case is—when the seed is sown, when the land is hard, stiff, and in large lumps, that will not break down with the harrows or cover the seed properly, there will be a certain loss of seed and want of healthy plants. The price of the lost seed alone, if applied judiciously, would often remedy this defect, and ensure a fair crop, where now it is very light. The quantity of barley sown this year is, we believe, much less than usual, but generally a fair crop, and the sample greatly better than last year. Oats is not a heavy crop, particularly in straw. A very dry season is not the most favourable for oats, although the most so for wheat, barley, and indian-corn. Peas are generally good where any justice has been done to them in cultivation. This year was favourable for bringing beans to maturity, although the straw may not be heavy, or the pods very numerous. Indian-corn looks well, and cannot fail to be a good crop on suitable soil. Potatoes are not planted extensively, except on very few farms; but we have never seen them look better than they do at present. The other root crops we have observed to be short of plants in numerous instances, we suppose, in consequence of the very dry weather we have had from the time the seed has been put in the ground. Every competent farmer who would make a tour in

any direction in Lower Canada, must be struck with the very defective system of our agriculture generally. It is quite manifest that the crops of wheat this year might, in numerous instances, average double what they will produce, had the soil been better drained and better cultivated. To cultivate well, and in time for our spring sowing, is impossible, unless the land is well drained. Indeed, without draining, the stiff clays of Canada can seldom be in a fit state for working advantageously. The system of thorough draining now introducing in the British Isles is considered imperfect unless they are placed at 18 or 24 feet apart, and from 3 to 4 feet in depth. Here, on the contrary, you will seldom find any parallel drains in a field, except those at the side fences. In England, there are seven or eight parallel drains in the square of an acre, while here it is thought sufficient to have one parallel drain in the square of a farm of from two to four acres wide, and they are seldom so deep as the English drains. It may be imagined what the consequence must be in the well drained and the imperfectly drained soil upon the crops. Upon the former, the crop will stand thick and close together, yielding of wheat from 30 to 40 bushels per acre, and over, and of other grain in proportion; while on the latter, it may be from 6 to 15 bushels of wheat per acre, and other grain in proportion. We do not say that many farmers in Lower Canada do not obtain a much larger yield than 15 bushels to the acre occasionally, but we are quite certain that the average of this section of the Province is generally greatly below 15 bushels, and we believe will be 10 this year, although a very favourable season for wheat, and not much injured by the fly. We have seen crops of wheat this year that we are convinced will not exceed 6 bushels to the acre, and growing on land that, if well drained, we have no doubt, would have produced 24 bushels. We have seen other crops equally deficient. It cannot be otherwise with our present system. There are not much potatoes cultivated now, and there is scarcely any other green crops, and we may say, no summer fallow. With such a system it is out of the question to raise good crops. There is no excuse for this system. We see immense fields of fine land lying idle, merely producing a poor herbage of grass and weeds, and pastured by cattle and sheep that can scarcely find their subsistence, much less sufficient food to improve them in size and condition, or enable them to yield milk or butter. It is this management that has prevented Canadian cattle from being appreciated as they deserve, and will render any other cattle that may be substituted for them worthless, if not managed differently, and better kept. These waste lands, if summer fallowed, would produce as much wheat from one acre as three acres produce now. If the labour expended on three acres now was applied to the cultivation of one acre, we have no doubt that this one acre would yield a more valuable produce than three acres, and the two remaining acres might be left to rest and improve under grass and pasture, and would require no expenditure. To plough less, and plough and cultivate better, is the grand requisite in Canada, and it is an improvement easy to introduce. If farmers are content with bad crops, when they might have good ones, and unprofitable cattle and sheep, when both might be good and profitable, it is in vain to recommend a better system to them. We believe it is only farmers who would be content with an inferior system when it was in their power to adopt a better, and we humbly conceive that any man who will keep land in his possession, without endeavouring to improve and make the most of it, does not do his duty to his Creator, who made land for our use, and gave us seed time and harvest, to cultivate and raise fruits from it, nor can it be said that he does his duty to himself or to his country, as no country can be truly prosperous, whose occupied lands are not managed and cultivated to the best advantage. We have frequently mentioned the great want of shade and shelter on the generality of old

cultivated farms in this country. It is only necessary to notice cattle that are favoured by trees or other shelter of a very hot day, to be able to estimate the condition and suffering of those poor cattle that have none. In the former case, the animals remain in the shade the greater part of the heat of the day, and are generally thriving and in good condition, if they have a reasonable supply of grass, while in the latter case, poor animals must suffer exceedingly, exposed perhaps to a heat of from 120° to 150° in the sun. This is no exaggerated picture, but one we have frequently witnessed even this year. In many places, there is scarcely a tree to be seen on one hundred farms. Nothing but long strips of land separated by straight lines of dead wooden fences, without a tree, is anything rather than an agreeable landscape. The want of trees is the farmer's own fault, because trees have been the natural production of every farm. This defect is capable of remedy, and should be remedied by planting trees. We cannot say too much in condemnation of the manner cattle are kept here in many cases, even in summer. The pastures are so wretchedly poor that the cattle cannot thrive or yield any profit to their owners, and they only come into condition when the winter commences, which again reduces them in condition; and at the opening of spring they are generally very poor, indeed, which helps to keep them low and unprofitable the whole summer. There is another practice of disposing of the manure by some farmers, which we cannot understand, unless it be to get it out of their way from the farm yard, without any regard to disposing of it to the best advantage upon the soil for a future crop. We allude to the practice of carting out manure in the heat of summer, and placing it in heaps or cart loads very close together on the pastures, or land proposed to be ploughed in the fall. We have seen as much manure placed in this way upon one acre as would be ample for four or five acres, properly applied. The practice appears most absurd, and contrary to any system of good husbandry, and would indicate either a total ignorance of the value of the manure, or of its judicious employment for the improvement of the soil for producing crops. Our object in writing monthly Agricultural Reports is more to bring the real state of our agriculture before the public, than to pretend to be able to represent the probable produce of each crop. We cannot, of course, have visited every part of the country, but we have seen sufficient of it to enable us to estimate, with all the accuracy necessary, what the state of crops generally is, and also the general system of cultivation. The general system practiced here is the same with most Canadian farmers, and the results of this system may be expected to be about the same on land of equal quality. We do not wish to misrepresent matters, or make our system of agriculture appear worse than it is, but we refer to the country, in every section of it, in proof of the general correctness of our representations. The state of agriculture has often been pointed out to us, and we have been told that improvement was hopeless, and was not desired or considered to be necessary by most farmers. We, however, have been disposed to a contrary opinion, and to hope that by instruction and encouragement a better system of husbandry might be introduced. To say that a better system is not necessary to the real prosperity of Lower Canada, is an absurdity. There is no possible means to secure prosperity to the country, except by her agriculture, and if that is not in a flourishing condition, very different from what it is now, we need not expect to be prosperous. It is not from anything external we can secure our prosperity, but from our own resources alone we have to do so, and these resources are our lands and our cattle, both properly managed.

There is not much variation in the market prices of agricultural produce since our last. The dairy produce, so far as butter, is amply supplied, and the prices low. Of cheese, we have not seen any of superior quality. The meat market is well supplied, and prices mode-

rate. Potatoes are abundant, and of excellent quality—the price from 1s. 8d. to 2s. the minot.

