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THE

CANADIAN QUARTERLY

AGRICULTURAL & INDUSTRIAL

MAGAZINE.

DEDICATED TO THE FARMERS OF CANADA.

By WILLIAM EVANS,

AUTHOR OF THE TREATISE ON "AGRICULTURE," &C.

[AUGUST, 1838.—VOL. I.—No. 2.]

MONTREAL:

PRINTED BY CAMPBELL & BECKET.

MUIR'S BUILDINGS PLACE D'ARMES.

1838.

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ADVERTISEMENT.

THE Proprietor of this Magazine begs leave very respectfully to state, that the publication of this work was undertaken from no other motive than a desire to promote, if possible, the improvement of Canadian Agriculture, and the prosperity of those engaged in it, as well as to advance the general interests of this community. Whether the work is calculated to *assist* in producing the objects he professes to have in view, he must leave to those who read it to judge. As, however, a considerable expense must be incurred in publishing, he would hope that if the work is considered worthy of encouragement, it will, *at least*, receive sufficient support from the public to pay the expense of publishing; otherwise he must, in justice to himself, discontinue the publication, having already expended on former Agricultural Publications more than perhaps it was prudent for him to have done.

THE CANADIAN QUARTERLY

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MAGAZINE.

No. 2. AUGUST, 1838. VOL. I.

THE IMPORTANCE OF AGRICULTURE, &c.

FOR several years past the author has unceasingly endeavoured to attract the attention of the Canadian community to the importance of Agriculture. He has also attempted to prove that the profession of agriculture is not a less honorable and dignified one, than any other that a man can be employed in. With the same views, he now submits the following article partly copied from the *Connecticut Observer*, making such omissions, alterations, and additions, as he thought was necessary to suit it to the circumstances of this community, as British subjects, and members of the great British family.

The profession of agriculture, is justly entitled to stand in the highest grade of dignity in every country, and more particularly in British America. Agriculture must be the basis of all the industrial interests in these provinces. It is the only producer of the material of wealth. All others are but employed in working some change upon this material, in transforming and shaping it to the conveniences of civilized life. Enumerate these arts that are practiced here and elsewhere—the hatter, the clothier, the manufacturer of woollens and of cottons, of iron, of leather in all its varieties, the tailor, the cordwainer, the miller, the paper-maker, the printer even, could not carry on the purposes of their respective callings a single day, were the materials which they derive from agriculture to be entirely withdrawn; while agriculture rude indeed, but still agriculture in some sort, could subsist with little aid from these or any arts. It is dependant indeed on other arts for its successful prosecution, but not for its very existence. Commerce is but an interchange of the produce of agriculture, wrought, it may be, into ten thousand forms, but still owing their original existence, and deriving their seminal principle from the soil. In the bosom of the earth they were nurtured, and by the ministering hand of agriculture they were fostered into maturity and perfection. Even the canvass which whitens the ocean, and the keel which ploughs its waves, owe their being to the same influences. The earth is the common mother of mankind—the great nurturer of nations.

The profession of agriculture is

more favourable to the entire development of the human faculties, to the unfolding and perfecting of this physical, this intellectual, this moral and immortal being which God has given us, than any other employment. It has more to do with nature in her freshness, and less to do with contaminations and corruptions of artificial life. It imparts vigour to the body and to the mind—it leaves the soul free from feverish excitements, to imbibe as it were with its growth the lessons which nature teaches; in fine, it is capable of ministering the most successfully of all arts and of all occupations to health, to intelligence and to virtue. It creates, as it were, the elements of individual and of national prosperity; it secures independance to the citizen, and independance to the state: as it was the first, so it is the chief, the most important, the most entirely *fundamental* of all the mere earthly occupations allotted to man. In itself embracing, as it does, such high interests, it is full of dignity. Oh, too happy agriculturist, exclaimed the Roman poet, if they only knew their own blessings! How ennobling, how full of dignity, might we exclaim, are the pursuits of agriculture, if they were but duly appreciated! There has been, we think, a tendency in the public mind to depreciate these pursuits. This tendency has been owing in no small degree to the attraction of ostentatious wealth, to the eager spirit of gain, to the desire of sudden riches, that are more frequently obtained by other pursuits, than by agriculture, to the undue homage that has been paid to other professions and other arts. Far be it from us to say anything in disparagement of any useful profession. As between all sciences there is a kind of relationship, a bond of affinity, so between all useful arts there is a similar connection. Agriculture is allied to them all; but she is allied to them rather as a parent than a sister art. But if there be any one cause which has operated more than others to depress agriculture in public sentiment, to assign her a lower place in the scale of dignity, it is that agriculturists themselves have not properly appreciated their own vocation. They seem not to have been impressed with a just sense of the rank and character which it might attain: they seem not to have felt its capabilities, to have been inspired with the force of its own genious. Regarding it as the primeval occupation of man, the source of useful arts, as necessarily embracing among its followers the great body of the inhabitants of almost every state, as in itself eminently suited to the development of the faculties of man, they would surely entertain for themselves and for their calling in life the highest respect. This self-respect, this just appreciation of their dignity, would be rendered manifest by the position they would assume and maintain in society, by an appropriate exterior, of manners, and of dress, by an arrangement in their dwellings, their grounds, their farms, in all that which regards their external condition, characterized by order, by neatness, by propriety; especially would it be rendered manifest by a prevailing spirit of improvement, by a thirst for knowledge, by systems of education fitted to impart a very high degree of intelligence by physical, by intellectual, and by moral culture. The sentiment certainly prevails, in some degree, and to some extent, that any thing is good enough for the farmer. It pervades the minds even of farmers themselves. Are it is said, they are the manners of a farmer. Is the dress slovenly and unbecoming, disfiguring the human form which God made to wear a noble aspect, we are apt to regard it

as a thing of little consequence—because they are the manners and dress of one who tills the earth. Is their education scanty, it is education enough for one who is called to follow the plough. This feeling ought by no means to be cherished. We do not indeed expect, nor do we by any means desire, to find among the hardy yeomanry of our country, habits, manners, and modes of dress, such as are found in courtly circles. We hope not to see the forms which prevail in cities introduced among them. But we do hope to find every thing bespeaking a proper self-respect. We do desire to see an exterior indicating that the mind is penetrated with a sense of the high purposes which its professor is called upon to fulfil. We fervently wish to behold a manly assertion of their claims to high regard, exhibiting, not by envies and jealousies towards other classes of useful and honourable individuals, but by a dignified and manly deportment, by a demonstration of superior character and intelligence, by a language, and by manners, and by habits worthy of high-minded men—in fine, by a full development and reduction to use and enjoyment of all the capabilities which the profession of agriculture so eminently affords. There is no want of dignity in agriculture. Of the vocation itself we have nothing to complain. But we have somewhat against agriculturists (they will excuse our freedom), that they do not sufficiently sustain the dignity of their vocation, that they do not fill up the measure of its high capacities, that they do not sufficiently manifest their sense of its advantages and of its worth, that they do not make science and knowledge tributary as they might to agricultural labour, to the improvement of their circumstances in life, of their condition as intelligent, moral, and accountable beings. We do not say that they fall below other classes of the community in any of these respects, we insinuate no comparison between them and others, rather we compare themselves as they are, with themselves as they might be, and as we fondly hope they will one day become.

What other country presents a theatre like ours for the pursuits of agriculture, not as a system of perpetual and interminable drudgery, of drudgery performed, as in other countries, at the will and under the supervision of others, but as an honorable profession—a profession, if rightly conducted, affording leisure for the improvement of the mind, for the cultivation of the social affections, and thus of the modes of social intercourse. A profession requiring intelligence, skill, and holding out to labour, performed under the guidance of intelligence and skill, the most ample rewards. In other countries the soil is owned by a few men, who are lords of the most extensive estates, transmitted unbroken from age to age, by inheritance, while the great body of agriculturists are only tenants, and are seldom proprietors of one acre of land. Under such circumstances they cannot feel the same desire for improvement and advancement that you should feel, proprietors as you are of the soil you cultivate, and for which no demands are made upon you for rent or taxes in any shape. Your position is indeed the most favourable one that can well be conceived.

With a soil abundantly fruitful, and divided into freeholds of moderate size, of which our agriculturists are generally the *absolute owners*, they ought to be moved by all the motives which can influence the mind of man, by their attachments to their houses, by their love of country in which they are so highly favoured, and by the prospect which they behold before them of indefinite advancement

in their external condition as well as in character and knowledge. Add to those inspiring motives, that their country calls upon them in common with citizens of other classes, to sustain a part in public life, to acquit themselves as legislators, in behalf of the interest in which they have so high a stake. What more do we want of worldly advantages; and what condition of life so favourable to the cultivation of religious character as that afforded by the peaceable pursuits of agriculture? It is a condition comparatively free from the cares and temptations which choke the growth of religion. There is something, too, in its very nature calculated to inspire a sense of religious dependance, and to elevate the soul with sentiments of devotion and gratitude. The husbandman may well perceive the intimacy and constancy of the connection between Divine Providence and the condition of his life. The operations of nature, as witnessed in the cultivation of the soil, appear as it were a more immediate display of the Divine beneficence, or a more immediate withholding of the Divine bounty. God causeth the sun to shine. He giveth the former and the latter rain —he causeth the grass to grow for the cattle—he giveth bread to cheer man's hearts—he is the Lord of the harvest—and he too hideth his countenance, and bringeth blighting and famine. All nature is but an exhibition of his goodness, or an intimation of his displeasure.

How desirable it would be were our agriculturists duly to appreciate their advantages, and make a proper use of them. If they did, they would soon find themselves in the way to greater prosperity, and greater dignity than usually falls to the lot of the same class of men in other countries. Happily for us, the great obstacle to agricultural improvement and prosperity, the want of general education among the agricultural class, is now likely to be removed. We have the assurance of His Excellency the Governor General, that general education will be provided for. And now, if all classes would unite, forget all past animosities, from whatever cause they may have originated, and be unanimous in promoting, by every lawful means, the general interests of the inhabitants of these fine Provinces, we might look forward with confidence to better, more prosperous, and more happy times.

All who sincerely desire these favourable results are bound to give their humble aid in support of the measures which His Excellency the Governor General may see expedient to introduce for the peace, good government, and prosperity of the Canadas. We should remember that His Excellency has no interest in the measures that may be adopted, or the ordinances that may be enacted, but the general good of this community; and we have already sufficient assurance that His Excellency will understand perfectly what will be good for us all, to encourage us all, to give him our full confidence and support. This is the bounden duty, as much as it is the interest, of all lovers of their country, and of all *truly loyal* subjects of our youthful Queen.

DRAINING.

The following remarks on Draining are from the *Penny Cyclopædia*, and by the Author:—

As a certain quantity of moisture is essential to vegetation, so is an excess of it highly detrimental. In the removal of this excess consists the art of draining. Water may render land unproductive by covering it entirely or partially, forming lakes or bogs; or there may be an excess of moisture diffused through the soil

and stagnating in it, by which the fibres of the roots of all plants which are not aquatic, are injured, if not destroyed.

From these different causes of infertility arise three different branches of the art of draining, which require to be separately noticed.

1. To drain land which is flooded, or rendered marshy by water coming over it from a higher level, and having no adequate outlet below.

2. To drain land where springs rise to the surface, and where there are no natural channels for the water to run off.

3. To drain land which is wet from its impervious nature, and where the evaporation is not sufficient to carry off all the water supplied by snow or rain.

The first branch includes all those extensive operations where large tracts of land are reclaimed by means of embankments, canals, sluices, and mills to raise the water; or where deep cuts or tunnels are made through hills which formed a natural dam or barrier to the water. Such works are generally undertaken by associations under the sanction of the Government, or by the Government itself; few individuals being possessed of sufficient capital, or having the power to oblige all those, whose interests are affected by the draining of the land, to give their consent and afford assistance. In Britain there is no difficulty in obtaining the sanction of the Legislature to any undertaking which appears likely to be of public benefit. In every session of Parliament acts are passed, giving certain powers and privileges to companies and individuals, in order to enable them to put into execution extensive plans of draining. That extensive draining in the counties of Northampton, Huntingdon, Cambridge, Lincoln, Norfolk, and Suffolk, which is known by the name of the BEDFORD LEVEL, was confided to the management of a chartered corporation, with considerable powers, as early as the middle of the seventeenth century; and by this means an immense extent of land has been rendered highly productive, which before was nothing but one continued marsh or fen.

