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AGRICULTURAL JOURNAL,

AND

TRANSACTIONS

OF THE

Lower Canada Agricultural Society.

VOL. 9. . MONTREAL, DECEMBER, 1860. NO. 12.

With great pleasure, we give insertion to the communication of "A Ploughman," and we readily admit it to be the best written letter we have seen with this signature. We perfectly agree with our correspondent, except on two points, that is, the size of the furrow slice, and allowing a ploughman competitor at a Ploughing Match, to leave his plough, and arrange with his hands and feet, defects in his ploughing. We have no objection to offering advice to the ploughman, as to his work, when he comes to the head-land; although, such advice, unless coming from his employers, might not in all cases be judicious, and possibly would confuse the man. We agree with our correspondent, that establishing a scale is not of so much consequence, provided the furrow slice shall not be cut at a *less depth* than 5 inches, or a *greater width* than 8 inches, for this depth, but we do not think that a furrow slice of 6 inches deep and $7\frac{1}{2}$ inches wide, will make the best seed bed, or handsomest ploughing. We conceive that when the slice is cut off this size, it must necessarily stand too much upon the edge, and will allow the seed, when sowing, to go down between the slices, and hence, be buried too deeply. We should prefer that one slice lapped over the other, the one-third of its width, or about 3 inches at least, when ploughing grass-land. Doubtless the more minute the division of the soil, by the action of ploughing, the better, provided the furrow slice lies properly, and so as to check the growth of grass—but when the depth and width of the slice are

not in proportion, we have never, in our experience, found the ploughing to come up to our humble ideas of perfection. Of course, we only refer to ploughing swarth, or grass land, not to fallows, or land that has been in tillage the year previous. When ploughmen are allowed to quit their plough, and delay their time, (as they did at the last County of Montreal Ploughing Match,) in settling the furrow slice, they can never accomplish their work in the space of time, that would entitle them to receive a prize. But, independent of this, we humbly conceive the practice to be very objectionable, where men come forward as practiced ploughmen, and where the land is generally selected as the most easy to plough in the country, as it was at Mrs. Mills' farm. We offer these objections to the communication of our correspondent, whom we have not the pleasure of knowing, with the greatest deference because from the manner he writes, we are satisfied he must understand his subject better than we can pretend to do—and we can assure him it affords us much satisfaction that his general views on this subject, are so much in accordance with our own. May we hope that as he can write so well, and to the purpose, that he will often favor us on any agricultural subject. If we should at any time differ from him, we shall certainly state upon what grounds and in the least offensive manner possible. We give our correspondent credit for being a gentleman as well as "A Ploughman," and shall treat him as such, should he favor us again.

TO THE EDITOR OF THE AGRICULTURAL JOURNAL.

SIR,—Being a regular reader of your Journal, a few thoughts have been suggested by the perusal of your last number, especially from the letter of a *Young Ploughman* and the answer you gave him. The following remarks I wish you to give publicity to in your next number, that they may have a chance to effect some little improvement in certain quarters—if they are sound. And as *a* and *all enquiring young ploughmen* are to me interesting, allow me to answer his questions in my own way.

And **FIRST**. If the judges at matches be judges of ploughing it matters little whether there be scales given or not, for the ploughman who takes unsuitable proportions of a furrow, will cure himself of that, when he sees the decisions of merit given, as the most desirable style of ploughing may be learned from the successful lots. But the scale that I would have a young ploughman to aim at as a standard, is 6 inches deep by $7\frac{1}{2}$ wide: such a furrow is the most desirable and most perfect, and can be attained by means. Any other proportions will not satisfy an experienced eye, nor accomplish the requisites and effects of good ploughing, and he that possesses the knowledge to trim a plough to work a furrow of these dimensions as it should be wrought, may flatter himself of having acquired the greatest possible proficiency in ploughing so far as trimming of ploughs is concerned.

And **SECOND**. AS TO TIME, it is the most requisite condition that can be enjoined upon competitors. Where I came from, in Scotland, each lot was previously measured, and on the ticket of the lot was written the number of roods, falls and yards the lot contained, and the hours, minutes and seconds it was to be finished at.

Except at beginning and finishing, setting poles at *firing*, and leading one horse before another at *hinting*, no person was allowed to set a foot upon the land during its being ploughed, to aid the ploughman in any shape whatever, except at the head ridges or land-ends, where all had access to and where all or any interested parties might aid or instruct their *man* as in turning the horses and plough, while the ploughman took a peep along his work to detect flaws, and remedy them next *bout*, or give instructions

to him from any part of the field unoccupied by ploughs. But no person was allowed to set a foot upon the competing land except the competitors and judges, till the judges came off it, when all were allowed to cross it and examine and criticise as they pleased. The ploughmen were at liberty to use all the means in their power to make their ploughing as good as they possibly could, using hands and feet and all till their *time was up*, which they would do sometimes with watch in hand till the last second of their time, and if hurried, run across to a neighbour's lot rather than risk being scored out by running down to the land-end on his own lot. "Time," I overheard an old farmer on one occasion remark, at seeing the panic of some fearing they would be too late, "tries their mettle, at home, they may *stand* and plough, but here, they must *go* and plough." Time is the best subordinate safeguard to fair play, without restrictions to the less spirited and ingenuous will use it and abuse it for his own interest, as the difference of twenty minutes more taken by one than another, in a given extent of ground, may turn the prize otherwise than it would, had *time* been exacted.

Of course, lots cannot always be had alike in extent, and therefore all cannot be expected to finish at the same time, but for the falls and yards, let the time be calculated at the *given time per acre* for the entire lot. Circumstances may sometimes render exceptions expedient; but the rule should be, in *time* or *no prize*.

As some of your readers may not be aware of the strictness to which this point is carried in some places, I copy from a letter which I received from Scotland some months since, a remark or two on this point, showing as it does, how much order and fair play are appreciated. He says: "Your friend P. got a good lying lot but the leafield being above 30 years old, was so tough in the sward, that when the plough went fast through it, it would scarcely turn at all; and so tough was it that, if you had commenced tumbling back a furrow at one end of the field, it would have run to the other in a whole furrow. He had a pair of good horses, but they and him were nearly by with it. Many of them were best off without finishing their lots, and all of them were as well tired as ever they had been. Many were out of time, and even some who got prizes were as much as 20 minutes late: but

from the causes referred to, the work was generally inferior to previous matches, and therefore time-keepers and interested parties were less on the look-out than they sometimes are; and not easy to tell where many prizes would be, hence chances were got, but it was easy to see that P. was about first, and which, by the evidence of a large group on his land-end, made his time widely known, and that his time was *up before* he finished.

A meeting of Committee was held, and notwithstanding the untoward circumstances, it was decided, that he got nothing, *being out of time.*"

Rules should be binding, and those who infringe them should forfeit all claims, though deserving otherwise. But it is hard to bring ardent competitors or interested on-lookers to avoid doing so, especially when changes, unreasonable and different from long established practice are resorted to. Arising from such innovations, squabbles and ill-feelings may be expected to occur yearly, as at the late Montreal Match, where regard to the regulations was partially exercised and not acted out in every instance, which if they had been so, it is asserted by some parties that more prizes than that of the Senior Canadians would have changed places. But it is hard to know where each prize would have been, if the truth were told in this respect. But it appears to me that some of the rules are illiberal and unreasonable, and entirely inconsistent with the objects which such competitions are, in their truest sense, designed to effect. Is not the competition in ploughing for the improvement of that art chiefly, and through it indirectly agriculture generally? That all the regulations are not subordinate to the chief object, it is not hard to perceive, and look liker being framed from sinister motives and a spirit of strife. Let us look at one or two. "No ploughman shall be allowed to mend or arrange his land with his hands but may stop his horses—keeping his hands on the stilts, however—and make as long a leg as he chooses to tramp it behind him: and further, that no person shall be allowed to aid or instruct, in any shape, the ploughman after begun." These rules were made, I believe, from some of the crack ploughmen, having, last year, arranged the whole length of a furrow with their hands, and from some aiding by instructions or otherwise in

having the work as well as possible. Now, while I don't like to see any ploughman—from any cause, such as a bad plough or obstructions of any kind—in the unavoidable predicament of being obliged, for the sake of his work and in justice to the proprietor of the land, to lift and arrange bad places in his lot, on the one hand, and *disallowed* by a whim of a majority (who probably know little of such matters practically, and overlook common sense and justice through spleen) from making by all the means in his power, as good a day's work as he can; I say, in every respect, it is better to allow the ploughmen all the means they possess of making good work, but restrict them *to time*, and if the fault of recourse to dressing it with hands and feet (which is no fault at all but laudable when needed) lies in his want of skill in holding or in trimming of his plough to work it *herself*, where there is no obstructions, *the time* which will always sound in his ears while mending his land, will be the best incentive to improve himself in every possible way: for the look of a professedly and expected extra superfine day's job; for the discountenancing of a pernicious habit, now exploded and obsolete, of leaving one bad spot to be covered or arranged *afterwards*; and in justice to the proprietor of the grounds; allow, encourage and enforce each and all of the ploughmen to pass none of the work *unclosed*, and he will resort to all possible means to obviate the necessity of touching it with anything but his favourite implement, especially if *time* haunts or rather *hunts* him. It is said, "alike for one alike for all," but except the circumstances are the same throughout, the binding of all to one certain rule, is not *individual justice*. Lots are not all alike. One there is a road in, it is worst to close, but notwithstanding, were it allowed that hands and feet be used (in short a little harder work for it just to come this when there is *time*) its possessor might rival or beat his more fortunate neighbour and competitor. One lot there is not a stone in, and the plough, if in good trim, will preserve a steady onward motion and leave masterly work, if well held. While a plough as good and as well manned, in a stonier lot, cannot make the same work with the same ease: in justice this ploughman must have fair play with his more fortunate neighbour, and if among these untoward

circumstances, he can by any means beat his fellow, let him by all means have a hope to sweeten his labours and pains taking, that *merit within time*, by whatever means, shall be rewarded; or at least, merit, by whatever reasonable means, shall not be disqualified. As to the latter part of the clause, viz :

That no person shall be allowed to instruct or in any way aid the ploughmen—look at the rationality and consistency of it with the designs of the Society.

On-lookers can see flaws which the ploughman cannot always timeously see, and is it contrary to the best interest of any individual connected with the ploughing—especially with a view to adhere to the true spirit of the Society for Diffusing Agricultural Knowledge and Skill, without stereotyping its influences by pernicious rules subversive of its object—to allow any to give a useful hint or word, which may be useful to any hearing or observing it. A young ploughman may be at the side of the person giving the instructions, he may see and profit by what he hears. Everything but a spirit of selfishness makes it proper to “do good to yourself and others;” but is the Society to limit the collision of opinion and exchange of thoughts necessary to improvement, which is professedly the object of all such gatherings, in the greatest possible manner, through selfish whims?

Let any friend or person of skill give a useful word to any ploughman *openly* if he will without dread of being collared by any officials on the ground. Instructions can be given when parties will it, in defiance of all species of watching offenders. But let the Committee be disinterested and encourage by a vote of thanks rather than disqualify, any who has the liberality to give advice and any who thankfully accept it. Encourage the patriotism and disinterestedness of any who will proclaim secrets worth knowing and advantageous in their application to all, by a premium if you will, but hinder not and oust not any in his zeal for proficiency. The field is the best lecture room, and let each be a teacher if he will and the benefits will be mutual. Some find fault with the judges being present on the day of the match as by being there they may be biassed in some degree, almost insensibly, to some one independent of his ploughing qualifications. A judge may think

“there’s a neighbour of mine a good ploughman at home and he’s good to-day, what do you think of this man, he’ll be in the books.” Here’s another one that I knew long ago he’s a fine fellow, he’s done me a *gule* turn afore noo, he’s ploughing well too, &c.” &c. Such is a specimen of the objections on this point and sometimes these may happen in some degree unintentionally; for I would be hard to be made believe, that any one would go to act as judge without the desire of having for his motto, “Let the best win.” Of course having the judges to examine and decide on the day after, would obviate these objections, but then by such, that interchange of opinion, which is the chief object of improvement would be lost, and spectators would have no opportunity of examining the decision of the judges.

Just as at a Cattle Show, many learn points from the decisions which had they only seen the cattle without the decisions *before them*, would have awarded the premiums differently.

To learn judgment in such matters is the object of such meetings at all. Therefore, the greatest possible publicity and openness should be given, as public opinion also is the best subordinate safeguard to fair play or justice being exercised.

I have been intentionally diffuse in this communication, which may in some degree apologize for its length for your columns, but if any steps through it be taken towards amendment in the subject, the loss will be compensated.

A PLOUGHMAN.

EXTRACT FROM THOMSON’S LECTURES. ON BOTANY, ON SOILS, MANURES, &c.

It is a wise provision of nature, that as plants are not endued with volition and locomotion, nor guided by instinct nor reason, they are subject to more regular and unalterable laws than the animal creation, at least than that portion of it which possesses those functions which have been enumerated. Their food is always placed within their reach and they enjoy good health, and arrive at perfection in their growth, independent of external accidents, to which animals are equally liable, when they are situated where the soil contains those principles which are best adapted for the various purposes of their economy. The consideration of this question suggests the questions—What is the composition of soils? What part of soils are taken up as food by the roots of plants? To answer them has long em-

ployed the attention of the philosophical observer, and many and various opinions have been given to the public; but it is only since modern chemistry made those discoveries which may justly be regarded as the most splendid triumphs of experimental science, that any thing rational and satisfactory has been advanced.

The fact cannot be too often repeated and impressed on your minds, that plants are living beings, possessed of powers which enable them to convert into their own material substance, matters of a nature apparently very different from it, without keeping this in view, we should be forced to look for all the different productions of plants ready formed in the soil where they grow, and to suppose that these are simply taken up by their roots, and deposited in the different parts of the plant; an idea too incongruous to be admitted. On the contrary, they do not even take up those principles which are most abundant in the soil where they grow; but select particular parts of them, although these are not found, in general, forming in their uncombined state any part of the vegetable frame.

The ultimate components of all the various substances produced by vegetables have been found the same, differing only in the quantity and the mode of their combination; and the parts of the soil which supply these have been found to be much fewer than was previously supposed.

Every soil fit for yielding nutriment to vegetables may be supposed to consist of earth, water, air, a small proportion of metallic oxyds, and decomposed vegetable and animal matters, in which are included salts, gases, and vegetable extracts.