Farmers upon the whole have a right to be well satisfied with the general character of the season for the last four months, and where they have done justice to the soil and management of crop, they will have no cause to be dissatisfied with the produce of any crop. There are many poor crops, undoubtedly, but it is not certainly the fault of the season, or, in many cases, of the quality of the land, but solely owing to defective cultivation and after management of the crop. A dry season will ever be found more favourable to the farmer than a wet one—but either in extreme is not to be desired. The crops are not secured yet, and will not perhaps before the end of September, and, of course, they cannot be considered safe before they are housed, but we must hope that we shall have good harvest weather now, as we have had a favourable growing season. The crops, with the exception of hay, will be a full average for Lower Canada, although we regret to say that average is a very low one.

August 23, 1849.

It is very interesting to read over the description of agricultural implements both old and new, which were exhibited at the annual show of the Royal English Agricultural Society at Norwich, in July last. The whole number entered was 1880, and generally of the best description and workmanship and adaptation to the several uses for which they were made. To be able to obtain such implements, and skilful hands to work with them, is a great advantage to agriculturists in the British Isles. We observed amongst other articles mentioned, "specimens of glass milk pans, glass cream pots, and glass butter pots." Some of those articles we would be very glad to see imported here. The exhibitor was James Phillips, of 116 Bishopsgate Street Without, London, and were manufactured by Hartly & Co., of Sunderland. There were several other articles of glass by the same parties, such as bee glasses, tiles made of rough plate glass, sheet glass, and corrugated glass; also slates made of rough plate glass and of sheet glass. We do not see why we should not have some of these articles imported or manufactured in Canada. Glass milk pans and vessels of the same material for holding cream and butter, would answer well in this country. They would be easy to keep clean, and would not impart any ill taste to milk, cream, or butter. We do not appear to understand here the implements necessary for a dairy. We have a manufactory of wooden pails for milking, but although there may not be any objection to painting them on the outside, we think there is no necessity to paint them on the inside. Indeed we have never seen painted milk vessels except in Canada and the United States. It certainly saves some scrubbing and washing to the dairy maid, but we should imagine the vessels made of unpainted wood would be more likely to be kept perfectly clean and beautifully white, and impart no ill flavour to milk or butter. Paint is both useful and ornamental in its proper place, but not as a means of saving labour and necessary cleanliness in dairy utensils, which should be kept clean and sweet by careful scalding and washing.

The report of the great Cattle Show, of the Royal English Agricultural Society, held at Norwich in July last, is very interesting. There was 624 entries of stock, and 1880 of implements. Over 900 persons were present at the great dinner, and the whole thing was worthy of the society and of the country. Some beautiful cattle and sheep were shown but we were surprised to see that the premiums for one year old short-horn bulls was withheld for want of sufficient merit. We give insertion to extracts of a few of the speeches delivered at the dinner, to show how agriculture is regarded, in England, by the first in rank and education. We hope it may act as an inducement to persons, in Canada, to interest themselves in agriculture,

as a fashionable occupation, even although they should not be farmers, or directly interested in land. Unfortunately for our agriculture, we have few persons here not directly engaged in husbandry, who appear to regard it with any interest or favor. The dwellers in towns cannot see what they have to do with the crops or cattle of the country, except so far as they can purchase them for their tables when they want them, or for commercial purposes. This indifferance would be excusable to any other trade or business, but towards the agriculture of the country, upon which the prosperity of all the inhabitants depends, it is not, we conceive, to be excused in any party who understands his duty or real interest.

The Earl of Oxford said, "Let them not think that the effects of those exertions were limited to the narrow boundary of this land; they, on the contrary, knew that their machinery increased in perfection every year, and was eagerly sought after by the inhabitants of every part of the world. They had had amongst them, at their various meetings, the representatives of almost every European state; and last though certainly not least, they found that when agricultural societies were established in other countries, the Journal of their Society was eagerly demanded, and in many instances translated (loud applause). Now, one word with regard to the implements exhibited. The great improvements which had been made in agricultural implements, and the more general diffusion of intelligence, had dissipated the prejudice entertained by some because of the supposition that they interfered with the demand for labour; they had now discovered that the demand for manual labour had increased with the more general propagation of mechanical contrivances. It was neither his habit nor his wish, nor, indeed, would the time permit him to trespass any longer upon their patienee; there was only one remark more he would make before he sat down. If they looked at the different nations of the world—if they turned to France, Germany, Belgium, or Russia—they would perceive they were relinquishing their antiquated notions, and were sending to them for the various improvements they had made, and were anxious to adopt the modes of culture which they had tried here, and proved to be successful (cheers). He would conclude with the toast which he had been entrusted with —viz., "Success to the Royal Agricultural Society of England." (Cheers).

The Right Rev. Bishop of Norwich said, "He was glad of an opportunity of rising upon this occasion, though it was the first time that he was ever before the Royal Agricultural Society of England. He was glad of doing so, if not with the practice, at least with the spirit, that ought to animate a British farmer (applause). He should be ungrateful to his profession if he could do otherwise, for the Church depended upon the land of England (loud applause). He did not wish them to think that he spoke from the love of filthy lucre; he said it because he thought, as he before stated, that the agriculture of England was intimately connected with the welfare of the Church of England (renewed applause). It was a gratification to him to stand before them at this meeting. It was such a meeting as he loved to appear in, because it was a meeting in which people of all opinions, all persuasions, all denominations, met, forgetting their differences and animosities. They had but one great object in view and that was to promote the agricultural interest; and whoever had that interest at heart, he considered him not only an Englishman, but he was persuaded that person must have the spirit of true Christianity in him (applause). There were divisions between the pasture and the arable land, and there were divisions of opinion among them; but their controversies were amicably carried on, as he knew they had been on some occasions, as to the comparative merits of Swedish turnips and mangold wurtzel. He congratulated himself on meeting not only people of different opinions, but also people of every rank, from the prince to the peasant—from the occupant of Buckingham Palace to that of the meanest cottage in Norfolk. He rejoiced in this, for there they were all of one mind, all upon the same platform, and in the same room; forgetting their difference of rank, and all meeting together, as Englishmen, upon common and neutral ground. They were all met upon the same soil—the soil of England (applause). Don't talk to him of the regions of gold beyond the Oregon territory. Don't talk to him of migrating to the far west in search of gold. They had the gold at home. They had British interests, British ingenuity, and British industry; and here, in Old England, was the true and veritable California (applause). He had a great deal more to say, but he had spoken his seven minutes, and beyond that he must not go."