In the valleys of the Jura, in the canton of Neufchatel in Switzerland, which are noted for their industry and prosperity, extensive lakes and marshes have been completely laid dry, by making a tunnel through the solid rock, and forming an outlet for the waters. The greater part of the Netherlands, and Holland, have been reclaimed from the sea, and from rivers which flowed over them; and they are now as productive lands as any on earth.

In Canada very little draining has yet been effected; and in consequence some of the best situated lands are allowed to remain waste, that would not require a large expenditure to drain them perfectly. The principal obstacle is, the want of power to oblige all those whose interests would be affected by the draining of the land, to give their consent, and afford assistance. In some particular cases, were a proper application to be made now to the Government, perhaps the necessary powers might be obtained. It is only where outlets require to be cut, that would drain large tracts of land; or where small rivers require to be straightened and deepened, that the interference of the Government could be applied for. But in such cases, were the Government to grant the necessary powers, it would greatly promote improvement, and prove highly advantageous to the industrious agriculturists.

In hilly countries it sometimes

* The author, in the Supplement, to his Treatise on Agriculture, has submitted some remarks on the subject of draining the public wild lands, by the application of a part of the funds derived from their sale, in order to facilitate their settlement, and the general improvement of the country. He begs to refer to that work, pages 180 to 191.

happens that the waters, which run down the slopes of the hills, collect in the bottoms where there is no outlet, and where the soil is impervious. In that case it may sometimes be laid dry by cutting a sufficient channel all round, to intercept the waters as they flow down, and to carry them over or through the lowest part of the surrounding barrier. If there are no very abundant springs in the bottom, a few ditches and ponds will suffice to dry the soil by evaporation from the surface. This principle might be applied with great advantage, in many cases, where the water could not be drained out of considerable hollows, if it were allowed to run into them.

When there are different levels at which the water is pent up, the draining should always be begun at the highest; because it may happen that when this is laid dry, the lower may not have a great excess of water.

In draining a great extent of land, it is often necessary to widen, straighten, and deepen rivers, and alter their course; and not unfrequently the water cannot be let off without being carried, by means of tunnels, under the bed of some river or canal, the level of which is above that of the land. In more confined operations cast-iron pipes are often a cheap and easy means of effecting this. They may be bent in a curve, so as not to impede the course of the river, or the navigation of a canal.

The draining of land, which is rendered wet by spring arising from under the soil, is a branch of more general application. The principles on which the operations are carried on, apply as well to a small field as to the greatest extent of land. The object is to find the readiest channels by which the superfluous water may be carried off; and for this purpose an accurate knowledge of the strata through which the springs run is indispensable. It would be useless labour merely to let the water run into drains after it had sprung through the soil and appears at the surface, as ignorant men frequently attempt to do, and thus carry it off after it has already soaked the soil. But the origin of the spring must, if possible, be detected; and one single drain or ditch, judiciously disposed, may lay a great extent of land dry if it cuts off the spring before they run into the soil. Abundant springs, which flow continually, generally proceed from the out breaking of some porous stratum in which the waters were confined, or through natural crevices in rocks, or impervious earth. A knowledge of the geology of the country will greatly assist in tracing this, and the springs may be cut off with greater certainty. But it is not these main springs which give the greatest trouble to an experienced drainer; it is the various land springs, which are sometimes the branches of the former, and often original and independant springs, arising from sudden variations in the soil and subsoil.

In England, it is found that in one situation boring will bring water, and in another it will take it off. This principle being well understood will greatly facilitate all draining of springs. Wherever water springs there must be a pervious and impervious stratum to cause it, and the water either runs over the impervious surface, or rises through the crevices in it. When the line of the springs is found, the obvious remedy is to cut a channel with a sufficient declivity to take off the water in a direction across this line, and sunk through the porous soil at the surface into the lower impervious earth. The place for this channel is where the porous soil is the shallowest above the breaking out, so as to require the least depth of drain; but the solid stratum must be reached, or the

draining will be imperfect. It was by attending to all these circumstances that Elkington acquired his celebrity in draining, and that he has been considered as the father of the system. It is, however, of much earlier invention, and is too obvious not to have struck any one who seriously considered the subject. In the practical application of the principle, great ingenuity and skill may be displayed, and the desired effect may be produced more or less completely.

When the drains cannot be carried to a sufficient depth to take the water out of the porous stratum saturated with it, it is often useful to bore numerous holes with an auger in the bottom of the drain through the stiffer soil, and, according to the principle explained, the water will either rise through these bores into the drains and be carried off, and the natural springs will be dried up, or it will sink down through them if it is above.

If the surface of peat mosses be properly dried, dressed with lime, and consolidated with earth and gravel, they will soon become productive. If the soil, whatever be its nature, can be drained to a certain depth, it is of no consequence what water may be lodged below it. It is only when it rises so as to stagnate about the roots of plants that it is hurtful. Land may be drained so much as to be deteriorated.

When a single large and deep drain will produce the desired effect, it is much better than when there are several smaller, as large drains are more easily kept open, and last longer than smaller; but this is only the case in tapping main springs, for if the water is diffused through the surrounding soil, numerous small drains are more effective; but as soon as there is a sufficient body of water collected, the smaller drains should run into larger, and these into main drains, which should all, as far as practicable, unite in one principal outlet, by which means there will be less chance of their being choked up. When the water comes in by the side of the drains, loose stones might be laid in them to a little above the line where the water comes in, and they may then be covered with earth rammed in tight.

The third branch in the art of draining is the removal of water from impervious soils which lie flat, or in hollows, where the water from rain, snow, or dews, which cannot sink into the soil on account of its impervious nature, and which cannot be carried off by evaporation, runs along the surface and stagnates in every depression. It requires much skill and practice to lay out the drains, so as to produce the greatest effect at the least expense. There is often a layer of light earth immediately over a substratum of clay, and after continued rains this soil becomes filled with water like a sponge, and no healthful vegetation can take place. As under-drains will not answer for draining these kind of lands in Canada, because the soil continues frozen over them for weeks perhaps, in the spring, when above all other seasons it is required that they should be in full operation to discharge the superfluous water. Open drains must be made in the most suitable situations, and if the land is ploughed into well formed ridges, the furrows between the ridges may answer all the purposes of under drains, and convey the surface water into the main drains.

Though much of the lands of Canada are very level, yet in the most level field, there is generally an inclination in some direction. It is necessary to ascertain in what direction the greatest fall may be had, and to cut the drains so as to obtain the full benefit of the fall. Drains cannot always be in a straight line, unless the ground be perfectly even-

They should, however, never have sudden turns, but be bent gradually where the direction is changed. The outlets of all drains should be carefully kept clear, for wherever water remains in a drain, it will soon derange or choke it. Cross drains should be so arranged or turned, that the outlet shall meet the main drain at an obtuse angle towards the lower part where the water runs to. A drain brought at right angles into a ditch must necessarily soon be choked by the deposition of sand and earth at its mouth.

The following is an article on the same subject from the *Quarterly Journal of Agriculture*:—

At the conclusion of our last thoughts on draining (vol. vii. p. 533.) is expressed a sentiment which cannot be too emphatically impressed on the minds both of landlords and tenants, that draining is the first step towards the improvement of the soil, which, if neglected, and the soil permitted to remain, not only in its natural, but in a half cultivated state, all other means of fertilizing it will only prove comparatively abortive in their application. Were draining thoroughly effected, all the present undrained but improveable soil of the country would be rendered *capable* of receiving all the benefits derivable from numerous indirect modes of fertilizing it. These various modes of fertilizing soil, were enumerated to be ploughing, dung, lime, and bone-dust, and these subjects were recommended as interesting topics of enquiry for another paper. It is our purpose now to prosecute that enquiry.

1st, *Ploughing.*—In ploughing undrained land, particularly land resting on a wet subsoil, the attention of the ploughman is constantly exercised, otherwise the plough may be thrown out at one place, and dip deeper at another, without any apparent cause for the diversity of its action. There is, however, a paramount cause for it. The texture of soil, however homogeneous it may appear at the surface, greatly varies where the soil rests on a *wet* subsoil, in being consolidated at one place, and loose at another; and of course in being hard and soft at different places. The hard portions become dry by the expulsion of water, by the compression of the soil, and the porous portions remain constant receptacles of superfluous water. Small stones become firmly imbedded in the hard portions of the soil, and are loose, and apt to be pushed before the plough in the soft portions. The plough through these alternate changes of hard and soft, wet and dry, portions of the soil, requires the utmost attention in its guidance; the hand and the eye of the ploughman being constantly in requisition, during the operation, to prevent the plough being thrown out or burying itself. But even with attention, such ploughing is unequally executed, and therefore unsatisfactory; whilst the disagreeable nature of the work tends to fatigue the body, and irritate the mind of the ploughman, and the unsteady draught occasioned by the unequal state of the soil, jades the horses more severely than the extent of the work performed. Great discomfort, both to men and horses, attends ploughing soil in such a state, at any season, and it is only less irksome than the danger which both run of injuring their health. Ague and consumption affect the men, whilst cholic and inflammation of the bowels not unfrequently cut short the existence of the horse. That this is no exaggerated result can be attested by all farmers of wet land. But the evils of wet land are not confined to the annoyance of men and horses; they obviously affect the state of the cultivated soil, the nature of work, and the condition of crops. With regard to wetness affecting the state of cultivated soil, whatever labor and manure may be bestowed upon it, it

always seems poor, hungry, weeping, and is apt to become foul with the strong ramifications of semi-aquatic plants, threading themselves in all directions through it. Being inelastic, its surface is easily permanently imprinted with the hoofs of animals, and consequently, easily poached. Of the nature of the work on soil, in that condition, the furrow-slice in breaking up lea, is not easily laid over with the ear of the mouldboard, its under edge adhering tenaciously to the subsoil, the vegetable matter in the soil becoming, in fact, a kind of incipient peat. When the furrow slice cannot be easily laid over, the slices never clap close together. The harrows rather make scratches over the furrow slices than cut them in pieces and blend them together, and the roller compresses such land so as to deprive the sown crops of the power of spreading their roots in it. As to the effects of wet land on crops, they consist of stinted growth of straw, or should a flush of vegetation be at any time encouraged by the state of the weather, the grain in both cases is lean, thick-skinned, and light. The grass too is short, wiry, and inclined to acidity, instead of being mucilaginous and saccharine in quality and taste, or rather the finer grasses disappear and coarse semi-aquatic kinds occupy their places.

Thoroughly drained land, on the other hand, can be easily worked with all the common implements. Being all alike dry, its texture becomes uniform; and being so, the plough passes through it with a uniform freedom; and where ordinary-sized stones obstruct its course, the plough can easily dislodge them. The plough by its own gravity tends to raise a deep furrow, and the furrow on its part, though heavy, crumbles down and yields to the pressure of the mouldboard, forming a friable, mellow, rich-looking mould, not unlike the granular texture of raw sugar. The harrows, instead of being held back and starting forward, swim smoothly along, raking the soil into a smooth uniform surface, entirely obliterating the prints of footmarks. The roller compresses the surface of the soil, and leaves what is below it in a soft state for the expansion of the roots of plants. All implements are much easier drawn, and held or driven on drained land; and hence all the operations on it can be executed less laboriously, and, of course, more economically and satisfactorily than on undrained. Much has of late been said of deep-ploughing in connexion with drained land. Deep-ploughing we conceive to be a safe practice under every circumstance. It acts as draining to wet land, which of course must be very temporary in its effects. Its efficacy can only be fully developed on land that has been drained. There it forms one indispensable supplement to draining. It opens an easy access for light and air to the roots of plants, and facilitates their combined beneficial influences on the ingredients in the soil which go to support vegetation. These are all natural consequences of deep ploughing in the ordinary state of land; but these consequences will only be permanently observed and felt on thoroughly drained land. It matters not in what manner the soil is deeply stirred, the benefits of it will be derived in any case. The common plough with four horses, or a plough made little stronger for the purpose, will stir the soil that is *thoroughly* drained, deep enough for the rumination of the roots of all plants raised in agriculture. Such a plough is equally efficient as any subsoil plough. A soil thus stirred one foot in depth will afford sufficient scope for the roots of most cultivated plants, and even fusiform roots will penetrate beyond that depth in a subsoil that has been thoroughly drained. It matters little, we conceive, whether a

drained subsoil is brought up by the plough or no. We are sure it can do no harm when brought up, for it can be made the medium of conveying nourishment to plants as well as the upper soil. Both may be blended together for the common object, and, in a short time, neither can be distinguished from the other. By this property of drained land, we anticipate a general and increased improvement in soil, such an expansion, in short, of its capabilities as to yield more abundant crops with the ordinary quantum of labor and manure.