Earth which is the essential basis of all soils, is, as it is commonly spoken of, a compound of different earths: the most general of which are *Calcareous earth, Argillaceous earth, Silicious earth, Magnesian earth, and Ferruginous earth.*

1. **CALCARIOUS EARTH** comprehends lime usually combined with carbonic acid, in a state of limestone, chalk, shells and marl, which is a mixture of carbonate of lime with clayey and sandy matters; but lime is sometimes, also found in combination with sulphuric acid, forming a substance called gypsum; and more rarely with phosphoric acid. When too much calcareous matter is contained in a soil, it is unfruitful, owing to its absorbing moisture, and consequently remaining too dry. But the case is different when the calcareous matter is mixed with silica, for then the moisture absorbed remains in a free state, and not so united with the chalky matter as to disappear and be useless to plants. But the absorbing properties of all calcareous soils are not alike; and a great difference depends on the degree of combination of the calcareous matter. Thus 100 parts of calcareous sand retain, according to Professor Schubler's

experiments, 29 parts only of water, whilst 100 parts of the same matter in the state of fine powder retains 85 per cent. In the first case, when calcareous earth and silica predominate in an arable field, they produce a hot and dry soil.

ARGILLACEOUS EARTH, comprehends clay which is generally mixed with silicious sand and mineral substances, and is very retentive of moisture.

3. **SILICIOUS EARTH** is almost entirely composed of sand. The water passes so readily through it, that very little is retained for the purposes of vegetation; and soils which contain much of this earth are, therefore barren and unprofitable. In the form of sand it retains 25 per cent. only of water, while 100 parts of it, as it occurs with clay in an arable field, retains 280 per cent. of water.

4. **MAGNESIAN EARTH** is not so commonly found as the earths we have already noticed. The magnesia it contains is combined with carbonic acid, and mixed with silicious particles. It approaches nearest to the nature of clayed earths in its power of retaining moisture; that power enabling it to retain $4\frac{1}{2}$ times its own weight of water. This renders it, when it predominates, very prejudicial to vegetation; while it increases, when added in moderate proportions, the fertility of a dry sandy soil.

FERRUGINOUS EARTH consists of those oxyds of iron, known by the names of ochres and pyrites, mixed with silicious matter. These oxyds, in particular the pyrites, when in considerable quantity in a soil, if it contains little calcareous matter, are extremely injurious to vegetation.

The pyrites is a compound of sulphur and iron, and is converted by exposure to air and moisture into sulphate of iron, which destroys plants by over-stimulating them.

Vegetable earths have the least specific gravity, and sandy soils the greatest, whether they be dry or moist; the vegetable earths contain, besides vegetables in a state of decay, animal matter and a large proportion of salts, which are chiefly common salt, sulphates of magnesia and of potash, nitrates of lime, and carbonates of potash and of soda.

Such are the earths generally contained in soils; when any one of them abounds, the compound earth is named after the component; as for instance, a calcareous soil, an argillaceous soil, &c.

The principal difference which characterises the various kinds of earths, is their power of retaining the next component of soils, **WATER**. Water, as forming a part of soils is either chemically combined with the earth, or merely mechanically mixed with it, and retained in combination by cohesive attraction. In the former, it is of no use to vegetables; in the latter, it is essentially necessary for their support. If the soil be not sufficiently retentive, the plant is starved for nothing can be taken up from the

earth that is insoluble; and as we shall show afterwards, water itself is a principal part of the food of plants. If the soil be too stiff and retentive, the water remains upon its surface, and does not percolate to a sufficient depth to be applied to the roots; and if the vegetable be of a succulent kind, the herbaceous part remaining constantly surrounded with moisture has its vegetative powers weakened, and rots. This is particularly the case in winter; for, as the vital energy of the plant is then much lowered by cold, a disease of the vegetable takes place, similar to what happens in a leucophlegmatic state of the animal body, from which the plant rarely recovers. The most efficient soil, as far as winter is concerned, is that which contains a due mixture of carbonate of lime, sand and pulverised clay, with some vegetable or animal matters; and in which the materials are so mingled as to remain loose and permeable to the air. This is calculated not only to retain the water in proper quantity; but also to absorb it from the atmosphere, which is one great source of the supply that vegetables require; for water, as has been already remarked, is requisite for rendering the other matters in soils sufficiently soluble to be taken up by the roots of plants.

All the earths are more or less soluble in water; thus lime is taken up readily in its pure state; and also if the water contains much carbonic acid in solution, when the lime is in the form of chalk, or a carbonate, in the proportion of about 1-650 part of its weight. Clay is soluble in a minute proportion in rain water; silica even may be retained in solution by the aid of carbonate of potash; and in the minute state of division in which it is precipitated from an alkaline solution, it is soluble in 1000 parts of water; 200 parts of pure water hold one of magnesia in solution.

Air is, also, a necessary component of soils. Atmospheric air is absolutely necessary, as we know, for carrying on the process of germination; the more pulverulent, therefore the soil is, the more air it is capable of containing, and consequently is the better adapted for supporting vegetation. But a soil which is too sandy, the water not being retained, although it appears to be loose, yet does not contain so much air enveloped in it as it required; for the small particles of which it is composed apply more closely to each other, and lie in a smaller compass than the aggregated masses of a better soil, which touch at a few points only, and, therefore, have more and larger interstices between them. When the soil is too retentive, the water which remains on its surface evaporates in summer, and deposits the clayed particles which it had suspended, a kind of paste is left, which hardening, by being baked, as it were, in the heat of the sun, no air can penetrate to the parts beneath it; nor can that which has been already used in the vegetative process, and which is

unfit to carry it further on, escape; and we know that as atmospheric air is vitiated by the roots of growing plants, and during the germination of seeds, a constant renewal of it is requisite for supporting the vigour of vegetables. It is the oxygenous portion of the atmospherical air contained in the soil which is vitiated by the functions of the roots of plants.

The last component of soils which we have to mention, has always been regarded as the most important of the whole. We allude to animal and vegetable matter in a state of decomposition, from which the black mould which constitutes the richness of soils is almost altogether formed. But the analysis of some of the most fertile soils has proved, that their fertility does not depend on the presence of a large proportion of those substances. Thus Sir H. Davy found that the soil of a very fertile field in East Lothian, contained nine parts only in the hundred of decomposed animal and vegetable matter; and a soil from the low parts of Somersetshire, long celebrated for yielding crops of wheat and beans without manure, contained five parts of these principles only in the hundred. It is indeed, true that the carbonaceous matter contained in plants can be derived most easily from decomposing animal and vegetable substances; but these also yield salts, which prove highly stimulating to growing plants; and although plants seem to attain great bulk and vigour when much manure is applied, yet they are over stimulated, and their growth is connected with disease, in the same manner as in an overfed and pampered animal. The natural state of both is altered; premature age succeeds and death arrives long before the period when he should be naturally expected. Those plants also, which are intended for food for man and animals, when reared upon soil of the kind we are now noticing, yield less nutriment in the same bulk, than that which more healthy plants yield; and it is also of an unwholesome kind. Upon the whole, we may truly assert, that more harm is done by loading soils artificially with much animal and vegetable matter, than the natural deficiency of it in soils can occasion.

When a Botanist examines a space of ground, he forms an estimate of the nature of the soil, by observing the kind of plants, or weeds, as they are termed, which it naturally produces, and draws his conclusions from the knowledge he possesses of the relation which always subsists between the plant and the soil. If the plants are those which have divided roots, he concludes that the soil is pulverulent and easily penetrated; but if the roots are thick and fleshy, that as they require a humid soil, it is probable that it is damp and retentive. Some kinds of plants grow on one soil, but are never found on another; some require a large supply of carbonaceous matter, or a rich fertile soil; others, he knows, glean the little they require in the

most barren, and soon die in richer spots. But the knowledge of the Botanist although it is an accurate guide to a certain degree, in directing his judgment to the value of uncultivated soils, and is valuable in preventing him from making bad speculations by introducing new objects of culture into a place which cannot admit of them; yet it is of little avail to examining soils under the immediate influence of cultivation. The experienced eye of the farmer supplies much of this defect. On too loose and poor soils the roots of barley and other grains are long, but the stems small and weak; but in a richer and more tenacious soil the roots are short, thick, and very closely set with fibrils. The reason of these circumstances is, that the root shooting out towards the spots where the stimulus of nutriment is in greater quantity, exhausts the little nourishment it can obtain in adding to its length, and, therefore, an insufficient supply is left for the stem and leaves; but in richer soils the whole of the fibrils being surrounded by nutritious matter, a greater quantity is actually taken up by much smaller surface of roots, and supplies more freely the herbaceous parts of the plants.

To ascertain the real nature of soils, chemistry must lend its assistance; and this mode of examination is undoubtedly the most certain. Sir H. Davy has, however, justly remarked, "that the results of analysis, considered as affording indications of fertility, must necessarily differ according to the variations of climate, situation, and other circumstances. Thus, the power of soils to absorb moisture ought to be greater in warm and dry countries, than in cold and moist ones; and when the quantity of argillaceous earth they contain is larger. Soils, likewise, which are elevated on declivities, ought to be more absorbent than those in the same climate situated in plains and valleys. The productiveness of soils must likewise be influenced by the nature of the subsoil, or the earthy and stony strata on which they rest. Thus, a sandy soil may sometimes owe its fertility to the power of the subsoil to retain water; and an absorbent clayey soil may occasionally be prevented from being barren, in a moist climate, by the influence of a substratum of sand or gravel." [Here follows the mode of examining soils, which will be given in a future number.]

Every farmer knows the fact, that many plants will grow only in certain soils; and his art consists in supplying to the natural soils that part which is most essentially necessary for their support. As we have proved that the components of all vegetable matter are carbon, hydrogen, and oxygen, we must look for the supply of these ingredients in the soil; and it is from water and decayed organic matter that they are doubtfully obtained. From this matter, then carbon is supplied; and as water only, and these substances which it can hold in solution,

can be absorbed by the mouths of the roots of plants, the carbon, which is contained in the soil, separated from vegetable and animal matters by decomposition, must be dissolved in the water in order to be taken into the system of the plant; and it thus becomes their proper food.

If this view of the subject, be correct, the art of the husbandman and horticulturist must consist in applying those substances to the soil which will promote the growth of plants without over stimulating them. The different matters known under the titles of manures, which are employed for this purpose, must act in four ways to produce the effect required. 1st They must render the soils of the consistence which will enable them to retain a sufficiency of water; but not too much. 2. They must render it pulverulent to admit the roots of the plants to permeate and spread freely in it. 3. They must enable it to admit and retain air in its interstices; and 4, fit it to form carbon, and afford healthy stimuli to the vegetable vitality. The importance of a finely pulverized soil was first pointed out by Jethro Tull, in 1733; but although his ideas on this subject extended to an absurd degree, and led him to form a theory of vegetation altogether mechanical, yet the direction of the agriculturist to the importance of pulverization has been productive of most beneficial results. It allows of the easy extension of the roots of plants, admits a necessary supply of air during the process of germination, and assists those decompositions which are requisite for rendering manure useful.

The first place among the substances fit to answer the purposes already specified, is certainly due to lime. This substance acts upon soils either mechanically or chemically; and on the plants it acts physiologically. When in the state of carbonate, or united with carbonic acid, it is added to clayed soils, it acts mechanically by rendering them more free, loose, and pervious both to air, moisture, and the roots of plants; it acts chemically when it is deprived of carbonic acid, or is in the caustic state, by destroying worms, and other insects hurtful to young vegetables; and, by quickening the decomposition of their dead bodies, renders them useful to vegetation. In either state it neutralizes acids, and decomposes salt of iron and other injurious saline matters often contained in soils; and by the healthy stimulus it affords when in the state of quicklime, it invigorates vegetation both in young and mature plants. Lime also hastens the decomposition and solution of vegetable matter; and has been long known as a most useful manure when applied where half-decomposed vegetable matter abounds, as for example, in peat soils. The best corrective, therefore, for ground that has been too much dunged, is lime; and peat mosses, which consist of vegetable substances, the decay of which has been suspended by the formation of a peculiar acid in

them are rendered arable and highly fertile by a proper use of lime. In this operation the lime is combined with the acid contained in the moss, and also with carbonic acid, and remains as a component of the newly formed soil. Every kind of quicklime, however, does not answer for manure, and particularly that which abounds with magnesia; for although magnesia, when united with carbonic acid, is a useful ingredient in a soil, yet in its uncombined state or as calcined magnesia, which is that in which it must be, when magnesian limestone is burnt into quicklime, it is injurious to plants: as proved by the experiments of Mr. Tennant. When, however, even the best quicklime is too freely used, it becomes hurtful by over stimulating the growing plants; and, therefore, the more frequent and small application of it is preferable.

The object of all manures is either to alter the retentive quality of the soil, or immediately to supply carbonaceous matter to the plants. For these purposes, as occasion has required, clay, brick, rubbish, limestone, marl, chalk sand, gravel, has been employed as mechanical means; calts of various kinds as stimulants; and soot, ashes, and dung, as affording the nutriment of plants. That salts are taken up ready formed from the soil by vegetables is pretty certain; Drs. Hamel and Cadet having established the fact, that if the marine plants which yield soda when they grow near the sea, be removed to inland situations, they gradually cease to yield soda, and at length potash only is obtained from the ashes. We shall merely notice, with regard to dung, that when it is completely rotten it does not afford much soluble carbon, owing to its becoming as it were oxidized, and the carbon being converted into real charcoal; other principles also, such as carbonic acid and ammonia, useful both as stimula and nutriment to plants, are dissipated during the violent fermentation which is requisite to reduce dung into this state. Fresh dung, or that which is not completely rotten, on the contrary, benefits not only the present crop but several subsequent ones, as its good effect continues as long as the process of decomposition goes on.

SUMMER FALLOWING, WEEDING,

&c.

“Exposition to the atmosphere is one of the principal advantages. The most stubborn, and unfertile soil, if exposed to atmospheric influence will be improved in its texture, and rendered much better calculated for the process of vegetation. This is effected, either by the soil acquiring properties from the atmosphere, or by those substances which render it barren, being neutralized, destroyed, or washed away.

The fact is, that by no other means but by a complete summer fallow, can a wet bottomed clay be freed sufficiently of the moisture it has imbibed, which having been long locked up in the soil, holds saline and mineral matters in solution. These matters being discharged, the soil readily imbibes fresh water, and gets into a mellow and fertile state. The soil becomes more friable, the crops which it produces are vigorous, and abundant, and, comparatively speaking, freed from weeds.”—(Extract from Sinclair.)