The Earl of Chichester said, "Gentlemen, as many of you are aware, I had the happiness of being one of its first members, and from the moment that the subject was introduced to me by my noble friend the Duke of Richmond (applause), I at once perceived—and I take no credit for any uncommon degree of sagacity for that perception —that we were about to establish one of the most important, and one of the most useful, and as I still believe, one of the most prominent institutions of this great country. Gentlemen, we all knew that if our efforts succeeded, this institution would be the means of bringing together men belonging to very different classes of society; that it would

bring together all the agricultural classes; that it would bring us into contact with men of science, with men of rank, influence, and intelligence, and of other countries; with men like the right Rev. Bishop on my left, distinguished in our own country for the sacred office which they fill, and for the zeal with which they discharge the duties of that office, taking care of the moral and religious condition of their fellow men (applause). Gentlemen, I should conceive that no one who anticipated such a combination of science, of learning, of practical skill, and of all the great moral qualities that belong to those who have favoured us with their warmest support, but must have anticipated the best results from the meetings of this society. I shall not, on this occasion, occupy your time by going into detailed remarks on the success which has hitherto attended our efforts in promoting the improvement of agriculture, but I have alluded to the different classes of persons who meet together, and their great efforts for the benefit of mankind, and especially of our own country, because I feel it is due to those valued supporters of this institution who are not agriculturists, to say how heartily we value their support, and how deeply we are indebted for the valuable exertion of their talents which they have so freely devoted to this cause (applause). My right rev. friend has alluded to the amicable discussions and amicable rivalry that take place at the meetings of this society. I am confident that most of us have learned, by experience, that it is useful to us all to meet together to discuss such questions; that it is useful to the practical farmer to become acquainted with the man of science; that his own skill and success in his vocation are improved by receiving some new ideas, whether he receive them from a brother agriculturist, in a different district, or from the man of science. I believe that we all derive great benefit from such meetings and such discussions. It seems to me that we undergo a sort of ventilation, that very much improves the atmosphere in which we labour. It seems to me that we are thus enabled to get rid of many of our prejudices, and perhaps more of our conceit. I look around me, and recollect that I see some of the most distinguished practical farmers from every county of England; and, if I might borrow an illustration from one of the good lectures I have heard given before this Society (I allude to that I heard Professor Simmonds), I should say that this kind of ventilation reminds me of what takes place in the human system in the circulation of the blood—that the farmers of England, and all the different ranks of agriculturists, are met on those occasions, and come to this great centre, to get rid of a great deal that they can well spare, and to have their energies and their minds refreshed by this wholesome ventilation (applause); and they return back to their farms with a great many new ideas, with fewer prejudices, with that useful kind of stimulus which competition produces, and I am sure with greater information and greater intelligence.

We have frequently suggested the use and necessity for introducing a regular system of agricultural statistics, in order that we might be acquainted with its true state and products. This, we conceive, would enable us to employ the best means for its improvement. We are aware that statistics are frequently made up to serve certain purposes, and are more calculated to mislead the public than to give a correct idea of the real state of matters. Statistics are often most encouraging on paper, until we find out, by practical experience, that the compilers of them, either designed to deceive others, or were, themselves, deceived. Agricultural statistics, or the compilers of them, cannot have any inducement to mis-represent, and, therefore, might be relied upon. Their usefulness, however, would mainly depend upon the judgment of those who would make them out, that they should be able to describe things accurately. It is desirable that we should be acquainted with the quantity of food produced in the country, and the mode adopted for its production. If this was well understood, we could take measures for improvement where it was required, or, at least, we would know what improvements were necessary, whether we introduced them or not. This is the object of agricultural statistics, and not by any means to deceive or obtain unjust advantages. We could never desire that agriculture should obtain any unjust advantage; all we would be anxious for is, that it should have equal advantage with other interests, and we would have no fear for its success. Correct statistical returns would be likely to give it a better chance by making its true condition fully known and understood. We beg our agricultural friends, who we know have not much reliance upon statistics generally, will excuse us for recommending them in agriculture. We shall refer to this subject again. In England com-

plaints were lately made in both houses of Parliament of the inaccurate returns made of the prices of corn, the prices in many instances being much higher in the weekly returns than they ought to have been. When this is done where the parties are bound on oath to make correct reports, statistical tables made where there is no such obligation cannot be much depended upon.

The great cattle show and fair of the Provincial Agricultural Society of Upper Canada is advertised to take place on the 18th, 19th, 20th, and 21st of September next, at Kingston. There are a large number of premiums offered —we suppose 700 or 800—for animals, implements, agricultural and horticultural products, manufactures, fine arts, &c., and no doubt the show will be well attended. There is a class open to persons residing in the United States and Lower Canada for neat cattle, horses and sheep. Agricultural implements, we believe, are also free to all competitors. We would rather suppose that all the premiums offered are free to the inhabitants of the Province of Canada, from reading the following "Rule":—"7th. Every article exhibited for competition must be the growth, produce, or manufacture of Canada, except agricultural live stock for breeding, which must be owned in the Province." According to this "Rule," it would appear that the premiums are open to competition to the whole of Canada, which is, undoubtedly, very liberal, and we hope the farmers and inhabitants of Eastern Canada will avail themselves of the privilege, and be competitors in every class; but we remind them that they require to become members of the Upper Canada Agricultural Association, which they can do by paying five shillings.

At the Annual Tup Show of Southdown sheep of Mr. Jonas Webb, of Babraham, Norfolk, England, which took place on the 17th of July last, 67 tups were let out for the season at an average of £22 each. The highest price paid was 86 guineas for one. The 67 sheep were let for £1474 for the season, and then to be returned to Mr. Webb. This proves in what high estimation Southdown sheep are held by English agriculturists. There was one gentleman from Russia commissioned to make purchases on behalf of the Imperial family. This was the twenty-third annual show by Mr. Webb, and it is said his sheep have been constantly improving in some points during all that period, showing what may be effected by skill and perseverance in breeding and feeding of animals.

We are sorry to be again obliged to advert to the new variety of seed wheat which was sent to our office last winter, and which we at the time recommended in this Journal in the strongest terms. The sample sent to us was very fine, and perfectly free from mixture of other varieties. We also had two small parcels of the wheat in the straw unthrashed sent, which have not one ear of any other variety of wheat, and these parcels are yet in the seed-store of Mr. Shepherd. Under these circumstances, we never supposed that mixed varieties of wheat would have been sold for seed, one half at least, as is reported, differing from the sample sent to us. We feel it due to the parties who have purchased the wheat on our particular recommendation, when asked our advice, to give this explanation, and to assure them we acted in good faith towards them. We had no interest in the matter, and purchased a small quantity for ourselves with the same object that we recommended to others—namely, to raise seed for next near to sow more extensively. The only remedy now is to separate the varieties while in the straw. We shall in future be cautious in recommending seed wheat, and leave the matter to parties who have seed to dispose of to say what they please of it. We regret exceedingly that any agriculturist would sell mixed seed to brother-farmers, who thought they were purchasing a valuable new and clean seed wheat. There might be some excuse for

seedsmen selling mixed seed, because they might have bought it so; but the growers of crops should be perfectly aware whether the grain they sell is pure and unmixed or otherwise, and must incur all the praise or blame of the sort of sample they do sell for seed when they represent it as of any particular variety. In taking leave of this subject we would observe it must be perfectly manifest that no agriculturist would purchase for seed at a high price any grain that he knew to be a mixture of several varieties, and therefore the parties who purchased the wheat in question cannot but feel that they have not been well treated, and that they were induced to purchase what they would not have bought, had they known its quality.

