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AGRICULTURAL JOURNAL,

AND

TRANSACTIONS

OF THE

Lower Canada Agricultural Society.

VOL. 2. MONTREAL, FEBRUARY, 1849. NO. 2.

The Lower Canada Agricultural Society have been organized with the object of advancing the prosperity of the country, and as the means of effecting this, they endeavour to promote the improvement that is necessary in our general system of Agriculture. As a commencement, they have, at considerable expense, published an Agricultural Journal for the past year, and this second number for this year. There is no desire in publishing this Journal to do away the present system of Agriculture, and propose an entirely new one that is unknown and unproved here by farmers. The Journal shall only propose improvements in the present system of husbandry, where they are manifestly required, and recommend these improvements by stating the results that have been obtained from certain systems of cultivation in other countries. Any farmers who are satisfied with their own modes of farming, and that no improvements are required, should, by all means, continue their present system, and we can assure them they can very well afford to pay for this Journal, if only to prove to their own satisfaction, that they already understand and practice a superior system of Agriculture to any we could propose to them. We may give insertion to selections from Agricultural publications, but if these selections are good, we know they will not be rejected by sensible men. This Journal is purely Agricultural, and does not contain any political matter; it cannot, therefore, be objectionable on this ground. It would appear most extraordinary why any publication of this nature should want for the unanimous support of every farmer in Canada. It is exclusively devoted to their interest, and open to their communications on any subject connected with Agriculture, and all this for five shillings per annum. We are not so very modest as not to say that we know some single numbers of the Journal to be worth more than five shillings to any farmer who was not under a particular vow not to be instructed by anything he ever sees in print. We cannot understand why farmers do not unite together to promote improvement, and support the general interests of Agriculture. Experienced farmers, if they feel convinced that they are perfect in the art and practice of Agriculture, cannot reasonably object to this Journal, if it is not all they would think necessary to make it useful, because we have constantly invited them to contribute to its columns to make it useful to their brother farmers, if they desire the general improvement of Canadian Agriculture. No one can for a moment suppose there is any other object in publishing this Journal, but that we have stated—the improvement and prosperity of Agriculture. It is the medium of communication and means of connection between the Lower Canada Agricultural Society and the Agricultural classes. Why, then, we would beg to inquire, should it not be made a useful publication, and obtain the support of every farmer in Lower Canada, if there is only one individual in the family who can read it? We can promise it shall not, while under the present management, ever contain a line on politics, or that will interfere with religious opinions.

or moral duties. We shall advocate the judicious cultivation of our soil, in order that our lands shall yield abundant crops—the care and management of our cattle and sheep, so that they shall give us profitable returns—the introduction of such domestic manufactures as we shall conceive might be advantageous to us; indeed it shall be our sole study to write for the benefit of our subscribers, and for the general interests of Canada. We may address this Journal to many that are not disposed to subscribe to it, notwithstanding all we have said in this article to recommend it as good value for a dollar. Those who will not be charmed by us, charm we ever so wisely or sweetly, we would request to return this number, addressed to us as Secretary of the Lower Canada Agricultural Society, and the Journal shall be discontinued to them. We would hope, however, that not one copy shall be returned, but, on the contrary, some thousand copies ordered, after this urgent invitation to all our brother farmers. Agricultural Societies throughout the country, we shall, as a matter of course, expect to order large numbers of the Journal for distribution to the unsuccessful competitors at their shows. They will thus make them perhaps successful competitors at some future shows. Indeed we would recommend to all County Agricultural Societies to distribute this or some better Agricultural Journal to each unsuccessful competitor at the cattle shows, and perhaps it would be found to produce more improvement, where it is most required, than all the premiums paid to successful competitors. We shall answer for it, that this Journal for a year, if given to an unsuccessful competitor, will, at all events, enable him to understand the cause of his failure. According to our idea of the matter, it would be quite as necessary to give instruction and encouragement to the unsuccessful competitors for Agricultural premiums, as to reward those who are successful, and who may owe their success to fortunate circumstances, that are not in the power of the unsuccessful competitors. To encourage and instruct the inexperienced farmer, we conceive, if not to be the first, certainly to be the most useful duty of Agricultural Societies, and this is the chief object of the Society who publish this Journal. The establishment of Agricultural Schools and Model Farms, is the next means they propose for the accomplishment of the same object. The Society are organized and incorporated, and capable of producing immense benefit if they obtain the support they are entitled to from every true friend of Canada. To the Catholic clergy, who, for the past year, have been the best patrons and supporters of the Journal, we continue to send it, and respectfully beg they will exert their powerful influence to assist in promoting the objects advocated by the Journal, so far as they shall approve of the same.

The following selections from Thaer's Agriculture we recommend to the attention of farmers, who must see the correctness of Thaer's observations, and cannot fail to profit by them if so disposed. We prefer to copy from the work of this practical agriculturist to submitting our own ideas, as we perfectly agree with Mr. Thaer. We cannot conceive any reasonable objection to copying into this Journal good selections from practical works on agriculture, particularly when our own ideas coincide with the matter selected. There may be some selections copied occasionally, that we do not agree with, from our want of practical experience on these particular subjects, but in such cases, we shall simply copy without any recommendation, leaving the reader to judge for himself. We are aware of the difficulty of giving general satisfaction in a publication of this nature, as well to those who may know very little of agriculture, as to others who may think they know vastly more about the matter than we do. All that is in our power we have done, and ever shall continue to do, to make the Journal useful to any subscriber who may desire to profit by it. For our own part, we have been most anxious to read any agricultural publica-

tion we had an opportunity of seeing, and always with advantage, as there is scarcely any work on the subject, that does not contain some useful information or suggestions that the most experienced farmer might profit by. There are numerous publications for information and instruction in every other business and profession, and we see no sound objection to farmers endeavouring to obtain instruction and information from agricultural publications, founded on experiments and practical experience:—

"It should now be asked, what depth should be given to the ploughing, the variety of opinions which exist with regard to the point has entangled us in a labyrinth of discussion, through which we vainly endeavour to thread our way. There is a very great difference in ploughing a soil deeply, the vegetable layer of which is only homogeneous to a considerable depth, and augmenting a more or less superficial layer of earth by means of deeper ploughings, or, in other words, rendering its constituent parts homogeneous to a greater thickness, and impregnating them with fertilizing particles throughout their whole extent. Every attentive observer must admit the manifest superiority of deep over shallow soils. The depth to which the roots of plants will penetrate when they meet with a fertile soil, varies according to the nature of these plants. There are some, the roots of which have been traced to the depth of fifteen, twenty, and even thirty feet; as for example, sainfoin and lucerne. Red clover will push its roots to the depth of nearly three feet; and several other plants of common growth, probably penetrate even to a greater depth, when, instead of encountering obstacles, they meet with a loose, fertile soil. I have pulled carrots two and a half feet in length, the top root of which was probably another foot long. But as land is chiefly devoted to the cultivation of various kinds of grain, its value ceases to increase beyond the depth attained by the roots of cereals; at least to a similar extent.

The unassisted eye will frequently enable us to trace the roots of grain plants to the depth of eight inches, and with the aid of a magnifying glass, we can distinctly see that these roots have been broken off, and some portion of them still left in the ground. I have myself seen corn grow on the shoulders of ridges, with roots twelve inches long, but I believe they would never have penetrated so far on a flat soil even had it been equally rich. The seed, when sown, is usually placed two inches below the surface of the soil; and I have seen the roots penetrate twelve inches deep into the soil. Hence it appears we may consider twelve inches to be the proper average depth for a soil adapted to corn, and admit it as a principle, that the plants penetrate thus far where they find the earth sufficiently loose and friable. Where the plants are sown very closely to each other, their roots are still more disposed to penetrate into the ground. Whenever we have the opportunity of observing, we shall see the roots avoiding each other and put forth their largest shoots in those places where they will not interfere with others; this is most perceptible in plants growing in water, because we have more opportunity of observing the roots there. When therefore, a plant is prevented by those around it from extending its roots in a lateral direction, it pushes them downwards, provided that instead of encountering obstacles it meets with a loose soil well impregnated with nutritive matter. But if, on the contrary, the roots encounter a hard or sterile substance, it extends itself on all sides and in this case, when the plants are very close together, their roots form a thick and knotty tissue disputing with each other for room and nutriment; the weakest give way before those which possess more vigour, and, however advanced in their vegetation, are weakened, or literally perish. The deeper a soil is, the nearer together can plants be made to grow in it without injuring each other, and the greater number of them will attain to perfection. No attentive observer can fail remarking the wide difference between deep and shallow soils. It appears in proportionate degrees in soils of four, six, eight, and twelve inches in depth; provided that such soils are equally impregnated with manure, throughout their whole extent. If it were possible to conceive that each grain of corn bears a plant, we ought to be able to sow land having a layer of vegetable soil eight inches in thickness twice as closely as we could one which had only four inches depth, and obtain a double crop from it. In this manner the value of a soil would be determined by a multiplication of its surface by its depth. But we must not, however, venture to carry out this principle to its fullest extent, because the influence of the atmosphere always gives to extent of surface an advantage over depth. No impartial observer who has had experience in this matter will, however, venture to dispute the fact that depth of land has a great influence over its value. In order not to exceed the bounds of truth, I shall lay it down as a principle that this value is increased eight per cent by every additional inch of depth which the soil acquires from six to ten inches, and diminished in equal proportion from six to three inches.

But deep soils have likewise another advantage; they suffer much less from drought and from moisture than those in which the layer of vegetable earth is more shallow. When the weather is wet, and a great deal of rain falls, the water sinks into a loose soil impregnated with manure as low as the vegetable layer extends. Such a soil absorbs a quantity of moisture proportionate to its depth, before it suffers any to return to the surface. This is the reason why garden ground, which is well tilled with spade labour, never suffers from

excess of humidity, even when the surface of shallower soils would be drenched with moisture. Deep land retains the moisture which they have absorbed for a considerable period, and communicates it to the surface when that becomes parched and dried up. Nor is this advantage confined to the extent to which the roots of the plants reach; I am well convinced of this from having noticed that during a long period of dry weather, a crop of grain, growing upon land that had some years before been dug up to the depth of three feet, suffered much less than another that grew on a soil only a foot and a half deep, although both of these soils had received exactly the same amount of cultivation and preparation.

Nor is this all; crops of grain growing on deep soils suffer much less from sudden changes of temperature, from drought, or from heat; because their roots being able to penetrate farther, are less subject to the action of these influences, than they would if nearer to the surface. During excessively hot or very dry weather, it is evident that the plants are much fresher in deep than in shallow soils. Lastly, it has been everywhere remarked that corn growing upon deep soils is much less liable to be laid even when very luxuriant in vegetation; this is, no doubt, owing to the greater degree of strength which the depth of the roots gives to the lower part of the stalks, a strength which corn growing upon a shallow soil never can attain, because then the fresh shoots put forth by plants growing closely together, cannot find sufficient nutriment to enable them to attain their full vigour. Nor is it to grain crops alone that the depth of soil is beneficial; it is not less favourable to the cultivation of plants the roots of which penetrate deeper into the soil and seek their nourishment beyond the level occupied by the roots of grain crops. This is the reason why a deeper than is absolutely necessary for the cultivation of grain crops, is always desirable, to make it more suitable for root crops. But if we would have a soil attain all these advantages, and permanently possess them, it is requisite that from time to time it should be ploughed to the very bottom of its vegetable layer, turned over, loosened, and every part submitted to the vivifying and beneficial action of the atmosphere. Unless this is done, it will, if nearly superficially ploughed, generally lose all those advantages of which we have been speaking; a hard crust or pan will be formed immediately beneath the sphere of the plough's action, which cuts off the earth beneath from all communication with the atmosphere and with the vegetable mould. Experience has convinced me that it is not necessary that this deep ploughing should take place every year, but only that it should be repeated once in six or seven years, especially if, during the interval, the depth of the ploughings given to it are varied, for nothing contributes so materially to form the crust of which we have spoken as repeated ploughings of equal depth. "It appears that the alternate cultivation of grain and of corn crops, the tuberculous roots of which penetrate farther than the others, likewise contributes towards the loosening of the inferior layer of the soil, and maintaining its communication with the upper and superior layer. Land ought, therefore, to be ploughed every seven years to the very bottom of its layer of vegetable soil; and the intervening ploughings may be more or less superficial, and varied in their depth, according to the purpose for which they are bestowed."

The foregoing extract from Thaer, although copied from a book, may be read with advantage by the most experienced farmers in Canada. It clearly shows the necessity and advantage of ploughing the soil in a very different manner from the general mode adopted here. Indeed there are few fields in Canada ploughed according to Thaer's plan, and we have no hesitation in saying that it would be most desirable that all deep soils should be ploughed in the manner pointed out above, provided the land was sufficiently drained.

TEMPLEMOYLE SEMINARY.

An agricultural seminary has existed at Templemoyle, in the county of Londonderry, for some years. It originated with the members of the North-West of Ireland Farming Society, and in it the sons of farmers and tradesmen are taught agriculture.

"The formation of this establishment has caused its founders an expenditure of above £4,000, of which about £3,000 were raised at its commencement by shares of £25 each, taken by the noblemen, and gentlemen, and members of the North-west Society. The Grocers' Company of London, on whose estate it is situated, have been most liberal in their assistance, and have earned a just reward in the improvement of their property, by the valuable example in the farm of Templemoyle presents to their tenantry. In sending a pupil to Templemoyle, it is necessary to have a nomination from one of the shareholders, or from a subscriber of £2 annually. The annual payment for pupils is £10, and for this trifling sum they are found in board, lodging, and washing, and are educated so as to fit them for land-stewards, directing agents, practical farmers, schoolmasters, and clerks. From fifteen to seventeen is the age best suited to entrance at Templemoyle, as three years are quite sufficient to qualify a student possessed of ordinary talents, and a knowledge of the rudiments of reading and writing, to occupy any of the above situations."—*Stephens' Book of the Farm.*

CORRESPONDENTS.

[*For the* AGRICULTURAL JOURNAL.]

THE PRESENT CRISIS.

BY RUSTICUS.

It may be laid down as an indisputable fact, that the prosperity of Montreal depends upon that of the surrounding country, and that the prosperity of the country will be promoted and sustained by fostering the agricultural interests and introducing manufactures. There are many articles of produce which we might grow profitably, but which we do not, and there are many manufactures which might be profitably engaged in, which are now left to our neighbors on the other side of line 45°. Agriculture must not be slighted, and every attention should be paid to facilitating the introduction of improvements into the system of farming, but while this is the case, the introduction of manufactures should not be lost sight of. We have already stated, that woollen manufactories create a market for the produce of the farmer, and there are many other branches of manufacturing industry which would have a similar effect. The establishment of hemp and flax works, for instance, would at once open up a new field for profitable competition in the markets of the world. It has been again and again stated, that Lower Canada is peculiarly fitted to be a hemp and flax growing country, but the statement has never been acted upon to any extent; I do not anticipate that a speedy restoration of prosperity would take place, were manufactures introduced, that would open up new articles of growth to the agriculturist; the process would doubtless be a slow one, but the result would eventually compensate for the tardiness of its attainment. It is an undoubted fact, that we go to the States for a great number of articles which might be profitably manufactured here. This will be admitted by every one, but what avails the admission, unless some attempt is made to remedy this state of things?