An experiment has been made in Scotland by planting potatoes in a part of a fallow field where the soil was favourable, with a greater allowance of manure than the naked fallow; and it was found that the part cultivated with potatoes yielded a less crop of wheat, than the ground that had been fallowed;—the other crops on the fallowed part, were likewise more abundant; and the land much cleaner in the end. The ploughings should be carried on in dry weather, and the cross-ploughing carefully executed otherwise the process will be imperfectly done, and will not produce much benefit to the farmer.

We cannot expect profitable results from naked fallow, if the process is imperfectly done, and certainly that work is seldom properly executed in Canada. Mr. Marshall, in his agricultural work, accounts fallowing to be the best preventive of the wire worm. All herbivorous insects which have not the power of flight, at least in their early stages, are best extirpated by keeping the soil which they inhabit free from every thing herbaceous, especially during the summer months, when they are in a state of activity, and doubtless require daily support. In that case, they must be destroyed in soil that is properly fallowed. In many English countries fallow is thought essential, especially for barley, and it is considered that wherever the soil is strong, clayey, adhesive, and wet-bottomed, it cannot be profitably managed without fallowing.

The expense of six ploughings, six harrowings, and cleaning of an acre in England, is estimated at £3 11 6. It would not cost so much in Canada. In Flanders, much of the land is trenched with the spade, and light soils are preferred for that operation. The expense on light lands, trenched 18 inches deep, is £1 6 0 per acre. On strong lands, 18 inches deep £1 11 per acre. And on strong lands, 2 feet deep, £2 5 0 per acre. In parts of England where men are to be found accustomed to dig, light lands would be trenched at £2 10 0 per acre.

Summer fallowing would be extremely beneficial to the strong clay lands of Canada. But unless the lands to be summer fallowed are ploughed in the previous Fall, the work is not likely to be well executed subsequently.

The following remarks on Clay Soils, are from the "Penny Cyclopædia," and correctly apply to much of the soil of Canada:—

"Clay is an essential component part of all fertile soils. A clay soil consists of a large proportion of alumina, united to silica, of various degrees of fineness, and frequently also a portion of carbonate of lime. When the silica is very fine and intimately mixed with the alumina, the clay although stiff in appearance, is fertile in proportion to the humus which it contains, or which is artificially added to it. It then forms the class of rich wheat soils which produce successive abundant crops without change or manure. It has a strong affinity for water, which prevents the plants that grow in it being injured by drought; and it has a sufficient degree of porosity to allow superfluous moisture to percolate without making it too soft. All that is required for such soil is a porous substratum of rock or gravel; and where this is not the case, sufficient drains must be made to produce the same effect.

When clay soils are well drained, and when the effect of noxious salts has been removed by liming, burning, and frequent stirring, it will be found that a much smaller quantity of manure will produce a certain return in grass or corn, than on any light soils. The great difficulty is to choose the time when stiff clays are to be worked; and here it may be observed, that ploughing sometimes does more harm than good. When clay is wet, especially in the beginning of summer, and it is ploughed in the regular process of fallowing, the tough moist slice cut out by the plough is set on edge, and the sun bakes it into hard mass like brick. In this state it is not improved by exposure to the air, which cannot penetrate this hard substance. It would be much better to plough out deep water-furrows with a plough made on purpose, and wait until the moisture is reduced by gradual percolation and evaporation; so that the plough should raise a slice ready to break and crumble as it is turned over. This should be done immediately before winter, and then the frost will so divide and mellow the soil, that, provided it be kept free from superfluous water by drains and water-furrows, it will have the appearance of the finest mould when worked with the harrows in Spring. To plough it again would be to spoil all. It should have received the necessary manuring in Autumn, and be ready for the seed to be sown on this pulverized surface. The horses which draw the harrows or the sowing machines should be made to walk in the furrows, which should afterwards be deepened out with the spade, or by a plough constructed for the purpose. A free course and outlet should be formed for all surface water; for no maxim is more true than this, that stiff clays are never injured by a continuance of dry weather, unless they were in a wet state imme-

diately before. The driest clay contains sufficient water to supply the roots of plants for a long time; but wet clay, in drying and shrinking, destroys the texture of the roots by mechanical pressure. This may be of use when weeds are to be eradicated, and in that case a different mode of proceeding may be recommended; but when good seed is sown, the clay should be in such a state as to crumble under the harrows, and it should not be too moist. Experience has taught the plough-man that clay soils should be laid in round lands or stiches; and much of the produce of a field depends upon the skill with which this is done. It is not only the surface which should lie in a rounded form, but the bottoms of the furrows should lie in a regular curve, without small ridges or inequalities between them; so that when heavy rains penetrate through the whole thickness which the plough has raised, the water may find its way into the intervening furrows, without being retained by the small ridges left by an unskilful ploughman. It is seldom that a common labourer can be made to perceive the consequence of his carelessness. The slightest inclination of the plough to either side makes an inclination in the bottom of the furrow. An inequality in the depth does the same. The usual method is to increase the depth of the ploughing from the crown of the stich or ridge to the outer furrow. If the land has been cross-ploughed or dragged level before the last ploughing, this may answer the purpose; but if the stiches are only reversed, and the centre of the new stich is to be where the water-furrow was before, it requires twice ploughing to bring the stich to its proper form, and this is not always done for fear of trenching the land too much. Hence it is always preferable, where it can be done, to lay the land flat by cross ploughing and harrowing, before it is raised in stiches or ridges. The narrower the stiches are, the drier the land will be. The most convenient width is five bouts, as it is called, that is, five furrows on each side of the centre, which allowing nine inches for each furrow, makes seven and a half feet, leaving 13 inches for a water-furrow, which is deepened into a narrow channel in the middle.

Clay land will bear a repetition of the same crops much oftener than lighter lands; but every scientific agriculturist knows the advantage of varying the produce as much as possible making plants of different families succeed each other. The cereal grasses are one family, which is the reason why wheat, oats, barley, &c. do not succeed so well after each other as after leguminous plants or clover."

The foregoing remarks will give a very good idea of the best method to manage strong clay lands. By summer fallow, one year's crop is lost certainly, but the second year the land may produce a crop that would be more valuable

than two crops obtained without summer-fallowing, and the land will be left in a much more fertile and profitable state. Indeed according to the Canadian plan of managing land, leaving it one year idle, or growing natural grass and weeds, and the next year, once ploughing it for a crop, we may say that only one crop, and that very frequently a bad one, is obtained in two years, so that to summer-fallow the land cannot be considered to cause the loss of a crop.

Weeding is simply the extracting of such plants as it is not desired or needful to cultivate. The operation may be performed in various ways, by the hand alone; aided by a broad pointed knife; by gloves or by the aid of forks, spades, or other weeding-tools. In weeding thistles from pasture land, it has been found in England, that breaking or bruising them over, renders the roots much less liable to spring again the same season than cutting or even pulling them up. About the 1st of July is a good time to cut down thistles on pasture. They have to be destroyed before this period in the growing crops. It is necessary, early in June, to take them out of wheat, barley, oats, &c. or they cannot well be meddled with after. They are very subject to spring a second time in the growing crops, but they do not generally grow to any considerable size to do injury.

Preventing the soils from being injured by weeds, is attended with much greater difficulties than is commonly imagined.

It is most important to free the cultivated soil by every means that can possibly be devised, from those destructive intruders, and to prevent their growth in grass lands, on the sides of the roads and other places wherever they are to be found.

It is the more necessary to attend carefully to this subject, as the powers of propagation, which have been imparted by nature to this description of plants, render it extremely difficult for farmers to prevent their growth. Many of them are propagated by their roots and their seeds. Some plants extend their roots so far under ground, that it becomes extremely difficult to dig them up. In some instances new plants spring up from every joint left under ground. Others stretch out runners or stolons every way above ground, and to a considerable distance, while many plants, from their seeds having wings, by which they are scattered about by the wind in every direction and frequently to a considerable distance. These are so dangerous as to require every effort to have their future progress arrested, by cutting them down wherever they are to be met with, before or as soon as they have flowered.

In Canada, weeding is much neglected. Some of the richest and most fertile portions of the soil, near farm houses, and by the fences and drains, is allowed to be almost exclusively

occupied by useless and hurtful weeds—weeds also occupy a portion of the surface of the cultivated soil, and thereby the production of useful plants is considerably lessened. Any regulations, Civil or Legislative, that would contribute to the destruction of weeds, would greatly improve the appearance of the country—would be highly advantageous to the industrious and careful farmer, and to the general interests of agriculture. Farmers have no right to hold lands, if they allow them to be overrun with weeds, that must scatter their seeds over their neighbours' farms to their great injury.—*Evans' Agricultural and Industrial Magazine.*

FROM PARK'S CHEMICAL CATECHISM.

Chemists have agreed to call the matter of heat, *Caloric*, in order to distinguish it from the sensation which this matter produces. Caloric is everywhere indispensable to the existence of man. "It is with fire that, in every country, he prepares his food, that he dissolves metals, vitrifies rocks, hardens clay, softens iron, and gives to all the productions of the earth forms and combinations which his necessities require." The sun is the principal, and, probably, the original fountain which furnishes the earth with a regular supply of caloric, and renders it capable of supporting the animal and vegetable creations.

According to the laws of nature, animal and vegetable life are both very much influenced by the temperature in which they exist; we therefore find different kinds of vegetables, and a different race of animals appropriated to the different climates of the earth.

That caloric is as necessary for the support of vegetable as it is for that of animal life, may be proved by direct experiment. If, in the midst of winter a hole be bored in a tree, and a thermometer put in it, it will be seen that the tree is many degrees warmer than the atmosphere. Caloric is the cause of fluidity in all substances which are capable of becoming fluid, from the heaviest metal to the lightest gas. When the temperature of the atmosphere is reduced below 32° water gives out its superabundant caloric by degrees, till at length the cold atmosphere, robs it of its caloric, of fluidity also, and it becomes ice.

Owing to the distance of this globe from the sun, and to the vast mountains of ice at the poles, the atmosphere over a large portion of the earth is at times reduced to so low a temperature, that were it not for a wise provision of Providence, all vegetable life must be destroyed. Caloric has always a tendency to equilibrium; therefore, if the temperature of the air be lowered, the earth cools in proportion; but, when the atmosphere is reduced to 32°, the water which is held in solution becomes frozen, and precipitates in the form of snow upon the

earth, covering it as with a carpet, and thereby preventing the escape of that caloric which is necessary for the preservation of those families of vegetables that depend upon it for their support and maturity. Be the air ever so cold (and in the northern parts of the Russian empire it is sometimes 70 degrees below the freezing point) the ground, thus covered, is seldom reduced below 32°, and is maintained equally at that temperature for the purpose above mentioned. How multiplied are the means which nature has adapted for the preservation of all her productions.

The quantity of heat given out in freezing occasions the progress of congelation to be extremely slow. The constant emission of caloric from the freezing substances operates favourably; for thus the severity of the frosts is mitigated, and its progress retarded. On the other hand, if the return of caloric to the frozen body of water were not equally slow, what sudden inundations would be occasioned, in those countries where large masses of ice are collected, at the first approach of summer, as has before been remarked. That the melting of ice produces cold, is seen in many operations. By melting ice with common salt, confectioners produce cold much greater than that of the original ice.

In general, all bodies, whether solid or fluid, contract their dimensions, and become of more specific gravity when cooling. This axiom has been long known and acknowledged: but water affords a remarkable and striking exception. Water, as it cools below 42° 5, instead of contracting and becoming of greater specific gravity, actually becomes increased in bulk, and its specific gravity continues to lessen as it cools. From experiments, it has been found that water becomes of less specific gravity, whether it be heated above or cooled below 46° 5; a fact too astonishing ever to have been discovered or imagined a priori. The wisdom and goodness of the GREAT ARTIFICER of the world will manifest itself in this arrangement, if we consider what would have been the consequence had water been subject to the general law, and like other fluids, become specifically heavier by the loss of its caloric. In winter, when the atmosphere becomes reduced to 32°, the water on the surface of our rivers would have sunk as it froze; another sheet of water would have frozen immediately, and sunk also; the ultimate consequence of which would have been that the bed of our rivers would have become repositories of immense masses of ice which no subsequent summer could unbind: and the world would shortly have been converted into a frozen chaos. How admirable the wisdom, how skilful the contrivance, that, by subjecting water to a law contrary to what is observed by other fluids, the water as it freezes becomes specifically lighter, and, swimming upon the surface, performs an

important service by preserving a vast body of caloric in the *subjoined* fluid from the effects of the surrounding cold, ready to receive its own accustomed quantity upon the first change of the atmosphere!

These reflections, perhaps, will not be thought misplaced should they but afford.

"One ray of light in this terrene abode.
To prove to man the goodness of his God."

ROTATION OF CROPS SUITABLE TO THE DIFFERENT DESCRIPTIONS OF SOILS.

From Evans' Treatise on Agriculture.

The distribution of crops, and plan of their succession, is one of the first subjects to which farmers require to direct their attention. Whatever little regard has been hitherto paid by farmers to a proper rotation of crops in Canada, it is now a point on which their profits depend more than on any other. The kind of crops to be raised, are determined in a great measure by the climate, soil, market, and demand.

It has been found by experience, that besides the general exhaustion of humus or vegetable food produced by vegetation, especially those plants which bear farinaceous seed, each kind of crop has a specific effect upon the soil, so that no care or manure, can make the same ground produce equal crops, of the same kind of grain, for any length of time without the intervention of other crops. Whether this be owing to any peculiar nourishment necessary to each particular kind of plants, or because plants not indigenous degenerate in a foreign soil, the fact is certain with respect to most crops usually raised. This points out the advantage of varying the crops, accordingly as they are found to succeed best after each other. In general, all kinds of grain succeed best after a crop which has been cut before the seed has ripened, or the stem is dried up. Those plants which have a naked stem with few leaves, thrive best after leguminous plants, which have more succulent stems, and which bear their seeds in pods, as peas, beans, tares, or vetches, or after succulent roots, which strike deep into the ground, as carrots, parsnips, beet roots, and even potatoes. From this circumstance, confirmed by universal experience, the different systems of rotation have had their origin, taking the nature of the soil into consideration.

In the British Isles, where farmers have to pay heavy rents on short leases, there might be some excuse or justification for farmers deteriorating the lands by severe cropping; but here no such necessity exists, and consequently no such justification. Farmers are proprietors, and if they exhaust the soil by tillage beyond the point consistent with good management, they will be sure to pay dearly in the end for every

crop forced from the land unreasonably. A farmer who is a proprietor, cultivating his own land with skill and experience, if he understands the quality of his soil, and state of his fields, will know what crops are most likely to grow well in each; he will know what is most in request, both for his own use, and in the market, and he will act accordingly. But if he allows his land to be impoverished for want of rest or manure, or to run wild with weeds, he does not exercise the experience, judgment or activity, necessary to make his profession and pursuits profitable, whatever his skill or experience may be.