We have received from John Hall Maxwell, Esquire, Secretary to the Highland and Agricultural Society of Scotland, "The Journal of Agriculture, and Transactions" of that Society, published in July last. This publication always contains highly interesting and useful information on agricultural subjects, and cannot fail to be instructive to any farmer who may be so fortunate as to have an opportunity of reading them. The published Journals and Transactions of the great Agricultural Societies of the British Isles are highly prized in the old country, and have a very large calculation, although farming is certainly much more advanced towards perfection there than with us. The results of experiments made under the most favourable circumstances for testing them fairly and carefully are reported in these publications, and are well calculated to instruct us, and encourage improvements in agriculture. We shall occasionally give selections from these valuable works. It is extraordinary that there should not be a greater desire here to read all the information that can be obtained on agricultural subjects. No one can suppose that it is the consequence of our superior system of husbandry that is incapable of further improvement, being already so perfect.

We are very glad to see by the late English papers, that there is a probability that the Poor Law Commissioners will send out to this country a number of poor lads to be apprenticed here under certain conditions. This is a plan we have long advocated, and we have no doubt, that, if the system is carried out judiciously, it will be found to work well for all parties. It is a great evil in this country, that it is almost impossible to induce persons to remain in the same service for any length of time, and the consequence is, that changing servants and laborers continually, prevents farmers from having steady, well-instructed farm laborers, as it requires considerable practice and experience to make them so; and while they are changing continually, they seldom can be properly instructed. If young lads were apprenticed to farmers, they would settle down to their business, and strive to understand it, and before their apprenticeship would be expired, they would be properly trained, and able to execute well, twice as much work as an inexperienced man. This class of emigrants might be made very beneficial to the Province under proper management.

The Superintendent of Education for Lower Canada, Dr. Meilleur, has politely handed us a Pamphlet published by him lately, which contains Statutes relating to Elementary Education, with two Circulars addressed by Dr. Meilleur to the School Commissioners and others interested in the management of schools, and also a Series of Questions for School Teachers to prepare themselves to answer, in order to entitle them to obtain diplomas from the Board of Examiners, to qualify them to teach in Elementary or Model Schools. The circulars and questions, we conceive to be prepared with much judgment, and well calculated, if acted upon, to forward Elementary Education in Lower Canada. The circulars contain sound instruction for School Commissioners, and the questions for teachers are very judicious, and parties able to answer them

correctly, will be well qualified to take the management of a school. A useful education can only be given by competent teachers, and as schools are partly supported from public funds, none but well qualified teachers should, on any pretence, be employed.

We would be rejoiced to see manufactures established in Canada, so far as there would be any probability of their being advantageous to the country. Agricultural implements in particular of every variety and description might be manufactured here, and if they were perfect of their kind, and such as are made use of in England, it would induce farmers to purchase and make use of good implements. We would not, however, wish to see manufactures of inferior implements made to sell and not for use, as many of those imported appear to be. We have already Mr. Fleck's manufactory of ploughs, harrows, grubbers, cheese-presses, &c., excellent of their kind, so far as they go; but we want a greater variety of implements to show farmers what they are, and at moderate prices. A farmer who had never heard of some implements, if they were exhibited before him, and if he knew their uses, might be induced to purchase and to use them to his great advantage. The simple but useful articles, such as spades, shovels, and digging forks, might be manufactured here, and if made of the best materials, and in a proper manner, one of them would be worth half-a-dozen of those generally imported. These articles should be made of the best hammered iron and steel, not of sheet iron, such as those imported, that are only fit for public works, or for town work. The prices usually paid for these articles should purchase the very best of their kind. It is a great loss to farmers to have to purchase inferior implements. They are constantly going out of repair and breaking, and never execute the work so well or with so much ease to the operator, as well made implements, and of the proper materials. The spades or shovels made of sheet-iron are not fit to work with upon a farm. The price charged for implements used for horse or hand labour is not of so much consideration, provided they are of good quality. Hand implements in particular should be as light as possible, and they cannot be so unless made of good materials. We hope, if manufactures should be introduced here, that the very best articles will be made, and then success is certain; but if the articles are not good, their manufacture will not succeed, and we would be sorry they should. The best agricultural implements to be found on earth may be had in England, if they were only imported; but perhaps it is supposed we do not know the nature of good from those that are worthless, and therefore anything will do for Canada.

We have been favoured with the "Annual Report of the Normal, Model and Common Schools in Upper Canada for the years 1847 and 1848," with an appendix to each, by the Chief Superintendent of the Schools, the Rev. Dr. Ryerson. These Reports appear to be carefully compiled, so far as regards the statistical portions of them. Dr. Ryerson's Reports, Circulars, &c., are very interesting and well calculated to advance Common School Education. In reading over the list of text-books, of 295 authors, used in the Common Schools, there is not *one* on the *direct* subject of agriculture. This we regret, because we are convinced that in every Common School works on the science and art of agriculture should form part of their books. These works are as suitable for scholars to read as any other on the list. Farmers' children are the great majority of those who attend country Common Schools; and is it proper that their reading should be everything but that which has reference to the business in which they are to be engaged for their future lives? We have always endeavoured to recommend the use of agricultural books in Common Schools. There are agricultural catechisms—spelling books—and other books that might be most usefully introduced in schools, and that would be sure to

give a taste to young farmers to learn perfection in their business. Agriculture is the first of all *professions, both here and in every other* country, and yet the teaching and study of our youth is in another direction constantly, and has no reference whatever to the first of professions. Our best educated young men may well despise agriculture, and we believe this is one of the results of general education. It is time there should be a change. In the Provincial Normal School we are glad that the study of Agricultural Chemistry has been introduced, although it is only "so far as time will permit," a proviso that is not applied to any other study in the school. Thus, instead of the science and art of agriculture being one of the principal studies, *as it ought to be*, in every Common School, it is only the study in the Provincial Normal School, "when time will permit." We do not offer these remarks with any design to offend, but from our wish to advocate the interests of agriculture, and the best means of promoting it.

We would remind our subscribers of the great Cattle Show and Fair to be held the 11th, 12th, and 13th of September, at Syracuse, by the New York State Agricultural Society. No doubt it will be every way worthy of that great State, and of the character and enterprise of her agricultural population. It is at a season of the year that it will be agreeable to travel—September generally being the most pleasant month of the year. This Exhibition cannot fail to be highly interesting to all friends of the progress of Agricultural improvement. The inhabitants of the United States are alive to the vast importance of Agriculture, and all appear interested in securing its onward progress to perfection. We heartily wish prosperity to agriculture, and to agriculturists in all and every part of the world.

The reports from the continent of Europe, relative to the state of the growing grain crops and the probable result of the harvest, are of rather a conflicting character; but as there is a natural disposition to exaggerate any circumstance likely to have an unfavourable influence, and a corresponding unwillingness to make admissions where the prospects are good, we are inclined from the general tenor of the advices to come to the conclusion that there is not much to complain about. During a great part of June the weather seems to have been wet and cold in most of the northern countries, but July set in warm. In regard to political affairs the news is of a character to lead us to expect a speedy termination of war between the Germans and Danes. Business in wheat had been dull at the leading ports, but the smallness of the stocks, and the knowledge that prices had risen here, had caused holders to demand full terms for wheat.

At Danzig, on the 7th instant, quotations were fully as high as before. Since the 5th instant, 70 lasts of mixed Volhynian, weighing 63 to 64 lbs. per bushel, had been sold at 42s.; about 60 lasts mixed, of 61 to 62 lb. weight, at 41s. 6d., and 15 lasts fine high mixed Upper Polish, 63 lbs. per bushel, at 44s. per qr. Altogether, 830 lasts had changed hands during the week.