It would be a provincial benefit, if a little more energy and self reliance could be infused into us Canadians. If we set diligently about helping ourselves there would then be some hope of prosperity being again restored to us.

We put this statement of the case before our readers. Lower Canada is suffering under commercial depression, and that depression can be removed by increasing the products of the country both in number and in value, and by introducing manufacturing establishments which would create a market for the produce of the farmer. We call upon every lover of his native or adopted country to act in this matter, and if we succeed in inducing but one energetic man to adopt our views something will have been gained.

QUEEN'S COLLEGE, IRELAND.

We extract the following from the Regulations and Courses of Instruction of the Queen's Colleges, to be established in Cork, Belfast, and Galway, as they bear more particularly upon the work we have in hand—viz., agricultural improvement and civil engineering:—

"SCHOOL OF CIVIL ENGINEERING.

"Students before being admitted to the school of civil engineering, will be required to pass the matriculation examination, with the exception of the Greek and Latin languages.

"The following is the course of study prescribed to students of civil engineering:—

First Year.	*Second Year.*
Mathematics.	Mathematics.
Physics.	Practical mechanics.
Chemistry.	Mineralogy and geology.
Drawing.	Drawing.
Surveying.	Civil engineering.

"Any student who shall have completed the above course of study, and shall have passed an examination in the subjects contained therein, will receive a certificate of being qualified to act as assistant to an engineer.

"Students who shall have obtained the certificate of assistant, and shall also have been engaged, during three years, in acquiring a practical knowledge of engineering under the direction of a qualified engineer, will be admitted to examination for the diploma of civil engineering.

"The fees payable by students of engineering to the bursar, on behalf of the college, will be—

First year (including matriculation fee)	£3	0	0
Second year	2	0	0
Certificate of assistant	2	0	0
Diploma of civil engineer	3	0	0

"The fees payable by students of civil engineering to the several professors, for attendance on all the lectures prescribed in the curriculum for civil engineers will be—

Mathematics	£2	10	0
Chemistry	2	0	0
Physics and practical mechanics	3	0	0
Mineralogy and geology	2	0	0
Surveying and civil engineering	4	0	0

"SCHOOL OF AGRICULTURE.

"Students, before being admitted to the school of agriculture, will be required to pass an examination in English grammar and composition, and in arithmetic.

"The following course of study is prescribed for students in agriculture:—

First Year.	*Second Year.*
Elements of physics.	Mineralogy and geology.
Chemistry.	Land-surveying.
Natural history.	Natural history of farm animals, and of cultivated plants.
Theory of agriculture.	Practice of agriculture.

"Students, who shall have passed through the above course, will be admitted to examination for the diploma of agriculture.

"The fees payable by students of agriculture, to the bursar, on behalf of the college will be—

First year	£1	10	0
Second year	1	0	0
Diploma	0	10	0

"The fees payable by students of the agricultural school to the several professors, for attendance on all the lectures prescribed in the curriculum of agriculture, will be—

Physics	£1	10	0
Chemistry	1	10	0
Natural history	1	10	0
Land-surveying	1	10	0
Natural history of farm animals	1	10	0
Mineralogy and geology	1	10	0
Theory of agriculture	1	10	0
Practice of agriculture	1	10	0

THE HYDRO-INCUBATOR FOR HATCHING EGGS, AND REARING POULTRY, AT CHISWICK.

SIR,—Having occasion to visit the great city of centralization, overgrown wealth, and extreme poverty, I was driven out by a friend to Chiswick, to visit Mr. Cantelo's Hydro-Incubator, or egg-hatching, and poultry-rearing establishment, and must confess, though I had no previous faith in it, it astonished me to see, at this inclement season, chickens of all ages, from just emerging from the shell to that of being ready for the table, and, most singular, each in perfect health —no drooping of wings, no moping in corners, no pip or roup—in fact, no disease to which poultry flesh is heir to. A lot of chickens, in large or small quantities, in such rude health, I have never seen; and there has been reared up in one building, and at one time, upwards of 1,300, all to be disposed of, from the London poulterers' shelves, and still not equal to the demand. The advantages are many, in comparison to hatching by the hen; in the first place, they have no hen to devour their dainty food, such as chopped egg, and oatmeal for the young ones; they have no hen to drag them through the ditches; they have no hen to trample them to death, and they have no hens or larger chickens to peck at them; they have their artificial mother, kept up to the temperature of the natural mother; and it is beyond conception, how they will adhere to the warmth of the mother, prepared for them, and run in under the woollen cloth, as if it was natural to them. Each age has its separate compartment, with an opportunity, in fine weather, of passing out to a grass-plot; and you will see them enjoying themselves in the open air, and, when at all chilled, returning to the artificial mother, and making themselves perfectly comfortable.

My astonishment at the fine, healthy, and vast number of chickens produced by this means, has caused me to begin rather at the wrong end, having described the chickens before I have hatched them. The hatching apparatus is a table, the upper part of which is kept up to 106 deg. and is padded with Indian rubber; the eggs are placed in a tray, with perforated bottom, and laid on a woollen cloth, and raised, to come in contact with the rubber, which sinks and covers the eggs as much as the natural mother is supposed to do; thus nature is represented as nearly as possible. After incubation, the artificial mother consists of a number of heated pipes, about an inch and a quarter in diameter, and about the same distance apart, resting on supporters, about five inches from the floor; beneath these pipes is a sliding board, which is always at such a height as to allow the backs of the chickens to touch the pipes, and is gradually lowered as they increase in size. This board is removed and cleaned every day, or replaced by another, which had served the day before, and had been cleaned and aired during the twenty-four hours preceding; above the pipes (about an inch) is another board similar to that below, from which descends a curtain in front of the mother; this board serves the double purpose of economizing the warmth, and preventing the chickens from dirtying each other, as they are fond of jumping on the mother if not prevented. The young chickens having been once placed beneath this mother, will only leave it to eat, drink, and exercise, and return to it, of their own accord. The patentee, Mr. Cantelo, has had equal success in rearing turkeys, pea, and guinea fowl, and, although I have seen ducks in all quarters of Great Britain, I have never seen, in one lot, so fine a collection as those produced by the Hydro-Incubator.

Having, on my journey, visited the great aviary of the Earl of Derby, I there found the incubator in its perfect working state, and was informed by his lordship's intelligent curator, it was most valuable for hatching out the eggs of foreign birds.

Any further information wished for by the scientific or curious on the above subject, shall be communicated, through the medium of your widely-circulating paper, by yours, &c. JAMES JOS. NOLAN, 33, *Bachelor's-walk, Dublin.*

EFFECTS OF CULTURE ON VEGETATION.

The effect produced by civilization on the feelings and intellect of the savage, the modifications induced in the characters of the lower animals by domestication, are not more wonderful than the changes which have been effected on many vegetable families, by the power of cultivation. Root, stem, leaf, flower, and fruit, are each naturally endowed whith a certain degree of mutability, according to circumstances of soil, climate, and other external conditions; and man, practising upon this mutability, has, in course of time, succeeded in rearing products which bear scarcely any resemblance to their natural originals. There is a limit, no doubt, to this divergence from the normal type—a line beyond which organic adaptability cannot be forced, without interfering with the healthy existence of the organism; but of such a limit in vegetation, we are yet almost absolutely ignorant. All that can be said in the present state of our knowledge is, that certain results have been obtained, some of which we intend to notice as being at once highly curious and important.

In a state of nature, most vegetable tribes are limited to definite localities, these situations being characterized by some peculiarity of soil and atmospheric influence. If the conditions of soil and climate remain the same, the character of plants is nearly uniform and stationary; and this may be always said of them in their natural state But if they be removed from a poor to a rich soil, from a warm to a cold climate, from a dry to a moist habitat, or *vice versa*, then their internal structure will undergo a change, and this change will manifest itself in one or other of their external characters. In some classes, the change is most evident in the roots and tubers; in others, in the stems and leaves; while in many, the flowers and fruit are the parts most affected. Sometimes change of situation produces merely a more luxuriant development of all the parts of a plant, without causing any abnormal growth of a particular organ, as may be seen every season, by comparing the crops on a poor gravelly soil with those on rich alluvium, or the produce of a neglected field, with that of a well-manured garden. Culture, in the widest sense of the word, may, therefore, be considered as the cause of these irregular changes which assume in plants a wonderful degree of permanency, and may be transmitted to successive races; though, generally speaking, if the artificial stimulus be not kept up plants will return to their normal or natural condition.

The changes which *roots* and *tubers* can be made to undergo are numerous, and highly beneficial to man. The potato, for example, is a native of tropical America, and when found wild, its tubers are not larger than a chesnut, and scarcely edible; while in Europe, it has been rendered, by artificial treatment, one of the most valuable articles of human food. The produce of an acre of wild potatoes could be held in a single measure; while in Britain, the same area will yield from forty to sixty bolls. Cultivation has also produced inumerable varieties of this tuber, each varying in shape, size, colour, and quality; and this, it may be said, all within the last hundred years; for though the potato was imported from America, three centuries ago, it is scarcely one since it met with anything like attention. Beet, parsnip, and turnip, have been also wonderfully modified by culture, and made to break off into numerous varieties. The bulb of the latter, for instance, has, since the beginning of the present century, been metamorphosed from globular to fusiform in colours from white and yellow to purple and green, and in weight from a couple of ounces to more than twenty pounds. So also with the carrot, which, in a wild state, has a slender root of a yellowish-white colour, but which, under cultivation, swells out, and becomes succulent, assuming a deep red or orange colour. In the one case the root is not much thicker than a common quill; in the other it becomes as thick and long as a man's arm—the produce being sometimes as much as 400 bushels per acre. The cause of most of these changes is abundantly obvious. Cultivation removes a plant to a richer soil, where it can obtain all the elements essential to its growth with greater facility, and without suffering those impediments to continnous growth which alternate drenchings and droughts are so apt to occasion in a state of nature. If the soil be too wet, it undergoes drainage; if too dry, it is irrigated; besides being deepened and softened, to admit of the easy expansion of the bulb or tuber on every side. As in animals, so in plants, every individual has a tendency to reproduce its own qualities in its offspring, and man, taking advantage of this feature, rears only such species and hybrids as best suit his purpose, until, by successive developments, these qualities greatly exceed anything in nature, or even become altogether monstrous.

Stems, though less liable to metamorphoses of this kind, are still capable of being strangely changed from their normal condition. Every one is aware, that, if a tree which is a native of mountains, be planted in a valley, it grows more rapidly, but its timber becomes softer and less durable; and, in like manner, if the tree of a valley be removed to a mountain, it becomes of slow growth and stunted form, but produces timber remarkable for its toughness and durability. By cultivating upon this principle, tall stems are for the most part rendered short or dwarfish, and shorter ones taller—and dahlia, for example, having been reduced to one-half of its natural height by garden culture. The cabbage, in a wild state, has a tough, slender stem, which by culture has become fleshy and fusiform. There are no stalks and shoots to be found among the asparagus plants of the sea-shore, which can compare with those of

our gardens; and so also it might be noted of many culinary plants, that differ so much from their originals, that none but a botanist could detect the relationship. Nor is it in the external characters only that cultivation effects such changes: the intrinsic properties are equally liable to metamorphosis—as from sour to sweet, from acrid to agreeable, or even from poisonous to wholesome. The well-known garden celery is a native biennial, found on the sides of ditches in the vicinity of the sea, and in this state is highly acrid, and of a coarse rank flavour. Culture, however, has now transformed the leaf-stalks of the common species into one of the most agreeable salads, and the bulbous roots of the celeriac into a wholesome and nutritious esculent.

As in roots and stems, so in *leavus*, the influence of cultivation is manifested in a very marked and curiour manner. "The *Brassica oleracea*," says Dr. Neil, "is a plant indigenous to our rocky shores; but no one seeing it waving its foliage in its native habitat, could possibly anticipate that it would ever appear in our gardens, disguised as the ponderous drum-head or sugar-loaf cabbage, or on our tables as the delicate cauliflower and broccoli." In the one case, the stem is tough and slender; in the other, it becomes fleshy and fusiform; when wild, the leaves are small and wavy; under favourable cultivation, they become large and succulent, thickening so rapidly, that they have not actually room to unfold themselves, put gather into a *heart* or cluster, several feet in circumference. The original colwort would weigh scarcely half-an ounce; we have seen a well-nourished drum-head weigh more than thirty pounds. The *Crambe maritima*, another plant growing spontaneously on the Southern shores of our island, has, in like manner, been improved into the sea-kale of our markets, so it may be remarked of the artichoke, the endive, spinach, succory, and, in fact, of all our esculents and salads. It is owing to this protean susceptibility, that, under cultivation, certain leaves become puckered, as in the curled cress and curled savoy; that notched and lobed ones become simple and entire; and that thin and leathery ones are transformed into thick and succulent masses.

The changes which occur in the *floral organs* are also very numerous; and, on this feature, depends all that beauty and variety which it is now so much the object of the florist to produce. These transformations consist in an increase of the petals, in a conversion of petals into stamens, and in some modification of the colour. What are called *double* flowers are produced by a multiplication of the petals, as in the common varieties of the rose; and *full* flowers are those in which the multiplication is carried so far as to obliterate the stamens and pistils. The rose, for example, produces, in a wild state, only a single row of petals, surrounding a vast number of yellow stamens; but, when cultivated, many rows of petals are formed at the expence of the stamens, which are proportionally diminished in number. Compare the dog-rose of our hedges with the cabbage or Provence rose of the garden; or compare the single anemones and ranunculuses of the Levant, with the finest Dutch varieties, and see what cultivation has produced. In the one case, there are only five diminutive petals; in the other, we have hundreds: the wild anemone is scarcely an inch across; Dutch florists have reared specimens more than six inches in diameter. The same may be remarked of the polyanthus, which is very unlike its parent, the primrose; of the auricula, the hyacinth, dablia, and other floral favourites, which, under cultivation, have each sported into many hundred varieties. "The dahlia," says a recent authority, "is a native of Mexico, from which it was introduced in 1789, but afterwards lost to our cultivators. It was reintroduced in 1804; but it was ten years later that it was generally known in our gardens. The first plants were single, of a pale purple colour, and though interesting, as affording a new form of floral ornament, they, by no means, held forth the infinite diversity of that tint and figure exhibited by their double-flowered successors. At present, the varieties are endless, each district of the country possessing suites of its own, and cultivators occasionally raising at one sowing a dozen kinds, which they think worthy of preservation. The results have been most propitious to the flower-garden, from which, indeed, the dahlia could now nearly as ill be spared as the potato from the kitchen-garden."—*Chamber's Edinburgh Journal.*

EFFECTS OF MILDEW ON CORN.