The system of rotations is adapted for every soil, though no particular rotation can be given for any one soil which will answer in all cases. In some situations much depends on the kind of produce for which there is the greatest market demand; indeed, this will influence rotations directly or indirectly, in every situation. But whatever the system of rotation that is followed, if the several processes of labour which belong to it are properly executed, land will rarely get into a foul or exhausted state, or at least, if foul or exhausted under a judicious rotation, matters will be much worse when any other system is followed.

The particular crops which enter into a system of rotation must be such as are suited to the soil and climate, varied by local circumstances, such as the proximity to towns, where there is generally a demand for potatoes, carrots, turnips, hay, &c. In a thinly peopled district, peas, beans, tares, flax, summer fallow, clover, and timothy might be interposed between corn crops on clay soils, and potatoes, carrots, Indian corn, clover and timothy, on dry loams and sands. A variety of plants, such as peas, tares, flax, Indian corn and carrots, might occupy a part of that division of a farm which is allotted to green crops, and on good lands, well managed, these plants might be grown to prepare the soil for wheat without perhaps resorting to summer fallow, except very rarely.

A farm of strong, rich soil, divided into six fields or enclosures, might have half the farm under different species of cereal grasses, or grain crops, peas, beans, tares, roots, or plain fallow; the other half under cultivated herbage, meadow and pasture. The rotation and distribution of crops might be the following:

One field or division, equal to one-sixth of the arable land, to be under wheat certainly, if the soil is suitable, if, not, barley or oats should be substituted. The wheat is to succeed green crops, or summer fallow, and the land, with this crop, or any other crop substituted for it, to be sowed down invariably with clover and timothy, or other grass seeds. Second field, one-sixth, ploughed in the previous fall, after pasture, to be in peas and oats, or perhaps all oats. Third field, or one-sixth, (following after oats and peas

the year before,) to be manured with beans, mangel wurtzel, potatoes, carrots and flax; and should the farmer be unable to find manure for the whole division, he may fallow the remainder, or sow tares, or some other green crop that he might plough in as manure if necessary. This last division will be prepared for wheat or barley the ensuing spring, and be seeded down with whatever crop is sowed. The other half of the arable land comprising three fields or divisions, should be in meadow or pasture. One field or division, equal to one-sixth of the whole, coming annually into tillage, to replace the division seeded down yearly with the crop of wheat or barley as before stated.

On farms of light or sandy soils, divided into nine fields or enclosures, the tillage should not exceed one-third of the arable land, or three fields in tillage, and six in meadow or pasture. By this rotation, the land would be under grass six years out of nine, instead of three out of six, as in the first rotation, the management and course of cropping for the part in tillage, to be the same as that laid down for the rich, or clay soil, varying the distribution of crops to suit the quality of the soil, and introducing Indian corn in this rotation.

It may be expedient to vary from these rotations. The experienced farmer will understand when and in what manner it will be prudent to do so. I believe, however, that the more nearly the rotation adopted in Canada, is conformable to these general rules, the more certain will be the profitable improvement of agriculture. This system of convertible husbandry, is the most suitable to the present circumstances of this province, and of British America. Under this course of husbandry, the lands would be constantly in good heart, capable of producing abundant and excellent crops, and though the largest portion may be under cultivated herbage and grass, I am well convinced the gross produce of the land, and the farmer's profit, may be augmented two or three fold, if the produce be judiciously applied, and the rearing and feeding of cattle, for the dairy and the shambles extensively introduced. Peas, beans, tares and roots, may be raised in this rotation in great abundance, for feeding cattle and hogs and a greater quantity, and better quality of grain produced in one year, than under the present system of farming can be produced in two.

No food, no cattle; no cattle, no dung; no dung, no corn, is a maxim that ought to be fixed in every farmer's mind.

In a report of select farms in England, one in Cumberland, of excellent soil has adopted the following rotation: On clay soils of the best description, first year, summer fallow, sometimes green crop; in either case, the land thoroughly cleaned, limed, and manured. Second year, wheat, with grass seeds for pasture. Third and fourth years, pasture. Fifth year,

pasture, top dressed with lime or compost. Sixth and seventh years, pasture, and ploughed in the Fall for oats the succeeding Spring, to be followed by summer fallow, or green crop.

On gravelly soils: First year, green crops, well manured. Second year, barley, with grass seeds. Third and fourth years, pastured. Fifth year, pastured, and top dressed with compost. Sixth, seventh, and eighth years, pastured.

Ninth year, oats, out of lay, and the rotation begins again.

It is no wonder that land managed in this way should be constantly in the best condition, producing from 34 to 38 imperial bushels of wheat to the acre, on an average of favourable years; and I am well persuaded this kind of rotation is more profitable in every way than the scourging one of constant cropping, however well ploughed or manured the soil may be.

Not to repeat the same kind of crop at too short intervals, is a rule with regard to the succession of crops, that ought to be strictly observed. Whatever may be the cause, whether it is to be sought for in the nature of the soil or of the plants, experience clearly proves the advantage of introducing a diversity of species into every course of cropping. On new land, or land that has been pastured several years, before it is again brought under the plough, there may be less need of adhering steadily to this rule; but the degeneracy of wheat, and other corn crops recurring upon the same land every second year for a long period, has been generally acknowledged.

Wheat it is supposed cannot be grown in perfection, on an average, more frequently than once in every five years on the same land. Beans, peas, potatoes, carrots, and red clover, that may be called green crops, become less productive, and much more liable to disease, when they came into the course, upon the same land, every second, third, or fourth year. What the interval ought to be has not yet been ascertained, and from the great number of years that the experiments must be continued, to give any certain result, probably cannot be determined until the component parts of soils, particularly the sort of nourishment which each species of plant extracts from the soil, have been more fully investigated. All good farmers will, however, avoid overcropping, or treating land in any way so as to exhaust its powers, as the greatest of all evils.

DEEP CULTIVATION.

Under this head I propose taking a cursory view of the causes that produce the beneficial effects that follow their execution; and afterwards, to confirm those facts by describing the results of my own experience.

There is an evident necessity of seeing the causes of the effects that govern our daily prac-

tice, that we may be enabled to remove them (if possible) when attended with injurious influence, and thus obviate former difficulties—and thus empower us to govern those effects that now govern us, and so enable us to guide our daily practice with that minute precision so needful to profitable culture.

Under the powerful influence of carbonic acid, oxygen, and moisture, the hardest rocks are crumbled; human structures are by them and rain water swept away—soils disintegrated, and constituents liberated in a fit state for the plants' reception: yet are these destructive agencies too slow in their action to merit the attention of many agriculturists.

Notwithstanding that the mechanical operations of ploughing, harrowing, &c., accelerate disintegration and liberation, we have no clear proof that they are strictly concomitant. It is enough for us to know that liberation will be produced in proportion to the exposure of the soil to the destructive agencies of the air—that it is brought to pass through atmospheric influence; and it is natural we should strive to deepen and pulverize our soils, thereby exposing every particle to be acted on by chemical solvents.

Perhaps the greatest of all means connected with fertility is an equal supply of moisture. Without an equal supply of moisture, vegetation languishes; the soil is irregularly assimilated by the plant and, consequently, our crop is deficient in bulk.

When a fertile soil, possessed of a good supply of carbonate of lime and finely divided clay, has a thorough division of its parts, it has the power of absorbing a large amount of moisture from the atmosphere during the night in dry weather; whilst deep cultivation will enable it to retain, in its interior, a supply equal to the demand of the plant, when most required; and by increasing the velocity of the water passing through the soil, a more speedy evaporation will be gained, and less of that chilling process—evaporation—will follow.

By deeply and properly cultivating a fertile soil, we provide for the plant a fitting receptacle—a receptacle sufficiently deep to permit them to penetrate beyond the scorching influence of the sun's rays, and in which every obstacle is removed for its speedy and equal supply of abundance of nourishment.

These were the views held by me in the year 1846, when, to test their accuracy, the following experiment was instituted on a piece of thorough-drained land situated on the Weald clay formation. It was found to contain an abundance of decaying organic matter to the depth of eight inches, the usual depth of cultivation. In the autumn the soil was forked twelve inches deep, turning up and exposing to the pulverizing influence of the winter's frosts two inches of clay and vegetable mould mixed,

which apparently had never before been brought to the surface: at the same time loosening two inches more that were left at the bottom. Thus the roots had four inches more pasture than was commonly supposed could be advantageously stirred, two of which were brought to the surface. Care being taken to effect the complete pulverization of the soil in the Spring, to the depth of seven or eight inches, it was afterwards cropped with carrots and cabbage, which fully repaid the expenditure. The plants flourished with equal luxuriance with those on land dug to the usual depth (8 inches) until the month of July, when the want of moisture gave a severe check to those on the latter, whilst the former gave a satisfactory proof of the efficacy of deep cultivation.

The crops on both soils were not weighed, but the deep dug portion was computed to contain a greater weight, in proportion to the additional depth of the soil. I am not sanguine enough to expect a double return by doubling the extent of active soil, but that the increase of produce will more than repay the outlay I fear not to assert.

By deep cultivation we expose a greater extent of surface to the destructive agencies of the atmosphere, and, consequently, the liberation of the food of the plants is accelerated; and, by a sufficient and equal supply of moisture, and by the aid of additional fibres, the nourishment that was before irregularly conveyed to the plant, in a fit state for its reception, is transmitted regularly and in sufficient quantity to support its constant growth. This, with the prolonged growth in the autumn, will easily account for the superior crops attained by deep cultivation.—*George Summers, Stoke Walke, Dorset.*

P. S.—I suppose it unnecessary here to remind my readers of the incapacity of a soil to absorb moisture in any weather when not permeable to the atmosphere, or to remind them of the injurious influence of certain subsoils on vegetation.—*G. S.*

The varieties of soil suitable for compost need not be particularized. All soils are benefited by the mixtures, if they are properly adjusted to the circumstances under which it is applied: the application of an earth to form the basis of a compost being regulated chiefly by the mechanical character of the soil. But the special fertilizing properties of an earth for compost, may with advantage, be considered, at the same time that we have in regard due attention to its mechanical effect upon the soil.

It is usually considered, that to attain the full mechanical as well as chemical influence of a compost, we must apply a large quantity of it. But by a judicious mode of applying an earthy compost, this end, so far as the growing crop is concerned, may very frequently be secured with little trouble. The best method is

to apply the fine fertile compost soil by *drill* along with the seed; so that the young plant shall, in some degree, exist in the artificial soil. In Yorkshire, the drill machines, which are capable of distributing bulky composts, are much in favour on strong soils; and unquestionably, enable many farmers to secure a plant, and to attain a luxuriant crop, in soil that is of a very unfavourable texture. Mr. R. S. Grabb of Glastonbury, Somerset, very properly directs attention to this feature in the application of composts, by which mechanical advantages are attained with little cost of application. "The admixture," says he, "of soils by the aid of the improved drills, has not sufficiently engaged attention. The cultivator of clay soils is enabled to grow Swede turnips, by depositing with the seed a *seed bed* of light earth, in which the young plants will flourish, until able to derive support from an imperfectly pulverized soil. The occupier of soils too light for the growth of heavy samples of wheat, is enabled, by the deposition of a strong earth, rich in the elements favourable to the support of wheat, to produce the grain of good quality; and the occupier of peat soils, abounding in vegetable matter, but deficient in earthy substances is enabled, in the absence of clay, by frequent application of small quantities of earth, sand, or gravel, to convert a merely vegetable and root-producing soil into a highly valuable soil, fitted for the growth of grain of excellent quality."

Lastly, earthy composts are well adapted for mixing with artificial manures. Substances which are small in bulk, or which are apt to injure the seed by too immediate contact, may, when thus added to the compost heap, be evenly and safely distributed.

TREATMENT OF THE MODERN WINDOW.—The office of junction of the window is not a more important one in the pointed style than it is in the classic: it has as strong a claim to consideration and character in the one as in the other, and therefore no good and sufficient reason can be assigned why, while the jambs of the Gothic window enshrine a labyrinth of beauty and intricacy of decoration, the filling up of the classic window should be entirely neglected in the way of design. I say neglected, but it seems worse than neglected: not only have imagination, taste, artistic feeling, had no part in the design, but it is positively marred by the sash in common use. The straight sash-bars, dividing it into a series of equal squares, do not improve the appearance of the humblest cottage, but in an architectural composition they are an injury. In most instances a spectator, ignorant of the custom, would be led to conclude that the architect had abandoned this portion of the façade to the joiner, who had filled it up in the cheapest manner he could.—*The Builder.*

THOUGHTS ON STEAM PLOUGHS AND AGRICULTURAL PROGRESS.—We do believe that an era of agricultural development, as fast and wonderful as that which the present age has already witnessed in manufactures, is not only within the bounds of probability but on the eve of advent—that a time is at hand when our present primitive agricultural implements will be put away as curiosities beside the distaff and the spinning-wheel—and that the alleged discovery by Daguerre of a mode of rearing three-year plants in three months—the reported power of some of our market-gardeners to rear a salad (like a mushroom) in a single night—the alleged power of the Japanese to dwarf the lofty pine into a miniature tree, a few inches only in height—the traditional story of the monks of Glastonbury Abbey, who could make the hawthorn bloom at Christmas—or even the trick of the Indian jugglers, who appear to cause a mango seed to spring up out of the soil in course of a few hours, and before the eyes of hundreds, unfolding leaves and flowers and fruit—are all but, at the worst, vaticinary imaginings, or rudimentary typifying ideas, of actual power of nature, scarcely less wonderful, and yet to be developed—just as was the old traditional idea of the magnetic telegraph of separated friends, with its needles and alphabets, but without any record of its invisible connecting wire—alone wanting to reduce it all to credibility. Believing, at all events, as we decidedly do, that a great era of agricultural development is at hand, when even the steam-plough, as it at present exists, may be a rude implement, it is interesting in such belief to witness just such beginnings of this anticipated era as were the first steam-engines or the first spinning and weaving machines in manufacture, or the locomotive with legs, like a horse, in the railway system. The steam-plough may, even yet, be just such an implement with relation to agriculture.—*The Builder*.