2. *Dung.*—The baneful effects of undrained land on farm-yard and other matter commonly called manure, are most obvious. The perceptible dampness in undrained soil, dissolves the soluble portion of farm-yard manure, which, by its gravity, descends beyond the reach of the rootlets of young plants; whilst the strawy portion remains undecomposed for a length of time. This statement may account for the invariable languid vegetation of plants while young in undrained land. After the straw has been decomposed, and vegetation been forced by the advancement of the season, the plants derive nourishment not only from the decomposed straw, but probably also from the soluble matter which had previously descended through the damp soil. Vegetation is thus promoted in summer, but it is generally too late for that season to foster the plants to full maturity. The lateness and immaturity of crops on wet land may thus be explained. The fact is, wet land cannot be put in heart with manure to a sufficient degree to force vegetation without the assistance of the season. These effects on manure will be similar, whether the manure has been applied broadcast or in drills; but as the drill system deposites manure in larger masses on the same extent of ground, the effects will always be found to be comparatively less prejudicial to drilled than to broadcast crops. As an instance in point, potatoes cannot be successfully raised on wet land, when the manure is spread broadcast on the ground in autumn or early in spring. Before such a practice can succeed, the land must be in heart. But even in drills, on wet land, the manure will be decomposed in different degrees and at different times. The driest portion of the soil will first and most effectually decompose the manure, the hardest next in degree and time, and the wettest will retain it in a state of maceration, as long as the water is unevaporated by drought. Besides manure remaining inert in wet land, it also remains inert in such land rendered dry by drought. In that predicament the manure becomes desicated, undecomposed, and easily separated from the soil, which becomes like a sterile powder; and remains so until the return of rain. Were the rain to fall in moderate quantities, the decomposition of the manure would be rapidly hastened in the warm soil, but if in inordinate quantities, its decomposition would be retarded as effectually as by the drought, although in this case it would be dissipated before decomposition. Nothing can so convincingly prove the benefits of draining in immediately securing the fertility of manure to the soil, than in contemplating the baneful effects of too much drought or moisture on manure. And to render the proof the stronger, we have only to contrast these effects with the effect of drained land on manure. The moment that manure is deposited in a proper state, that is in a state of humidity in drained land, its juices are absorbed by the dry soil, and retained there as in a wet sponge half squeezed. The strawy portion being thus deprived of moisture by absorption, and still surrounded with comparatively dry soil which retains heat within itself, and readily absorbs

more from the air, it is readily decomposed, and soon becomes intimately blended with the soil. Food in a semi-moist state is thus placed near and ready prepared for the tender spongioles of plants to exist upon; and supposing the weather no better but only equal to that we have supposed, in the case of the manure deposited in undrained land, the progress of vegetation will completely outstrip that in the latter.

3. *Lime.*—Many farmers consider lime a manure, and talk of it as such, but it cannot be a manure, that is food for plants, in the caustic state in which it is desired to be applied to land, however it may be changed in its nature by admixture with the soil or exposure to the air. Caustic lime would soon destroy vegetable life. Instead of itself being a manure, it rather converts other substances in o manure which would otherwise have remained in an inert state. It acts on vegetable matter on all soils, and, by decomposition, renders that matter fit food for plants. This is its chemical mode of action. It also acts mechanically, by separating the particles of adhesive soils by desication; but it is not probable that it acts chemically on the earthly portions of any soil. Confounding these properties of the action of lime, when applied to soil, with one another, might lead us to form erroneous conclusions regarding them. When, for instance, we observe lime to act with effect on vegetable matter lying inert in soils, we might conclude that it would be applied with best effect to wet land, in which vegetable matter is most abundantly found to be inert. When lime is found to pulverize and to dry clay soil become hard and cloddy with moisture, we might conclude that wet clays would derive most benefit from lime. Both these conclusions would be decidedly erroneous. Because, although lime readily decomposes vegetable matter in soil, it only decomposes it advantageously in dry soil, or soil rendered dry by draining, the moisture in wet land rendering the lime effete before it has time to act chemically on the vegetable matter in the soil; and lime only acts beneficially on drained soil, that contains excess of vegetable matter. Many dry soils, and particularly wet soils when drained, contain excess of vegetable matter, which matter, although encouraging a flush of vegetation, is deficient of silica to harden the straw and fill the grain. Caustic lime converts a portion of this soft vegetable matter into silica, whilst it converts another portion of it into a pabulum, by which vegetation is powerfully supported. In like manner, the application of lime to wet clays would be to convert them into mortar, which would harden the soil in drought that was intended to be pulverized. Even in the case of top-dressing grass with lime, which is an excellent practice when performed aright, pasture in a constantly swampy state can derive no benefit from it. Before the application of lime therefore, in any circumstances, land should be thoroughly drained.

4. *Bone-dust.*—The extraordinary power of crushed bones, when mixed with the soil, to promote vegetation, has not yet been satisfactorily explained. The finer the bone-bust, and the more intimately it is mixed with the soil, the more active is the vegetation. That the bone is chemically decomposed in its union with the soil is obvious. Lift up a handful of earth in which bone-dust has been mixed for some days, and it will be found to be saturated with a rich oily substance, which makes the earth adhere together into a ball when squeezed in the hand; and this effect will be observed although the bones should have been boiled previously to being crushed into dust. It is hardly conceivable, *a priori*, that so small a quantity of any substance, as

of the bone-dust when used, should be able to produce so sensible a change on the soil immediately in contact with it. We cannot positively assert which of the ingredients of the bone-dust it is that constitutes the food of plants, for although the circumstance of boiled crushed bones being as good manure as those in a raw state, would support the belief that it is not the oily matter in bone which constitutes the manure, yet the fact that boiled crushed bones render the soil apparently as rich with oil as raw, forbids us from asserting that the phosphate of lime alone constitutes the food of plants in bones. But whatever the chemical action of bone-dust on soil may be, we can assert with confidence, that bone-dust will impart no richness to any kind of soil, unless the soil is either naturally dry, or has been drained; and when soil does require draining, the more thoroughly it is drained, the greater effect will bone-dust have upon it as a manure.

We thus see, that unless land be thoroughly drained, all the adventitious substances which are employed to render it fertile, cannot impart their fullest benefits to it. Since this is the case, it is lamentable to think what vast quantities of manure, which take much time to collect, and much money to purchase, is yearly wasted on undrained land! How much more produce might not these quantities of manure annually raise, were they applied to land rendered fit to receive them by thorough draining!

The following article from *Roget's Bridgewater Treatise*, on the Absorption of Nutriment by Plants, is so very interesting to Agriculturists, that it is given entire:—

ABSORPTION OF NUTRIMENT BY PLANTS.

The greater number of cellular plants absorb water with nearly equal facility from every part of their surface. This is the case with the Algae, for instance, which are aquatic plants. In Lichens, on the other hand, absorption takes place more partially; but the particular parts of the surface where it occurs are not constantly the same, and appear to be determined more by mechanical causes than any peculiarity of structure: some, however, are found to be provided in certain parts of the surface with stomata, which De Candolle supposes may act as sucking orifices. Many mushrooms appear to be capable of absorbing fluids from all parts of their surfaces indiscriminately; and some species, again, are furnished at their base with a kind of radical fibrils for that purpose.

In plants having a vascular structure, which is the case in by far the greater number, the roots are the special organs to which this office of absorbing nourishment is assigned; but it occasionally happens that, under certain circumstances, the leaves, or the stems of plants, are found to absorb moisture, which they have been supposed to do by the stomata interspersed on their surface. This, however, is not their natural action: and they assume it only in forced situations, when they procure no water by means of the roots, either from having been deprived of these organs, or from their being left totally dry. Thus, a branch separated from the trunk, may be preserved from withering for a long time, if the leaves be immersed in water; and when the soil has been parched by a long drought, the drooping plants will be very quickly revived by a shower of rain, or by artificial watering, even before any moisture can be supposed to have penetrated to the roots.

It is by the extremities of the roots alone, or rather by the spongioles which are there situated that absorption takes place; for the surface of

the root, being covered in every other part by a layer of epidermis, is capable of performing this office. It was long ago remarked by Duhamel, that trees exhaust the soil only in those parts which surround the extremities of the roots; but the fact that absorption is effected only at those points has been placed beyond a doubt by the direct experiments of Senncbier, who, taking two carrots of equal size, immersed in water the whole root of the one while only the extremity of the other was made to dip into the water, and found that equal quantities were absorbed in both cases; while on immersing the whole surface of another carrot in the fluid, with the exception of the extremity of the root, which was raised so as to be above the surface, no absorption whatever took place. Plants having a fusiform or spindle-shaped root, such as the carrot and the radish, are the best for these experiments.

In the natural progress of growth, the roots are constantly shooting forwards in the direction they have first taken, whether horizontally, or vertically, or at any other inclination. Thus they continually arrive at new portion of soil of which the nutritive matter has not yet been exhausted: and as a constant relation is preserved between their lateral extension and the horizontal spreading of the branches, the greater part of the rain which falls upon the tree, is made to drop from the leaves at the exact distance from the trunk, where, after it has soaked through the earth, it will be received by the extremities of the roots, and readily sucked in by the spongioles. We have here a striking instance of that beautiful correspondence which has been established between processes belonging to different departments of nature, and which are made to concur in the production of remote effects, that could never have been accomplished without these preconcerted and harmonious adjustments.

The spongioles, or absorbing extremities of the roots, are constructed of ordinary cellular or spongy tissue; and they imbibe the fluids which are in contact with them, partly by capillary action, and partly also by what has been termed a hygroscopic power. But though these principles may sufficiently account for the simple entrance of the fluids, they are inadequate to explain its continued ascent through the substance of the root, or along the stem of the plant. The most probable explanation of this phenomenon is, that the progressive movement of the fluid is produced by alternate contractions and dilations of the cells themselves which compose the texture of the plant; the actions being themselves referable to the vitality of the organs.

The absorbent power of the spongioles is limited by the diameter of their pores, so that fluids, which are of too glutinous a consistence to pass readily through them, are liable to obstruct or entirely block up these passages. Thus, if the spongioles be surrounded by a thick solution of gum, or even of sugar, its pores will be clogged up, scarcely any portion of the fluid will be absorbed, and the plant will wither and perish; but if the same liquids be more largely diluted, the watery portion will find its way through the spongioles, and become available for the sustenance of the plant, while the greater part of the thicker material will be left behind. The same apparent power of selection is exhibited when the saline solutions of certain strength are presented to the roots; the water of the solution, with only a small proportion of the salts being taken up, and the remaining part of the fluid being found to be more strongly impregnated with the salts than before this absorption had taken place. It would appear, however,

that this is merely the result of a mechanical operation, and that it furnishes no evidence of any discriminating faculty in the spongiole; for it is found that provided the material presented be in a state of perfect solution and limpidity, it is sucked in with equal avidity, whether its qualities be deleterious or salubrious. Solutions of sulphur of copper, which is a deadly poison, are absorbed in large quantities by the roots of plants, which are immersed in them; and water, which drains from a bed of manure, and is consequently loaded with carbonaceous particles, proves exceedingly injurious when admitted into the system of the plant, from the excess of nutriment it contains. But in the ordinary course of vegetation, no danger can arise from this general power of absorption, since the fluids which nature supplies are always such as are suitable to the organs that are to receive them.

The fluid, which is taken up by the roots, and which, as we have seen, consist chiefly of water, holding in solution atmospheric air, together with various saline and earthy ingredients necessary for the nourishment of the plant, is in a perfectly crude state. It rises in the stem of the plant, undergoing scarcely any perceptible change in its ascent; and is in this state conducted to the leaves, where it is to experience various important modifications. By causing the roots to imbibe coloured liquids, the general course of the sap has been traced with tolerable accuracy, and it is found to traverse principally the ligineous substance of the stem; in trees its passage is chiefly through the alburnum, or more recently formed wood, and not through the bark, as was at one time believed.

The course of the sap, however, varies under different circumstances, and at different epochs of vegetation. At the period when the young buds are preparing for their development, which usually takes place when the genial warmth of spring has penetrated beyond the surface, and expanded the fibres and vessels of the plant, there arises an urgent demand for nourishment, which the roots are actively employed in supplying. As the leaves are not yet completed, the sap is at first applied to purposes somewhat different from those it is destined to fulfil at a more advanced period, when it has to nourish the fully expanded organs; this fluid has accordingly received a distinct appellation, being termed the nursling sap. Instead of rising through the alburnum, the nursling sap ascends through the innermost circle of wood, or that which is immediately contiguous to the pith, and is thence transmitted, by unknown channels, through the several layers of wood, till it reaches the buds which it is to supply with nourishment. During this circuitous passage, it probably undergoes a certain degree of elaboration, fitting it for the office which it has to perform; it apparently combines with some nutriment, which had been previously deposited in the plant, and which it again dissolves; and thus becoming assimilated, is in a state proper to be incorporated with the new organization that is developing. This nursling sap, provided for the nourishment of the young buds, has been compared to the milk of animals, which is prepared for a similar purpose at those times only when nutriment is required for the rearing of their young.