The next question that suggests itself to us is—What remedies may be successfully applied to check the devastating growth of puccinia, or corn mildew? Although its botanical character is now so well known, the remedies hitherto suggested have been principally conjectural. Mr. Knight, who was a most careful and experienced observer, expressed his persuasion that when fogs come on after a very dry time, the wheat-plant is more than ordinarily subject to this blight. This opinion is in unison with the supposition in the preceding pages, relative to the action of the *stomata* under such circumstances. Hence the obvious method of guarding against mildew in places particularly subject to its influences, is to endeavour to procure the earliest varieties, which may arrive at maturity before the autumnal fogs extensively prevail. More observations are also wanted as to the effects of soils on the growth of this fungus, and especially whether heavy soils are really more favourable to it than light ones. There is as yet little more than surmise on these points, which is always unsatisfactory. Nor is it well decided whether spring wheats are less liable to it than winter wheats, though an opinion that

such is the case widely prevails. Agricultural Societies should make all these things matter of accurate special inquiry, which can only be known from practical men.

The certainty that all the gramineous tribes are liable to mildew, renders it very doubtful whether the extermination of this evil can ever be expected; but, unquestionably, much may be done towards checking its injurious diffusion to any alarming extent. The proper method is, to consider what remedies may be safely recommended, and to try them carefully. The following are undoubtedly worthy of attention:

1. An endeavour as inexpensively as possible to change the texture of soils by amendment by mixture, where mildew has long obstinately prevailed. The farmer should learn that the mechanical state of his land is just as important as the chemical. Glass, which refuses to part with its alkalis when in a solid state, if brought into contact with water, parts with them easily when moistened, after being finely pounded in a mortar. Any person may convince himself of this fact, by laying a lump of wetted glass on turmeric paper. No result follows. Now, reduce the same piece of glass to fine powder, and wet it; the turmeric paper turns red, indicating that an alkali has been set free. Hence the fine mechanical division of the soil effected by judicious mixture of more friable materials, may produce great results in giving out organic compounds whose tendency is to strengthen it against the attacks of disease. This is only one instance out of thousands, to show the importance of science to a class of men long entirely neglectful of its advantages, but now becoming more aware of them.

2. A careful notice of many places where mildew has prevailed, will at once satisfy the observer that they have been so situated as to be subject to the evils of too much shade, or want of free circulation of air. Letting in more air and light in these localities, by obvious means, would be, in such cases, the best mode of proceeding.

3. There is no doubt that over luxuriance in early growth is favourable to the mildew. The intelligent farmer will know best how to check this, whether by feeding it down with sheep for a few hours in the day-time, or other methods. This must be a matter of experience, keeping only the design in view.

4. The desirableness of growing early varieties in places subject to mildew. The reasons have already been considered.

5. Another plan worthy of being adverted to, is the avoidance of manuring immediately before setting the seed.

6. Attention should also be given to hoeing the wheat crops in the early stages of growth, and taking great care to free them from all weeds. Mildew will seldom prevail to any extent where this precaution is taken; but wherever there are many weeds on the land, the straw will be generally found more or less affected by it. The author can say from experience, that he has seldom, if ever, failed to meet with it in unclean lands.

Wherever the farming is of the best kind, where these precautions are taken, and where drainage is good, this fungus will not be found in any alarming degree. Just as the clean skin of animals is a defence against nauseous living parasites, so, by an analogous method, the soil will be rendered free from the destructive fungi under our present notice. Improved domestic habits in our peasantry are well known as tending to check the spread of epidemic diseases; and, in the same way, a better system of cultivation will avert diseases from our corn-fields, while there is given thereby increased opportunity for the employment of the poor. Mildew was once more prevalent than it is at present; and doubtless its diminution is in a great measure to be ascribed to a better husbandry.

The following article contains interesting information respecting the habits of the wheat fly in Britain. As to the ichneumon, we are not quite certain that it is so distructive to the larvæ of the wheat fly with us as in the Old Country, but certainly enquiry should be made in this matter, that is of such importance to us to be well understood. The natural history and habits of insects injurious to agriculture, should be carefully studied, as a means to enable us to check their depredations, that are often so distructive to our crops:—

Great indeed are their services to mankind, in preventing the injuries of the insects which prey upon our corn. "In vain," to use the words of the able naturalist from whose writings quotations have been previously given, "does the destructive cecidomyia of the wheat conceal its larvæ within the glumes that so closely cover the grain. Three species of these minute benefactors of our race, sent in mercy by Heaven, know how to introduce their eggs into them, thus preventing the mischief they would otherwise occasion, and saving mankind from the horrors of famine." It would be foreign to the purposes of a popular little book like the present, to enter into the entomological details of the formation and habits of these creatures. A general view of their operations will be quite enough. The most common of them is a small fly, like all the rest of the hymenopterous order. It was originally called *ichneumon tipulæ*, but now goes by the name of the *platygaster tipulæ*. A most accurate description, and a drawing of this fly, may be found in the interesting papers of Mr. Curtis, adverted to in a previous part of this volume. The male is black,

and the female is of a pitchy colour. Both shine very much; the former is difficult to meet with. Superficial observers, who have noticed the larvæ of the wheat-midge in the ears, have mistaken the ichneumon, which they have observed amongst them, for the parent of these larvæ, and have consequently condemned it as the origin of the very ills it is destined to diminish. This affords another instance of the folly of hasty conclusions, and of the false reasoning relative to the inferences people deduce without accurate investigation, when they merely see two things together. Just in the same way some farmers have concluded that the little ichneumon flies we are now noticing must lay the eggs producing the larvæ of the midge, because they have themselves seen them amongst the corn containing these larvæ. It is time for all observers to arrive at a better state of knowledge, lest we destroy, as authors of mischiefs, the friendly antidotes to their increase. Prejudice and hasty judgment lead to perpetual misconstructions, as to things both moral and natural.

But to return to the ichneumon. This little platygaster may be readily found on the glumes of the wheat-plants, in the months of July and August. It runs rapidly over the ears, and seems to know well which are those occupied by the larvæ of the midge. The author found numbers of them in various wheat-fields in August 1845; and almost invariably, on examining the ears on which they appeared, discovered that they contained the objects of their search. The ichneumon hunts for them with the utmost eagerness, and by the aid of a sharp tail-piece) a single egg in each of their bodies. The sight has been witnessed by the following experiment: a number of larvæ of the wheat midge were put on a piece of white paper, pretty near each other, and an ichneumon was dropped into the midst of the group. The energy of her manner, the rapid vibrations of her antennæ, and the whole of her attitudes, were most amusing. On approaching one of the larvæ her agitation quickened to the utmost intensity; she soon bent her body in a slanting direction beneath her breast, applied her tail to the larvæ, and, becoming still as death, sent forth her curious sheath and deposited her egg in the victim, which writhed considerably under the operation. If she came to one that had previously an egg in it, she left it in an instant and sought another; for the platygaster lays but one in each. This however, often repeated, destroys a great many of these little devastators of the grain. The observations of professor Henslow confirm those which have been already made. He says, "When these are hatched, the young maggots which they produce, and which are the caterpillars of the ichneumons, feed upon the fleshy or muscular parts of the caterpillar they are attacking, carefully avoiding the vital parts. At length the caterpillar, they have been thus devouring alive, dies; or, as frequently happens, it changes to the state of a chrysalis before it is destroyed. The ichneumon caterpillars also pass to the chrysalis state, and either remain within the body of the dead caterpillar, or come out before they assume the fly state. Each species of ichneumon is restricted in its attacks to one, or at most to a few particular species of caterpillar; and the females instinctively proportion the number of eggs they deposit in each individual to the relative size of their own offspring, and that of the insect on which they are destined to prey." It is impossible to contemplate these habits of the minute insects thus brought before our notice, without being deeply impressed with the omnipresence of the great Being to whom all things owe their existence. The same hand that spread the north over the empty space, and suspended the earth upon nothing, and keeps the stars in their courses, regulates the numbers, instincts, and uses of the smallest living things, appearing equally perfect in all:

"What less than wonders from the Wonderful,
What less than miracles from God can flow?"

The two other ichneumons mentioned by Mr. Kirby are supposed to limit the increase of the platygaster tipulæ. One of them is said to oviposit in its eggs, the other in its maggots. There are also many other species, opening a wide and curious field of inquiry for the entomologist. Several very interesting drawings of those alluded to here are given by Mr. Curtis, in the paper previously recommended to the reader's careful perusal. One of these extraodinary flies has an ovipositor, nearly thrice its own length, which it inserts into the parts of the flower containing the eggs in which it designs to lay its own. Indeed the instruments with which nature has furnished all the ichneumons that have been observed, manifest the most remarkable adaptation; and there could scarcely be conceived a more beautiful subject for a separate treatise than that of their forms and habits, whenever they may have been sufficiently investigated. The design of the present remarks is merely to show how carefully there is provided, by the goodness and wisdom of God, a natural antagonism to the disaster that would befal mankind from the unchecked multiplication of our insect enemies. Nor do the ichneumons alone perform this office. There are flies which live upon the midges, carrying them off and devouring them in the same way as hawks and other birds of prey diminish the numbers of the smaller feathered tribes. While this agency is going on in nature, there is left abundance of scope for the exercise of our own ingenuity; and the next question is, how we may effectually call it forth in the way of defence against the little pests now under review?

The economy of the minutest insects and animalcules with which we are acquainted is quite as wonderful as the nature of the fungi adverted to in the preceding chapter; while some experiments recently made on the infusoria, to which class the

little eels of the pepper-corn of the wheat belong, are as striking as those that have been described in relation to the growth of moulds. The injuries we receive from insects are doubtless great; but we have our compensation in the benefits they confer upon us. When we look upon some of these separately insignificant portions of creation, their importance seems almost incredible. Who could suppose, on examining a minute cochineal insect, that this nation actually pays about five millions of dollars every year for the myriads of their dried tiny bodies which art has called into use? How wonderful is it to remember, when we may be sealing a letter, that the little gum-shel-lac insect provides for us wax as an appendage to our writing apparatus, and that very large sums are yearly expended on its importation! When we look at a sluggish silkworm feeding lazily on some leaf, and consider it merely as the larva of a plain looking moth, and perceive its feeble movements and rather sickly aspect, it fills us with amazement to recollect that more than fifteen hundred thousand human beings gain their daily bread from gathering, winding, and manufacturing the web of the cocoon of such a caterpillar! Many other instances might be adduced to prove that though the insect tribes offer us much annoyance, and inflict upon us frequent losses, we are still largely their debtors. Like the fungi, also, they have assigned to them a most beneficial part in the grand economy of nature; and this is the removal of decomposing organic matter, and thus preventing disease from putrid exhalation. Every maggot that is bred in the dead body of any animal, or the tissues of any rotten plant, is performing this needful and beneficial function. For this purpose extensive powers of multiplication and great voracity, are evidently essential requisites. Hence we may see the reasons of the changes peculiar to the insect world, and of the multitude of eggs the various flies which are parents of larvæ continually lay. Small numbers could not perform the offices assigned them to any useful extent; nor, if insects passed at once into that state in which they are employed in the cares of reproduction, would they be able to carry on the work of feeding on putrid matter as their sole object. Hence we see the wisdom of God as applied to his designs. The design in this case has been explained, and we may perceive the adaptation. It is expedient that these insects, whose province it is to remove the injurious substances adverted to, should be wholly employed in this work. Accordingly we find these maggots in a state incapable of reproduction, and endued with what they require—an insatiable desire for constant feeding, and proportionate digestive organs. They pass into another condition before they begin the reproductive processes, which must interrupt their operation of constantly feeding on the superabundant and injurious matters which would otherwise destroy the healthiness of the air we breathe. The larva, therefore, has no propensity but a constant appetite for food, and is the longest state of insect life. After this it is changed into a condition of inactivity, wherein, by certain slow processes, the perfect fly is formed, and subsequently disclosed, not to feed with the voracity of its maggot, but to lay multitudes of eggs in places suitable for the development of more larvæ. The object of its existence having been thus answered, it dies. Who can think of these marvellous transformations, and not admire the wisdom and power of God, nor fail to remember for himself, that, before he can perform the services of a better world, he must be transformed too, and that by the renewing of his mind? The same insect may be said, in certain cases, of live in several different worlds. It inhabits, in its successive conditions, water, earth, and air, while it is fitted for these respective abodes by new organs, instruments, and forms suited to each. Every one has some purpose. Can we have a better illustration of this than in Bonnet's celebrated remark: "Of what riches should we not have been deprived, if the silkworm had been born a moth without having been previously a caterpillar!"

Still the larvæ of many insects do the greatest injury to the produce of the farms of this country. For example, there is scarcely any species of cultivated plant free from their attacks. Wheat, rye, oats, and grasses are largely destroyed by them. These wire-worms are the larvæ hatched from the eggs of certain beetles. "It will probably," remarks Mr. Curtis, "surprise the general reader to learn that there are nearly seventy species of beetles in this country which are the parents of wire-worms: many of them, however, live in decaying trees, or under the bark; and the number that affect our crops of corn, vegetables, and flowers, is very limited." The beetles from which they spring, and into which they pass, are called *elaters*; and almost every farmer has an instinctive dread of these worms themselves. Yet not many of these persons know that the little long beetles called "skipjacks," which jump when laid on their backs in a wonderful manner, lay the eggs which produce these mischievous devourers. The elaters, or skip jacks themselves, feed only on flowers. The best account to be found of them is that by Mr. Curtis, who gives more hints for remedies than any other writer. The long time these wire-worms exist in their larva state, adds very much to the amount of mischief inflicted by them.

Gerenally speaking, the larva state is the one in which insects do most injury to corn; but Mr, Kirby mentions that the weevil devours it when housed in the granary, both in the *imago* as well as larva condition; and that a single pair of these insects will produce in one year about six thousand of their species.