COUNTRY MILK MARKETS IN LONDON.—The London and North Western Company are erecting a milk market on their station in Lime-street, Liverpool, from designs by Mr. Woods, one of the engineers. It will be covered by an iron roof by Mr. Turner, of Dublin. Such milk markets erected near the metropolitan termini of the various lines would have an unequivocal interest in upholding them, if based, as they doubtless would be on a more substantial foundation than the old "London chalk."—*The Builder*.

We did not make the world, we may mend it, and must live in it.

It is to be doubted whether he will ever find the way to heaven, who desires to go there alone.

Do nothing in thy passion; why wilt thou put to sea in the violence of a storm?

Wisdom is generally an acquisition purchased in proportion to the disappointments which our own frailties have entailed upon us; for few are taught by the sufferings of another.

Physiognomy—reading the hand-writing of of nature upon the human countenance.

Let the bent of thy thoughts be to mend thyself, rather than the world.

The hate which we all bear with the most Christian patience is the hate of those who envy us.

THE CITIES OF LONDON AND PARIS COMPARED.

—The report of M. Darcy, divisional inspector of the Ponts et Chaussées, who has been to England to obtain information relative to the macadamised roads, has just been published. In this work we find the following particulars relative to the population, extent of the streets, &c., in Paris and London:—The total surface of London is 210,000,000 of square metres; its population, 1,924,000; number of houses, 260,000; extent of the streets, 1,126,000 metres; extent of the streets, not including the foot-pavement, 6,000,000 metres; extent of the sewers, 639,000 metres. The total surface of Paris is 34,379,016 square metres; population 1,053,879; number of houses, 20,526; extent of the streets, 425,000 metres; surface of the streets exclusive of the foot-pavement, 3,600,000 square metres; length of the sewers, 135,000 metres; surface of the foot-pavement, 888,000 metres. Thus, in London, every inhabitant corresponds to a surface of 100 metres; at Paris to 34 metres. In London the average of inhabitants for each house is 7½; at Paris 34. At London the average length for each house corresponds to 40 metres 40 centimetres; at Paris, to a length of street of 15 metres. These details establish the difference which exist between the two cities, from which it appears that there is in London a great extent of surface not built over; that the houses are not very high, and that almost every family has its own. The Boulevards of Paris is the part where the greatest traffic takes place, and the following are the results of the observations of M. Darcy on this subject:—On the Boulevard Poissoniere, 7,720; Boulevard St. Denis, 9,609; Boulevard des Eilles du Calvaire, 5,856; general average of the above, 8,600. Rue du Fauburg St. Antoine, 4,030; Avenue des Champs-Elysees, 8,959. At London, in Pall-mall, opposite her Majesty's Theatre, there pass at least 800 carriages every hour. On Westminster bridge the annual traffic amounts to not less than 8,000,000 horses. By this it will be seen that the traffic in Paris does not come up to one-half of what it is in the macadamized streets of London.

True merit, like deepest rivers, make the least noise.

Agricultural Journal

AND

TRANSACTIONS

OF THE

LOWER CANADA AGRICULTURAL SOCIETY.

MONTREAL, DECEMBER, 1850.

What are the best means to adopt in order to promote the improvement of agriculture in Lower Canada *where its improvement is most required*. This is a question of importance with all true friends of the general improvement of Canadian agriculture, and the prosperity of the country. We have no doubt there is a diversity of opinion as to the best means, but by fair discussion, we may arrive at something like a just conclusion, and it would afford us much satisfaction to have this subject fairly discussed, not in a covert and underhand manner, but in this Journal, or some other newspaper, where the public may be able to judge. We rejoice in believing that there is not at present a farmer's family in Lower Canada, that has not some member of the family capable of reading: If this be a fact that is capable of proof, which we have no doubt of, can there be any better means of producing a spirit of enquiry, and improvement, than by the circulation of a well conducted Agricultural Periodical amongst the people, that would suggest improvements, and report experiments, and the results of a good system of agriculture elsewhere? could this possibly have any other tendency amongst the rural population than a useful one? Could there be any other periodical or newspaper circulated amongst them that would do more good, and as little harm? We answer, N — we are prepared to sustain this reply. It may perhaps be imagined that the Lower Canada Agricultural Society have been wanting in their duty, in not having an Agricultural Exhibition annu-

ally. The County and District Societies have had their Exhibitions, and the country must have had the full benefit of all these Exhibitions for the promotion of Agricultural improvement. The Lower Canada Agricultural Society have directed their attention to other means of producing the improvement of husbandry, which neither the County or District Agricultural Societies have adopted, and thus made up what was wanting. We have the opportunity of observing that these means have been successful, to a reasonable extent, and to an infinitely greater extent, than could be produced by any Exhibition that was in their power. We have had many Exhibitions, but we should regret extremely were we to believe that the exertions of the Lower Canada Agricultural Society, have not been productive of more usefulness to the rural population of this country, then all those Exhibitions put together. This may be considered as assuming a good deal but we are prepared to sustain our position by reference to respectable parties throughout the country, and by an extensive correspondence on this subject. All the good things that were to exhibit, have been exhibited, it may be presumed, and what useful purpose could it have served to have exhibited them again? We are not by any means unfriendly to a great Annual Agricultural Exhibition but on the contrary, would be very happy that the Lower Canada Agricultural Society would have the means to hold one regularly. We only state, that this Society have applied their funds for the time past, in the best manner possible, to advance Agricultural improvement in Lower Canada, and the Report of the Agricultural Committee of the Legislative Assembly last Session, will fully sustain us in this assumption. We do not pretend to say that all that was necessary, and possible to be done has been done, because there was not means. This Journal has advocated Agricultural Schools and Education, and Model-Farms;

and of course these things would require ample means for their general establishment, which this Society did not possess. We hope it is not assuming too much, to pretend that we have advocated in this Journal many useful measures that would be of vast benefit to Agriculture and to the country generally. We may not have advocated all that would be necessary, but we hope we have not suggested any that would be prejudicial to Agriculturists or to the community. There is another circumstance, which, we trust, we may be pardoned for adverting to—that is—our anxious desire that this Journal should be strictly Canadian, and that we should maintain the character of Lower Canada as not inferior in any respect to any part of North America, so far at least, as regards her natural capabilities and advantages. When this is the fact, the improvement of all those advantages is in our own power. These propositions we have constantly maintained. Would it then be too much to presume upon the zealous support to this Journal by all true friends of our beloved country? Would it be too much to expect that it would be supported in preference to any foreign Agricultural Journal, even though it should not have equal merit in every respect. The annual subscription is not much to every farmer, even though he should not read it, and subscribe to foreign Journals for reading and information. We have ever found farmers great advocates for the encouragement of home industry. They forget this principle when they encourage foreign Agricultural periodicals in preference to Canadian. In conclusion, foreign Agricultural periodicals are generally unsuitable for French Canadian farmers without revising and translating. This would be an expense equal to that of publishing this Journal in the English and French languages. What then is to be done? We do not pretend that every Canadian farmer who can read takes this Journal; but we do say, that a considerable number take it and read it, and that it is also taken by some of the country schools.

We can also say that the number of subscribers to the French Journal is larger than to the English. If it was not published, all those who take it would be deprived of what they must consider an advantage. On what grounds of patriotism or fairness then would it be expedient to discontinue the Journal, and deprive Canadian farmers of the opportunity of taking it and reading it—granted that foreign periodicals may possess as much merit in the estimation of some parties as this Journal, yet they are not in a language nor in other respects suitable for a vast majority of the farmers of Lower Canada, and last, but not least, they are not Canadian, nor are they by any means in Canadian interests, as they are opposed to reciprocal free trade between the United States and Canada. We advocate equal opportunities and equal advantages for every class of farmers in Canada as a common right, and this they could not have were not agricultural works accessible to all in a language they understood. A regular periodical has the advantage over books, as it constantly reminds farmers of what may be done, reports new experiments and their results, and may suggest many useful hints, for every day work, that might not be so attractive to the farmer in a book. Coming at stated periods, it creates an interest and desire for information. If a farmer finds even a few lines in one number that he considers useful, he is anxious to see the next number, expecting that it might also contain something interesting. Books do not have the same effect of creating a constant interest.

There cannot be any doubt that it would be highly advantageous to this country that manufactories should be established for supplying our own wants as far as possible, and thus raising up to a certain extent a class of customers for agricultural products at our own door. This home manufacture might, at all events, be introduced, so far as this country would yield, the raw products for them. It would be a double advantage to manufacture the raw products of Canada for our own use

instead of exporting them, and sell to the manufacturers here as part of the raw products what we now export to buy manufactures from a distant country. The expense of exportation and importation would be thus saved to the Canadian producer and consumer, and a home trade, the most profitable of all trades, established. We do not pretend that such a trade would do all that is necessary for us, or that it should give us a market for all we would have to dispose of, or supply us with all we would require. We only say that home manufactures of our own raw products, for partly supplying our own wants, would be a very useful help to Canada and her people. Any country situated as this is, so remote from market, should endeavor to manufacture, to the fullest extent that she can do so profitably, for her own people. We shall always have a large trade both in imports and exports, although we may have some manufactories of our own. We rely upon the export trade, because we shall be able to supply the British Isles and other countries with products they cannot obtain so well elsewhere. This is the only encouragement we may expect, but fortunately it will be certain and durable. We shall also require to import many things that we cannot manufacture. The prospects for Canada are most cheering for the future, if we improve the advantages that are in our power. There is nothing like ruin and decay to apprehend. Indeed the country is too fine a one to be brought to ruin or decay by any portion of its inhabitants. It may be possible to retard its general prosperity for the want of united action in measures that are necessary to insure general prosperity, but we may rest satisfied this state of things will not continue long. We have too many advantages inviting us to make use of them to be long neglected, by our population. Education and the introduction of capital would soon stir up the most dormant faculties.

THE RUTLAND WHEEL PLOUGH—This excellent plough is manufactured by Ransome

& Co., Agricultural Implement Manufacturers, Ipswich, England, and the name of the manufacturer is so well known that it is a sufficient recommendation to any implement coming from their establishment. We imported one from England some time ago, and our object in doing so was, as we have before explained, that it might be the means of introducing some improvement in the Canadian Wheel Plough, or the importation of the Rutland Wheel Plough. This plough was exhibited at the late Montreal Industrial Exhibition, but we were surprised to find that it was passed over, although certainly deserving of notice and commendation. It was not sent there to catch a prize, but to show the sort of ploughs that was esteemed worthy of a prize in the first agricultural country in the universe. This plough has been at work since the Exhibition, and it has been seen at work by respectable gentlemen, who expressed their satisfaction at the perfect manner it executed the work. It was draughted by two rather small sized Canadian horses, and we shall answer for it, that there is no iron swin plough of lighter draught, or that can execute the work in a better or more perfect manner. There is no difficulty in determining the merits of the plough by any party who sees it in operation. The wheels, mould board, muzzle and rack can be adjusted to any size of furrow-slice, in depth or width, that may be required, and in the hands of any ploughman accustomed to use such a plough, and with horses of strength proportioned to the work to be done, the plough will exactly cut and turn the furrow-slice of the size that is desired, without leaving a *single inch* uncut, or unturned, that ought to be cut and turned. There is no swing plough that ever was made will do this, unless where the horses are exceedingly well trained, and the ploughman a perfect master of his business, and constantly on his guard. We have seen ploughmen creep along at ploughing matches, in a manner that would be utterly unfit to be practised in ordinary ploughing upon a farm. Every ploughman should be able, in compe-

tition at ploughing matches, to stand up to his work, as it would be proper for him to do at home upon the farm. A man can do this with the wheel plough under every circumstance, where the land is free from stones and roots. So good an implement as this is does not require much recommendation or patronage to bring it into use, when it is once known. The mould-board and share are perfect in form, according to our idea, as any we have ever seen, and indeed the most perfect. The iron wheels might be substituted by wooden wheels if any danger of breaking them, might be anticipated. We do not recommend the plough in opposition to any other plough, but simply on its own merits, as an implement that would be very suitable for use on a large portion of the lands in Lower Canada, and particularly for Canadian farmers accustomed to wheel ploughs. We are satisfied it will not supersede the swing plough with those who use them, whatever may be its merits, nor do we desire or wish it. The swing plough, for those who know how to use it properly, need not be changed for any other, but if wheel ploughs are to be made use of, and we see no objection to them, the Rutland wheel plough is capable of executing work as well as any plough we have ever seen in America, and according to our humble judgment there is none equal to it for lightness of draught, and for exactness in executing the work.

We have already noticed, "The Farmer's Guide to Scientific and Practical Agriculture, by Henry Stephens author of the "Book of the Farm," &c., "assisted by John P. Norton—Professor of Scientific Agriculture in Yale College, New Haven, "now being published at New York, by "Leonard, Scott & Co. The 11th. number is now published, and the high character of the first numbers is fully sustained throughout the whole. It is to be had at Mr. Dawson, Place d'Armes. This work when complete, will be a very valuable addition to an Agricultural Library. There is no part of it

that we have seen, that may not be read with advantage, by farmers. However, it may be disputed by some parties, agricultural publications, are entitled to the merit of being the principal means of advancing the improvement of husbandry. It is by these publications that the experiments made by wealthy men and the results obtained from them, have been reported, for the instruction and encouragement of practical men. There are very few working farmers who have been first to introduce new and improved modes of cultivating crops, of breeding, rearing, or feeding stock, or the management of their products. There are many of these we rejoice to say, very willing to adopt suggestions proposed to them, but there are few who have originated the most valuable improvements we have. We have known parties to appropriate as their own, improvements which have only been suggested to them by published works on agriculture. This, to say the least of it, is most ungenerous. They might be content with profiting by the suggestions offered to them, and recommend the practice to others, but in justice to agricultural publications, they should give them the merit of the suggestions. It is this injustice that prevents agricultural works from having so wide a circulation as they deserve. You scarcely ever heard a working farmer acknowledge that he had even derived a useful idea from any work on agriculture, but all his improvements are his own and the suggestions of his own intellect.

Mr George Shepherd, the seedsman of the Lower Canada Agricultural Society, has just received from Europe a large supply of clover and other Agricultural seeds, of this year's growth, and of the best quality, which he will dispose of, as usual, on moderate terms. He also receives samples from farmers of any seeds they may have to dispose of, which may be seen at his store by parties desiring to purchase. In sending samples, it is requested that the variety be distinctly stated, and whether engaged to be unmixed. Also the quality of

seed, time of sowing and harvesting, and the produce per arpent of grain and straw—together with any other information that may be useful to Agriculturists. Mr. Shepherd has also on hands the very best steel spades, shovels, digging-forks and hoes, with many garden implements.

AGRICULTURAL REPORT FOR NOVEMBER.