Several opinions have been entertained with regard to the channels through which the sap is conveyed in its ascent along the stem, and in its passage to its ultimate destination. Many observations tend to shew that in ordinary circumstances, it is not transmitted through any of the distinguishable vessels of the plant; for most of these, in their natural state, are found to contain only air. The

sap must, therefore, either traverse the cells themselves, or pass along the intercellular spaces. That the latter is the course it takes, is the opinion of De Candolle, who adduces a variety of arguments in its support. The sap, he observes, is found to rise equally well in plants whose structure is wholly cellular; a fact which proves the vessels are not, in all cases, necessary for its conveyance. In many instances the sap is known to deviate from its usual rectilinear path, and to pursue a circuitous course, very different from that of any of the known vessels of the plant. The diffusion of the sap in different directions, and its subsidance in the lowest parts, on certain occasions, are facts irreconcilable with the supposition that it is confined in these vessels.

Numerous experiments have been made to discover the velocity with which the sap rises in plants, and the force it exerts in its ascent. Those of Hales are well known; by lopping off the top of a young vine, and applying to the truncated extremity a glass tube, which, closed round it, he found that the fluid in the tube rose to a height, which, taken into account the specific gravity of the fluid, was equivalent to a perpendicular column of water of more than forty-three feet; and, consequently, exerted a force of propultion considerably greater than the pressure of an additional atmosphere. The velocity, as well as the force, of ascent, must, however, be liable to great variation; being much influenced by evaporation and other changes, which the sap undergoes in the leaves. Various opinions have been entertained as to the agency by which the motion of the sap is effected; but although it seems likely to be resolved into the vital movements of the cellular structure already mentioned, the question is still enveloped in considerable obscurity. There is certainly no evidence to prove that it has any analogy to a muscular power; and the simplest supposition we can make is, that these actions take place by means of a contractile property belonging to the vegetable tissue, and exerted, under certain circumstances, and in conformity to certain laws, which we have not yet decided in determining.

NEAT CATTLE.

THEIR MANAGEMENT, &c.

The following is an extract from an article in the *Penny Cyclopædia*, on the "Cow," with additions by the author:—

When only one or two cows are kept, especially when they are to be maintained on a limited portion of pasture, it is of great importance that a good choice be made when they are purchased or reared. Some breeds, no doubt, are much superior to others; but as a general rule, there is a better chance of having a profitable cow, if she be reared on the land on which she is to be kept. When the common breed of the country is decidedly inferior it may be profitable to bring a cow from a distance, in which case it should be from some district of which the pasture is rather inferior to that to which she is brought, or at least not better. The best breeds are found in the richest pastures, but they do not thrive on worse. On poor land a small active cow will pick up her food and keep in condition, where a fine large cow would starve, or at least fall off rapidly. Where the pastures are poor but extensive, cows give little milk, and the number which can be kept must make up for the produce of each. Where, on the other hand, cows are stalled, as in Flanders, and fed on artificial food brought to them in sufficient quantity, large bulky cows give the best return for the food; at least this seems to be the opinion of the Flemish farmers in general.

The Devon cow of pure breed will, in England, yield about twelve quarts of milk per day for twenty weeks after calving; but the average produce per cow of a whole dairy through the year will not be more than half this quantity, even if all the cows are good. It is found that eight quarts of milk, of the pure Devon breed of cows will produce one pound of butter, while it will take twelve quarts of milk of the mixed breed to produce the same quantity. The milk of Canadian cows, of pure breed, is equally productive of butter as that of the Devon, and will generally yield as much butter from eight quarts of milk as the milk of large cows will from twelve, fed on the same kind of pasture.

In France, where the cows are led along the roads to pick up the herbage growing by the road-side, or are tethered on a small portion of clover or lucern, a small lean cow is preferred; and in general the cows commonly met with, and which are bred in each district, seem the best adapted for the mode in which they are fed. Whatever be the breed or quality of a cow, she should always have plenty of food, without which no considerable produce in milk can be expected. This food should be succulent as well as nourishing, or else fat will be produced instead of milk. A cow well fed may be safely milked till within a month of her calving. It is better she should be let dry before the new milk begins to spring in her udder. A little attention will readily prevent her becoming dry too soon, or being milked too long. Heifers with the first calf should be allowed to go dry sooner than old cows; because their growth would be impeded by the double drain of the milk and the calf. It is best to let a heifer go to the bull when nature prompts her to it; provided she be not less than from fifteen to eighteen months old; for if they are thwarted in their first heat, they are apt to become irregular ever after; and it is advantageous for a cow to calve regularly at the same season of the year. The best time is May, when the grass begins to be succulent. In some countries, such as Switzerland, the cows calve regularly in April or May, and are then sent to the pastures among the mountains. The calf is killed almost immediately, unless it be reared for stock, veal being of little value.

Where cows are allowed to be in the open air, with proper shelter from stormy and wet weather, they are subject to few diseases. They must be carefully looked to at the time of calving, but except in urgent cases, nature must be allowed to perform her own office. A little common sense and experience will soon teach the possessor of a cow to assist nature, if absolutely necessary; and in case of difficulties the safest way is to call in an experienced person. Drinks and medicines should be avoided; a little warm water, with some barley-meal mixed with it, is the most comfortable drink for a cow after calving. The calf, and not the cow, should have the first milk, which nature has intended to purge its intestines of a glutinous substance which is always found in the unborn calf. A very common disease with cows is a disordered function of the liver producing a yellowish tint in the eyes, and sometimes in the skin. A gentle purge, consisting of half a pound of glauber salts, an ounce of ginger, and two ounces of treacle, with two quarts of boiling water poured over them, may be given when it is milk-warm, and repeated every other day; keeping the cow warm if in winter by a cloth over the loins. This will in general restore her health. The symptoms of a diseased liver or lungs in a cow are leanness, with a staring coat, a husky cough with loss of appetite, a diffi-

culty of breathing, and a great diminution in the secretion of the milk. When a milch-cow is considerably diseased in the liver or lungs, it will be best to dry her at once, and fatten her if she will put up flesh.

Nothing is more prejudicial than the idea that medicines are necessary to keep cows in health, and the practice of keeping advertised medicines at hand to give to an animal whenever it is fancied to be ill, is very detrimental to their health. Attention to food and exercise, giving the first regularly and in moderate quantities at a time, and allowing the cow to use her own judgment as to the latter, are the great secrets of health; and a healthy young cow reared at home, or purchased of a conscientious dealer, will probably live to old age without ever having had any disease. A cow is old and unprofitable when she reaches twelve or fourteen years. She should then be sold fat, and replaced by a young one.

In a late description of the Agriculture of Buckinghamshire, the following remarks on the feeding of cattle in that County, may be interesting to the reader:—

"The large Hereford oxen are preferred for grazing where the land is very good, from the notion that a large ox is more profitable than a smaller. A large ox when fat has, no doubt, more flesh, in proportion to the bone and offal, than a smaller, supposing both equally fat and well-shaped; but it is by no means proved that this flesh is produced by the same proportion of food. A small ox will fatten on inferior pasture, and in a much shorter time than a larger. The return is equally quick and more certain, and there are experienced men who maintain that a small North Devon or Scotch Highland ox will give a better average profit on his cost and food, in a given time, than the larger breeds. The small Scotch oxen, which fatten so readily in English pastures, always bring the best price in the market, and there is never any difficulty in disposing of them.

The difference in the price of prime large oxen and prime small Scotch oxen in the Smithfield market, is always from a half-penny to a penny per lb. for the whole carcase, in favour of the small.

In order to know by experience what breed of cattle is most profitable, it is very advantageous to weigh them occasionally, and note their increase. Experience has shown the proportion between the saleable quarters and the offal, in different states of fatness; and tables have been constructed by which the net weight is found by mere inspection. Multiplying the live weight by 0,605, gives a near approximation to the net dead weight of an ox moderately fat and of a good breed. When an ox is fat, his weight may be very nearly guessed by measuring his girth immediately behind his fore legs, and the length from the tip of the shoulder to the perpendicular line which touches the hinder parts, or to a wall against which the animal is backed. The square of the girth in inches and decimals is multiplied by the length, and the produce multiplied by the decimal ,238. This gives the weight of the four quarters in stones of 14 lbs. This rule is founded on the supposition that there is a certain proportion between the net weight of the quarters and that of a cylinder, the circumference of which is the girth, and the axis the length taken as above. The proportion has been ascertained by observation, and by repeated comparison. The measurement will at all events indicate the proportioned increase during the period of fattening.

Good water is most essential to the health of cattle, and that which has been some time exposed to the air seems the best for them. When

they are fatted in stalls on dry food, they should always have a trough of water within reach. A piece of rock-salt to lick, or some salt given with their food, is highly conducive to their health, and will restore their appetite when it begins to flag. Rubbing the hide with a wisp of straw or a strong brush, as is done to horses, may appear a useless labour, but it is well known that there is no better substitute for the exercise which is essential to health. When labour is not regarded, as is always the case when the owner of the cattle attends upon them himself, the curry-comb and the brush are in regular use, and the advantage is not denied.

In those countries where the farmer is allowed to distil a spirit from his grain, it is a great advantage to an agricultural establishment to have a distillery attached to it, especially in a remote situation; and not only is the fattening of cattle on the refuse of the distillery a source of profit, but the manure extends fertility around. The produce in spirit and in cattle is easily transported to a great distance, and almost the whole of what is produced by the land returns to it in the shape of manure. The same may be said of the manufacture of sugar from the beet-root, which has been lately so much extended in the North of France. It can never be too much impressed upon the minds of agriculturists, that without dung their is no corn; without cattle there is no dung. Every means should therefore be used to encourage the breeding and feeding of cattle, and none can be more effectual than to show that the profits of a farm are always proportioned to the quantity of cattle kept, and the abundance of food provided for them."

In Canada the stock of cattle might be greatly and profitably increased, and an abundance of food provided for them, by adopting a judicious system of husbandry, and observing a due proportion between the number of cattle kept, and the land occupied as arable, meadow, and pasture. Unless there is a due proportion of cattle kept upon every farm, it is impossible that they can be profitably cultivated, and preserved in the state of fertility that is necessary to ensure the production of crops that will pay the farmer. On farms that are situated near our cities, where large quantities of manure may be obtained, it may not be necessary to keep a full stock of cattle. In such situations, the produce might be nearly all sold, provided the farmer carts manure from the city to keep up the fertility of the soil.

ON THE COMPARATIVE MERITS OF SHORT HORNS AND HEREFORDS IN ENGLAND.

The following extract of a letter, which appeared in the *Mark-Lane Express* in March last, may be interesting to Canadian stock farmers:—

"I wish, as R. S. made no scruple of using other people's names in his letter, and among the number mine, he had favoured us with his own, it would, in my opinion, have been more in keeping with plain fair dealing. I like to know my man, by name at any rate, and it is rarely indeed that I give myself the trouble to notice any letter, on any subject, however personal its contents may be, unless it has the author's name to it. In this instance, however, I am tempted to deviate, considering, as I do, that the subject is one of considerable national importance.