Cereal plants are likewise attacked by larvæ of the willow moth, which consume the grains of wheat and the seeds of grasses. Flies, also, of various kinds, lay eggs that give birth to larvæ

destructive to the several kinds of corn, when they appear in any considerable quantity. These flies have their ichneumons for checking their increase, in the same way as the midge described in a previous chapter. They do not, however, belong peculiarly to the wheat, and are therefore not legitimate subjects for this work, beyond a passing notice of their existence. Amongst the British flies, the one called *oscinis vastator* is much to be dreaded. Two broods of maggot are yearly ushered into life from its eggs. Those born in the summer are located between the sheath and stem, above the soil; those that are hatched in the autumn are close to, and perhaps below, the surface. These flies and their preventives are described in the papers before mentioned, which have been published by the Agricultural Society. One of the most remarkable flies which infest wheat and other grain, appears to be the *cephus pygnæus*, or corn saw-fly. For a knowledge of the singular habits of this creature we are entirely indebted to Mr. Curtis. No farmer had previously discovered it, as far as is known; no Englishman of science had previously described its operations and habits. It is, however, not a stranger to certain ingenious foreigners, who have noticed its ravages in the rye-fields of France, and have published accounts of it in the scentific annals of their country. The fly itself is about half an inch long, and black, with four transparent and iridiscent wings; the legs are yellow, striped with black. Many of them may be frequently observed on flowers, in corn-fields, during June, and on grasses, in woods; but a casual glance at them gives no indication of their mischievous habits. The female lays her eggs just below the ear, in the straw of the corn-plant, and the larvæ travel from the top to the bottom, eating as they go, and working through the knots with perfect ease, until the time of the ripening of the harvest, when they eat through the stem near the ground, and pass into the chrysalis state. France has, at times, suffered extremely by the attacks of this singular insect, whose habits have hitherto been little known and less suspected by those whom they much concern in this country. Persons have now been led, by the light thrown on the subject through the papers of Mr. Curtis, to search for it; and an interesting communication appeared respecting it in the "Gardeners' Chronicle" for February 21, 1846. It is stated in this periodical, that the maggots inhabiting the straws live through the winter, inclosed in transparent cases, of very close texture, and enter the pupa condition in March. It is also added by the correspondent of this valuable paper, that "these flies resort to flowers in corn-fields, grass in woods, and umbelliferous and composite flowers on banks and road-sides. The straws containing the larvæ may be detected after harvest by a little attention, the short pieces of stubble being cut horizontally by them. They undoubtedly cause serious mischief, as the ears of the infested stems are either sterile, or contain only a small number of shrivelled grains. Burning the stubble seems to be the best means of extirpating the cephus; but there is an ichneumon named *pachymærus calcitrator*, which keeps it in check by depositing eggs in the maggots, which hatch and live upon them."

There are many other little insects found on the stems and ears of the *cerealia*, or corn plants, the habits of which have not yet been sufficiently inquired into, nor the actual services performed by others that accompany them. We have an example of this in the *thrips*, as it is called, that Mr. Kirby described many years ago; but it ought to become the subject of fresh observations. This venerable naturalist took the orange powder in the ears for the excrement of the thrips. It was probably the *uredo rubigo* which he saw. The author found quantities of the *thrips* last autumn, (1845.) He has also found a great many this year, (1846.) The larvæ likewise of a fly called chlorops has this year attacked barley. In some instances the orange powder in the wheat appeared, and some not. Where it did appear, it was the uredo fungus just mentioned.

To say that wheat is subject to the presence of *aphides*, or plant-lice, is only to state in the case of wheat what may be affirmed of almost every known produce of our soil. The same may be likewise said of several other minute creatures that are found in the fields. In our granaries, besides weevil, the larvæ of a species of *tinea* make great havoc. Thousands of *acari* will be found in bran kept for any length of time. All these minute creatures, like the weeds, the thorns, and the briers, have been permitted to spring up; and in this our fallen condition we must count upon "the ears to be eaten by the locust, the canker-worm, and the caterpillar, and the palmer worm," which are "His great army," who rules over all things.

Inability of Ignorance.—How many men, rich in physical energy, stand with folded and idle hands because they are poor in knowledge! Tell such a man what he should do, and he is ready and willing to act. He stands still because he cannot see his way: he is uncertain because he cannot make out which of two plans he should choose. He is negligent, only because he is ignorant of what he ought to do, or of how it may best be done. Or if, in his physical impatience, such a man rushes forward, he fails to reach his aim, because he is deficient in the materials for successful action. How often do we see the energy of one man ill or wrongly directed because he knows too little of what he engages in, while, under the guidance of knowledge, every step, impelled by the energy of another, is observed to be a sure stride in advance.—*Professor Johnston.*

A wise man will ask no more than what he may acquire justly, use soberly, distribute cheerfully, and live upon contentedly.

THE FORMATION OF ALLUVIAL SOILS.

The richest alluvial soils are formed by natural causes, in a manner which it is more often in our power to imitate than is commonly supposed. And in thus taking a hint from nature's great operations, we possess the advantages of studying under a tutor, whose precepts rest on the most solid of all foundations—the laws of God.

In searching for the richest soils of the old and the new worlds, we shall find these almost always situated in the bottoms of valleys, by the banks of rivers, and in other lowlying situations. When we proceed to examine the cause of this, we find, in the action of the flood or upland stream waters, a ready explanation of this universal state of things. In these waters, at almost all seasons of the year, a mass of mechanically suspended matters are found. Finely divided earths—masses of organic matters—are thus carried along by the moving waters. It is true that the amount of them varies with the character of the countries through which these rivers pursue their course, and the rapidity of the stream; but all more or less contain a large proportion of matters, which, hurried along by the force of the current, are deposited as soon as the strength of the stream is diminished, or ceases, by the overflowing of its ordinary banks, or in the depths of the sea. By such means the rich soils of the cultivated alluvial fields of the farmer were first formed, are still enriched, and are still, at the mouths of rivers, gradually forming or enlarging the deltas, alike proverbial for their fertility; such as those at the mouths of the Thames, the Rhine, the Nile, the Oronoco, the Mississippi, or the Ganges. It may not be unattended with some little advantage to the advancement of practical agriculture, if, in this essay, I again endeavour to keep alive a spirit of inquiry as to the practicability of profitably imitating, by artificial means, these grand natural operations of the moving waters of the earth.

It is well known, that, in certain English localities, the farmer has, by the *warping* system, formed rich alluvial land, in places where only bogs and worthless soils were before in existence. It is not merely, however, to these that I would direct my observations. I would cautiously, yet confidently, approach in many districts, and examine this question:—"How far can the adjoining muddy waters be profitably raised by artificial means, for the purposes of irrigation and warping?"

It is a very practical argument, of which, in the first instance, to remind the farmer who may be startled with such a question, that the same powerful agents that drain the great fen districts of England can as readily raise the same enormous amount of water on to the land that the great Lincolnshire steam-engines remove from it—the same amount of water which *drains* so many thousands of acres of land, would irrigate, as copiously, the same extent of land. It is evident that, in those situations where water, containing a large proportion of mechanically-suspended earths and decomposing organic matters, can be employed, that there the two-fold object may be attained of feeding irrigated meads, while an alluvial soil is gradually formed by the deposit from the water. On a considerable scale this has been accomplished, in the formation of the rich meads near the city of Edinburgh, irrigated by the contents of the sewers; and, to a still greater extent, the very same process has been successfully carried on, in some of the districts surrounding the Humber, without the aid of the pump.

The rapidity with which these soils are formed is of course proportinate to the impurity of the water. In the case of the warping system, as followed on the shores of the Humber, Mr. Ralph Creyke, (*Jour. R. A. S.*, vol. 5, p. 402), remarks, that, "in one Spring, numbering, perhaps, ten or twelve tides, as much as from ten to fifteen acres have been known to have been warped the thickness of from one to three feet." If a similar plan could be adopted in the case of the waters of the Thames, the deposit of its mud would be certainly rapid. In the instance, too, of the sewer-waters of London, a large proportion of rich insoluble substances are suspended. From a gallon of one of these (the King's Scholars' Pond Sewer), examined by Professors Brande and Cooper, (*Rep. of Metro. Sew.*, 153), was deposited, by subsidence, 55 grains; of this—21.22 grains were combustible, and consisted of animal matter rich in nitrogen, some vegetable matter, and a quantity of fat; and 33.75 grains of matter consisting of—

	Grains.
Phosphate of lime	6.81
Oxide of iron	2.01
Carbonate of lime	1.75
Sulphate of Lime	1.53
Earthy matter and sand	21.65

The importance of adopting this mode of forming a soil long since attracted to the attention of Arthur Young. He noted the Lincolnshire system of warping (*Annals of Agri*, vol. 33, p. 343), as a most singular improvement. His account of the process employed there will serve as an instruction for those who, in other districts, may wish to accomplish similar improvements. The water of the tides, he says, that come up the Trent, Ouse, Don, and other rivers, which empty themselves into the great estuary of the Humber, is muddy to an excess; insomuch, that in summer, if a cylindrical glass, twelve or fifteen inches long, be filled with it, it will presently deposit an inch, and sometimes more, of what is called warp. The improvement is perfectly simple, and consists in nothing more than letting in the tide at high water to deposit the warp, and permitting it to run off again as the tide falls, so that, as he adds, it is not to manure the soil that is the object, but to create it. It therefore follows that it is not of much consequence what the soil is that is intend-

ed to be warped,—"a bog, clay, sand, peat, or a barn-floor are all one, as the warp raises it, in one summer, from six to eighteen inches, and in hollows and low places, two, three, or four feet, so as to leave the whole level."—*By Cuthbert W. Johnson, Esq., F. R. S., in Farmers' Magazine.*

FEEDING OF CATTLE.

Every practical farmer, should, if possible, keep cattle and sheep he wishes to fatten, quiet, for he knows well, by pecuniary experience, that restless animals not only require a much longer period of time to accomplish that object, but consume a much greater amount of food, than those which are quiet and tractable in their disposition; and as every feeder of domestic animals which are to be slaughtered for human food desires to produce the greatest quantity of muscular flesh (with some fat of course), through the medium of the smallest quantity of nutritious food, it is necessary that every collateral circumstance which can possibly accomplish this important object should be duly attended to In combination with rest, warmth, and good food, darkness materially contributes to facilitate the process of fattening, inasmuch as it deprives the animal of those causes which arouse its excitability, that would otherwise create, at least, a prejudicial degree of restlessness, and that would cause a tendency to generate the consumption of a greater amount of carbon (or fat-forming principle) in the lungs.

I have not said, as yet, anything respecting breeding, but I may remark, that quiet with a moderate share of exercise combined with a good, nutritious diet, (especially to pregnant animals), on the principles already described, will, in a great majority of cases, be sufficient.

There is another important point which the farmer has to attend to, and w'ch, if he desires to possess sound, healthy animals, he should never omit upon any account, and that is the regularity of their feeding; for, to speak physiologically, the gastric juice is secreted in the glands of the stomach at the time of their being accustomed to receive their usual complement of food, and if the stomach be empty at this time, it sets up an irritation of the mucus (or internal) and muscular coats of that organ, which creates not only a degree of pain, but a restlessness and degree of inquietude that are extremely prejudicial to the welfare of the animal itself, and which check the steady progress every practical feeder is anxious to preserve. Professor Von Thëer thus remarks, that "in fattening animals care should be taken to maintain an uniform, and particularly in the winter, a somewhat high degree of temperature. Light must be intercepted; for just in proportion as it keeps up the health of the cattle, so darkness accelerates the retainment of the required degree of fatness. The repose and contentment, the happy freedom from anxiety, arising from the certainty of receiving their food in proper time and measure, contributes so much to the fattening of cattle, that a much more plentiful supply, given irregularly, cannot make up for the want of order. The hour for feeding and the quantity of food may be variously regulated; but a system, once adopted, should be strictly adhered to."

The combination of the sugar of milk with the butter supplies the ingredients which are employed in the rearing of the young animals, for the generation of animal heat. The material of the growing muscle, and the gelatinous substance of the bones, are formed from the caseine, and the phosphate of lime with the other earthy salts which the milk holds in solution in the water, affords the earthy materials for the bones. Many circumstances, such as the breed of the cow, the nature of her food, the period of her calving, her age, and the general condition of health, very materially influence the quantity of her milk, and the proportions of its component parts. The temperature of the atmosphere, and the length of time it has been drawn, greatly influence the state of milk; heat has similar effects on milk as it has upon the fattening of the animal; for we find that in cold weather she not only produces a less quantity, but of butter also. This phenomenon is well known to agriculturists and cow-keepers generally, and arises from there being a greater consumption of carbon and those substances forming butter, going on in the lungs of the animal, in order that it should keep up its heat, and thereby counteract the effects of the external air. In proof that this explanation is correct, I shall relate an experiment made by Mr. Gyde, an excellent medical agriculturist and professional chemist, at Painswick, in Gloucestershire. "Six cows, in the warmest part of the summer of 1844, when in the field, yielded upon an average fourteen quarts of milk each, but as the cold winter season approached, the quantity of milk steadily diminished, and with it the butter. In the early part of November four of the six cows were placed in a house, the floor of which was boarded, in order to keep them dry. Light was nearly excluded, and the mean temperature of the house was kept at 55 degrees, the animals having barely room enough to lie down in their stalls; their diet was cut turnips, hay, chaff, and a little lentil ground with the chaff. For the first few days the animals were evidently uncomforrable in their new habitation, and their yield of milk diminished; at the expiration of three weeks the milk had again increased, and the quantity given was equal to that of the best yield in the summer. By the middle of December, the cold being then intense in the open air, the cows daily give eighteen quarts each of rich milk, from which a proportionate quantity of butter was made." And the reader will do well to bear it always in remembrance, that when animals are yielding milk they require a richer food than when they are *dry*; for as it is from the nutritious parts of the food that the ele-

mentary particles are obtained which secrete the milk, so it stands to reason, that if the diet does not properly contain these substances the milk must more or less, be without those nutritious matters so essential to the growth and development of the young animal; and in due accordance with the degree of nutriment the milk possesses, the health and the strength of the constitution, and the proportionate dimensions of the body are affected to a beneficial or an injurious extent; all in fact, depends on the treatment the animal receives during its first period of life after birth. It is an excellent plan to give suckling ewes, when they are fed on turnips during the winter, some bean or pea meal, linseed or oil-cake, as an integral portion of their daily provender. These materially improve the condition of the secretion of the milk; the young lambs thrive well in consequence, and they fatten and grow more rapidly than when they have not this addition, besides which the ewes themselves are in a much superior condition in the spring season.

When the farmer is desirous of fattening calves for veal, he should attend to the following particulars;—1. The calf ought to be of a moderate size, such as is sure to please the modern epicure. 2. The animal is to be kept in a state of perfect quietude. 3. As warm as circumstances can possibly permit; this last rule is very essential, as it prevents those elementary principles which form and secrete the fat being lost. 4. A situation somewhat of a gloomy nature, yet not perfectly dark, has been proved by extensive experience to materially contribute to the means, by creating both an inherent desire for sleep, and a perfect tranquillity of the whole system. 5. Rich, nutritious food should be regularly given at short intervals. 6. The strictest cleanliness should be observed. 7. Many farmers occasionally bleed their calves, and the effect of this proceeding is, that it checks the too rapid development of the muscular system; while at the same time it does not prevent the secretion of the proper accumulation of the quantity of fat which is thus desired.