The month of November was very fine, with scarcely any frost up to the 17th, when considerable rain and sleet fell, but on the 18th the weather again cleared up, and continued fine to the 21st, when we again had a light fall of snow that disappeared in the course of the day. Up to this time there was no interruption to ploughing, and we have seldom seen a more favorable Fall for completing the work of the farm. This cannot fail to be beneficial to farmers to have an opportunity to have their ploughing and drains in good order before the Winter commences. The working season is so short in Spring that it is a great advantage to have the soil ready for the seed the moment it can be sown. When the ploughing and draining is well executed in the Fall, the soil soon becomes in working order after the snow disappears in Spring. We were glad to hear from several parties that they had carted away the banks of open drains, and sloped them down, as we have so often recommended. This would be a most useful improvement in open drains, and make it quite an easy matter to keep them constantly in good order. We do not know an expenditure that would pay the farmer better than the carting away the sloping or all his drains. The drains will act much better when properly sloped than when cut perpendicularly, and will never require much labour to keep them clean. We had an opportunity this Fall to see a field thoroughly drained with tiles, by James Logan, Esq. The drains were over 3 feet deep, at 24 feet apart, and the work well executed, with the exception, that the bottom of the drains was wider than we thought necessary. We conceive it would be

better to have the bottom of the drains exactly the size of the tile, and that the tiles would be less subject to get out of their places; this would also save some excavation of the earth. Regular draining tools are necessary for this work, and we believe they are not to be had here unless when imported by those who want them. Mr. Logan has thoroughly drained another field some time ago, and has found it a great improvement. He told us the soil of this field immediately after rain is dry, and in a condition to be worked. This would be a great advantage in Canada. The expense of tiles may deter many from thorough draining, but we think wood or small stones might very well be substituted for tiles. We have, in former numbers of this Journal, described how stone drains are made, and also how they could be made with small poles. For a foot deep of the bottom of the drain it need not be more than 10 or 12 inches wide at height of the foot, and 5 inches wide at the bottom, and it is only necessary to fill this part with small stones, covering the stones with a sod of earth, with the grass side next the stone, and then filling in the upper part of the drain with the earth taken out. There is no doubt that the improvement of Agriculture in Lower Canada is progressing. When a few have commenced to improve their success will induce others to follow their example. The Agriculture of Eastern Canada may be in a backward state generally, but so is the Agriculture of every part of North America that we have ever seen. The result of this year's crop has been generally satisfactory in proportion to the cultivation of the soil. The season throughout, has been beautiful as we could have wished for. Wheat or potatoes have not suffered much by insects, or disease. The crop of wheat is not very heavy certainly, but the fly has not injured it much. It is extraordinary that the wheat-fly, *Cecidomyia Tritici*, is not accurately described by writers in this country, nor indeed in England. It is called by some the *Hessian fly*, quite a distinct insect, that cuts the stalk of wheat near

the root, instead of eating the grain in the milky state in the ear, as the larva of the wheat-fly does, and fortunately the Hessian-fly is almost unknown in Lower Canada. The wheat-fly is also described as the wheat weevil, an insect that has never been known in a wheat field, and only injures wheat in the granary. It is injurious to Agriculture, that troublesome insects when attempted to be described should not be described accurately as it leads people into error respecting them. We hope that as Agricultural skill and improvement is more general we shall be able to subdue and overcome the depredations of insects and vermin that are injurious to the farmer. It is possible yet to execute work in the fields, and we have seen parties ploughing up to this date. We do not even now see any appearance of winter more than a month ago. The crows are still here in large numbers, that usually leave us the latter end of October. We have not seen them continue here so late during 33 winters past. We suppose it may indicate a mild winter, but we hope not so mild as to deprive us of ice on our rivers, and snow on our fields and roads. Domestic animals find considerable provender still in the fields. There is no certainty of the weather continuing fine for any length of time, but there is no indication of an immediate change. The mildness of the weather will save much provender for cattle, and firewood to the people, and this is an important consideration. We do not think there is any portion of British America can boast of a finer Fall than Lower Canada this year. The markets continue abundantly supplied with all descriptions of Agricultural products, which sell at moderate rates. We have never seen here better beef and mutton in the market. The Canadian farmers bring in most excellent mutton for sale. We saw, last week, a farmer from Varennes, having mutton which we considered too fat. This fact is encouraging—Canadian cheese of good quality is plenty in the market this year, and we rejoice at it. Fowls are in great abundance, some very fine,

all sell at moderate rates. A stranger visiting our market, whatever he might have heard of signs of ruin and decay, could never believe that there was any danger of our population being starved for want of abundance of excellent food. Although nature reposes in the country during the winter, this repose is not unnecessary, but, on the contrary, is highly useful for future vegetation, flowers and fruits. Our fields could not always be producing in this climate. The frost and snow of Winter is of great benefit to our ploughed soil, as a covering of snow is highly advantageous to our meadows and pastures. Lower Canada has advantages in this respect that she does not get full credit for, over all other parts of North America that we know anything of. We have always endeavoured to represent this country as she is entitled to be represented, and we have no sympathy with those who would speak or write against it. In addition to all other advantages, it is the most healthy country in America, we believe, and is not this blessing alone one of the greatest advantages we could possibly enjoy? Without health there is very little of true enjoyment to mankind, wherever his lot may be cast on this earth. Sunny climes and constant verdure cannot compensate the invalid for the want of health, that is frequently the consequence of a residence in these favoured climates.

November 26th, 1850.

THE FALLS OF NIAGARA.—We have frequently been told by parties who had visited those stupendous Falls, that their expectations had not been fully realized on first seeing them. We cannot conceive what their expectations may have been previous to visiting them, when on seeing them, they were disappointed. For our own part, although we had formed high expectations of the wonder and delight we must experience at the sight of a water fall of which we had heard and read so much, our highest expectations were more than realized, and we never before saw any work of nature

that interested us so much. We fortunately had an opportunity of seeing them in fine weather—at night during a full moon, and before, and at sunrise. From the low banks of the river below the Cataract, we had a view of the Falls by the light of a full moon, and perfectly clear atmosphere, and the sight was sublimely beautiful and grand, beyond anything we could have previously imagined. Indeed the attraction was so great, that we could scarcely persuade ourselves to leave it during the night, and when we did retire it was only to the Pavillion Hotel, immediately over the Falls where we had a view of them from the windows, and heard the sound of the falling waters all night. At the dawn of morning we again took our station on the bank of the river. The weather was beautifully clear and calm, and before, and immediately after the rising of the sun, there was a dense mist, or steam over the waters, extending from the rapids above the Falls—to the Falls—and downwards to the Suspension Bridge. The best idea that can be formed of the appearance of this mist, is by imagining the rapids—the Falls—and the river below them, to be one vast boiling chaldron, producing this mist or steam. It is impossible to describe the beauty of the scene when the sun first appears above the horizon, shining through this mist or steam. Other parties perhaps might not estimate it so highly as we did but we certainly never witnessed any scene to equal it, and our only regret was its short duration, as, when the sun was half an hour high, the mist had nearly all disappeared, except immediately over the Horse-shoe Falls. We believe that under similar circumstances to these we have stated, a view of the Falls in the morning, before, and at sunrise, in the month of September will be more interestingly beautiful, than at any other time they can be seen. We noticed particularly, that there can be no mistake, as to the reported height of the Falls being fully equal to what they are stated to be; about 160 feet on the Canadian side. We also observed that the vast quantity of water

that finds its passage over the Falls from the immense Lakes of Upper Canada must be much greater than one would be likely to suppose from the width of the river below the Falls. The water is very rapid for nearly two miles above the Falls, and in passing over the horse-shoe Falls it does not flow in a regular stream as over the Falls on the American side, but it actually tumbles over in vast heaps or in great ridges or waves like those of the Ocean of great depth and size. Going under the protecting rocks, over which the waters falls, the noise is tremendous, and the view of the falling waters from this position is calculated to inspire the soul with awe and wonder. Immediately below the Falls, the waters are quite smooth, and there is a Ferry established between the Canadian and American shore. The Americans have also a small steamer, very appropriately named. "The Maid of the Mist" which takes passengers to view the Falls from these still waters, and she approaches them as near as she can. Any of the passengers who remain on deck, have to wear oilcloth cloaks, and hoods to throw off the spray, that is constantly falling. From the Ferry downwards, to Queenstown, the river is exceedingly rapid. The whirl-pool is about four miles below the Falls, and we suppose, is produced by a bend in the river. The rapid current when it comes to this bend, causes the whirlpools, and the constant and great agitation of the waters has formed quite a large Bay on the Canada side of the river. The agitation of the waters, at this bend or bay is tremendous and forms a number of whirl-pools, and pieces of wood, or any light substance, carried into this place are constantly turning round with the waters, and in fact the whole bay presents a most extraordinary appearance. We confess we should have been much gratified to see a boat or craft of some kind upon the waters in this Bay, to see what effect would be produced. It can be seen best from the Canada side, as you can look down upon the Bay. The whole seen, from the whirlpool, upwards

to where the rapids commences above the Falls, is, we suppose unequalled upon earth, and was our place of residence within a convenient distance, we should be tempted to devote more of our time to the contemplation of these mighty Falls than would be expedient for us. We had also an opportunity of seeing the burning well, situated about a mile above the Falls, on the Canada side. The water of this well ignites by applying a lighted match to it, and produces a flame like that from burning spirits of wine. We do not know anything of the chemical character, of the water, but it is perfectly clear, and has no ill taste. An American canal boat, has by some means, got into the rapids above the Falls, and now lies within a few yards of the edge of the Falls on the Canada side, and must be kept in its present position by rocks, that prevent her going over. Had she been even a few yards further from the Canada shore, nothing could prevent her going over the Falls, but she happens to be near the shore in the shallowest part of the water. There is another large rock, close to the place where the Table rock fell in lately, that will probably fall also, at no distant period. There is a large and deep fissure already between it and the banks, that is certain to extend. We were glad to see that no attempt has yet been made by man, on the Canada side to disfigure by artificial means this wonderful work of the Creator. The only thing that has been done on our side is the construction of a miserable stairs (from the upper to the lower bank of the river) that is quite broken and unsafe in many parts of it. We were surprised that the numerous visitors to the Falls, would not induce interested parties to construct such a means of access from the upper to the lower bank of the river, as would be suitable, safe, and in keeping with this greatest natural wonder of the world. Whatever may be done in this way, the work of man, in dressed wood, or stone and mortar, should be kept out of sight as much as possible from the view of the Falls—and we confess we should have been glad to see the tower on

Goat-Island tumble over the Falls provided that no life was lost by it, and that it was not to be replaced by another tower. We thought even the Canal boat a disfigurement to the Falls. It appeared a thing that had no business there. No work of man's hands can ever improve the appearance of the Falls of Niagara—in any part of it—from the Canada to the American side, and all disfigurements should be strictly prohibited by the inhabitants of both countries, whether for gain or whatever pretense. The Suspension Bridge situated about two miles below the Falls is not in sight from the Falls on the Canada side. It is a beautiful work of art, and highly creditable to its constructors. It is 800 feet in length, a single carriage-way, and in 220 feet above the water of the river. The agents very kindly allowed us to pass and repass, and would not accept any toll, and we beg to offer them thus publicly our best thanks—not for the remission of the toll, but for their civility to a stranger. We must not neglect to mention the museum of Mr. Barnett situated close to the Falls. He has a numerous and excellent collection of the natural productions of the country in every good preservation and arrangement. He has also some live wild animals, a male and female Buffalo, a wolf, perfectly tame, and some others. His Camera Obscura, is very interesting and we particularly admired his garden, arranged in such good taste for its peculiar situation. His place altogether is well deserving a visit. It may be considered rather inconsistent to occupy the pages of this Journal with a description of the Falls of Niagara that have been so often and so ably described by regular tourists. We only give a farmer's description of them, for the entertainment of farmers who may not have seen them, or read any particular description of them. The wonders and beauties of nature have always interested us deeply, and as the Falls of Niagara has interested us more than any thing we have ever seen before, we could not forego this opportunity to submit our humble description for those who

may not have seen them. It is rather a dull task to be forever confined to writing or reading on one subject, and we hope subscribers will not find fault with us for changing the subject in this instance. We find we have forgotten to state, that a carriage road has been cut from the Clifton Hotel down to the lowest shore of the river, at the Ferry, that answers the purpose extremely well at that point for gaining access to the lowest bank of the river.

We beg to thank a correspondent for the list about inserting in our January number, a list of the different District Agricultural Societies in Lower Canada, with the number of Members, and the amount of the Parliamentary Grant received by them, as the simplest way of shewing what interest is actually taken by the inhabitants in so wide a source of prosperity to the country. With a view to conveying out this idea, we should be glad to be timely informed by the Secretaries of local Associations what minor or *Branch Societies* have sprung from each district or present stock and are successfully co-operating therewith.—

We have much interest in reading the Report, published in the *Mark Lane Express*, of the County of Rutland great Ploughing match, which took place at Great Casterton near Stamford in that county, on the 8th of October last. Such a ploughing match would be worth looking at. We give a short extract of the proceedings, with a speech of the manufacturer of the Rutland wheel plough; Allen Ransome Esq., of Ipswich. Ploughing matches are calculated to produce much good, but there should be trials of the various ploughs in common use, and if possible, on various qualities of soil. Some ploughs that would be well adapted to light soil, might not be so suitable on heavy soil. While light soil might readily be ploughed with a light plough, and two horses of moderate size, it might require two larger sized horses, or perhaps more power, and a stronger plough, to plough heavy strong soil. There is generally

a trial on light and heavy soil in the Old Country at ploughing matches, and it should be so in Canada, if it was possible, to show in the most satisfactory manner, the best implements, and the necessary power of draught, on various qualities of soil. When a farmer sees a ploughing match on light and easy ploughed land, who knows that he has land of quite a different quality, requiring much greater animal power to plough it, he concludes that such ploughing matches are no example to him, and returns home with the conviction that he cannot make any alteration in his mode of ploughing, as a light plough and two moderate sized horses, could not work his strong soil. Whatever may be done by County Agricultural Societies, if there should be a District or Provincial ploughing match, there should be a trial with all sorts of ploughs in general use, as they are generally used and on at least light soils, and heavy clay lands, and if farmers could not bring their ploughs, there should be means adopted to have the ploughs brought there and worked at the expense of the District or Provincial Societies. The best, and most suitable implements are of the greatest consequence to agriculturists, and to the country, and every means should be adopted to discover which are the best and most suitable ploughs in various situations and circumstances, where they may be employed. If one plough is better than another let it be fairly proved in open competition and not upon the interested recommendation of the party who recommends it. There is another circumstance of great importance, that implements should be easy to keep in good order, and that the farmers should not be subjected to high bills of tradesmen, for annual repairs, as they frequently are in Canada. In a late Report of an English Farm, of 740 acres of land, and more than 500 acres of it in tillage—28 work-horses kept, 12 ploughs, and a large number of carts, waggons, and other implements, the contract made with the black-smith for several years past to keep up the whole establishment, was only £50 annually, and the far-

mer was to reduce it this year to £40. annually in consequence of the operation of Free Trade. But to return to the ploughing match. There was 8 classes to enter in, in the class open to all England, there was 49 entries. The following is an extract from the Report.