A letter from Konigsberg, dated 4th instant, informs us that, after a good deal of rain and a low range of temperature during the greater part of June, the weather had become warm and forcing. The growing crops were generally backward in that neighbourhood, but not otherwise injured. Owing to the rise in our markets enhanced rates had been asked for wheat, and fine high mixed, which was very scarce, had been held at equal to 42s. 6d. to 44s. per qr. free on board; mixed of 61 lbs. weight was then quoted 39s. 9d. and 41s. 8d., and red, also weighing 61 lbs., 38s. to 39s. per qr. free on board. The crop of rye would, it was feared, be deficient, and some purchases of the article had been made on Stettin and Berlin account at very low prices.

Our advices from Rostock reach to the 19th instant. The weather was then fine, but had previously been somewhat cold and ungenial, and the crops were not particularly promising. Scarcely a transaction had taken place in wheat, and our correspondent does not even quote the value of the article. The blockade was being strictly observed, and no vessels had either departed or arrived.

At Wismar, fair qualities of red wheat were held at 40s., and at Stettin the Uckermark was quoted 41s. per qr. free on board.

At Hamburg, on Tuesday, there was not much doing in wheat, the more subdued accounts from hence having checked the upward movement. Good parcels of Upland on the spot, weighing 61½ lbs. per bushel, were then offering at 41s. 6d. per qr. free on board. The weather was warm and favourable for the crops, which had some influence on business, and lessened the disposition to buy.

Our letters from Holland say very little respecting the crops, which we look upon as sure evidence

that there is nothing to complain of. At Rotterdam, on Monday, white wheat was in short supply, and fully as dear as on that day week, but red being rather more freely offered, slightly receded in value.

From France we learn that considerable progress had been made with harvest; in the south a large proportion of the corn had been carried in in good order, and in the less forward districts some quantity had been cut. The reports as to the yield and quality differ in different localities, but on the whole the wheat crop was well spoken of. At Bordeaux, on the 6th instant, good red wheat, weighing 62 lbs. per bushel, might have been bought at equal to 37s. per qr. of 480 lbs. free on board; freight to the United Kingdom varied from 3s. 3d. to 3s. 9d. per qr., according to the port of discharge.

In Italy harvest had been nearly finished, and a letter from Leghorn of July 6th, states that the wheat was mostly scarce; the yield and quality were both satisfactory, but no supplies of moment were for some time expected. Meanwhile prices of foreign wheat were well supported, fine Polish and Marianopole being quoted 35s. to 37s. per qr., and common Odessa of 60 to 60½ lbs., 32s. 5d. to 33s. 9d. per qr. free on board —*Mark-Lane Express.*

IRISH PEAT.

It is premature at present to offer any remarks upon the following statement, made in the House of Commons, by the O'Gorman Mahon. The facts, as stated, are startling; and if they turn out correct will decidedly turn out a great national benefit.

The O'Gorman Mahon wished to call attention to a subject which would be found to be of great importance as regarded the development of the resources of Ireland. The facts to which he wished to call attention were stated in a letter to him from an eminent chemist, who averred that peat was, with a very trifling expense in manual labour, capable of producing carbonate of ammonia, soda, vinegar, naphtha, candles, camphine oil, pitch, tar, common oil, and gas. This, he maintained, was one of the greatest discoveries of the age. It appeared from the testimonies of several persons that the Irish peat was capable of producing oil of a superior quality—quite equal to spermaceti. That which at present cost from £90 to £95 a ton, the manufacturers of this country could now have for £40 a ton; the iodine, which now cost £17, could be procured for 5*l.*, and an equal reduction could be effected in other articles. And now, as a proof of the accuracy of these assertions, he produced a spermaceti candle made from an Irish sod of turf (the hon. member here called attention to a candle which was on the table, and which was taken up and examined by Mr. Fox Maule, and then handed round to Lord John Russell and other members of the ministry). He had the guarantee of Mr. Owen as to this fact, and Mr. Owen was an Englishman of unimpeachable veracity; and so certain was he of the truth of that gentleman's word, that he had no hesitation in saying that he staked his word and honour on the truth of Mr. Owen's assertion, that in the candle then before them there was no foreign material. When there were several millions acres of peat in Ireland, he thought this discovery of the very greatest importance. He now appealed to the noble lord (Ashley) near him as to the character of Mr. Owen, and the trust that ought to be placed in any assertion made by him.

Lord Ashley said that a more high-minded or a more religious man than Mr. Owen he never had the good fortune to know. The hon. gentleman had told him it was his intention to appeal to him with respect to his knowledge of Mr. Owen, and he (Lord Ashley), in order that he might be quite sure of the facts, requested Mr. Owen to call upon him that morning, and he then took down in writing what that gentleman had to state on this subject. That statement, he admitted, was one which must appear almost incredible. They were to remember that what he was going to state was not true upon one hundred tons, but upon thousands of tons of peat, and on which there had been a large expenditure of capital, and on these results Mr. Owen staked his character. The results were these:—Every 100 tons of peat, on which the cost of labour was £8, were found to contain—of carbonate of ammonia, 2,602lb., the value of which was £32 10s.; soda, 2,118lb., value £8 16s. 6d.; vinegar, 600lbs, value £7 10s.; naphtha, 30 gallons, value £7 10s.; candles, 600lb., value £17 10s.; camphine oil, 600lb., value £5; common oil, 800lb., value £3 6s. 8d.; gas, £8 in value; and ashes, £1 13s. 4d.—makin a total of £91 16s. 1d. (cheers). These Mr. Owen held forth as the results of his operations; and he added that when the peat was cleared away, the soil below was found to be so saturated with ammonia as to be invaluable for the purposes of agriculture. Now there could be no doubt that such results had been attained; but taking only the half of what was stated to be true, it was manifest that the greatest benefit must be conferred upon Ireland. This was not theory; but the result of experiments that had been made.

Receipt for a Rider.—Keep your head up, chin down, chest forward, shoulders back, elbows in, hands down, back in, belly out, fork forward, thighs fixed, knees in, legs close, heels down, and toes in. Trot two hours a day without stirrups, loins loose, seat firm, hand tight, horse and rider well balanced, and then time and perseverance may make you a horseman.—*Bell's Life.*

AGRICULTURAL HINTS.

TO THE EDITOR OF THE MARK LANE EXPRESS.

SIR,—Agriculture, like all other arts, may be considered as practiced under three forms: as, 1st, the make-shift or "do well enough"; 2nd, the common, or tolerably good; and 3rd, the best possible, although even the make-shift may often be the best possible, under certain circumstances, or we may look upon farming as practised extensively. Intensively, where a too dense population makes land dear and labour cheap; and in a country so situated, we naturally hear of small *arable* farms, spade culture, greater economy in collecting manures, cattle soiled in buildings, and hand-tools instead of machines. Extensively, where the population is very scanty and labour high: there herds of cattle and sheep will abound as in Australia; or if arable culture is attempted, it will be rather of a slovenly character, and machines worked by horse or steam power used whenever possible, as in the United States.