"It appears, Sir, to be the opinion of R. S. that the best standard to test the merits of different breeds of cattle, is to be effected by offering such premiums as will induce persons to send to various agricultural meetings throughout the country, a num-

ber of enormously fatted animals, and to which ever sort a competent judge, or judges, award the prizes so offered, is a sufficient test, in his mind, of the utility to propagate. So far, however, is this mode of showing stock from being in accordance with my views on the subject, or having a tendency even to lead us to those correct and beneficial conclusions, so desirable for both breeders and feeders to arrive at, that I deem the 'Smithfield Cattle Show,' constituted as it now is, a perfect delusion, calculated to produce, and has produced, to my own knowledge, loss, instead of benefit, to very many individuals. How, Sir, is it possible for any man acting as a judge on such occasions, however competent he may be to decide which is the best ox, &c., viz.: which has paid the most money for the food it has consumed, when he has no satisfactory data to guide him? And this is never given; we have therefore here, as in numberless other shows, a costly pageant, void of utility. A great deal has been said and written by the advocates of short-horns, to induce the public to believe that these cattle will mature earlier than any other sort, and this seems to be the opinion of R. S., to substantiate which he cites, as an example, the three years and six months old heifer, that took the gold medal at the last Christmas Cattle Show in London. The idea I believe to be perfectly fallacious, and would have only existed in the minds of those who, either from prejudice or some other cause, had not taken the pains to arrive at more correct conclusions. As I have often seen Herefords as fat at *two years old*, as beef for beneficial purposes ever ought to be made, and *much riper* than I ever saw a short-horn of the same age, fatted in a similar manner—namely, on hay and green vegetable food only, I am quite as great an advocate for breeding those animals that have an inclination to mature early, as R. S. or any other person, but I fully concur in the observations made by your Herefordshire correspondent, in the P.S. to his letter, that it is worse than folly, in any one, for the purpose of making an ox or steer as fat at an early age as his *nature will admit*, to expend upon him double his worth; and without such expenditure, or very near it, it cannot be done, let the sort be what they may. This I ascertained by dear bought experience, nearly forty years ago, since which I have seen nothing to justify a change of such opinion, but on the contrary, very much to confirm it, though for more than twenty-five years past I have been intimately acquainted with the improved short-horns, but more particularly so the last ten or twelve years, during which time I have endeavoured, in various ways, to induce them who propagate them to test their merits in a fair, legitimate feed manner, against Herefords. * * * *

"That my steers will meet with their equals in short-horns, in the London show-yard, I never doubted; how could I, knowing as I well do, those petted creatures never appear there till they have been for two or three years in the hands of a skilful man-cook, and a 'valet-de-chambre,' who had, during that time, invented, concocted, and administered to their aristocratic appetites, every delicacy and comfort that art could invent; not in a common feeding-pen, but in a suite of apartments savouring, at *times*, more of 'Eau de Cologne, than of the vulgar odour of a Buckinghamshire grazier's feeding-stall."

Poole, House, Upton-on-Severn,
March 8, 1838.

JOHN PRICE.

To force, by extraordinary feeding, animals of any breed, for show, at a cost they never can repay, tends only to lead farmers into error that must be injurious to them; and the above letter is given to prevent such a practice in Canada.

THE COMPARATIVE ADVANTAGE OF FEEDING CATTLE WITH GRAIN, OR WITH OIL CAKE.

(From an English paper.)

"If the farmer was a friend to himself, the preferable mode of fattening was to feed the animal with the good and clean produce of his own farm. When in the English markets, beans can be purchased at 15s., and barley at 13s. per coomb, of 4 bushels, it is recommended decidedly to feed with farm produce. It is the opinion of eminent feeders of cattle, that to feed a beast for a prize, corn is preferable to oil-cake; for independently of the cheapness of the one, the exact composition of the oil-cake sold in England was not known; and besides, feeding stock with corn was beneficial to the farmer, as it was creating a market for his own produce."

A farmer states further:—

"I gave my feeding beasts ground corn for several years with success, particularly bean meal; I also used barley and wheat meal, which, when I gave to them without a large proportion of bean meal, disagreed with them, causing them to scour; but three years ago, having a quantity of inferior barley, and no beans, I determined to try whether the boiling of the barley would prevent the effects the meal produced on the bowels. The trial was so successful that I continued feeding with boiled barley ever since; and this year I have six beasts feeding on boiled barley superior to any I have seen in the neighbourhood fed on oil-cake: and so convinced was a friend who saw them very lately, of the superior condition of mine to his, which are feeding on oil-cake, that he expressed his intention of immediately following my example.

The method of boiling the barley is as follows:—To two parts of water add one of barley, then boil it slowly; when it boils add no more fuel, but let it remain in the vessel closely covered; at the end of forty-eight hours take it out to cool, and if properly done, it will have imbibed all the water, every corn will be burst and in a jelly-like state; this mix with chaff, and afterwards give hay to assist rumination. My six beasts, each weighing from 50 to 60 stone (14 lbs. to the stone) consume two bushels of barley per day, worth at market 3s. per bushel. The cost of boiling, now coals are selling at 1s. 6d. per cwt., is 1¾d. per bushel."

There is no doubt but Canadian agriculturists will find their advantage in adopting the plan of feeding cattle on some of their inferior grain. If wheat cannot be grown to advantage, we will not be able to find a market for all the barley and oats that may be grown, unless we manufacture some of it into butchers' meat, by feeding cattle with it.

CALVES.

The rearing and fattening of calves is a very important part of rural economy, and on the care with which this is done depends much of the profit of grass-land in particular situations. In the dairy districts the milk is so valuable, that calves are got rid of as soon as possible. In some countries they are killed when only a few days old, and the flesh is of little value, being very soft and tasteless. In others the flesh of very young calves is considered unwholesome, and penalties have been imposed on those who kill a calf before a certain age. This is the case in France and Switzerland, where ten days is the earliest time at which a calf is permitted to be killed for sale.

Wealth and luxury have introduced a very different mode of proceeding in England. Calves are suckled with great care, and allowed to take as much milk as they can swallow, in order to make them fat, and their

flesh white and delicate. The price at which a fat calf is sold, when from eight to twelve weeks old, is often much greater than he would fetch at twelve months old, if reared in the common way.

It is chiefly in the neighbourhood of large towns in the British Isles, that the practice of fattening calves is profitable. And there are calf-dealers who buy calves in the dairy districts, and sell them to those who fatten them near towns. When the calf begins to thrive on the milk which he sucks from the cow, or that is given to him warm, nothing more is necessary than to keep him extremely clean and dry, to give him plenty of air, but not much light, and never to disturb him between meals, which are generally twice a day, at the usual time of milking the cows. If one cow does not give sufficient milk for the calf, when it begins to get large, it ought to get milk from another cow.

The calf-pens should be made like narrow stalls, each for the accommodation of only one calf, just wide enough to allow him to lie down, but not to turn about and lick himself, which, if it become a habit, will much retard his progress of fattening. The bottom of the pen may be paved with bricks, and washed clean morning and evening; or if boarded, the boards should be about six inches from the ground, with holes bored in them to let the urine drain through. A piece of chalk, or powdered lime stone is put in a small trough, which the calf licks, and thus corrects the acidity which is apt to be generated in the stomach. When the calves are taken out of their stalls to suck the cows, they should not be allowed to play instead of sucking. If they appear not to have much appetite, a little salt may be rubbed into their mouth, and they may occasionally have a raw egg put down their throat. At five or six weeks old, if kept so long, a small bundle of sweet hay might be hung up before the calf, and it will pick a little of it; and by thus exciting the saliva the digestion will be assisted. It is only by minute attention that the fattening of calves can be made more profitable than the making of butter or cheese. When it is well managed in England, and the price of veal is about one half the price of butter by the pound, it is thought to be advantageous to fatten calves, but otherwise making butter is considered more profitable. When a calf gets large, and passes the age of eight weeks, it takes a much greater quantity of milk in comparison to what it did previously to that age, to produce the same increase of flesh; and it is generally prudent to sell them at the age of eight weeks. A calf well fattened, whose four quarters will weigh from 120 to 144 lbs., will always sell better in the English market than one that is larger. The difference in the price is generally one penny in the pound, and sometimes over that. To know the weight of the four quarters of a calf when killed, take the live weight and multiply it by 0,6. Thus if a live calf weighs 200 pounds, his four quarters when killed will weigh 120 lbs. 200 x 0,6=120.

When calves are intended to be reared for grazing or for the dairy, the most perfect ones should be chosen. They should be allowed to suck the mother three or four days, but no more, and then be taught to drink milk out of a pail. This is soon accomplished by gentleness and care. Should there be any difficulty in teaching him to suck with the hand in the usual way, a wisp of twisted straw is put into the pail and one end of it in his mouth. It is said that this seldom fails to bring him to drink. When the calf is a week old, skimmed milk which has been boiled and allowed to cool again, so as to be milk-warm, may be given him. After a time this may be diluted with water,

and a little meal stirred into it; or some thin gruel may be made to which skimmed milk is added. Carrots and turnips make excellent food for calves, if boiled with cut hay and given warm. In this way calves might be reared on very little milk, till they can live on grass alone. The diseases of calves are chiefly *scouring* and *constipation*: for the first, if the calves are strong, the following receipt is recommended as likely to remove the complaint:—prepared chalk four ounces, crabs' eyes two ounces, white powder of burned bones two ounces. These ingredients are pulverized and well mixed, and a large table-spoonful of the powder is given in a pint of new milk every night and morning before the calf is fed, until the purging ceases. For costiveness the following is a good and safe remedy:—castor-oil one ounce, prepared kali half a drachm, ginger in powder one tea-spoonful. Mix these for a dose, and give it in half a pint of warm milk.

INSECTS INJURIOUS TO AGRICULTURE.

In Canada *Insects, above all other animals*, are by far the most injurious to agriculturists; not only from their prodigious numbers, but from their attacking the produce of the earth in all its stages of growth and maturity. It would, therefore, be very advantageous to persons engaged in agricultural pursuits to acquire as much knowledge as possible of those insects that are more particularly injurious to him. In Kirby and Spence's *Introduction to Entomology*, vol. 1, and in the *Linn. Transactions*, vol. 4 and 5, there is much valuable information respecting insects, including those that are the most injurious to the Canadian farmer.

It would occupy many pages to go into a minute description of the various insects that occasionally damage the seed and crops in this Province. For the present, the author will give a few extracts from works lately published on Entomology, that may be interesting to farmers.

And 1st. *The Physiology of Insects.*

Insects are distinguished from worms, by always having feet in their perfect state, as the beetle, butterfly, &c. Worms crawl upon their bellies and have no feet, as the earth-worm, slug, snail, &c. The generality of insects have only six feet; but some few have a great many more.

Nearly all insects are oviporous; that is, produced from the egg. These eggs are seldom found singly; they are small in size and do not grow. The eggs of some species are hatched in a few days, while those of others remain during the winter, and the young do not come forth until the season at which the leaves of the plants upon which they feed begin to expand.

The second state of the insect is called the larvæ, in systematic language, and is known to the vulgar by various names. Caterpillars are those larvæ which are exposed, and feed upon leaves and plants, as the caterpillar of the common cabbage butterfly. The larvæ of beetles usually live in the earth, in the trunks of trees, or on the substance on which they feed; they are generally of a whitish colour, thick and clumsy in form, and are called grubs. The larvæ of the common cockchaffer, and of the nut-beetles, are of this description; while the name of maggots is usually given to the larvæ of flies, bees, ants, &c., all of which live in the some confined state as those of beetles. It is in this stage of existence the insects are most voracious, and consequently most destructive to plants.

When the larvæ has attained to its full size, it changes into the pupa or

chrysalis state. This is done in different situations, according to the tribes to which they belong. The chrysalis of butterflies are naked, and either suspended or attached to trees, branches, walls, &c. Those of moths are either concealed in a case like the coccoon of the silk worm, or the caterpillar undergoes its change in the earth. The period in which insects remain in this state varies according to the species; but in most cases they are inactive and torpid.

The imago, or perfect insect, is produced from the chrysalis, and is the only state in which all its parts and members are fully developed. The appearance and economy of perfect insects, in general, is totally different from those of the larvæ and pupæ, and it is only in its final state of existence that they are furnished with wings, either four or two in number. The females of the glow-worm, and of some few moths, are apterous, while many beetles (although furnished with hard winged cases) are destitute of real wings.

The duration of insects is extremely variable; the greatest proportion appear to be annuals emerging from the egg, and passing through the three stages of their existence within the space of a year. But there are a great number of species, particularly among the beetles, which pass three, and even four years in the caterpillar state; and instances are on record of beetles remaining in timber from ten to fifteen years. The greatest proportion of moths are biennial, passing the winter in the chrysalis state, and closing their existence in the succeeding summer. The transitory life of the Ephemera is proverbial; the perfect insect exists but for a day, and seems born only to continue its species; yet in the larvæ state it enjoys a life of one, two, or even three years.

2. *Classification of Insects.*

Macleary observes that insects may be divided into two groupes: 1. *Apterous Insects,* having either no metamorphosies, or only that kind of it the tendency of which is confined to the increase of the number of feet; these, as the name implies, are destitute of wings. 2. *True Insects,* or those whose metamorphosies have a tendency to give wings to the perfect or image state, but never more than six feet.

True Insects are again devisiable into two primary groups; the first of these are organized for mastication, in their perfect state, and the second are organized for suction alone. Each of these divisions contain five separate orders.

The Masticating Insects are furnished with jaws of a horny or membranacious substance, infinitely diversified in their form and structure. It is not necessary to notice the several orders into which they are divided. It will be sufficient to describe those that are particularly injurious to the agriculturist.