When it is desirous that the calves should be brought up for the purposes of stock, they ought to be made to take a moderate proportion of exercise, for the purpose of properly developing their muscular systems; while they should be allowed a sufficient quantity of rich, nutritious food, which *must* contain gluten in sufficient amount, that the full demand for their growth may be supplied. They ought likewise, to have a good bed, formed of clean fresh straw, with a shed for their repose during night, and for shelter when it rains. Calves thus brought up, will not only fatten quicker, but they grow more rapidly; their constitutions are healthier and stronger than those fed upon coarse, inferior, or an unwholesome diet, which is absolutely unfit for not only supplying to the extent required, the natural demands of the system, but produces a development of the animal system, which in itself is imperfectly developed whilst diseases which are not only painful and troublesome to the poor animal itself, are often engendered, sometimes ending fatally; thus proving a source of pecuniary loss to its owner

I have endeavoured, in the course of these remarks, to point out, how the sciences of anatomy, physiology, and chemistry can be rendered serviceable to that of agriculture. I have applied the principles to one of the most interesting subjects that can occupy the attention of the farmer, and endeavoured by illustrating the principles thus advocated, by quoting the experiments performed by some of our most celebrated agriculturists; and, therefore, practically demonstrating the truths which philosophy reveals—the application of truisms, if fully carried out, will enable the farmer to manage his live stock to better advantage, than has hitherto been generally effected.—*Farmer's Gazette.*

In purchasing Agricultural Implements, great care should be taken to choose from the variety of instruments those which are best adapted to the end which it is proposed they should attain, and to the soil and circumstances of the undertaking on which they are to be employed. It is very ill-judged economy to refrain from the purchase of such as are calculated to fulfil the proposed end in the best possible manner; it not unfrequently happens that the advantages arising from the employment of them are so great that their cost is repaid in course of the very first year, nay, sometimes, in the very first season.

It will hardily be believed that there can be among agriculturists men of such narrow minds, or who are so little sensible of their actual interests, as to grudge the sum which such an instrument costs, although fully sensible of all the advantages arising from the employment of it, or authors to blend and bigoted by prejudice and avarice as to defend and advocate such niggardly and futile policy. The poorest mechanic does not hesitate to purchase the tool adapted to his art as soon as he becomes convinced that it will tend to facilitate and improve his labor, and render the fruits of it more perfect. It is such contracted views as these which retard the progress and perfection of the noble science of Agriculture, and debase it below the level of the meanest art.—*Thaer's Agriculture.*

Plants are nourished by the absorption of food from the air and earth, in consequence of which they grow, and produce their peculiar secretions. The growth of plants is very rapid; the leaves often acquire six or seven times their original weight per hour. Dr. Disaguliers calculates that a turnip seed weighs not more than the 14,000th, or 15,000th, part of an ounce, and that it may increase fifteen times its own weight in a minute. This root has been found to increase 15,990 the original weight per day.

Agricultural Journal

AND

TRANSACTIONS

OF THE

LOWER CANADA AGRICULTURAL SOCIETY.

MONTREAL, FEBRUARY, 1849.

It may be the opinion of many that we have, and do, occupy too large a portion of this Journal in our endeavours to prove the necessity of adopting promptly, every means that would be most likely to promote the general improvement of Canadian husbandry, as the most certain mode of relief to the country in its present embarrasments, and gloomy prospects. We have adopted this course, because we are firmly persuaded that there is no remedy that can be relied upon for our relief, unless the augmentation of our own productions in quantity and value. There is nothing we can reckon upon, or call our own, but what we produce from our lands, and so far as the produce of these lands may give employment to Canadian manufactures. We can never make foreign trade or commerce profitable except by our own productions that we may have to exchange for our imports. If we have not a surplus produce to export, it is impossible that we can profit much by foreign trade or commerce; indeed we cannot have any foreign trade. Domestic manufactures may assist us to a certain extent, but it is the productions of agriculture we must chiefly rely upon to support our domestic manufactures, as well as every other business in the country. An improving and prosperous agriculture can do more for the general advantage of Canada than any other trade or business we can engage in. It is the most suitable to the situation and circumstances of the country, and to the habits of the population. We have no hesitation in stating that there would be much less difficulty in making the rural population most excellent farmers, than in instructing them in any other business or employment, and we appeal to every friend of the country, whether it would not be more desirable to see the rural population good farmers, the lands judiciously cultivated, the cattle and sheep suitable, and well kept, and agriculture yielding abundant and profitable returns, than to divert their attention to other and more uncertain modes of obtaining their living. If we wish to see the rural population prosperous, contented, and happy, let us endeavour to secure this happy state to them by instructing them in the best systems of husbandry. Farmers may in many instances be obstinately attached to old modes of husbandry, but if superior modes are exhibited before them, and proved to be superior by their results, they will not reject their adoption more than any other class would refuse to adopt improvements. It is by Model Farms, that Canadian farmers can be best instructed, and encouraged to introduce good systems of agriculture, as they can see at these establishments the practice of good husbandry, and the results obtained from it. We do not believe that there is any country on earth, where the rural population might enjoy more of the conveniences and comforts of life than in this country, provided they were to make the most of their natural advantages. It may be replied to us, that the rural population are already contented and happy, but this will not excuse us from desiring that they should possess more ample means of comfort and happiness, when we know that it is possible these means might be vastly augmented. It appears to be the general desire of the human family to better their condition, and a very laudable desire it is, that we should possess as much of the comforts placed in our power by our Creator, as it would be possible for us to obtain by skill and industry. We believe that education enlarges these desires, and we are not of those who regret that it should have this effect, because education should also have the effect of assisting us in obtaining our reasonable desires, if our training and instruction are what they ought to be. The object of this reasoning is to remove any objections that may be offered to adopting prompt and effec-

tual measures for the improvement of our agriculture. If its present state is satisfactory to all, and incapable of profitable improvement, what we state is useless; but if, on the contrary, the state of our agriculture is not satisfactory, and is capable of profitable improvement, we shall not, we hope, have written in vain. We never can expect to attain perfection in any art, or profit by any business, if we do not devote our whole attention to it, and estimate it more highly than any other business we could employ ourselves in. If we despise the occupation of the farmer, and only follow the business because we cannot get into any other, we never can expect to excel in it, or be contented or happy as farmers. It is from this cause it is so desirable that agriculture should be estimated as an honourable occupation and of vastly more importance to this country than any other business or profession. By taking active measures now to provide effectually for the improvement and prosperity of agriculture, it will be seen that it is estimated as it should be, and thousands will be disposed to devote their attention to it, and endeavour to understand the art perfectly, so as to be able to practice it advantageously and creditably. All other improvements in our power, are as nothing compared to what the general improvement of agriculture would be, and would do for the country. The Creator has done much for Canada, and if we only do our part as we ought, and as it is our duty and interest to do, "The folds shall be full of sheep; the valleys also shall stand so thick with corn, that they shall laugh and sing." This would assuredly be the result of our introducing an improved and judicious system of husbandry.

It is much to be regretted, that the educated classes here do not show a greater interest for the general improvement and prosperous condition of agriculture, when, if they give any serious consideration to the subject, they cannot fail to be convinced, that the products of agriculture, whether scanty or abundant, must afford the chief means of support for commerce, manufactures, and all other business and professions in this country. We have considered this subject in all its bearings, and in our humble judgment, the present depressed state of trade and business here, is mainly to be attributed to the backward state of our agriculture, and its very deficient products. It is true that in other countries they complain of great depression in trade, as well as in this; but if our agriculture was in a healthy and flourishing condition, we would not be subject to the same fluctuations that are experienced in the old world. The chief produce of Canadian agriculture formerly was wheat, but for the last fifteen years this has been almost a failure in Eastern Canada by the wheat fly, and we believe we are below the estimate when we say the country is *poorer* by more than six million pounds, currency, by the ravages of this insect; and this circumstance alone, will, in a great measure, account for our present position. By our defective system of agriculture, we had no other resources to fall back upon when wheat failed, and consequently our surplus produce for the last few years has been a mere trifle. If our agriculture was more perfect, our farmers would not now be dependent on the sale of a few bushels of wheat, oats, barley or peas, at an extreme ly low price, but they would have beef, pork, butter, cheese, and other articles to dispose of, that would always meet a ready sale. Under a better system of husbandry, farmers from the same quantity of land, might create a produce that would give them a surplus of from ten to twenty times the value of that which they have to dispose of this year. Of course, more labour and capital should be employed, but this would be much more for the general benefit of the country, than employing it in over building our cities and towns. A well cultivated field would yield a much better annual return, than the finest and most expensive house in the city would, unoccupied. There is at this moment a vast amount of expended capital unproductive in Montreal, and we cannot see any

probability of its being otherwise very soon, until made so by the prosperous condition of agriculture. We may offend the inhabitants of our cities by assuring them the prosperity of the city depends upon the country, but the fact is not the less certain—and we may assure them further, that the only means to secure the city in prosperity, is to secure it first to the country, by an abundant produce. The beautiful, and costly New Market building, that is so creditable to the city, what is it good for, but as a place of sale for the products of the country? It is the fields, and industry of the farmers, that must support it, and nothing else can—and it is the same case, with a vast proportion of the buildings of our cities—the farmer's fields must afford, *indirectly*, the means to pay the rents and taxes except where there is an income from other than Canadian sources. These facts do not depend upon our asserting them, and the sooner they are generally understood, and admitted, the better for the country, as there may then be some chance that remedial measures shall be provided, if they are possible—and we are convinced they are possible. We have given our present system of agriculture a sufficiently long trial to understand all its advantages and defects, and we should now be well qualified to apply the remedies necessary to diminish the defects, and increase the advantages. It is not for us to be content as we are, if we have it in our power to do better. We entertain great expectations from the present Session of the Legislature, that this subject, that is of such vital importance to the country, above all others, will obtain all the consideration that is due to it. We do not expect that the Legislature would provide for the better cultivation and management of our fields, and our cattle, but we do hope that some means will be provided for affording an agricultural education to all who would desire it, and for the practical instruction in the art of agriculture, by means of Model Farms. We have no object in pressing this subject on the public, except the good of the country,—neither do we wish that our propositions should obtain any more consideration than they will be found entitled to. All we desire is, that the inhabitants of Canada, one and all, should possess the means to be prosperous, content and happy.

In Flanders, where great attention is paid to the management and keep of milch cows, it is customary to give the cattle warm mashes composed of grains, bran, malt, dust, boiled turnips, steamed potatoes, or other roots, and for drink, water whitened with the meal of rye, buckwheat, or oats, made luke-warm. The quantity, as well as the richness of milk, will greatly depend upon the nature of the food supplied, because the elements of the milk must be contained in the nutriment taken by the animal. It is found, however, that certain breeds of cattle, and some individuals of each breed, give different quantities, and qualities of milk, as if their organization was so constituted as to make some of them more capable of extracting the various elements, contained in the food supplied to them, than others. It is only upon this principle that the different quantities and qualities of the milk produced by different cows, when supplied with the same food, and in the same quantity, can be accounted for, and these results are very important. A small quantity of ground malt is an excellent addition to any mash given to milch cows, when it can be made by the farmer, or purchased at a reasonable price by any one who keeps milch cows. When it is discovered that one cow gives a more *valuable* return of milk than another, it will be the interest of the owner to fatten for the butcher the cow that yields inferior milk. Canadian cows in general, possess the valuable quality of yielding very rich milk, and we have ever thought that this breed, if properly attended to, in breeding, selecting, and feeding, no more profitable stock could be had for the generality of Canadian farmers, at all events, until agricultural improvement is much more advanced.

AGRICULTURAL REPORT FOR JANUARY.

The first day of the New Year was very fine, but was succeeded by very cold weather up to the 19th, with one light fall of snow, which scarcely covered the ground from its having drifted considerably. We always regret when the land is not sufficiently covered with snow previous to severe frost, and this year, the land has been very much exposed to intense frost, without being covered with snow. Our liability to have our lands thus exposed is a discouragement to our sowing fall wheat in Eastern Canada, although if it were sown in time (the latter end of August) it might succeed, and also escape the fly. We would recommend some experiments to be made this year. Perhaps by covering the young wheat with straw, or light manure in the fall, which might be raked off in the spring, it would assist in keeping the snow upon it, and would accelerate its coming into ear before the wheat fly would appear. This matter is of so great importance that experiments should be made, but unless the wheat was sown very early, so as to take deep root before the winter, it is useless to try it. The seed should also be sown in drills so as to be evenly and sufficiently covered. If we could find a plan by which we could succeed in growing fall wheat so as to escape the fly, it would be an immense advantage to agriculture and to the whole country. In the experiments heretofore made the seed has not been sown in time, or put into the soil sufficiently deep, and we believe the young wheat has seldom been covered before the winter. Sowing in drills, and applying a mixture of lime and salt, might have the effect of preventing rust in the crop, if the crop was kept clean by hoeing between the rows early in spring. We would further recommend that the experiment should be made on thorough drained land, where the farmer has such. We introduce this subject in sufficient time to consider it. We continue to hear of short returns from the wheat crop, and much of the grain is small. We hope this year will be more favourable for growing wheat than last year, and that the crop will not be liable to rust, grown from our own seed, as we fear there is not much prospect of our getting new samples of Black Sea wheat for spring sowing. One gentleman who has made inquiry, assured us that it was almost impossible to import *unmixed* Black Sea wheat, that could be depended upon for seed. If a good unmixed sample of this wheat could be imported by any merchant who could procure it, there is very little doubt that it could be disposed of here without any difficulty in the spring,—and provided it arrived here previous to the twenty-first of May, or sooner if possible. This matter is of great importance to Eastern Canada. The price of wheat is remunerating if there had been a reasonable crop, 4s. to 4s. 9d. the minot. Barley is very low in price, and must greatly discourage its production this year, 2s. to 2s. 3d. per minot. Oats is extremely low, 1s. to 1s. 3d. the minot, without any prospect of its becoming higher. The prices of these two articles of our principal produce, do not afford farmers much means to purchase imported goods, or any other goods. If we had a more perfect system of agriculture in operation, neither oats nor barley would ever sell for so low prices in Canada, because much of the land now appropriated to these crops, would be applied to the production of beef, butter, cheese, and more of these grains would be employed in feeding pork—and all these articles for exportation. The government contract price in England this year is five pence sterling the pound weight for beef. It is absurd to grow either oats or barley for sale at such low prices—that it would require a minot of barley or two of oats to pay a farm labourer a day's wages. When crops will not return remunerating prices, they should not be cultivated for home consumption, but to convert them into articles that may be exported, or to grow such crops that may be directly exported. We do not wish to see high prices, but farmers should be fairly remunerated, or it is useless to recommend improvements to them. It is easy to see what

ruinous markets we have here if over supplied with products that cannot be exported, and farmers must be aware of this so as to guard against glutting the market with articles that cannot be purchased for a foreign demand. It cannot serve any class of the community that so large a class as the agriculturists should be any thing but in a prosperous condition. Peas are brought to market in abundance, the price 2s. to 2s. 6d. per minot, although the value of peas in British markets, should, we think, afford a better price here. If shipped in good condition, they are generally in good demand in England. Indian corn sells for more than peas, but we believe only for home consumption, and we are glad of it, as it is one of our products that should be consumed here in the manufactnre of beef and pork. Hay finds a very slow sale, at from 20s. to 25s., and straw from 5s. to 10s. the hundred bundles. We do not know a greater annoyance to farmers, than the loss of time wasted in selling hay. We have known many instances in which the whole price of the hay was wasted in the expenses of its sale—and this without benefit to the seller or buyer, although it may be to other parties. We have often suggested the closing of the market at a certain hour, as in Scotland, that would give the farmer or his servant a reasonable time to return home with his horses. We do not make this suggestion to raise prices, but to prevent the waste of dear paid labour, and great injury to men and horses. It is not the fault of the hay seller, holding over for exorbitant prices, because we have seen the market scarcely commenced until sunset, when hay was at from 10s. to 15s. the hundred bundles, a price scarcely sufficient to pay for taking it to market. This is not the country that labour should be unnecessarily wasted, as it certainly is to a vast extent in the hay market. The meat market is well supplied and prices not very high; beef, 22s 6d to 27s 6d, pork 27s 6d to 32s 6d the 100 lbs. The latter, we conceive, much too low for the prospect of disposing of it next spring for exportation. Butter, fresh 10d to 1s, salt 6d to 7d, per lb.; the latter is still brought to market put up in casks that are unsuitable for exportation, hence causing a loss of a penny or more the pound to the farmer, and this is the farmer's fault. Cheese, 45s. the 100 lbs., for very good quality and inferior not over half this price. We hope these articles will soon form a large item of Canadian exports, as they ought to do. We shall now conclude by wishing farmers all possible prosperity this year. First, that their health may be good to enable them to work and attend to their business—next, that they may have a favourable spring time for putting in the seed—and lastly, that their crops may flourish and be most abundant, with a fine harvest to save them; and abundance of labour procurable, with ample means of paying for all.