These rules applied to England show the inconsistency of writing up a garden-like culture, as a panacea for all evils, and as a thing either to be wished for or expected: or of supposing that the system of the London market gardeners, where a very dense population supplies manure and labour, and consumes the produce, is applicable to more thinly populated districts. In the most "extensive" system of agriculture, the labourer lives almost entirely on meat; in the most "intensive," as in Ireland, on potatoes, for the quantity of labour employed increases in a greater ratio than the quantity of food produced by that labour.

The intensive or minute farming of Belgium, China, and other densely populated countries, is as old as the density itself; but "high farming," by which I mean a striving for perfection in every branch of farming, almost as much for the sake of excelling as for profit, is altogether modern and of British growth.

Thus our workmen, our horses, and our machines, are expected to perform a greater quantity of work, and in a better manner, than any others in the world; our fattening stock, to lay on fat quicker and more of it, and our land to be ploughed and tilled better. We have brought division of labour, and a consequent higher perfection in all kinds of work, to almost as great an extent in agriculture as in manufactures. Our ploughmen, our hedgers and ditchers, our thatchers and sheep shearers, do little else, during the proper seasons, but plough, hedge, thatch, and shear; and consequently these are done here in a superior manner to any other country. We apply this principle, division of labour and special applicability, even to our animals; and thus we have separate breeds of horses for farm-labour, riding, driving, hunting, and racing, each bred and trained with a view to perfection in its particular work. Our cattle may also be divided into working, fatting, and dairy breeds. In no other country do we find private associations for rewarding superiority in moral character, or quantity and quality of work among labourers, and giving prizes for superiority in stock; although foreign *governments* may, in some instances, try to imitate private English associations, and thus improve the indifferent farming of their countries.

As to the system of rewards. Young, in the Suffolk Report, tells us, that drawing team against team for sweepstakes, to test the strength and bottom of the horses, was then common; and in his Annals, he says that rewards ought to be given to the labourer, the implement, and the team. To the labourer, for the best work made; to the implement (tested by the dynamometer), for ditto, and for the the least draught; to the horses, for strength and quick stepping. He also advised that prizes should be given to horses, not for outward appearance only, but for strength, endurance, and quickness in *walking*, as tested by drawing a heavy cart for a certain number of miles. The slow pace of ox-teams renders them worse than useless in high farming, as they are not only slow themselves but make all those who have anything to do with them slow likewise. Labourers ought to be as active and efficient as possible; and here the northern practice of giving food, or the raw material of food, to labourers instead of money wages, is an advantage; as is the use of efficient tools. Compare, for instance, the long-handled scythe of the northern counties, taking ten feet in a sweep, with the garden scythe of the southern taking six feet only.

But to return to "minute" farming. Here the transplanting system and that of double culture might be brought into far greater use, thus transplanting all plants when arrived at a certain stage of growth, just as we now do cabbages or kohl-rabi. It may be said that all plants would not stand transplanting. I do not know any (except peas and beans) that would not, if proper precautions were taken—as, in dry weather, to water the seed-bed well before drawing the seedlings, so that each should have a small lump of moist earth sticking to it, and no fibres be broken. Then, to manure and prevent the effects of planting on unsuitable ground, dibble large holes with a potato-dibble, and fill these with a suitable compost before inserting the plants; and also dip the roots of the plants, just before setting, in some thickish composition of adhesive earth, water, and manure; so that they may be checked as little as possible in their growth.

As to the double culture, this may be done for various reasons—1st, to protect one crop from the attacks of vermin, as white turnips of mustard grown with swedes; 2nd, to take the place of the failing crop, if there is a risk, as when beans or cabbages are grown alternately with potatoes, or turnip-seed sown with mangold-wurzel; 3rd, to grow an under crop till the main crop be cleared off, as in the common case of seeds with bar-

ley, or in the Belgian plan of carrots with flax; and so to manage that two crops, one advancing to maturity, and the other in a young state, shall always be growing, and their roots to be, one suited to subsoil, the other to surface soil.

But although England stands foremost in agriculture, yet there are many things practised in other countries which ought and might be practised here, and which, because farmers are the only class that do not travel on the Continent, are not yet well known. Besides the farming practices, the household economy of foreign countries might afford many hints to both farmers and labourers in England. There may be many kinds of valuable seeds and plants well suited to us that we know nothing of. A knowledge of the manner of building, living, and farming in hot and cold countries, with plans of farm-buildings and drawings of machinery, would be useful to Australian and American colonists, and to those Englishmen intending to emigrate there.

But it may be asked; How could such information be obtained? Why, by four or five hundred farmers subscribing their sovereign each, to send out a person tolerably acquainted with agriculture to take notes of all worth noticing, to inform them what, if any, would be advisable places for them to emigrate to; each subscriber to have a copy of the report, and be at liberty to add one or two private commissions; and as farmers generally know little of drawing or languages, one of that class of foreigners so common in England, who know nothing else, would have to be engaged to accompany the person sent.

ANNUAL MEETING OF THE ROYAL AGRICULTURAL SOCIETY OF ENGLAND AT NORWICH.

The implement yard was open this morning, Wednesday July 18, and was soon tolerably well filled with visitors. Those who came for the transaction of buisness had, no doubt, every reason to be satisfied with their visit, for great variety and excellence and cheapness gave employment and satisfaction to purchasers. Those, also, who came to study any particular branch of the wide subject of agricultural mechanics had no difficulty in obtaining the instruction they desired; but if any desired merely to see what was to be seen, and to carry away in their minds the impression of the show as a whole, they must have left, we imagine, but little wiser than they came. The show is much too unwieldy an affair to be carried off in that way. More than 140 ploughs with every variety of mould-board and frame-work, 13 subsoil pulverisers, 66 drilling machines, 10 manure distributors, 18 steam engines, nearly 60 thra-hing machines, 30 corn dressing machines, about 40 flour dressing and grinding mills, upwards of 40 linseed crushers, 70 chaff cutters, 20 turnip cutters, 30 oil-cake breakers, 90 carts and waggons, nearly 30 draining tile machines and pug mills, 20 sets of draining tools, four dozen Norwegian and common harrows, 40 scarifiers and cultivators, nearly 50 horse hoes, 20 rakes, 7 dibbling machines, 44 hand dibbles and drills, 10 haymaking machines, 3 gorse bruisers, a dozen of steaming apparatus—but it is needless enumerating further—we have only gone half through the catalogue, for it contain axles, and barrows, and bean-splitters, and *bedsteads*, and churns, and clod crushers, and covers; fencing, fire engines, flower-stands, forks, and garden chairs, gates, gauges, glass, grass cutters, and harness, horse power, nummellers, hurdles, and levels, and mangers, manures, models, and pumps, and racks, ranges, ribbing machines, rickstands, rollers, and sack-holders, safes, saws, screens, seed machines, spades, straw shakers, and tree guards, troughs, and washers, weighing machines, wheels, whippletrees, wire netting, and about 130 "*other articles* not capable of classification as above." Such a collection of individuals, each in succession making its individual impression on the mental sheet, must in the great majority of cases have reduced it to the condition of one great blot, where memory can decipher but very little. For ourselves, we can only say that, after the first survey, we arrived at the conclusion, that the exhibition was far more for the interests of buyers and sellers than for the instruction of visitors—and that the *trade* of machine making was prospering, and being furthered more than the *art*. There certainly remained with us the impression of some clever liquid manure carts and distributors, an ingenious churn, a remarkable slotting machine called a deep drain plough, a wonderful display of ingenuity in hand dibbling machines, and a portable farm railway, &c.; but without asserting that all individuality besides was lost, little else remained than a confused recollection of wire fencing, and steam engines, and drilling machines, and ploughs, and the hundred other articles present along with them. Certainly it would be an improvement if a smaller number of articles were a maximum, beyond which these exhibitions should not pass; if not more than one or two specimens, to illustrate the best developments of any one exhibitor; if the show yard were less of a mart and more of a museum—less for the benefit of salesmen personally, and more for the benefit of their art.