1st. *Coleŏptera.*—This well defined and extensive order comprehends all insects known by the name of beetles. They have two wings, concealed beneath a pair of hard wing-cases, which meet close together in a straight line down the back. There are many tribes of these insects, which, both in their larvæ and perfect state, are extensively injurious to man.

2d. *Orthŏptera.*—The true wings are but two, very large when expanded, and fold length-ways when at rest, and are covered with wing-cases, of a thin tough substance. The leading characters of this order are exemplified in the blátta, or cock-roach; the pest of tropical countries, and frequently troublesome in our kitchens and larders.

The Suctorial Insects contain five orders. In their larvæ state, they are mostly furnished with strong and well defined jaws, and feed voraciously

upon animal and vegetable bodies; yet, from the perfect insect being supported by suction alone, it is obvious that in this state they can do no injury to the agriculturist.

1. *Lepidōptera.*—The wings are four, thin, membranaceous, and covered with a fine powdery substance, which, by the magnifying glass, is shown to consist of minute scales, lying one upon another, like those in fishes. The butterfly and moth tribes are examples of these insects, the larvæ of which are called caterpillars.

2. *Diptera.*—The wings are two, clear and transparent, like those of the common house-fly. The order is very numerous, and contains many insects which are injurious to vegetables as larvæ, and troublesome to man in a winged state; as the great wheat-fly, wheat-fly, crane-fly, &c.

3. *Hemiptera.*—Insects of this order are furnished with two folded wings, covered by wing-cases, also crossing over each other, of a semi-corneous substance, and which are likewise useful as organs of flight. The various insects commonly called field-bugs, which emit a strong and disagreeable smell when handled, are all arranged under this order.

4. *Homōptera.*—These insects resemble the last; but the body, instead of being depressed and flat, is convex and thick; the wings, also, instead of folding over each other, embrace the sides of the body. The frog-hopper, in its perfect or winged state, is a good example of these insects. The larva resides in a drop of froth of its own making, and is then commonly known in England as the cuckoo-spit insect; by feeding upon the sap it causes the leaves to curl up, and the growth of young plants is thus materially checked.

3. *Insects injurious to Live Stock.*

The Horse.—The principal foes to this animal are the horse-bee and gad-fly. The first deposits its eggs on such parts of the body as are liable to be licked by the tongue; and the animal, unconscious of what it is doing, thus conveys its enemy into the stomach; the young larvæ are there nourished, and becomes whitish rough maggots, which are known by the name of bots. They attain their full size about the latter end of May, and are voided by the anus from that time until the end of June. On dropping to the ground, they find out some convenient retreat, where they change into a chrysalis; and in six or seven weeks the fly appears. The female is distinguished from the male, by the lengthened shape of her body. The inside of the knee is chiefly selected for depositing her eggs, which will frequently amount to four or five hundred on one horse. In other species, the gad-fly is still more troublesome; it deposits its eggs upon the lips, and causes excessive and distressing uneasiness to the animal. A Mr. Clark, who has investigated the history of these insects, observes that, in ordinary cases it is not improbable that they are beneficial to our cattle, by acting as perpetual stimuli, or blisters; yet, when they exceed certain limits, they produce disease, and sometimes death. The prevention of bots may be effected by watching the animal at the season when the female deposits her eggs (usually in August and September), and should the horse appear much agitated in its pasture, there will be good reason to suspect that it has been attacked by the fly; the eggs may then be removed by the brush and curry-comb, or by a pair of scissors.

Horned Cattle are likewise subject to the attacks of a peculiar species of gad-fly, which causes them great terror and distress. The larvæ is smooth and fat: and the chrysalis opens by a lid when the insect

emerges from it. When this insect appears among the herd in England, they exhibit great agitation; and with their tails erect, gallop about and utter loud lowings. The eggs are deposited *within* the skin of the animal, and in a wound made by a tube resembling an auger, with which the female is provided. These flies only attack young and healthy subjects; but, independently of the terror they create, do not appear to occasion any material injury.

Sheep are also infested by another species of gad-fly, which deposits its eggs in the inner margin of their nostrils. The moment the fly touches this part of the sheep, they shake their heads, and strike the ground violently with their fore feet; at the same time holding their noses close to the earth, they run away looking about them on every side to see if the fly pursues; they will sometimes crowd together in a wet or dusty road with their noses close to the ground. The larvae are white, flat on one side and convex on the other; they inhabit the cavities of the maxillary sinuses, and crawl, when the animal is dead, into those of the horns and frontal sinuses; when full grown, they fall through the nostrils, and change to a chrysalis, which produces the fly in about two months. Swine, pigeons, and all kinds of poultry are subject to fleas and lice of various kinds, but seldom to such a degree as to occasion death.

4. *Insects injurious to Vegetables.*

The ravages of insects upon plants commence from the time the seed is committed to the ground, and continue until the produce is gathered into the barn. These various injuries, in one shape or another, are annually experienced; and many of them, we have great reason to apprehend, will hereafter increase to an alarming extent. Farmers have a prejudice against birds in consequence of the grain they destroy in the harvest; but it is very probable that Providence has kindly given us these birds to keep the insect tribes within due limits; and it may be the interest of the agriculturist to protect birds, rather than destroy them, though they may consume some of his grain.

Wheat, in every state, is subject to many insect depredators. A small grub, (by some mistaken for the wire-worm) eats into the young plant about an inch below its surface, devours the central part, and thus causes its immediate death. The wire-worm is also most destructive to the wheat-plants in the spring, particularly if the soil is loose and very fertile. In England, wheat is sometimes attacked by a fly, which makes a lodgement in the heart of the principal stem just above the root, giving the crop at first a most unpromising appearance, but ultimately it proves that the plant, instead of being injured, derives great benefit from this circumstance; for, the main-stem perishing, the root, (which was not hurt) threw out fresh shoots on every side, so as to yield a more abundant crop than in other fields where the insect had not been. When first observed in England, this insect caused great alarm among agriculturists, who thought it might prove the Hessian fly. The Hessian fly has appeared in Canada occasionally, but within the last few years it has not caused any material injury to the wheat crop. When the wheat blossoms, it becomes exposed to the attack of a small orange-coloured gnat, which deposits its eggs in the centre of the flower; the larvæ or grub devours the pollen, and thus prevents the impregnation of the grain. This latter insect has been particularly destructive to the wheat crop in Lower Canada for the last four years, and is generally known as the wheat-fly. Its history and economy has been ably investigated by Marsham and the Rev. Mr. Kirby,

The injury first appears in the ear, several of which, on being opened, will be found to contain an orange-coloured powder; in this are concealed very minute larvæ, which, on their being magnified, are seen to be thick at one end, extending and contracting themselves at pleasure, and frequently jumping half an inch at one spring; they take their station in the longitudinal furrow of the grain, and by sucking its milky juice causes it to shrink up, and become what the farmers in England call *pungled*; the last sown wheat (fall sown in England) is always most infected. In the beginning of June (in the latter end of June in Canada), the perfect insect may be seen in innumerable multitudes, flying in the evening, in all directions over the wheat-field; but during the day not one is to be perceived. The female lays her eggs by means of a rectractile tube, which incloses a very long and acute sting resembling a hair; but this can only be distinctly seen when the insect is magnified. The wheat-fly would soon become a formidable enemy to mankind, were not its race exposed to an inveterate foe, scarcely larger than themselves; this is the *Ichneumon Tipulae*, the female of which carefully searches out the grubs of the wheat-fly, and deposits in each one of her eggs; these are hatched, and ultimately the larvæ devours the body which gave it life. One Ichneumon will thus cause the death of many dozen, and prevent the future multiplication of thousands. It is very doubtful whether the Ichneumon destroys many of the larvæ of the wheat-fly in Canada.

The only palliative that has been recommended for stopping the progress of this insect has originated in Mr Kirby; this consummate naturalist thinks much benefit would be derived by fumigating the wheat with tobacco and sulphur, when the wind is in a favourable quarter; this must be done as soon as the ear begins to shoot from the leafy stalk.

To those who have not seen the wheat-fly, the following description of it, as given by the Rev. Mr. Kirby, may be interesting:—

"*Tipula tritici*.—This little fly is about one-twelfth of an inch in length, and of a reddish yellow colour; the wings are milk-white, and exhibit the prismatic colours in certain lights; the eyes are black. This insect, which is commonly known as the wheat-fly, may be observed sometimes in the greatest abundance, flying about wheat-fields in the month of June. It generally makes its appearance about seven or eight o'clock in the evening, yet in the morning not a single one is to be seen upon the wing; they do not, however, quit the field which is the scene of their employment, for upon shaking the stalks of the wheat, or otherwise disturbing them, they will fly about near the ground in great numbers. I found their station of repose to be upon the lower part of the culm with their heads upwards." Mr. Kirby states further that it is about eight o'clock in the evening that they deposit their eggs; and that he had seen twelve specimens thus occupied at the same time on a single ear, and observes that these flies are sometimes so numerous, that were all to lay their eggs, one half of the grain would be destroyed. In Canada, very frequently, nine-tenths of the crop is destroyed by this fly. Mr. Kirby says, "I have seen, more than once, seven or eight florets in an ear inhabited by the larvæ, and sometimes so many as thirty in a single floret, seldom less than eight or nine, and yet I have scarcely ever found more than one pupa in an ear, and had to examine several to meet with that. The pupa that I have observed have generally been somewhat attached to the grain, and, what is worthy of notice, I never observed them within

these florets where the larvæ had taken up their residence; they seem invariably to chose for their habitation, in their immediate state, one where the grain is uninjured, to which they may attach themselves." This account agrees perfectly with the habits of the wheat-fly in Canada. The only difference is, that the injury to the crop here is generally much more extensive than it ever has been in Britain.

One cause of this is, that the fall sown wheat in England is generally in ear before the fly appears there. It is only immediately after the ear is shot out, while soft and tender, that the fly can deposit its eggs within the glomes that cover the germen or florets. This same cause may save the fall sown wheat in Upper Canada, that is generally in ear early in June. We have never observed the wheat-fly make its appearance in Lower Canada before the 25th of June, and could we have our wheat fully shot out in ear, a few days previous to that, it might escape injury.

Previous to this year the wheat was the only grain that suffered much by the fly; but this year, the rye and the barley has been very much injured; indeed we have seen ears of barley that had not one grain left. It is probable that we must contrive to sow our barley in future at such a time that it will come into ear before the 25th of June, or after the 15th or 20th of July. The fly disappears about the latter period. It is dangerous to have our wheat or barley very late; but there appears to be no remedy against the ravages of the fly but by having the grain come into ear at a time they are not present to injure it. If the fly is reproduced from the larvæ, they would soon become extinct if they had only the barley to feed upon, because the larvæ cannot escape from under the rind of the barley grain, as they do from the glomes of the wheat grain, and, therefore, they must perish there. We have seen the larvæ or pupa fall to the ground from the wheat, but whether they remain there, and reproduce the fly in the succeeding spring, is a matter we have not been able to ascertain, though we believe it to be so. Last year, immediately before the larvæ or maggots disappeared from the wheat, we examined them with a microscope, and found many of them in the act of casting off the old skin, and when they had effected this, they appeared of a brighter colour, and larger size. In the year 1835, we had a crop of wheat greatly injured by the fly. In the fall the wheat stubble was ploughed; and in the succeeding spring, potatoes were planted in the land. In the latter end of June, the fly appeared in myriads, flying about the potatoe plants, though no wheat was near the place. It would appear from this circumstance probable, that the larvæ or pupa remains in the soil during the winter, and produces the fly in the spring.

Many persons have confounded the larvæ of the wheat-fly with the corn-weevil, and have attributed to the latter insect the injury done to the wheat crops in Canada for the last four years. The corn-weevil is, however, altogether a different insect, as the following description of it will show.

The corn-weevil (CALANDRA, *granaria*), which commits so much havoc in English granaries, is about the sixth of an inch long, or rather less; of a pitchy red colour; the thorax is coarsely punctured, and the wing-cases are deeply striated; the striæ are minutely punctured; the legs and attennae are red.

This little insect bores a hole into the grain with its proboscis, in which an egg is deposited; the egg turns to a little grub or larvæ, which devours the whole of the inside of the grain, leaving the husk entire. This

quantity of food is just sufficient to mature the grub; it then turns to the pupa, and afterwards to the weevil, which easily breaks through the husk, and is then at liberty to produce as its parent did. When wheat is suspected to contain these little weevils or their grubs, that which is affected may be easily discovered by throwing the whole into water; that which is good will sink, while the rest will float. This insect will never injure grain, except when it is stored in granaries.