January 21st, 1849.

There are many circumstances connected with agriculture, deserving the serious attention of the farmer. It is the opinion of some that farming would not pay the expenses of cultivation, were we to cultivate here as in England. We believe, however, that judicious cultivation *of land sufficiently drained*, will pay much better here, than slovenly cultivation, and it is always found to do so in the British Isles. There is a vast difference in the advantage of a large produce from cultivated crops, beyond a small produce—and it is this which enables the British farmer to pay rent, taxes, labour, and have a profit left. In England it has generally been considered that one bushel of wheat should be a fair allowance of wages for five days' labour, and in some cases for six days' labour. Thaer's agricultural work says that a bushel of rye was considered equivalent to eight days' labour in Prussia. In Canada it requires a bushel of wheat to pay two days labour, and in some parts of it, it will scarcely pay for one day's labour. This certainly makes a great difference in the actual value of produce to those who have to pay labour. It is not our object to discourage the employment of

labour, but we wish to show that good cultivation and an abundant produce is what will make farming profitable. Scanty crops, with low prices, and high wages, will never do. We must endeavour to have good crops, which with moderate prices will admit of our paying high wages. The farmer who has command of labour in his own family, will of course be able to accumulate the wages earned by his family for their future use. If we make correct calculations, we cannot fail to discover, that scanty crops must be very unprofitable to the farmer, and for the whole country. They do not furnish much means after the seed is replaced to be divided among all who may have claims. It will require a much larger proportion of a scanty crop to pay the expenses that are chargeable upon it, than of a good crop, Indeed the difference betweeen the two, will perhaps pay the whole of the expenses. This is the art of good and successful farming—to obtain returns that will pay all expenses, and leave a balance to the farmer that will be a greater amount than the whole produce that could be raised under a defective system of husbandry, and this we are certain can be done by judicious management.

The object of every farmer ought to be to raise as large a quantity of grain, and to keep as great a number of cattle and sheep as possible, upon the land he holds in his possession. The best method to accomplish these objects is the adoption of such a regular and judicious system of Agriculture, as will bring all the land into a productive condition, and not allow any plants to grow in it but those that are useful. This cannot be done by allowing onehalf of it to remain nominally in pasture and rest, (as is usual here,) but in reality so completely exhausted, by over-cropping and bad management, as to be almost incapable of yielding any kind of produce, except a very scanty and worthless pasturage. The first thing necessary towards the establishment of a system for the recovery of such lands, and converting them into a source of profit to the occupier, is sufficient draining, ploughing it properly so as thoroughly to pulverize and mix the soil, and supplying it with the manure it may require. To furnish the latter, a sufficient stock of cattle is necessary, although we admit it is difficult to keep these on an exhausted farm that has not sufficient pasturage or meadow. There is one means, however, in the farmer's power, to enable him to commence a better system—that is, by summer fallowing to such an extent as his circumstances will admit, and by doing this properly, and burning the weeds, and some of the soil, as manure for it, if he has no other means to supply it, a farm may be soon brought into good condition. We cannot find any excuse for a farmer who will allow his land to be in a barren and unprofitable state, when he has the means in his hands of making it fruitfully productive by summer fallow. It is undoubtedly very unprofitable, and we might say, discreditable, to see a few cattle striving to find a bare subsistence over a poor pasture, containing three or four times the quantity of land that would, under better management, afford ample food to those cattle, and make them profitably productive to their owners. It is only necessary for a farmer to resolve to commence a better system, and he can do so, by adopting the method we propose, without incurring any extraordinary outlay. A farmer may be content with a very scanty produce annually raised from his land; but we will not admit that he is doing his duty to his country, or to his fellow man, while he uses no exertion to make his land produce all that its natural quality is capable of. We do not know when the loss of crops in other countries might occur, exposing their population to all the horrors of the want of food. Under such circumstances, would it not be very gratifying if we were in a condition to supply them with a part. While we neglect improvement, we not only expose ourselves to want food in adverse seasons, but we are never in a condition to have much surplus to supply other countries when they might have pressing

occasion for it. A large production will always augment the number of consumers, and ensure the prosperity of commerce, manufactures and revenue; while, on the contrary, a poor and scanty production is sure to check population, and afford no means for trade, commerce, manufactures, or revenue.

DRAINING.—We have constantly endeavoured to attract the attention of farmers to draining, as the improvement which should precede all others where it is necessary. The expense of thorough draining may deter many from attempting it. We think, however, that it might be executed for much less than is generally imagined, particularly, if small stones can be had convenient, and where they cannot be procured, small branches of hemlock, or small poles might be made use of for the parallel drains. Thorough draining might be tried on a small scale first, and we have no doubt the results would give sufficient encouragement to drain more. There are excellent tiles manufactured in Montreal by a Mr. Peel, with a machine imported by Major Campbell, as we stated in our last number. Samples of these tiles may be seen at the Rooms of the Society. Mr. Peel informed us that the prices were seven dollars for the small size, and eight dollars for the large size, per thousand, taken at the tile yard near the city, and at a dollar a thousand extra if delivered at the port, or in the immediate neighbourhood of Montreal. Where there is command of capital there can be no difficulty in draining with tiles, and several gentlemen who have made use of these tiles speak in the highest terms of the excellent effects produced upon the lands. In the last number of the Journal we submitted several modes of draining, and it is therefore unnecessary for the present to propose any other modes; upon a Model Farm experiments might be advantageously made to prove the good effects of draining.

We would recommend those who have grown carrots for the use of horses, to have them boiled or steamed for them, and if substituted for one feed of oats in the day, each horse should be allowed from 15 lbs. to 20 lbs. for the feed, and if swedish turnips or mangels are given, they should have a little more. In the old country, where the temperature is much more moderate than here, they recommend having any roots given to horses boiled or steamed—and we know it is infinitely better to give them so than in a raw state. In stall feeding sheep, bruised oats, with some sliced turnips, mangel-wurzel or carrots, if they can be kept from freezing while they are eating them, will be found excellent food, and where there are not roots, the bruised oats will answer well, giving a little salt occasionally. Oats being so low priced at present, we recommend its use in stall feeding either sheep or cattle, in preference to any other grain, and as being less troublesome, and likely to sustain the necessary temperature of the animal's body, better than any other food. It must always be borne in mind that stall feeding cattle can only be profitable for the supply of the home markets, until grass fed beef comes in—and it is only the latter that can be profitably exported.

Stall feeding cattle, we have already recommended to be kept warm in stalls, well ventilated, and perfectly clean. It will also be found to answer a good purpose to curry the animals at least once a day, and trim the top of the long hair at the ends of their tails. If warbles should be found on the back, we have frequently pressed them out with the finger and thumb, washing the parts with a strong brine of salt and water. From any cattle, full grown warbles may be extracted by this method without injury to the animal. Before the warbles are at the full size, a little spirit of turpentine frequently applied, will destroy them. In cases of *hove*, we have seen it recommended in the *Farmer's Ga-*

zette to give the animal, the full of an egg shell of gunpowder, with nearly a handful of common salt, dissolved in a pint of skim milk; pour it from a horn down the animal's throat, when it is said it will speedily disengage quantities of the most fetid gas, quickly relieving the animal, and soon acts as a most powerful purgative. Animals that do not thrive in the stall should be disposed of, as they are not likely to pay for their keep.

The friendship of some people is like our shadow keeping close while we walk in the sunshine, but deserting us the moment we enter the shade.

How to enlarge Vegetables.—A vast increase of food may be obtained by managing judiciously, and systematically carrying out for a time the principle of increase. Take, for instance, a pea; plant it in very rich ground, allow it to bear, the first year, say a half dozen pods only; remove all others save the largest single pea of these, sow it the next year, and retain of the produce three pods only; sow the largest the following year and retain only one pod, again select the largest, and the next year the sort will be by this time treble its size and weight. Ever afterwards sow the largest seeds, and by these means you will get peas, or anything else, of a bulk of which we have at present no conception.—*Boston Cultivator.*

There cannot be a doubt that superior samples of grain of every variety might be obtained on the same principle as the above—selecting the best and fullest ears, and continuing to sow them; wheat and barley particularly, might be greatly improved by this means—and would well repay the trouble. Both these grains, tied in small sheaves, might have the inferior ears taken out previous to being threshed—and the wheat should be slashed out, not being very particular to take out more than would come freely.

Complete sets of the Agricultural Journal, in either language, and a few copies of Mr. Evans' Treatise on Agriculture, are for sale at the Society's Office.

The First Book of Lessons in Chemistry, in its Application to Agriculture. By J. F. Hodges, M. D.

The want of such a book as Doctor Hodges' "First Lessons in Chemistry, as Applied to Agriculture," has been long and deeply felt by the most inquiring class of agriculturists. It is a most useful digest of first principles, with much practical experience combined. The description of the simple apparatus necessary for the exemplification of the experiments described in the "Lessons," is not the least valuable. We trust, now that such necessary information for the profitable guidance of the farmer in the proper and economical use of manures, &c., has been placed within the reach of even the most humble of the class, they will avail themselves of it. As a useful book on elementary enducation, it should be abundantly supplied to, and read in all schools as a class-book.

We give the following extracts, and will continue to do so from time to time:

"ROTATION OF CROPS.

"A field, if made to produce the same crops for a number of years in succession, may, as has been shown, in the grain and cattle sold off the farm, be improverished by the loss of all the inorganic matters which it contained in a fit state to serve plants for food, and thus suffer a *general* exhaustion, or it may, by the growth of a plant requiring *chiefly* the alkalies or lime, supposing the *active soil* to contain the usual amount of these ingredients, be rendered by their loss incapable of supporting crops requiring a large supply of these matters, such as turnips and clover, and yet be capable of affording sufficient nourishment to plants which are found to select chiefly materials of a different kind. Experience has taught that, whilst crop after crop of the same plant materially exhausted the soil, the injury produced by changing the crops grown was not so great; and even before chemistry had enabled us to understand the effect produced by the growth of plants, farmers in many advanced districts, were induced to put a limit to the number of crops of the same kind grown in succession.

"In considering the effects which the different kinds of plants exert upon the soil, it is necessary to recollect what has been stated, that not only do the different plants of the farm give a preference to particular kinds of food, but that the different parts of the same plant require different proportions of these materials

for their growth. Such being the case, it is obvious that the exhausting effect which the production of any crop exerts upon the soil, will be influenced in a great degree by the purpose for which it is cultivated. Thus, plants like wheat, oats, barley, beans, peas, and flax, cultivated for their seeds, which are collected and used for food or sent to market, require a large supply of mineral materials, and especially of phosphoric acid, a substance which you are aware is contained in very small amount in even the most fertile soils, and must therefore produce a different effect from the crops, such as potatoes, turnips, mangel-wurzel and clover, which we grow for the sake of their roots or foliage, or of flax when pulled before the seeds come to maturity. The study of the food of plants, therefore, points out to us the propriety of alternating with the wheat, and other crops which require, for the formation of their seeds, a large amount of nitrogen, and phosphates, others, like the foliage and root crops, which do not contain the same amount of these substances, and are besides capable of condensing from the atmosphere a larger amount of its materials. In many districts in Ireland the farmers yet act with the same kind of thoughtlessness that distinguished the early settlers in North America; they scourge the soil with crop after crop of grain until it will scarcely return the seed, and then leave it "to rest" in unprofitable pasture. The same mode of cropping was common in many parts of England before the introduction of what has been termed the Norfolk system, which led the way to the improved management of the soil which at present distinguishes the north of England, and which has been followed and improved in Scotland, and is gradually making its way into this country. In this system, the land is every year made to produce food by a skilful application of the principles which have been laid down.

"The investigations which have been made within the last two or three years have led to some curious observations on the composition of the ashes of plants; which, if corroborated by future researches, will be of great practical importance. It is known to the chemist, that, in the mineral kingdom, certain substances are found to replace one another in the composition of minerals; thus, soda in some minerals takes the place usually occupied by potash, &c.; and in plants a similar curious substitution of one substance for another has been detected. Thus, in the ashes of clover grown upon soils rich in potash and poor in soda, the former of these substances is found in large quantity, while in soils in which soda is abundant and potash deficient, the soda is found to occupy the chief place in the ashes of the plant. The same thing has been discovered in other plants. The ash of the oak, for example, is usually found to contain potash, but on the sea coast of North America, at Long Island, soda has been found to take its place (Gardiner). The study of these curious substitutions opens an interesting field to the agricultural chemist.

"The practical rules to be deduced from the foregoing observation are—

"I. That plants which require *chiefly* the same kind of materials for their support should not be grown in succession.

"II. That as the effects which different crops produce upon the fertility of the soil are influenced by the purpose for which they are grown, that plants cultivated for the sake of their *seeds*, as wheat, barley, oats, flax, should be made to *alternate* with those which are cultivated for their *roots*, *foliage*, or *fibre*, as turnips, clover, &c., and also hemp and flax when the seeds are not allowed to ripen.

"III. That the greatest possible interval should be introduced in the rotation between plants of the same kind, by the growth of as great a variety of crops as the climate of the country will allow; thus, instead of the farmer confining himself to wheat, barley, oats, turnips, potatoes, and clover, he should cultivate beans, peas, vetches, mangel-wurzel, carrots, parsnips, beet, flax, hemp, &c.

"INFLUENCE OF SOIL UPON THE QUALITY OF THE CROPS.