RUTLAND PLOUGHING MEETING.

It is 23 years since Mr. R. W. Baker, of Cottesmore, first turned his attention to the advantage of encouraging good ploughing in Rutland by means of annual competition; at that time there were very few good ploughmen; but as meeting followed meeting, the spirit of honorable rivalry increased, until at length the smallest county in England stood before the agricultural world as the most celebrated for its arable cultivation. Rutland ploughing having reached this point of pre-eminence, and Mr. Baker having arrived at the 20th year of his management, three years ago he relinquished his position, in the hope that what he had so well established might be continued by others; no one, however, seemed willing to take the responsibility of the meetings, and the annual competition ceased until the present year, when Mr. Baker again resolved to take the field, and the result has been the largest and most important series of ploughing matches ever known in this or any other country. The locality selected for the trial of industrial skill was Great Casterton and Inghorpe (two miles from Stamford), on the farms of Mr. Edw. Roberts; and at eight o'clock on Tuesday the 8th inst., no less than 133 ploughs were simultaneously set to work. The scene was a most imposing one; and as the operations progressed, admiration was on all sides expressed at the extreme nicety with which the numerous competitors guided their shares, turning up ridges straight as a line, and forming furrows of such accurate dimensions that not the least difference of measurement was perceptible. The judges had a most difficult task to perform in selecting the best men, though in the end their decisions gave general satisfaction. The number of visitors to the fields in which the ploughing took place was immense, and the village of Casterton had not presented such a busy aspect for many years. Among the county gentry who attended the operation in the course of the morning were Gilbert John Heathcote, Esq., M.P., and some friends, Geo. Finch, Esq., and his daughter, the Hon. Gerard Jas. Noel, M.P., the Hon. Henry Noel, Stafford O'Brien, Esq., J.A. Ransome, Esq., of Ipswich, &c., &c. The judges were Mr. T. R. Cutbush, of Teston, Kent; Mr. Hawkins of Assingden Hall, Suffolk; Mr. Benj. Painter, of Carlton Curlicu, Leicestershire; Mr. Harrison, of Bagworth Park, Leicestershire; Mr. Burbidge, of Wakerley; and Mr. Fowler, of Exton.

The ploughs used were chiefly manufactured by local makers, being Ransome's principles adapted to the soil and system of the county. The quantity to be ploughed by each candidate was half an acre of land, and the conditions were that the work should be done within four hours, the furrows not less than four inches deep, and horses abreast without a driver.

At the Dinner, amongst the toasts given, a Mr. Harmond proposed "The Plough Makers of England," and coupled with it the name of Mr. Allan Ransome of Ipswich.

Mr. RANSOME said it was to him a source of great pleasure, though not unattended with difficulty, to be able to join the company on the present occasion; for, when he looked back through the long vista of years during which he had occasionally been associated with his kind friend Mr. Baker, and with many of those now present whose heads had grown grey since he had known them—and when he found that the places of some of his early acquaintances had been supplied by younger men whom he had not before met—it was gratifying to find that the object of efforts of more than 20 years' continuance had been fully and successfully realized (cheers). He remembered the time when Rutland was behind the other Midland Counties in ploughing, and when he introduced ploughs which were the types of those now in use; and he congratulated the county on its efforts to carry to perfection this necessary employment. He heartily recognized as brother-workers those makers who had taken the Ransome plough as their model; and, far from looking upon them as competitors, he hailed with satisfaction the display of their ingenuity, and felt great pleasure in meeting them. He had no desire to lower the value of the improvements which had been made in some of the ploughs; but, as an implement-maker, he thought it right to warn them of this fact, and to acknowledge an error into which he had himself possibly fallen, that by a too high breeding as it were, by attempting to make the very best article for the species of competition they had that day witnessed, it did not necessarily follow that the plough best adapted for that purpose was the best description of plough for general purposes. (Hear.) It was important to look to that which would tend most to promote the pounds-shillings-and-pence value of cultivation, and not be led away by the applause which attended success on occasions like the present. Reverting to the principal object of the day, Mr. Ransome said it was pleasant to be able to congratulate the company on the increasing prosperity which attended their efforts in Rutland to promote the cause of good ploughing. He had for many years attended ploughing meetings, though for the last few seasons he had from necessity held himself excused; but, like a good hunter, at the sound of the horn he could not refuse to visit his friends in Rutland, upon re-

ceiving an intimation from Mr. Baker that their meetings were about to be revived. He knew of no instance on record where such a large number of ploughs had started, and so many had done such good work, as at Casterton. He had seen work that morning which he had never seen excelled, if equalled; and he questioned whether he should ever again see it equalled. Looking at the large number of competitors and the limited number of farmers in the county, he was convinced that Rutland had accomplished what no other county could do. Mr. Ransome concluded by offering £5 towards the funds for rewarding unsuccessful competitors at the next meeting; he remarked that he admired the plan of not allowing any man who had come forward in the honourable spirit of emulation to entirely lose the value of a day's work (cheers).

In the course of the evening a song was sung, which concluded with the following verse:—

"Britannia rules the waves, they say;
Well, that's a power no greater
Than ploughing as we've done to-day,
For she could rule no straighter.
But now I've done; and ere I close
Let's give the room a shaker.
For this is what I must propose—
Long life to Richard Baker."

We copy the following interesting Report of the proceeding of a meeting which lately took place in Wales. The example might be followed in Canada with great advantage to agriculture and to the general interest of the Province. We do not say that agricultural education can be provided here as in Wales by private support alone—but we do say it should be provided from some means.

Institution for the Education of Farmers's Sons.

Mr. SANDBACH,—Who had vacated the chair, then moved that it be taken by Sir. Watkin Williams Wynn, Bart., as president of a meeting originating in the recommendation of one, held at Denbigh on the subject of the education of farmers' sons, which was carried by acclamation. The proceedings of the committee were then read by Mr. Turnor, and

Mr. R. H. SANDBACH, in compliance with the request of the committee at the Denbigh meeting, came forward to move the first resolution. He said that the operations of the Agricultural Society had been much impeded by the want of education amongst the farmers of the district, and the members had at length been induced to take the necessary steps for the improvement of the rising generation of that class. They had several meetings, and after consultation with the gentry of the country, had determined to form an association in furtherance of their views. He did not propose to go into details,

but only to have a committee appointed to decide on any plan of operations which they might deem best; and he should move—"That although so much has been done of late years for education, no provision has been made for teaching those who are to be farmers the principles of the art they are to practise. That the times require all the skill and industry possible to be brought to bear upon the agriculture of the country, That an association be formed, to be called "The North Wales Association for promoting improved Education in the principles of Farming."

Mr. TURNOR said he had the honour and privilege to have been selected to second the resolution. As a farmer, and mixing much with farmers, he must say they were the worst educated class in the country. They could not avail themselves of the means of education enjoyed by the class below them, and the class above them rendering them no assistance they were retrograding in information. This was a very unsound state of society. It was a misfortune that those who paid the lower classes for their labour should be in a worse position than those whom they employed. As Welshmen, he must say that though their language was a beautiful one, they had but a limited literature, and could not have access, through their ignorance of the English language, to the scientific works and the records of important operations which are printed in that tongue. The population of the country was too numerous in proportion to the means of living in it; and if a portion of them had to emigrate and become labourers in another country, it was their duty to take care that they should have such an education as would qualify them for something else than being mere hewers of wood and drawers of water, and that they should carry away with them information that would be useful. He should be happy to give any assistance to the Society in his power.

The resolution was put and carried.

P. D. COOKE, Esq., in moving the second resolution, said it was a sad circumstance that a branch of industry of the greatest importance, one on which their very existence depended, was the last to be forwarded by education. Surely in these times it was necessary that they should take advantage of every invention and improvement, and all the information which could be obtained to enable them to compete with the foreigner. Agriculture certainly had not kept pace with civilization. In those countries where the arts flourished, agriculture was more behind than in other countries which were not so far advanced in civilization (Hear hear.) But he hoped that in this country they would all put their shoulders to the wheel, and lift their class out of their difficulties, without waiting for Wales. He moved that subscribers of £1 per annum be members of the Association, and eligible.

to be on the managing committee; that an annual meeting of subscribers shall be held in the month of July or August to which shall be submitted a full report of the proceedings of the committee and which shall elect the committee for the ensuing year.

The object of this society, which is called the "Society for Improving the Education of the Children of Farmers and others in the rural districts of Denbighshire and Flintshire." will be better understood after the perusal of the following extract from the minutes of meetings of the provisional committee held at Mold and Denbigh:—

"To effect the important objects contemplated by this Society, it is proposed to engage the services of a competent person to visit such of the Free, Grammar, National, and other Schools, as shall be willing to co-operate in promoting the views of the Society, in order to introduce into such schools instruction in the principles of farming.

"In the Scotch schools, a similar plan is extensively acted upon with great advantage, and no attempt is made in them to teach the practice, but only the principles of farming.

"It is further proposed that examinations should be held in certain districts, and at stated periods, and prizes given to boys who shall have attained the greatest proficiency; and (if the schools should be adequate) that such prizes should consist of grants of money, to enable the pupils to complete their education at Chester, York, Cirencester, or at other superior schools."
—*Chester Courant.*

TRIAL OF SUB-SOIL PLOUGHS.—On last Tuesday, 12th instant: a trial was made of the comparative merits of a sub-soil Plough, manufactured by the firm of Rappelle & Co., of Rochester, in the State of New York, and one of English Manufacture, made by Read. The trial took place on the farm of J. B. Marks, Esq., near Barriefield. Read's Plough is the property of Charles Penner, Esq., of Lachine, the one which was exhibited at the Provincial Show held in this city in 1819, on which occasion the first prize was awarded to one of the Rochester made ploughs. Read's plough carries the palm in England, as making by far the best work of all the sub-soil ploughs brought into competition with it there.

The undermentioned practical Agriculturists were present by invitation of Mr. Marks, to witness the trial, viz: Charles Penner, Esq., Dr. Young of the Garrison, W. Ferguson, Esq., W. Holditch, Esq., A. Cameron, Esq., W. Wilson, Esq., Thomas Briggs, Esq., Mr. W. Starks, Mr. A. Sandlaw, Mr. James Cowan, and Mr. John Dann, who unanimously decided in favor of Mr. Penner's Plough, as being lighter of draft, easier to hold, and more thoroughly breaking up the soil, without bringing it too much towards the surface.

It is to be hoped some of our plough manufacturers will embrace the present opportunity of making application to Mr. Penner for this plough to take patterns by, and thereby supply their customers with the best articles as yet known of this most valuable farm implement. The day was highly favorable, and no pains were spared to do every justice to investigations. The approved plough, while cutting to the depth of six inches under the bottom of the previously cut furrow, was drawn by one horse, and that a light one, while the other plough was drawn by four oxen part of the time, and part by a yoke of oxen and one horse in front.—*Kingston Argus.*

We find much satisfaction in giving insertion to a Report of a trial of sub-soil ploughs, which took place lately near Kingston. We have seen Mr. Penner's plough at work on his own farm at Lachine, immediately after he imported it, and we considered it the best sub-soil plough we had ever seen. This plough was awarded the first prize for sub-soil ploughs by the Royal English Agricultural Society, and it is sufficient proof of their correct appreciation of implements when it is compared with other sub-soil ploughs we have seen. We have often stated, and we now repeat it, that there are not on earth better Agricultureal Implements than are manufactured, and in use, in England, and we never can adopt any better, or copy after any that are more complete. It may be possible certainly that we could make some of them more suitable for use in Canada, but we never can find better models to work upon. We have very frequently recommended Mr. Penner's sub-soil plough as the best pattern in America for any party who required such an implement.

THE DAIRY IN HOLSTEIN.

A great district of Continental Europe, that of Holstein, is celebrated for its dairies, and the butter they produce. These have been thus graphically described by an English gentleman, long settled there as a large farmer. In reading his interesting and instructive detail, the English reader must remember that the climate of Holstein is much colder in Winter and warmer in Summer than in our island, and that however large the dairies here described may be, yet still most of the good principles followed in them may be readily adopted in the smallest dairy.

The pride and boast of the Holsteiner, says Mr. J. Stanley Carr (*Jour. R. A. S.*, vol. i., p. 376

is his dairy; and the fame of Holstein butter, which, if we except that made in Holland Proper (or Zetland,) may well claim to be the best in the world, not only justifies his preference, but may render a sketch of those peculiarities of management, by which the Holstein dairy system is more especially distinguished, neither uninteresting nor useless to the English farmer. These may be chiefly classed under four heads, viz., the buildings and utensils; the time of milking; and the number of hands employed; the management of the milk; and the mode of working, salting, and packing the butter.

The buildings indispensable to a large dairy (which varies from 100 to 400 cows) are, a milk-cellar, a butter-cellar, a churning-house, (and closely adjoining, the horse-mill by which the operation of churning is invariably effected), a cheese-room, and a kitchen, in which not only the various utensils are washed, but the food cooked for all the persons immediately engaged in the dairy-work; to which must commonly be added their sleeping and eating apartments, as, on large estates, the whole of the establishment is usually kept apart from the mansion-house. The size and site of the milk-cellar are esteemed matters of first-rate importance: it ought to front the north; be shaded from the southern sun by the rows of trees—elder being especially selected for this purpose, and indeed placed if possible near the windows, on account of their influence in keeping off the insect tribes; and a thatched projecting roof is preferred, affording greater protection from the heat; while, in choosing the site, peculiar care is taken to place the dairy beyond the reach of everything calculated to generate bad odours, or in any way taint the atmosphere. The size of the milk-cellar must necessarily be regulated by the number of cows, but it should always be calculated to contain the produce of four milkings; and as the milk-dishes usually occupy a space of two feet square, the produce of 100 cows, giving on an average 8 quarts per day (a large average for the cows of this country throughout the year), would fill fifty milk-dishes at each milking, and would require a ground surface of 500 square feet, as the milk-dishes are invariably placed on the floor, the amount of each milking a little apart, and there must unavoidably be spaces left, to enable the dairy-maids to go through their various operations of skimming, sieving, and removing cream, &c. The floor, though sometimes flagged, is more generally of brick, neatly fitted, so that no water may lodge in the joints; and always gently inclined, with a grated opening at the lower end, to facilitate the mopping and washing of the floor, which is never omitted to be done twice a day, notwithstanding that every avoidable impurity is carefully guarded against, and every drop which may fall at the time of the milk being strained is instantly wiped up. A great improvement

has been recently made in some newly-arranged dairies, by dividing the floor into compartments with brick ledges, from three to four inches high, between which the milk-dishes stand; and the compartments (the lower extremity of which is fitted with a small sluice) being filled, by means of a pump, with cold water twice a day, the milk is preserved so cool as to prevent all approach to acidity for several hours longer than when placed on a dry floor; thus affording, even during the summer solstice, sufficient time for a complete separation of the milk and cream, without which the full proportion of butter cannot be obtained. For effecting the same desirable result, ice is frequently resorted to in sultry weather, either by dropping a piece of pure ice in each milk-pan, or by placing a pailful in the dairy, which, by giving off its cold, sensibly lowers the atmospheric temperature.