Rye is subject to the attacks of a small fly which introduces its eggs into the heart of the shoots, and occasions considerable loss in the crop in England. No remedy has yet been proposed for this pest, which, if not extensive, may be checked by plucking the injured ears and burning them. The wheat-fly injures this grain in Canada.

Barley is less subject to insect foes in the progress of its growth than wheat. The wheat-fly attacks it, and does it some injury, and this year to a great extent. The wire-worm sometimes cuts the young plants of barley below the surface of the soil, and destroys a large portion of the plants on lands that are loose and fertile.

Oats are not subject to many diseases, but like other grain are subject to be destroyed by the universal devastator, the wire-worm.

The diseases of Peas are mildew and blight occasionally: its insect enemies, however, are formidable, particularly the plant louse, one species of which is peculiar to this plant. Beans are exposed to the same injury from another species of plant louse, of a black colour, which begins at the top of the plant, and multiplies downwards. In both cases the most effectual remedy is to top the plants at an early period of the infection, and burn the parts so gathered; this plan is likewise advantageous, as it improves both the quantity and quality of the crop. The earlier peas and beans are sown, the better chance they stand of escaping this pest; or if a small quantity of quick-lime is sprinkled upon them when they are a few inches high, experience has shown that the plants remain uninjured, while the insect is totally destroyed.

Turnips are subject to several peculiar diseases, and are the food of many noxious insects. On the first appearance of the leaves, a host of little jumping beetles attack and devour them. Danger is also caused by a little weevil which pierces a hole in the cuticle. Watering with lime water is said to check both these evils. Tobacco water is also recommended.

The Hop is also liable to many external and internal diseases; by the first term may be understood injuries caused by insects, while those which belong to the vegetable are internal. When the plant first emerges from the ground, they are infested by a small beetle, vulgarly called the flea. In a more advanced state the tops and branches are devoured by the hop A'phis, better known by the name of the green fly, while at the same time the roots are subject to the attack of the caterpillar of a singular species of moth, named by collectors the ghost. The vegetable diseases incident to the hop are the honey-dew, the mould, the blight, and the fire-blast, all of which take place at different times, though mostly when the plant is full grown.

As a remedy against the insect called the flea (which properly is a beetle of a species closely allied to that which infects young turnips) it is recommended to dust the young plants with pulverized quick-lime, on the first symptom of their being attacked by this insect. The same remedy is recommended against the green fly. Sudden and violent showers of rain, or strong wind, will destroy millions of them, and vast

quantities of them are devoured in England by small birds. The moth or ghost must be destroyed, and may be done by attracting them to a candle and lantern carried over the hop-field at night, when they may be readily destroyed by a person accustomed to catch insects. It is said that this method is frequently adopted in England, and that one active person may clear a large plantation of this moth in a few evenings.

Meadows and Pastures are often destroyed to a very great extent by the larvæ or grub of the cock-chaffer or brown-beetle.

The eggs of this devastator are white, and are deposited in the ground, where they soon change into a soft whitish grub with a red head, and about an inch and a half long. In this state it continues four years, during which time it commits most destructive ravages on the roots, not only of grass, but of all other plants, and potatoes in particular. In some seasons, whole acres of grass land is rendered unproductive; all verdure is lost, and the turf will roll up almost with as much ease as if it had been cut with a spade. The whole of this injury being carried on under ground, admits neither of preventive or palliative measure: but the destruction to be expected from the perfect insect may be prevented. If the dried and withered turf is now removed, the soil underneath will appear turned into a soft mould for an inch in depth, like the bed of a garden; in this will be found the grubs, lying on their backs in a curved position, and vast quantities may be gathered and given to pigs and poultry. When full grown, the larvæ dig in the earth to the almost incredible depth of five or six feet, spin a smooth case, and then change into a chrysalis. In this inactive form they remain until the following spring. The perfect insect then comes from the ground, and commences an immediate attack upon the leaves of all trees. Their numbers are sometimes so immense, that were not the following account fully authenticated, one might doubt its correctness:—

In 1688, the cock-chaffer appeared on the hedges and trees in the county of Galway in clusters of thousands, clinging to each other's backs in the manner of bees when they swarm. During the day they remained quiet, but towards evening the whole were in motion, and the humming noise of their wings seemed like distant drums. Their numbers were so prodigious, that for the square of three miles, they darkened the air; and the noise they made in devouring the leaves was so loud as to have been compared to the distant sawing of timber. In a very short time the leaves of all the trees for many miles were destroyed, leaving the whole country, in the middle of summer, as naked and desolate as it would have been in winter. Swine and poultry devoured them in vast quantities; they waited under the trees for the clusters dropping, and became fat upon this unusual food; even the lower orders of the people, from these insects having eaten up the produce of the earth, adopted a mode of dressing them, and using them as food. Towards the end of summer they are said to have suddenly disappeared, and we have no account of their having been seen in any considerable numbers the following year.—*Philosophical Transactions.*

This account is introduced in order to show that insects may appear occasionally in prodigious numbers in a district or country; and having remained for a season or more, may again disappear altogether as unaccountably as was their first appearance. It is to be hoped that the wheat-fly may leave us in the same manner, as no remedy against their ravages is at present in the power of man.

Cabbages, fruit, and forest-trees are subject to be injured by caterpillars, and other insects. The best mode of destroying caterpillars on fruit trees or cabbages, is by hand-picking. Other remedies are recommended, such as dusting the trees with pulverized quick-lime with a hand machine, called a lime-duster. Cabbages may be dusted in the same way. It is also recommended to bore a small hole in the trunk of the apple tree infected with caterpillars, fill it with sulphur, and stop up the hole with a tight plug. It is said that in twelve hours after the sulphur is put into the tree, there will not one caterpillar remain upon it.

The A'phides, or Plant Lice, next to locusts, are the most universal devastators of the vegetable world; almost every plant has its peculiar species; their fecundity is so prodigious, that Reaumur has calculated that in five generations one A'phis may be the progenitor of 5,094,900,000 descendants; and it is supposed that in one year there may be twenty generations! Those which attack the different kinds of grain seldom multiply so fast as to be very injurious; but those peculiar to pulse increase rapidly, and take such possession, that the plants are greatly injured, and frequently destroyed before the seeds are matured; and this often happens without the farmer's knowing the true cause of damage to his crop.

The only check to the multiplying of these insects is that of their being in their larvæ state, the favourite food of sparrows and other small birds, who destroy myriads of them. But the most destructive foe of the plant-louse is the lady-bird or lady-cow (Coccinella) which, in its larvæ state, feeds entirely upon these insects. The application of powdered quick-lime to crops of peas or beans infected with the plant-louse is recommended, or to top off the infected shoots before the insect is greatly multiplied, is also a good plan.

The wire-worm is a name that has been given without discrimination to the larvæ or grubs of various insects, totally different from each other; hence it is, that much confusion and contradiction will be found respecting it in agricultural books. The true wire-worm is the grub of a small beetle (Elater *segetis*), and it derives its name from its slender form, and uncommon hardness. It lives in the larvæ state nearly five years; during which time it is supported by devouring the roots of wheat, rye, barley, oats, and grass, which it attacks indiscriminately, and causes annually a large diminution of produce; it abounds chiefly in new broken-up land, and is particularly destructive to gardens recently converted from pasture land. In the larvæ state it may be decoyed by offering it more tempting food; but no method has yet been devised for destroying the perfect insect. Large premiums are offered in England for the discovery of an effectual remedy against the ravages of the wire-worm.

The Grub is a general name for several larvæ of crane flies, *(Tipulidæ)*, called, by country people in England, long-legs, or gaffer long-legs.

One of the most destructive of these insects to the roots of grass and grain is the Tipula Oleracea. The larvæ burrows among the roots and feeds upon the fibres. In many parts of England it cuts off a large portion of the wheat crop, especially if sown upon clover-lays. It is equally destructive to the wheat crops in Canada. Reaumur says, that sometimes in France, particularly in marshy lands, the grass of whole districts have been so destroyed by it, as not to produce the food necessary for the maintenance of the cattle. No remedy has yet been discovered for this evil, nor is the insect killed by lime, even when

applied in much larger doses than usual.

The operations for destroying insects, or counteracting their injurious effects are various, but it rarely happens that insects can be exterminated by any art of man, even from one district; the numbers may be diminished, but the species will still remain, although in such small numbers that their operations may not be very injurious. Insects may be injured by watering the plants upon which they feed with tobacco or lime-water, or by scattering upon the leaves powdered quick-lime, soot, ashes, barley awns, &c. The smell of tar is particularly offensive to insects, and the effects produced by the fumes of tobacco, sulphur, urine, &c. are well known. Hot water, heated to 120 or 130 degrees will not injure plants, and will destroy insects. The late Sir Joseph Banks recommended placing slices of potatoes or turnips where vermin abounded, as a trap for them; the vermin will collect upon the slices during the night, and by examining them in the morning vast numbers may be destroyed. The slices of potatoes or turnips are put on skewers and buried lightly under the surface of the soil. This is a remedy that cannot often be tried on a large scale in Canada. It might answer very well in gardens, and would compensate for the trouble.

Earth-worms are not injurious to the agriculturist. On the contrary, where they abound, they are highly useful. Without worms, the earth would soon become hard, cold, incapable of receiving moisture, or of giving nourishment to roots; they are in fact great promoters to vegetation, by boring, perforating, and loosening the soil beneath, and by manuring it above with their excrement, which is thrown up into lumps called worm casts.

The foregoing article on "Insects injurious to Agriculture," has been selected, in a great measure, from several authors who have written on the subject, particularly Kirby, and London. Within the last three or four years, insects and their larvæ, have become more than usual injurious to Canadian farmers; and this year particularly so. It is very probable that insects may also be the cause of producing the dry-rot in seed potatoes, because we have found the decayed seed full of small maggots. There is, fortunately, a remedy for the dry-rot, in planting whole potatoes that are sound; but against the wheat insect there is none certain, except in the interposition of a good Providence to remove the plague altogether from our country.

AGRICULTURAL SOCIETIES.

It has been lately proposed in England to form "A National Agricultural Institution," to be established in London, and to comprise a complete Agricultural Library, a museum for specimens of seeds, plants, &c., for models of implements; and, in all cases where it can be effected, for the implements and machines themselves, together with the means of trying them; to engage the superintendance of men eminent in the respective branches of science; to collect reports on foreign agriculture; to correspond with other societies both at home and abroad; to refer, as in the French Institution, and the British Association, papers or professed discoveries of acknowledged importance; to select committees to investigate and report; to amass statistical information interesting to agriculture; to offer premiums for inventions, bearing some proportionate value to the expenses to be incurred; or, in certain cases, defraying the cost of experiments, observations, and reports—a course pursued by the British Association; and, above all, to communicate to the agricul-

tural classes throughout the Kingdom, by means of cheap publications, all matters of moment, which shall have been submitted to competent authorities of the Society, and which shall have stood the test of fair, rigid, and impartial experiment.

It was expected that the resident yeomanry throughout England, who would be induced to contribute their assistance, both by subscription and experience, and who, by adopting various proposed improvements, would, as it were, convert the district, containing probably many varieties of soils, and different modes of culture, into a large experimental farm.

Mr. Handly, M. P., in a letter to Earl Spencer, says, "What has been the course adopted by our enterprizing manufacturers? Had they been satisfied with the inventions which chance, or the intelligence of their artisans might have discovered, in vain would they have struggled for the proud ascendancy which they now hold in the scale of the manufacturing world. How truly has it been said, that a Manchester manufacturer, who has been absent from England for the last seven years, would be ruined, if on his return now, he endeavoured, with his former processes, to compete with the almost daily improvements of his indefatigable and intelligent rivals. How many thousand acres of land would the bleaching operations of Manchester alone require, what enormous capital would lie stretched for weeks unproductive on the sward,—and how impossible would it have been to have completed the accumulated orders from foreign customers, had not chemistry furnished a cheap and rapid substitute? How much of scientific research must have been employed to unite, for the ingenious purposes, the product of all climes, as has been so forcibly demonstrated in the case of the commonest printed calico, which the talented author of a recent pamphlet, observes, 'combines the united products of the four quarters of the earth:—the cotton of America, the indigo of Asia, the gum of Africa, and the madder of Europe, all brought from remote regions to produce a rustic's gown piece!' How widely different——observes Mr. Handley—the picture which agriculture presents! Since the introduction of the turnip as a field-crop, upwards of a century ago, we look in vain for any improved practice that may be viewed as an epoch in the cultivation of the soil; and we are still so far in ignorance that we do not yet know with accuracy in what the food of plants consists.