"The remarkable difference in the quality of the grain produced upon soils differing in their composition, has long been recognized by experienced purchasers. I have been informed by an intelligent starch manufacturer in Belfast, that the wheat grown in the barony of Ards, in the county of Down, and in the neighbourhood of Bangor in the same county, is highly valuable for his purposes, while that grown near Armagh yields in general a much smaller amount of starch. Another manufacturer is so fully convinced of the superiority of the wheat of the neighbourhood of Bangor, that he willingly gives five shillings per ton above the market prices for that procured in the parish of Balloo. The general statement on the subject is, that soils rich in organic

matter, or highly manured with decomposing animal or vegetable substances, afford a grain which is richer in gluten than that produced by lighter and more sparingly manured soils, and those of the slate formation. The above statement respecting the value of the wheat grown in some districts of the north of Ireland, seems to confirm the statement.

Polytechnic Institution,—Dr. Ryan has been engaged during the past week in delivering a series of most interesting and important lectures, at the Royal Polytechnic Institution, on agricultural chemistry, suited to the farmers who at this season annually visit our metropolis. Dr. Ryan's reputation as an agricultural chemist has long been established: and it will be recollected that three years ago he was chosen by the council of the Royal Agricultural Society of England to deliver the annual lectures to the members. His lectures during the past week have been confined principally to "the food of plants, and the sources from which that food is derived," In the first part of the course, Dr. Ryan directed the attention of his audience to the organic and inorganic consitituents of vegetables, giving a number of apt experiments for the purpose of explaining fully the nature and character of these constituents. He then passed on to the consideration of the food of plants, and the supply of that food. The food which formed the organic portion of the plant—namely, carbon, hydrogen, oxygen, and nitrogen—he proved was derived from the atmosphere; while such inorganic constituents as silica, potash, soda, iron, lime, phosphoric and sulphuric acids, were derived either from the soil, or from some substance added artificially to the soil. The lecturer entered at great length into the sources of the organic food, showing first the changes which produce carbonic acid during respiration, combustion, and decay and then pointing out practically the separation by plants of the carbon, and its assimilation to form the future wood. The decomposition of atmospheric water by the plant, to supply its hydrogen and oxygen, was also shown; and the learned doctor gave it as his opinion that the vital action of the plant, enabling it to decompose these various compounds, was dependent on electrical force. The separation of nitrogen, also, from the carbonate and nitrate of ammonia in the air, was proved very satisfactorily. In the second part of the course, Dr. Ryan explained the process of the disintegration of rocks—the comminution of their particles, and their decomposition by the action of air and moisture, to form soils; and to these changes he proved we were to trace the supply of the inorganic constituents of plants. The experiments by which he showed the conversion of such insoluble matters as silica, chalk, &c., into food, were most interesting and characteristic. In the concluding portion of the series Dr. Ryan congratulated the farmers upon the removal of much of that prejudice against chemical agriculture, which formerly existed, and regretted that it should still exist in some minds. He also laboured to prove that by the aid of chemistry alone could farming become a perfect science; and that it was only by an analytical examination of the soils, and a comparison of their constituents with the requirements of the future crop, that the system of manuring could be successfully carried out. We need scarcely say that these lectures throughout were most numerously attended by the class of persons for whom they were principally intended.

Sale of Short-Horned Cattle by Lyne and Cother.—On Thursday a part of Mr. Timms' stock of improved Durhams took place in a field close to Banbury, when about 40 head of cattle, including nine bulls of different ages from three weeks to four years and a half old, were brought to the hammer, beginning with the cows, 24 of which were sold and one withdrawn. The highest price was 46 guineas, and the lowest 18, averaging upwards of 23 guineas. Six heifers, from 5½ months old to 12, averaged nearly 13 guineas; two cow calves ves, two or three days old, made 10 guineas; the nine bulls averaged 27, wanting one guinea; the bull Prince, 30 months old, was knocked down at 60 guineas; two of the bull calves, three weeks old (by Robin Hood), were sold at 20 guineas each. The produce of the sale was little short of 900 guineas. Being market day, there was a very numerous assemblage. The arrangements for sale were very complete, and the stock did credit to Mr. Timms as a breeder; and, considering the fall in stock, doubtless proved satisfactory to him.—*Devizes Gazette.*

SMITHFIELD CLUB SHOW.

The numbers who visited this Cattle Show this year were very great. Each day, from morning till night, the spacious building in which the show is held, in Baker-street, was densely crowded. On Thursday, the Duke of Cambridge honoured the Club with his presence. His Royal Highness arrived at the Bazaar at one o'clock, and was received by His Grace the Duke of Richmond, the President; Mr Gibbs, the Secretary; Mr. Kendall, and other Members of the Club Committee; and by Mr. Bulnois, the proprietor of the Bazaar; and was by those gentlemen accompanied through the Exhibition. His Royal Higness paid particular attention to the Hereford ox belonging to Prince Albert. His Royal Highness next proceeded to view the stupendous picture, painted by Mr. James Ward, R. A., of the "Alderney Bull, Cow, and Calf," executed in competition with the "Bull" of Paul Potter, at the Hague. His Royal Highness expressed his astonishment and gratification at viewing so extraordinary a specimen of English art. Amongst the other members of the aristocracy who were observed during the day were the Earl of Leicester, the Marquis of Exeter, the Duke of Cleveland, the Earl of Radnor, Lord Portman, Major General Wemyss, Sir Francis Lawley, Sir R. P. Joddrell, the Earl of Verulam, Sir Thomas Leonard, Colonel Sibthorp, M. P. &c., &c.

On Saturday morning, shortly after eleven o'clock, considerable interest was created by the arrival at the bazaar of Prince Edward of Saxe Weimar, in company with the exking of the French, Louis Philippe, and his three sons, the Prince de Joinville, the Duke de Nemours, and the Duke d'Aumale. His royal highness and the members of the exroyal family of France were received by Mr. B. T. Brandreth Gibbs, the Secretary of the Club, Mr. Bulnois, and Mr. Collins, the manager of the bazaar, and by those gentlemen conducted through the spacious area. The French princes minutely examined the beautiful Hereford ox belonging to his Royal Highness Prince Albert, which obtained in the first class the first prize of £30, and a silver medal to the breeder. They next expressed a wish to be shown that class of cattle used in Sussex and other counties as beasts of burthen, and expressed their deep interest and admiration at the specimens of South Down sheep and pigs, the latter appearing to afford the party, particularly Louis Philippe, considerable amusement.

We cannot omit to notice the exceeding good order and regularity of the arrangements in the Show Yard of the Smithfield Club, and for which we consider the Club is deeply indebted to the stewards—Mr. W. Fisher Hobbs, Mr. Chamberlin, and Mr. Torr, and especially to the Hon. Sec., Mr. B. T. Brandreth Gibbs, who must be indefatigable in his exertions to get through a labour of such extent in such a short period of time. We are apprehensive that the weight of his duties will be increased by the alteration requiring the cattle to be all in the yard on the Saturday, so that the judges may make their award on the Monday, and the yard open to the public on the Tuesday, instead of the Wednesday, as heretofore.

DUKE OF RICHMOND'S SPEECH.

I have never (said his grace) been of opinion that the agricultural interest was the only one which ought to be considered in this great country; but I have always maintained the opinion that upon the prosperity of the agricultural interest was based the welfare and prosperity of all classes of the community (cheers). I am one of those who wish well to the manufacturing interests of our country. They are our great consumers. They are our fellow subjects. They pay allegiance to the same sovereign. They are proud of the same institutions. Without their welfare, without the welfare of the commercial interests of this great country, we, the farmers, should indeed be at a loss; but, gentlemen, I cannot understand why the three great interests of our national industry should not be combined one and all, in support of the basis of all, which is the agricultural interest of the country (cheers). I cannot better explain my views upon agricultural improvement, than by saying that I have witnessed in the last ten or twenty years very rapid strides toward that improvement. I see land which formerly could hardly be called cultivated, by a thorough good system of draining made to produce nearly double the crop that it did before. I believe that draining has been adopted to a very great extent; but I wish to see every acre of land that will pay for draining ultimately subjected to that process (cheers). And here I appeal to the monied

interest of the country whether they had not better invest their capital in companies whose object is to promote drainage in their own country, than embark in speculations in far distant climes (Hear). When I speak to you of drainage I do so as a practical farmer, because I have a property in Scotland which I have largely drained ; but I feel that if I had treble the capital I possess, I could make more money than most of the City men do now—that is, taking into consideration their bad debts, which could not exist if they lent their money to the landed proprietors, who are willing to give them the first security for it. Whenever I travel about the country, it is my pleasure, as it is my habit, to go and visit the farms in the neighbourhood where I may for the time be staying ; and I went the other day into a county (Lancanshire) which is not famous for its farming ; but I there saw some of the most astounding proofs that I ever saw of draining upon moss land. There were large tracts of country which formerly no horse could go over, and upon which I saw stubble which proves that the best of crops had been grown there, and a field of Swede turnips which would not disgrace some of the best land in Sussex (Hear, hear). I have made these remarks because I am satisfied that nothing is so calculated to give employment to the agriculutral labourer, and to promote the interests of agriculture, as bringing new land into cultivation, and well draining the land which is in cultivation at the present moment (Hear, hear). There is not a gentleman here who can go to his home without seeing very many acres on his farm which would well repay the outlay for drainage.

EXHIBITION OF IMPLEMENTS, ETC.

At no previous show of this Club was the number of agricultural implements, seeds, roots, &c., so large as this year ; the extraordinary enterprize and ingenuity of the people of this country which seizes at once upon every improvement that effects the smallest abridgment of labour, was never so manifest as at this exhibition. Crowds of visitors thronged the galleries from the commencement on Wednesday morning to the close on Saturday night. Indeed, to every mind imbued with the spirit of nationality, the contemplation of the number of agricultural implements, and the improvements effected within the last few years in many of them, was calculated to awaken feelings to the most gratifying description. To attempt a description of the vast number and variety of implements exhibited in the spacious galleries of the Bazaar would more than fill the whole of our paper. A cursory notice is therefore all we are enabled to give. Amongst the old established and extensive manufacturers of agricultural implements, who displayed their usual variety, we noticed Messrs. Garrett and son, of the Leiston Works, Saxmundham. Of the many useful implements exhibited by them their patent horse-hoe appeared to attract the most attention ; and, for the character of our agriculture, we were glad to note that the demand for that implement is greatly on the increase: the following also were much sought after—his drills for general purposes, portable steam-engine, patent bolting thrashing machine, patent lever drag rake and hand and pipe machine.

PATENT DEEP DRAINING MACHINE, AND PATENT DEEP SUB-SOIL AND PULVERIZING MACHINE.—The implement department of the Smithfield Show has been rendered especially attractive this year by the exhibition of two powerful instruments—a patent deep draining machine, and a patent sub-soil and pulverizing machine, the inventions of Mr. Joseph Paul, of Thorpe Abbot's Hall, Norfolk, a large practical farmer of known respectability. The deep sub-soil and pulverising machine unquestionably takes precedence of all the several sub-soil ploughs and pulverizers of which there are upwards of twenty varieties, and cannot fail to double the value of nine-tenths of the land in England, not excepting the inferior old pastures, of which unfortunately we have too many. The scientific observer is instantly impressed with the applicability of these powerful instruments for the purposes for which they are intended, and the results which Mr. Paul has himself obtained by direct experiment demand the immediate attention of the enlightened agriculturist. Universal attention was directed to these inventions, and it was repeatedly remarked that if England is destined to grow enough for her population, it would be by some such power as Mr. Paul appears to have decovered. Mr. Paul also exhibited a diagram of a plough, which by a peculiar and most ingenious contrivance, fills up the drain with rapidity and exactness.

ATMOSPHERIC VEGETATION, &c.

The atmospheric supplies the vegetable creation with the principal part of its food; plants extract inorganic substances from the ground, which are indispensable to bring them to maturity. The black and brown mould, which is so abundant, is the produce of decayed vegetables. When the autumnal leaves—the spoil of the summer—fall to the ground, and their vitality is gone, they enter into combination with the oxygen of the atmosphere, and convert it into an equal volume of carbonic acid gas, which consequently exists abundantly in every good soil, and is the most important part of the food of vegetables. This process is slow, and stops as soon as the air in the soil is exhausted; but the plough, by loosening the earth and permitting the atmosphere to enter more freely, and penetrate deeper into the grround, accelerates the decomposition of the vegetable matter, and consequently the formation of carbonic acid. In loosening and refining the mould, the common earth-worm is the fellow labourer of man. It eats earth, and after extracting the nutritious part, rejects the refuse, which is the finest soil, and may be seen lying in heaps at the mouth of its barrow. So instrumental is this reptile in preparing the grounds, that it is said there is not a particle of the finer vegetable mould that has not passed through the intestines of the worm; thus the most feeble of living creatures is employed by Providence to accomplish the most important ends. The food of the vegetable creation consists of carbon, hydrogen, nitrogen, and oxygen, all of which plants obtain entirely from the atmosphere, in the form of carbonic acid gas, water and ammonia. They imbibe these three substances, and after having decomposed them, they give back the oxygen to the air, and consolidate the carbon, water, and nitrogen into wood, leaves, flowers, fruit. When a seed is thrown into the ground, the vital principle is developed by heat and moisture, and any part of the substance of the seed is formed into roots, which suck up water, mixed with carbonic acid from the soil, decompose it, and consolidate the carbon. In this stage of their growth, plants derive their whole sustenance from the ground. As soon, however, as the sugar and mucilage of the seed appear above the ground, in the form of leaves or shoots, they absorb and decompose the carbonic acid of the atmosphere, retain the carbon for their food, and give out the oxygen in the day and pure carbonic acid in the night. In proportion as plants grow, they derive more of their food from the air and less from the soil till their fruit is ripened, and then their whole nourishment is derived from the atmosphere. Trees are fed from the air, after their fruit is ripe, till their leaves fall; annuals, die. Air plants derive all their food from the atmosphere. In northern and mean latitudes, winter is a time of complete rest to the vegetable world, and in tropical climates the vigour of vegetation is suspended during the dry, hot season, to be resumed at the return of the periodical rains. Almost all plants sleep during the night; some show it in their leaves, others in their blossom. The mimosa tribe not only close their leaves at night, but their foot stalks droop; in a clover field not a leaf opens till after sunrise. The common daisy is a familar instance of a sleeping flower; it shuts up its blossom in the evening, and opens it, white and crimson-tipped star, the "day's eye," to meet the early beams of the morning sun; and then also "winking May-buds begin to open their golden eyes." The crocus, tulip, convolvus, and many others, close their blossoms at different hours towards evening, some to open them again, others never. The condrile of the walls opens at eight in the morning, and closes up at four in the afternoon. Some plants seem to be wide awake all night, and to give out their perfume then only, or at night-fall. Many of the jessamines are most fragrant during twilight; the Orlea fragrans, the Daphne odorata, and the night stock reserve their sweetness for the midnight hour, and the night flowering cereus turns night into day. It begins to expand its magnificient sweet-scented blossom in the twilight, it is full blown at midnight, and closes never to open again, with the dawn of day; these are "the bats and owls of the vegetable kingdom."—*Mrs. Somerville.*

THE SOILS.