In 1841, 312 implements were entered for exhibition; at the annual meeting of the Society, in 1842, 455; in 1843, 508; in 1844, 948; in 1845, 942; in 1846, 735; in 1847, 1321; in 1848, 1508; and now, in 1849, as per published catalogue, there were about 1700. For the examination of this immense number, nine gentlemen undertake the thankless and laborious office of judge; and the work which might well occupy them for a fortnight has to be performed in a day or two. "You don't think that I care anything about such a trial as that," we overheard an exhibitor say to them, on hearing their decision against them; and "Well, you cannot blame us for the shortness of it," was

the reply. The conversation was perfectly good-humoured on both sides—the machine maker seemed too well satisfied with the opinion of his customers to care much for that of the society's judges; and the latter cannot have much confidence, themselves, in an opinion formed under such inadequate circumstances. And the fact is, that the judgments have in successive years varied so considerably as materially to diminish their authority—a circumstance which might be accounted for on the ground that the prize machines are either entire novelties or have appeared against different competitors every year, were it not that this is really not the case. Take the case of drilling machines: for instance, when Messrs. Garrett and Hornsby alternate on the prize list—each, every other year, gaining over the other; not we believe because the other after victory loses ground in the progress of improvement, but because judges of different opinion succeed one another in office. Or take the subject of grubbers, where Biddel's scarifier and the Uley cultivator have won honours turn about, and where the chief prize is this year denied to both, and given to a tremendously heavy tool by Messrs. Smith, of Stamford. Take the instance of subsoil ploughs, where Smith has given way to Read, and Read has now given way to Comins, though all three have annually had the same implements in the yard for many years past.

But we must not pursue this subject further; the implement show is a magnificent affair, and most useful, with all its imperfections, which have arisen out of the success with which this very usefulness has endowed it. Some method of curtailing the numbers exhibited of nearly similar machines, and a longer time in which, or a greater number of judges before whom, to submit their several merits to sufficient trial, seem to be the chief things wanted to increase this usefulness.

Before proceeding to describe a few of the machines exhibited, we must say that the two important particulars, simplicity and cheapness, seem to have been generally well kept in mind in the above awards. Certainly some of the iron implements exhibited, ploughs and horse hoes for instance, are remarkably cheap.

We cannot pretend to give anything like a detailed description of the machines exhibited, and must, therefore, be satisfied with selecting one or two as we walk round the yard. The first objects seen on entering are the various glass utensils of J. Phillips, 116, Bishops-gate-street-without, for dairy and other purposes, including milk vessels, lactometers, thermometric fire-alarum, &c., Mr. Newberry's well-known dibbling machines, which should have occupied stand No. 1, being absent. The next stand, that of Messrs. Stratton and Hughes, of Bristol, contains a large number of carts, waggons, water carts, &c. Among them we particularly noticed cylinder water and liquid manure cart, thus described by Mr. Thompson, in the Society's report last year:—"The inconvenience of all other liquid manure carts is altogether avoided in Mr. Stratton's implement, which consists of a wooden or iron barrel revolving upon its axle. One side of the barrel consists of a perforated board, which is kept uppermost when not at work, and to set it to work it is only necessary to turn the barrel round. Thus valves and delivery pipes are altogether unnecessary; and however hilly the land, or however empty the barrel may be, it will always adjust itself by its own weight, and deliver its contents at an uniform rate. As a natural consequence of this greater simplicity of construction, the price is considerably lower than that of any liquid manure cart hitherto exhibited."—The cart No. 15, containing 100 gallons, weighs only 5¼ cwt, and can be drawn by a stout donkey, or small poney. Price £14 10s. The tumbler cart, especially adapted for use on streets, or where the roads contain no ruts, is also an ingenious contrivance. The body hangs on the axle, which passes through it; and the former may be turned completely round it, bottom upwards, for emptying, and downwards, of course, for filling. The next stand (Mr. Busby, of Newton-le-Willows, near Bedale) contained a ribbing and drilling machine, which appeared a clever contrivance. It will rib and drill seven rows of corn at any width that may be required; can be worked by two horses, a man, and a boy, as the steerage is placed behind the implement. It is a simple machine, with seven ribbing ploughs, which hang independent of each other. Price £14 14s. It was rewarded with a silver medal. Mr. Busby also carried off the prize for the best Turnip horse-hoe; certainly a most excellent implement, and remarkably cheap. Price £2 10s. It contains three paring teeth; the two outer ones shifting to or fro, according to the width required, and these are followed by a sort of Norwegian harrow, on a small scale, which must reduce the land stirred to a good tilth.—Stand 13 (Mr. Burrell, of Thetford) contained, among many other things, a circular saw bench, fitted with a machine for boring and morticing at the same time, which is adapted for morticing hurdle or gate-heads, by which the five mortices for the ledges to fit in can be made in two minutes, and two men can complete one hurdle in a quarter of an hour. An extra frame is also supplied for putting the hurdles or gates together upon, by which they are all made one uniform size. It received a silver medal. Stand 19 (Mr. Hayes, of Stilton, Huntingdonshire), contained what is called "a crank appendant," which assists a man in working any sort of machine which is turned by hand. It is a "see-saw" (resting on the land), on which the man stands with a foot on each end of it, and as in turning the handle of the chaff cutter to which it may be applied he describes the downward half of the revolution, his weight then resting on his right foot, tells on the one end of the beam to the advantage of his hand power, while during the upper half, when he draws himself backward, his