It is considered necessary that the milk-cellar should be sunk from 3 to 4 feet in the ground; be from 16 to 18 feet high (the best have an arched roof, as being more conducive to coolness than boards); and be furnished with two rows of windows, (and, if possible, on three sides, north, east, and west,) to secure a thorough air. The lower range consists of wooden trellis-work, provided inside with gauze frames to exclude insects, and outside with hanging shutters, which can be lowered and elevated at pleasure. The upper range is furnished with glass sashes when light only is requisite, which are exchanged for gauze frames, when more coolness is desirable. The butter-cellar also must be light, airy, and cool; being likewise sunk in the ground, and the same precautions adopted as in the milk-cellar, to secure an abundant current in pure air. In it the butter, when carried from the churning-house, is worked, salted and packed; and the filled butter-casks ranged on clean boards, somewhat elevated above the floor to admit a free passage of air, are weekly turned and wiped.

Next in order to come to the churning-house, it differs in no respect from similar arrangements in England, excepting that, of late years, the perpendicular movement of the churn-staff has been exchanged for the rotatory,* which is found to churn in a shorter time, and with less risk of producing, even in hot weather, what is called oiling.

The cheese-room is never admitted near either milk or butter-cellar, and is, in newly-arranged dairies, placed as far may be from them. In fact, as cleanliness forms the great object of the Holstein dairy system, the closest attention is paid to guard against every impurity, and to remove everything from the vicinity of the dairy which could, by possibility, exercise a sinister influence on the very susceptible substances of milk and butter; which suffer, to a degree those unaccus-

*Seventy-two revolutions per minute.

tomed to observe it would little suspect, from a tainted atmosphere. As the preparation of cheese is better understood in England than here, I will only mention that three sorts are made—sweet milk, skimmed milk, and occasionally what is termed cream cheese; and shall now proceed to describe the management of the milk, first enumerating the number of hands required. These consist, in large dairies, of a master or overseer, a cooper, one or two cow-herds (as may be requisite), one or more swine-herds, an upper dairy-woman, and dairy-maids in the proportion of 1 to every 18 cows. The overseer's duty involves a general charge of the cattle, whether, in health or sickness, with a competent knowledge of their diseases and the remedies; he is responsible for the swine being properly cared for; that the calves, whether fattening or rearing for stock, are regularly and suitably fed; that the cow-herd does his duty; that the hours of milking are punctually adhered to; and that everything and every person is in proper place and keeping. He must further pay strict attention that the cows are milked thoroughly out, on which so very much depends; as not only the cow which is allowed to retain any portion of her milk diminishes her produce by so much from day to day, but the last being by far the richest part, a loss of butter is incurred, much more than proportionate to the quantity of milk, by this culpable negligence of laziness. According to the observations of an accurate examiner, Dr. Schubler, the first drawn milk contains only 5, the second 8, and the fifth 17 per cent. of cream! If the number of cows be not above a hundred, the overseer can also undertake the cooper work; which, when wooden milk-dishes are used, in addition to the cream-barrels, milking pails, and butter-casks required in the course of a year, is a consideration both of time and expense. But in large dairies, a cooper is kept in addition, who however must milk a certain number of cows, assist in carrying the milk, feeding the cows when housed, or any other dairy work which a man is capable of. The wages of these two persons vary according to the extent of the dairy, but may be averaged the first at 60, and the second at 40 dollars per annum.

The dairy-maids, besides milking, cleaning the vessels, &c., work in the garden in summer, spin in winter, and wash, bake, brew, and cook for their own establishment, under the superintendence of the upper dairy-woman, who is by far the most important personage in it, as on her skill, attention, and diligence depend, in great measure, both the quantity and quality, and, by consequence, the profit of the produce. She must not only thoroughly understand, but accurately observe, the moment when the milk should be creamed; the degree of acidity it must attain in the cream-barrels; its temperature, whether requiring the addition of warm or

cold water to the churn, as well as the all-important operations of kneading, beating, salting, and packing the butter. She must not only be punctiliously clean herself in person and work, but keep a strict eye over the cleanliness and order of her subordinate maidens. In very large dairies the upper woman has full employment, without milking, and needs the assistance always of one, and sometimes of two, of the more experienced dairy-maids, in butter and cheese making; but in smaller establishments she milks a certain number, generally 10 cows, while each of her subordinates have 18; her wages are usually 55 to 60, that of her chief assistants 22, and that of the others 18 dollars per annum.

THE NIGHT OF DEATH.

- " Life passes from me, mother—oh, so rapidly away; Etherial voices speak to me—they will not let me stay:
Oh! there are dark forebodings all entwined around my heart,
And they tell me, dearest mother, that thou and I shall part.
- " Oh! let me see the sunshine, and the gay and glorious earth.
With all its bright and beautiful just budding into birth;
They told me when the spring-time came with song of birds and flowers,
That I should rally and revive amid its genial hours:
- " They told me—but it was not true—I feel its falsehood now,
The signet of the shadowy land is set upon my brow.
It is a long, long journey—I am going all alone;
The pathway to the spirit world is distant and unknown.
- " Nay, mother, dearest mother; nay, I would not have thee weep—
Oh! is it not a gentle thing to lay one down and sleep.
Away from all the weariness, the sorrow, and the pain,
Which make the fairest things of life so empty and so vain?
- " I would not have thee mourn for me, and grieve when I am gone,
For when the star of life shall set, and hour of death come on,
Thou'lt join me where, within those realms, those regions of the blest.
'The wicked cease from troubling, and the weary are at rest.'
- " The shades are gathering o'er me fast—alas! I cannot see;
Life's bark is tossed upon the waves of lone eternity:
The waters rise around me, they engulf my waving breath—
Oh! mother, take my hand in thine, this is the night of Death!"

EMILE VARNEDELL

RULES

OF

THE LEGISLATIVE ASSEMBLY,
RESPECTING PRIVATE BILLS.

ADOPTED on 3rd August, 1850, and substituted for the Rules (numbered 60 to 72) heretofore in force.

60. That hereafter no Petition for any Private or local Bill will be received by the House, after the first fifteen days of each Session, unless the Petitioners shall have first applied, after notice thereof, for leave to present such Petition, and obtained permission of the House to do so.

61. That hereafter this House will not receive any Private or local Bills, except within the first four weeks each Session.

62. That this House will not receive any Report of a Standing or Special Committee, upon any Private or local Bill, except within the first six weeks of each Session.

63. That the Clerk of this House shall, immediately after the issuing of the Proclamation convoking the Provincial Parliament for the despatch of business, announce, in the Canada Gazette, and other newspapers published in this Province, until the opening of Parliament, the day on which the time limited for receiving Petitions for Private Bills will expire, according to the Rules of this House; and the said Clerk shall also announce, by notice set up in the Special Committee Rooms, and in the Lobby of this House, by the first day of every Session, the days on which, according to the Rules of this House, the time for receiving Petitions for Private Bills, Reports on those Petitions, and Reports on the Bills upon those Petitions, are to expire.

64. That all applications for Private or local Bills, whether for the erection of a Bridge the making of a Rail Road, Turnpike Road, or Telegraph Line; the construction or improvement of a Harbour, Canal, Lock, Dam, or Slide, or other like work; the construction of works for supplying gas or water; or for the incorporation of any particular Profession or Trade, or of any Banking or other Commercial Company, or Cemetery Company; the incorporation of a Town or City; the levying of any local Assessment; the division of any County or Township; the regulation of a Common; the re-survey of any Township, Line, or Concession; or for granting to any individual or individuals any exclusive rights or privileges whatsoever, or for doing any matter or thing which in its operation would affect the rights or property of other parties; or for making any amendment of a like nature to any former Act, shall require the following notice to be published, viz.:

In *Upper Canada*—A notice inserted in one newspaper published in the County, or Union of Counties, affected.

In *Lower Canada*—A notice inserted in one newspaper in the English, and one newspaper in the French language, in the District affected (if any be published therein), and also affixed at the Church door of every Parish or Township that such application may affect, or in the most public place where there is no Church.

Such notices shall be continued in each case for a

period of at least two months, during the interval of time between the close of the next preceding Session, and the presentation of the Petition.

65. That before any Petition praying for leave to bring in a Private Bill for the erection of a Toll Bridge is presented to this House, the person or persons purposing to petition for such Bill shall, upon giving the notice prescribed by the 64th Rule, also, at the same time, and in the same manner, give a notice in writing, stating the rates which they intend to ask, the extent of the privilege, the height of the arches, the interval between the abutments or piers for the passage of rafts and vessels, and mentioning also whether they propose to erect a draw-bridge or not, and the dimensions of such draw-bridge.

66. That parties publishing notices of intended application for Private Bills under the 64th Rule, shall be required to send, addressed to "Private Bill Office, Legislative Assembly," (as soon as may be after its publication) a copy of the local newspaper containing the first insertion of any such notice (or a certificate of the insertion thereof, by the proprietor of such paper); and also, after the presentation of the Petition, a copy of the paper containing the last insertion of the said notice (or a certificate thereof), together with proof of notices having been affixed (when required) at the Church doors.

67. That every Private Bill shall be prepared by the parties applying for the same, and printed by the contractor for the Sessional Printing of the House, at the expense of the said parties, and one hundred and fifty copies thereof shall be deposited in the Private Bill Office, for the use of Members, before the second reading.

68. That Bills of a private nature shall be introduced on a Petition, to be presented by a Member, and seconded.

69. That when any Bill shall be brought into the House for confirming Letters Patent, a true copy of such Letters Patent shall be attached to the Bill.

70. That the expenses and costs attending on Private Bills giving any exclusive privilege or advantage, whether for the erection of a Bridge, or the construction of a Railroad, Turnpike Road, Telegraph Line, Harbour, Canal, Lock, Slide, Dam, or other like work; or for the incorporation of Banking or Commercial Companies, Cemetery Companies, or Companies for the construction of Gas or Water Works, or for any other objects or profit; or for amending, extending, or enlarging any former Acts in such manner as to confer additional powers, ought not to fall on the public, and that for the purpose of defraying the same, the parties seeking to obtain any such Bill shall be required to pay into the hands of the Clerk of this House the sum of fifteen pounds, before, in any case, the said Bill shall be further proceeded upon after being read a second time.

71. That every Private Bill, after having been read a second time, shall be referred to the Standing Committee on Private Bills, if any such shall have been appointed, or to some other Standing Committee of the same character.

72. That whenever any Petition or Bill presented to the House shall have been referred to a Committee to examine the matter thereof, and report the same as it shall appear to them, to the House, the House will not admit any Petitioners to be heard, by

themselves or Counsel, against such Petition or Bill, until the matter shall have been first reported to the House.

73. That all persons whose interest or property may be affected by any Private Bill shall, when required by the Committee, appear in person before them to give their consent, and if they cannot personally appear, they may send their consent in writing, which shall be proved before the Committee by one or more witnesses. And in every case the Committee upon any Bill for incorporating a Company, shall require proof that the persons whose names appear in the Bill as composing the said Company, are of full age, and that they are in a position to effect the objects contemplated by the Bill, and have personally consented to become so incorporated.

74. That no Committee on any Private Bill, based upon a Petition, notice of which is required by the 64th Rule, shall sit thereupon, without first causing a week's notice of the day of sitting to be set up in the Lobby.

75. That the Committee to whom any Private Bill shall have been referred, shall report the Bill to the House, whether such Committee shall or shall not have agreed to the Preamble, or gone through the several clauses, or any of them, and when any alteration shall have been made in the Preamble of the Bill, such alteration, together with the ground of making the same, shall be specially stated in the Report.

79. That when the Committee on any Private Bill shall report to the House that the Preamble of such Bill has not been proved to their satisfaction, they shall also state the grounds upon which they have arrived at such a decision.

77. That a filled up Bill containing the amendments proposed to be submitted to the Committee on the Bill, be deposited in the Private Bill Office, one clear day before the meeting of the Committee upon such Bill.

78. That the Chairman of the Committee shall sign, with his name at length, a printed copy of the Bill, on which the amendments are fairly written, and shall also sign with the initials of his name, the several amendments made and clauses added in Committee.

79. That no Private Bill be read a third time, until the party interested shall have delivered to the Clerk a certificate from the Queen's Printer, that the cost of printing one hundred and fifty copies of the Act for the Government, has been paid, or secured to him.

80. That (except in cases of urgent and pressing necessity,) no motion shall be made to dispense with any Sessional or Standing Order of the House, relative to Private Bills, without due notice thereof.

81. That a Book, to be called the "Private Bill Register," shall be kept in a room to be called the "Private Bill Office," in which Book shall be entered, by the Clerk appointed for the business of that Office, the name, description and place of residence, of the parties applying for the Bill, or their agent, and all the proceedings thereon, from the Petition to the passing of the Bill; such entry to specify briefly each proceeding in the House, or in any Committee to which the Bill or Petition may be referred, the day on which the Committee is appointed to sit, and the name of the Committee Clerk. Such Book to

be open to the public inspection daily, during Office hours.

81. That the Clerk of the Private Bill Office do prepare, daily, lists of all Private Bills, and Petitions for Private Bills, upon which any Committee is appointed to sit, specifying the time of meeting, and the room where the Committee shall sit; and the same shall be hung up in the Lobby.

MATTHEW MOODY,

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JOSEPH PARADIS.

Montreal, 1st December, 1850.

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