The soil bears the same relation to agricultural industry, as primitive substances do to manufactures in general. The agriculturist endeavours to find land that shall unite all the qualities he requires, with the same anxiety and care that a manufacturer bestows on the selection of materials best adapted for his purpose. Each of these persons exercise

all possible judgment in forming a just estimate of the value of the article which he is about to purchase, or obtain possession of in order to avoid giving more value for it than it is worth. Each of them also, when he has obtained the substance or matter which he requires to mark with exactness its merits or demerits more narrowly, gives to each of its parts that destination for which it appears to be best adapted, and by means of which he may derive the greatest possible amount of profit both from the substance itself and from the labour which is applied to it. The manufacturer loses both time and money when he attempts to fabricate fine cloth from coarse and jagged wool, and lessens the value of the materials when he endeavours to make coarse cloth from superfine wool. He must therefore, divide and arrange, all his wools according to their various degrees of fineness; and in order to be able to do so properly, he will require much more experience, and a far greater knowledge of the subject, than is necessary to assist him in the comparatively simple act of making the purchases. In the same way the agriculturist, if he would derive the most satisfactory amount of profit, both from the soil which he has to work on, and from the labour which he applies to it; it can only be effected by means of a judicious selection of products, based upon a thorough knowledge and just appreciation of the nature and property of the soil in which they are to be sown.

The seeds, roots, and germs furnished by nature are to the agriculturist what the designs and models fashioned by art are to the manufacturer. The principal aim and study of the farmer ought to be to allow to each of these seeds the soil which is most proper for it, and to bestow on that soil the species of cultivation best adapted to its nature; and the more thoroughly he has made himself acquainted with the properties of the land which he has to work on, the better will he be able to fulfil his task. A perfect acquaintance with the earths and their properties also teaches the agriculturist how to derive the greatest possible advantage from those powers which Nature has placed at his disposal in the land which he possesses, and enables him to improve and enrich his land to advantage. *Thaer.*

ROYAL AGRICULTURAL COLLEGE AT CIRENCESTER.—We are glad to learn that this useful national institution is progressing prosperously. A large accession of new students are entered for the next session. On Thursday last a number of gentlemen of the council and shareholders inspected the college farm, and were much gratified with the vast improvements that have taken place during the last twelve months. The goodly rows of corn stacks evidenced the improved cultivation and management. A number of fine Herefords were being fattened; some in boxes on the Norfolk principle, others in stalls; the food, straw, &c., being conveyed to them by an iron railway. Mr. Huxtable's system of feeding sheep on boards was also under trial Some very highly bred cows and excellent pigs, of various breeds, attracted attention. The steam engine, in connection with the thrashing, grinding, pumping, chaff-cutting, &c., did its work very satisfactorily. The influence of example in agricultural improvement was very obvious in the neighbourhood of the college. One gentleman has erected new buildings, with steam engines, and every modern improvement; squared his fields, trimmed his fences, and largely increased the produce of the farm and the employment of labour—*From a Correspondent.*

COMPOSITION FOR ANOINTING OR WASHING THE BRANCHES OF FRUIT TREES, FOR THE DESTRUCTION, AND TO PREVENT THE BREEDING, OF INSECTS.—The following composition, if rightly applied, will be found efficacious in eradicating all or most insects that infect fruit trees, and now is the season, *at least for trees under cover*, such as fig, vine, and peach trees; apple, pear, cherry, plum, and also peach and fig trees out of doors, I consider are better to be done in January or February:—Take soft or black soap 2 lbs., sulphur-vivium 2 lbs., tobacco juice (such as can be procured from tobacconists, or sold by nursery, or seedsmen, for this purpose) one gallon, and turpentine an English gill, boiled in eight English gallons of soft or rain water (clear drainings of the dunghill suit this purpose), for the space of an hour. This mixture requires to be strictly watched when boiling, to prevent running over, as it effervesces strongly, so that constant stirring is necessary. It should be applied to the trees pretty hot, with a painter's brush or a piece of

sponge. The trees being pruned, and loosened from the walls, or trellises, and brushed clean with a soft brush, such as is used for painting, every shoot, bud, and angle should be carefully rubbed with the mixture. A good plan is, and which I commonly pursue, to mix the above ingredients with a little cow-dung, slaked lime, and lamp-black in the proportion of 2 parts cow-dung, 1 part lime, ¼ part lamp-black in a number 24 flower-pot, with a cork or batch of clay in the hole at bottom; just as much is put in as brings it to the consistency of very thin paint. This being rubbed on the trees will adhere tenaciously, and not a spot can be missed without being observed. The watering or syringing over the branches of the trees, and the swelling of the buds gradually push off the mixture, and by the time the fruit is set the trees are as clean as had the mixture never been used.—Yours, &c., JAMES DRUMMOND, *Blair Drummond Gardens, November* 25, 1848.

INDUSTRIAL EDUCATION.—The number of persons above fifteen years of age occupied in agriculture, including farmers and labourers, is 1,603,181, whilst the number variously employed in trade and manufacture, amounts to 1,288,198. The persons of property, Clergy, lawyers, phyisicians, and all professional men, are excluded from this calculation. nor does it include paupers, so that we have at one view the real working sinews of the State—that portion to which industrial instruction is of vital importance, and through whom, it will be made to repay the State tenfold. Depressed as may be our trade—unimportant as may seem our gross amount of manufactures—the number, as in the above return, absolutely engaged in these occupations, is sufficient to stimulate both the Government and the community, to make the exertions of that number available to the greatest posssible extent. But when we reflect, that our fisheries, mines, and collieries, are to be worked out—our various departments of public works, drainage, reclamation of waste lands, and public buildings, to be continued—our manufacturing and mechanical powers of every kind to be developed, and our commerce created—we shall at once comprehend the immeasurable utility of Industrial Education, and the urgency of its immediate establishment on a permanent basis. It is the duty of the Government to originate such a system; but we do not mean to say, that they should provide all the funds. The classes—particularly in the towns—to whom such instruction would be of real value, are quite able to defray at least a portion of the expenditure; and the Municipal Corporations should be called upon to allocate funds to the aid of such institutions; nor, do we doubt, that wealthy individuals would be found to co-operate by grants and bequests in such a useful work. It is not as well known as it ought to be to the people of these countries, what a perfect organization exists for this important branch of education in all the properous States on the Continent—in France, Holland, Belgium, Prussia, Saxony, Bavaria, Switzerland, &c.; nor to what a degree the industrial prosperity of these countries is attributable to this wise governmental provision. There are agricultural schools and colleges—schools of mines and forests, of fisheries, of commerce, of arts, and manufactures—of design, in practical application to matter—Gewerbe-Institutes and polytechnic schools—in which the physical sciences, in all their practical application, are taught. In pursuance of this subject we will, in an early number, give some practical details of the organization of some of those foreign institutions, shewing their mode of operation, and how the necessary funds are obtained. Seeing that education is, of necessity, slow of operation for ultimate improvement, it behooves us the more immediately to set to work. We believe that little new governmental machinery is required—the National Board, with an increase of practical men in its numbers, being suficient as a Central Board of Control; we believe, that all classes of society would be materially benefited by the adoption of such a system; and that, above all, the great middle classes would acquire thereby, practical knowledge and business habits.—*The Advocate, or Irish Industrial Journal.*

TREATMENT OF THE COLT.—Every care should be taken of the colt when young, for, as to its temper, much depends on its early education. A great many evil propensites may be traced to bad management when young. The colt, when weaned from the mare, should be turned into a loose box, where it may be fed on oats, bran, and boiled carrots. It should be haltered, and every means used to render it domesticated and tractable, so that it may be led about. Of course, should the weather admit, it should be turned out to grass a few hours every day, as this exercise will contribute much

to its increasing growth and strength, but always brought in at night. It should certainly be well fed on corn. To improperly limit this while he is growing is highly injurious, and the animal will bear the traces of this mistaken practice, and be much reduced in value. It is an old but most true axiom, if an animal does not pay for keeping, it does not for starving. To whatever cause may be attributed the decrease of useful horses in this country, whether poverty or want of knowledge on the part of breeders are separately or conjointly concerned, most certain it is, that a good horse may be bred, at a cost quite as low as one of an inferior description. Still we must regret the paucity of good horses that are now bred, and trust, by a more enlarged and comprehensive view of this important subject, that greater attention will be paid to the pure and proper selection of sire and dam, and a better adaptation of the one to the other. We shall then meet with fewer disappointments in finding so promising a mare with so faulty a foal, or the no less vexation that so promising a colt should grow into so weedy and useless a horse.—*W. G. Baker, in Veterinarian.*

School Gardens.—In the immediate neighbaurhood of Nottinghan are an immenss number of small gardens, occupied and cultivated by all grades of society; and with a most laudable and praiseworthy feeling, and friends connected with the High-pavement Chapel Boys' Sunday School have purchased two of these enclosures, in each of which is a commodious summer-house. One of these gardens is cultivated by the elder boys, the other by the juniors. Each garden is subdivided into smaller allotments, which are assigned to their respective tenants, boys from ten to fourteen years old, who cultivate and crop them according to their own fancy, a small portion of each being devoted to flowers. The diligence and ability displayed by these youthful gardaners are really astonishing. We have inspected their crops during several past Summers, and with truth can say, we were highly delighted with them. The onions, lettuce, celery, carrots, potatos, &c., were excellent, and would vie with the propuctions of older and more experienced cultivators. Prize gooseberries are also grown; and this year, the crops of London, Companion, Gunner, Eagle, &c., were amongst the best we have ever seen, either at Nottingham or elsewhere; in fact, these boys always endeavour to obtain, either of seeds or plants, the best varieties possible. In connexion with these gardens, and to excite emulation, a vegetable and flower show is instituted. This is held in the school-rooms, at Nottingham, and prizes are given for the best productions in vegetables, as well as for stands of pansies, verbenas, collections, of annual and perennial flowers and nosegays, or bouquets, as they are called by some. These exhibitions of youthful skill and industry are well attended.—*Midland Florist.*

Preparation for Preserving Wood.—Make a fire in the open air, put a gallon of linseed-oil, 1 lb. of resin, and 1 lb. of yellow ochre into a pot, and boil them for nearly an hour, when they will, by stirring well the ingredients during the operation of boiling, be well incorporated. Put the mixture on the wood while warm, with a brush in the same manner as paint is put on. Any wooden work, *rustic or plain*, out of doors, such as wooden-bridges, chairs, fences, &c., &c,. will last several years longer when this is applied. The wooden work of a new house is preserved from cracking by using this, and it prepares the wood for painting, as one coat of paint then will go as far as three without the mixture. If it be put on the floor of a room up stairs, it prevents water getting to the ceiling of the room below. When applied to stone, it hardens the flags and prevents them from shelving off. It will be found to be a very good paint for preventing moss and liehems from growing on grave stones, &c. Another advantage is its cheapness, 3s. 6. being the cost of the above ingredients.

Enemies.—Have you enemies? Go straight on and mind them not. If they block up your path, walk around them, and do your duty regarless of their spite. A man who has no enemies is seldom good for anything—he is made of that kind of material which is so easily worked, that every one has a hand in it. A sterling character—one who thinks for himself, and speaks what he thinks—is always sure to have enemies. They are as necessary to him as fresh air; they keep him alive and active. A celebrated character, who was surrounded with enemies, used to remark:—"They are sparks which, if you do not blow, will go out of themselves." Let this be your feeling, while endeavouring to live down the scandal of those who are bit-

ter against you. If you stop to dispute, you do but as they desire, and open the way for more abuse. Let the poor fellows talk; there will be a reaction if you but perform your duty, and hundreds who were once alienated from you, will flock to you and acknowledge their error.—*Alexander's Messenger.*

RULES FOR OBSERVANCE IN ORDINARY LIFE.

1. Never put off till to-morrow what you can do to-day.
2. Never trouble another for what you can do yourself.
3. Never spend your money before you have it.
4. Never buy what you do not want because it is cheap; it will be dear to you.
5. Pride costs no more than hunger, thirst or cold.
6. We seldom repent of having eaten too little.
7. Nothing is troublesome that we do willingly.
8. How much happiness the evils have cost us which never happen.
9. Take things always by the smooth handle.
10. When angry, count ten before you speak; if very angry, a hundred.
11. In all things do to others as you would wish them to do to you.
12. Never be afraid of doing right.
13. When you wish for information ask those who may be better informed.

COMPARISON OF THE "GREAT DAYS."

A Statement and Comparison of the Supplies and Prices of Fat Stock exhibited and sold in Smithfield Cattle Market, on Monday, Dec. 13, 1847, *and this day, Monday, Dec.* 11, 1848.

Per 8 lbs. to sink the offals.

	Dec. 13, 1847.		Dec. 11, 1848.	
	s. d.	s. d.	s. d.	s. d.
Coarse and inferior Beasts	4 0 to	4 4	3 4 to	3 8
Second quality do.....	4 6	4 10	3 10	4 2
Prime large Oxen.....	5 0	5 4	4 2	4 4
Prime Scots, &c.....	5 6	5 8	4 6	4 8
Coarse and inferior Sheep	3 8	4 0	3 0	3 4
Second quality do...	4 2	4 6	3 6	4 0
Prime coarse-woollen do...	4 8	5 0	4 2	4 6
Prime Southdown do.....	5 2	5 4	4 8	5 0
Large coarse Calves.....	3 8	4 6	3 6	4 2
Prime small do..... ..	4 8	4 10	4 4	4 6
Large Hogs.....	4 0	4 6	3 10	4 4
Neat small Porkers.....	4 8	5 2	4 6	4 8

SUPPLIES.

	Dec. 13, 1847.	Dec. 11, 1848.
Beasts.....	4,282	5,742
Sheep.....	18,170	23,840
Calves.....	109	124
Pigs.....	320	200

REAPING MACHINES.

THE Subscriber has on hand three REAPING MACHINES of the latest and most improved construction, *capable of cutting twenty-two acres per day.* Being manufactured by himself, he is prepared to warrant both material and workmanship as of the best order. PRICE—MODERATE.

MATTHEW MOODY, *Manufacturer.*
Terrebonne, July, 1848.

NEW SEED STORE.

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

OPENED HIS SEED STORE,

At No. 25, *Notre Dame Street, Opposite the City Hall,*

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.

GEORGE SHEPHERD.

P. S.—An excellant assortment of Fruit Trees, particularly Apples, which he will dispose of at one-fourth less than the usual prices.

Montreal, May 30, 1848.

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Dr. Conoquy.....	St. Cesaire.
Dr. De la Bruère.....	St. Hyacinthe.
Mr. Cadeaux.....	St. Simon.
Mr. T. Dwyer.....	St. Pauls, Abbotsford.
Mr. Gendreau, J.P.....	St. Pie.
Mr. Blanchet.....	La Presentation.
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