weight rests on the left foot on the other end of the beat, and it again comes in, by the intervention of crank work, to the assistance of that part of the labour. Mr. Croskill, of Beverley, at No. 25, exhibited an immense number of machines for carriage and cultivation. His cart and waggon carried off prizes—both of them are very cheap. The former is adapted for harvest as well as ordinary purposes. It is constructed without a nail, slot, sole, or mortice. The body is made of plain sides, bolted together; the form, position, and finish of this body is adapted for farming work; the loose shelvings are soon taken off, or put on the cart when required; the wheels of this cart are made upon the principle advocated by the judges at the Royal York Show. Price—mounted upon patent wheels and axle, 4 feet 6 inches high, with 4½ inch tire, to carry 30 cwt. loads, £18. Messrs. Howard, of Bedford, at No. 47, carried off the prize for the best plough for light land this year again. The prize implement is made entirely of iron (principally wrought), it is so constructed that it is sufficiently strong for four horses, as well as being easy of draught in general work for a pair; it can be used with horses at length as well as abreast. Its peculiarities consist in the very taper and regular curve of the cutting and moving parts, great attention having been paid by the makers to the share and furrow turner (of which they have several patterns), not only with a view to reduce the draught, but to make it suitable to as great a variety of soil as possible. At No. 58, Messrs. Barrett and Co., of Reading, exhibited thrashing machines, and their elegant and clever horse-power gear work. A two-horse power thrashing-machine and gear-work complete, which they exhibited at work, was a very neat, clever, and cheap piece of machinery. It had a patent breasting, formed by a series of straight wrought iron bars, moving in two sets of slots, crossing each other transversely; one set in the side of the machine, and the other in a segment, which being worked round the centre of the drum draws the breasting either towards or from it, the segment being so formed as to keep the required sweep of the breasting. The advantages gained by this arrangement consist of the readiness and accuracy with which the breasting can be set for the various kinds of grain, which is performed by merely raising or lowering a lever, with teeth at the end, which work in corresponding teeth upon the slot segment, and moves it round the centre of the drum. The breasting being made of wrought-iron is less liable to accident, and should one by any means occur, any of the bars can be taken out, and straightened. At No. 66, Mr. Hunter, of Kelso, exhibited a cart saddle, which was rewarded with a silver medal. The improvement in it consists in the boards and panels being moveable, by which means they adapt themselves to the form of the horse's back and fit a great majority of horses with perfect exactness, prevent galling and other dangerous consequences, and enable the horse to bear his burden with greater ease, which has been fully proved by experience. The boards and panels can be separated from the saddle at pleasure, and two or more pairs may be had for the same saddle, enabling them always to be kept dry and in good repair. The saddles with all the sets of harness are on the same principle. Price £1. At stand 115, Mr. Paul, of Thorpe Abbot's Hall, near Scole, Norfolk, exhibited his remarkable drain plough. It is a revolving disc, with projection teeth tools, which, once in position for working, are made to rotate by chains and windlass, at a distance, while the whole machine is pulled forward in the opposite direction, towards the unfinished end of the trench The teeth enter the land at the bottom of the drain; each takes its inch or so of the material on which it is acting, and works it out, lifting it up to the surface, and, with the help of a mould-board on each side of this disc, which takes out the first 8 inches of the top soil, throwing it on either side. It may be worked with three or more horses, and, by a single operation, will cut a drain from 3 to 4 feet in depth at the rate of from 4 to 5 feet per minute, according to the texture of the soil, leaving it in a finished state, with a perfect level bottom for the tiles to rest upon. It is also calculated for raising subsoil to the surface for the purpose of claying lands; and when the clay is in a plastic state, will raise from 4 to 5 cwt. per minute; and on stony soils it may be made equally efficacious, although the operation may be somewhat slower. It may be used to the greatest advantage when the surface of the soil may have become so hard either from frost or dry weather as to render it impracticable to accomplish the cutting of drains by manual labour. The utility of this implement, when it is required to cut drains on clover lands in course for wheat crops, and from which the first crop has been taken, is clearly seen, as the clay, from being immediately spread upon the surface, becomes thoroughly pulverised, and comes into immediate operation for the succeeding crop. Price, exclusive of royalty, £50. This machine deserves examination by those who are about to enter largely on draining. Mr. Coode's irrigator was rewarded with a silver medal. It is described thus:—Easily worked by a young boy, though more economically by two, and distributes water or liquid manure on the land with less violence and more regularity than a shower of rain. It will irrigate from 10 to 20 acres per day. No horses are used. The treading by the feet of the boys is inconsiderable, and the weight of the entire implement charged with liquid is less then 2 cwt. An acre may be manured with from four to twelve tons of liquid for 2d. Drought may thus be defied; it never need prevent seeding, planting, weeding, or any other operation. The land and the crops may be treated at any time with any manure or application they may require. Not only manures which are already liquid, such as sewer water, malt, hemp, and flax steeps, gas

water, spent leys, and the like, and all soluble saline manures, such as guanos, superphosphate of lime, marine, and other salts, but also farm-yard manure, and even lime, marl, clay, and other insoluble matters suspended in water by agitation, are applied to the land by this implement in the most equal and effective manner, and at a cost incomparably less than that of the common processes. The great object of the invention is to enable the cultivator to liquify all his manures, and to use it as rapidly as it is produced. Price £20.

Experience takes very high school wages, but she teaches like no other.

Speaking much is a sign of vanity; for he that is lavish of words is a niggard in deed.

The lives, liberties, and properties of a civilized people can never be legally secured, except by just laws and impartial governments.

We should give cheerfully and quickly: there is no grace in a benefit that sticks.

Report is a quick traveller but a very unsafe guide.

"What will you take?" said the gentleman of the house, without producing anything. "My leave," said the visitor, quietly.

Memory is like moonlight, the reflection of rays enanating from an object no longer seen.

He who will not reason is a bigot; he who cannot is a fool; and he who dares not is a slave.

The wealth of a man is in the number of things which he loves and blesses, and which he is loved and blessed by.

Love, however modified by time or circumstance, is the one abiding inhabitant of the human heart; it clings to man, even in the midst of his decay, and refuses to quit its dwelling in his bosom till that bosom's feeble flutterings are stilled.

It is an immense blessing to be perfectly callous to ridicule; or, which comes to the same thing, to be conscious thoroughly that what we have in us of noble and delicate, is not ridiculous to any but fools, and that if fools will laugh, wise men will do well to let them.

BOTANY BAY—THE LAST BLACK.—In new South Wales there is one, and only one, of the Botany Bay tribe remaining. He is very fond of the Bay, very intelligent, and has a ten-acre piece of ground and some "white fellows" tenants. "Well, Mitter," (Mr), said he to a friend of mine, in a half-musing tone, "all black fellow gone! all this my country! pretty place, Botany! Little piccaninny, I run about here. Plenty black fellow then; corrobory; great fight; all canoe about. Only me left now, Mitter. Poor gin mine, tumble down (die), all gone! Bury her like a lady, Mitter——; all put in coffin, English fashion. I feel lump in throat when I talk about her; but—I buried her all very genteel, Mitter."—*Townsend's Australia.*

FARMING IMPLEMENTS.

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 unqualified opinion that they are very much superior to any article of the kind which we have seen manufactured in the country, and equal to any imported.

And we would particularly recommend to the notice of Agriculturists throughout the Province his Subsoil Grubber, which he has improved upon from one which took a premium of £10 from the Highland Society of Scotland. This implement seems well adapted to improve and facilitate the labours of the Farmer, and we cannot doubt that it will soon be extensively used in improved cultivation. His Scotch and Drill Ploughs are also very superior, and well worthy of the inspection of every one desirous of possessing a valuable article.

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NEW SEED STORE.

THE Subscriber begs to acquaint his Friends and Customers that he has, under the patronage of the Lower Canada Agricultural Society,

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Where he will keep an extensive assortment of AGRICULTURAL and GARDEN SEEDS and PLANTS of the best quality, which he will dispose of on as favourable terms as any person in the Trade. From his obtaining a large portion of his Seeds from Lawson & Sons, of Edinburgh, who are Seedsmen to the Highland and Agricultural Society of Scotland, he expects to be able to give general satisfaction to his Patrons and Customers. He has also made arrangements for the exhibition of samples of Grain, &c., for Members of the Society, on much the same principle as the Corn Exchanges in the British Isles. He has a large variety of Cabbage Plants, raised from French seed, which he will dispose of to Members of the Society, at one fourth less than to other customers.

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Montreal, April 1849.

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