To what are we to attribute the great comparative pre-eminence of Britain over other countries? Why, most justly, to agriculture and our commercial operations. We, however, consider the former of by far the greatest importance to us, as upon it we are solely dependant for "our very existence—deriving from it, as we do, that without which we could not possibly subsist, and as it is a nation's only true riches. In thus attaching so much importance to that delightful and healthful occupation, in which the farmers of England are so usefully engaged, we are firmly of opinion, that every person will coincide in our observations, for it is well known to all that the greatest importance has been justly attached in all ages of the world, to that sublime (for sublime it may with evident propriety be designated) employment. To such a height, indeed, was this opinion carried at one period of the Christian era, and even anticedent to it, that even the princes and other nobles of the land, in many parts of the known world (especially in Italy, which produced most excellent and philanthropic characters, whose agricultural maxims are deserving of the eulogy and attention of all), person-

ally superintended the farm labours, and even themselves were known to work in the fields, and handle the plough. This very laudable, and, in every respect, praiseworthy regard for agriculture, and those engaged in it, we feel most happy in being enabled to assert, is not obliterated from the nobles of the present age, we finding them taking so much general, and so lively an interest in the welfare and happiness of the tillers of England's soil. 'One good action,' it has been asserted, 'is worth a dozen speeches,' to this truism we beg to attest our humble opinion, and so, in fact, appears to be the opinion of the higher classes."

On the 9th of May a numerous meeting was held at the Free-Mason's Tavern, London, consisting of the first men in England of all shades of political opinions, for the purpose of forming a new Agricultural Society, to be called "The English Agricultural Society," the distinguishing feature of which is the exclusion of politics from its proceedings. The room was crowded to excess with noblemen and gentlemen. The Society was formed, and a committee named to frame rules and regulations for the government of the Society, who were to make their report on the 27th June, to a general meeting of members to meet again on that day at the Free-Mason's Tavern to receive it. Several other Societies have been formed in England lately for the improvement of agriculture in all its branches.

The Yorkshire Agricultural Society encourage the improvement of machinery, in all its departments, as applicable to agriculture, the improvement of ploughing and other agricultural operations; irrigation, draining, and increasing the fertility of the soil by judicious admixtures; the economical rearing, feeding, and fattening of live stock; and, in a word, all the details of agriculture, and all the means by which the cost of farming can be diminished, and its produce increased, is to be the objects which they will have constantly in view. The competitors for premiums for well cultivated farms, must be prepared to show in writing, to the judges who may be appointed to decide these premiums, the quality of the soil, the mode of cultivation adopted for the last five years, detailing the course of crops, and description of manure applied, the estimated amount in bushels of the corn crops, the estimated weight of the green crops, and the details of any peculiar improvement which have brought the land to its present state of fertility.

The tenant who, within the last five years, shall have drained in the most effectual, judicious, and economical manner, the largest quantity of land in proportion to his occupation. The claimants shall detail the expenses incurred. For a detailed report of the best mode of cultivation upon which a farm of strong land has been actually managed. Detailed reports of the expenses incurred.

Premiums are offered for a report of the natural history of the wire-worm, and the best means to be adopted to avoid its ravages. Facts of actual experience must be stated as to the manner of checking their ravages. For the invention and improvement of such agricultural implements as may appear to deserve reward; also, for new or improved varieties of agricultural roots, grain, and other seeds, &c.

These details are given in order to show what are the objects of Agricultural Societies in a country where the importance of agriculture is more justly estimated than it is with us, though the English community are not so exclusively dependant upon its produce as the Canadian community are.

Who would expect that the pro-

fitable improvement of Canadian agriculture is to be effected by paying a few premiums at Cattle Shows to some of our most wealthy and favourably circumstanced farmers, who may exhibit choice animals at these shows? General improvement will never be produced by any such means. If the improvement of agriculture is desirable, every county in the Province should have an Agricultural Society established by law; and through these County Societies, information and instruction, on the various branches of husbandry, might be conveyed to every parish in the counties, by means of Parish Committees, composed of the most intelligent farmers in each parish, chosen by the parishioners. The useful education of the people, and the improvement of our agriculture are of infinitely more consequence to the inhabitants of Canada, than all these political matters that have distracted the country for many years past; and the Canadian community have suffered more injury a thousand fold, from the want of education, and the due improvement of agriculture, than from all the grievances that they were ever subjected to from the government. The general and profitable improvement of agriculture cannot be accomplished, without the education of the agricultural class; but education and agricultural improvement may proceed very well together. The annual production from our occupied lands, might easily and certainly be augmented to double what it is now, by better draining, better ploughing, and more judicious management.

There is perhaps 4,000,000 acres of land in cultivation at present in Upper and Lower Canada. On the most moderate estimate, this land might be made to yield a produce that would be worth five or six dollars per acre annually more than it does now. This would augment the annual agricultural produce of the Canadas £6,000,000. How greatly beneficial would such an increase prove to this community? How much it would enlarge the means of enjoyment to the agricultural class, enable them to extend the cultivation and improvement of waste land, the produce from which would still more augment the general resources of the country. The merchant, the manufacturer, indeed every portion of the Canadian community must profit by a large production annually created here, that was not previously in existence. This estimate of the possible increase of production is not made without due consideration, and any competent farmer that has seen much of the Canadas, must be convinced that the estimate is not over what it ought to be.

If the due improvement of our agriculture would be capable of producing the favourable results we have stated, unquestionably it must be a matter of paramount importance to produce this improvement if possible. The education of the people is the first step towards it. But as this will require many years to make it general, there are other means that might be adapted immediately, that would have a very beneficial influence.

In the British Isles, the extensive landed proprietors are sufficiently interested in the prosperity of agriculture to provide for its improvement. Here it is different. We have no extensive landed proprietors that can feel the same interest in the prosperity of agriculture that is felt in England by the same class, because there income from land here does not depend upon whether the occupiers or cultivators of land obtains a large or a small produce from it. We therefore require the interposition of the government to offer encouragement for the improvement of Canadian agriculture, or we need not hope to

see it much improved in our time. This might be effected without any great expenditure, and with a certain prospect of the expenditure being amply refunded, by the vastly augmented means of the people to purchase and consume taxable commodities.

The well instructed farmer, cultivating his own estate, for his own profit, cannot require pecuniary rewards from public funds to encourage him to do that which he is convinced it is his interest to do. He finds sufficient reward in the large produce he obtains from his lands by his agricultural skill and good management, over what his uninstructed neighbour can raise, from, perhaps, the very same sort of soil. Honorary rewards should satisfy those who have been so fortunate as to acquire a knowledge of their profession in the British Isles, where the science and practice of agriculture is certainly better understood than in any other country on earth. It is for the uninstructed farmer that it is necessary to provide instruction and encouragement, and we submit that it would be a necessary and expedient application of a portion of the public funds to provide this instruction and encouragement throughout the Canadas.

It may be the opinion of many that this matter might very safely be left in the hands of the agricultural class, without the interference of the Government; and that to appropriate a sum of money to be distributed by Agricultural Societies, where they may happen to be organized, would be all that the Government need or ought to do. This plan has been already tried, and we have sufficient proof throughout the country of its failure, even where Agricultural Societies have been formed. In more than half the counties of Lower Canada an Agricultural Society never was formed, though money was appropriated for each county, and was left for several years unexpended, and ultimately was paid back to the Receiver-General. From past experience, therefore, we may be convinced, that more effectual measures must be adopted in future for the general improvement of our agriculture, if improvement is desirable.

We have already stated the necessity that exists for the judicious education of the rural population; and we may hope that forty or fifty years hence almost every landed proprietor and farmer in the Canadas, will have received a sufficient education. When that time arrives, the improvement of husbandry may be left altogether in the hands of the Agriculturists. For the present, however, something is required to be done, or the produce from the cultivated lands of Canada will be diminished every year, and in a few years they will become so exhausted that it will be difficult to restore them to their primitive fertility. It is possible that a large portion of these lands may, from this cause, be sold, and get into other hands that will manage them better than their present owners. This is a result that, for sake of the present inhabitants, is to be deplored, but cannot be averted, unless a better and more judicious system of agricultural management is adopted without delay. How this may be effectually introduced is the question.

The organization of a General Board of Agriculture in each Province would, we feel convinced, produce much good, provided the Board was composed of men who understood the theory and practice of agriculture, and who would not be influenced by any other motives than a sincere desire to promote the general improvement of agriculture, and the prosperity of the country. The following outline of a plan for organizing such a Board, was suggested to the author, by having seen a report

made by the Committee on Agriculture for the State of New York, assembled in Albany in February last.

There shall be organized a Provincial Board of Agriculture to consist of three or five members, who shall be appointed by the Governor, and shall hold their office, for at least five years, and shall receive, while necessarily employed in the duties of their office, the same compensation as Members of the House of Assembly did receive. They may choose a Secretary, if deemed necessary; and shall hold quarterly meetings in Lower Canada, at Quebec and Montreal alternately; and may also meet at such other times and places as may be found expedient to fulfil the duties enjoined upon them by their office.

There shall be assigned for the meetings of the said Board of Agriculture, and as a museum for models, geological specimens, and agricultural productions, suitable apartments, both in Quebec and Montreal; which museum shall be kept in order by the Secretary, or by some person appointed by the Board, and shall at all time be open and accessible to the public without charge.

It shall be the duty of the Provincial Board of Agriculture to examine all reports and returns made by the Presidents of the County Agricultural Societies, and Boards of Agriculture; to select for publication such of them, and such other essays as they may judge advisable; and shall annually publish a volume, to be distributed in the several counties of the Province by the County Agricultural Societies. And they shall examine, when in session, and determine by practical experiment on the merits of all new farm implements or machinery offered for their examination, and they may award discretionary premiums upon all such as may be found truly meritorious and deserving of public patronage, provided the whole amount expended in any one year shall not exceed ——————; and provided further, that no such premium shall be delivered to the person claiming the same until he has deposited with the Board a model of his implement, machine, or improvement.

There shall be deposited in the room assigned to the Board, specimens of choice and rare agricultural productions, models of implements, drawings of choice animals, books, and all other articles which may be presented to the museum, a registry of all which shall be made by the Secretary, and open to the public inspection.

The Board of Agriculture shall report annually to the Governor in the month of January, a statement of their expenditures and of their proceedings during the previous year; and also all matters that they may deem calculated to promote the improvement of agriculture and of domestic industry.

That the Board of Agriculture, constituted as aforesaid, shall have the authority, at their discretion, to award premiums for the production of extraordinary and valuable crops of grain, roots, or any other agricultural or horticultural productions or household manufactures, which, in their view shall, by such encouragement, add to the productive wealth of the country, not exceeding, however, a fixed amount, which shall be placed at their disposal.

The mode of organizing County Agricultural Societies might be as at present, namely, that all subscribers should be members. The members to elect annually such and so many officers as they may deem proper; none of whom should receive any emolument from his office,. It would be the duty of such officers annually to regulate and award premiums on such articles, productions, and improvements as they may deem best

calculated to promote the agricultural and household manufacturing interests of the Province; having especial reference to the nett profits which accrue, or are likely to accrue, from the mode of raising the crop, or the animals, or the fabrication of the articles of household, or Canadian manufacture, with the intention that the rewards shall be given for the most economical or profitable mode of competition.

It should be a part of the duty of the Board of Agriculture to see that judicious rules and regulations should be established by the County Societies in the distribution of premiums. And in order to secure public confidence in such Societies, without which their proceedings will be viewed with jealousy and distrust, and produce very little benefit; it would be expedient that the officers annually elected, and the awarding committees, should forego premiums while in office. It would further be necessary to prevent an individual from receiving more than one premium at any anniversary meeting, or more than one premium on the same animal. This would give a wider circulation to premiums and to encouragement. It would also be right to provide, that before any premium shall be paid, the person claiming the same shall deliver in writing, to the President of the Society, an accurate description of the process in preparing the soil, including the quantity and quality of manure applied, in raising the crop, or feeding the animal, as the case may be—the expense and produce of the crop, or increase in value of the animal; with a view of showing accurately the profit of cultivating the crop, or of feeding or fattening the animal.

That the several Presidents of the County Agricultural Societies which may be formed, and who may receive public money to expend, shall annually, in the month of December, transmit all such reports or returns, as they shall be required to demand or receive, to the Secretary of the Provincial Board of Agriculture, together with an abstract of their proceedings, exhibiting a detailed account of the expenditure of all monies which shall come into their hands, and stating to whom and for what purpose paid, with the vouchers there for.

The above is respectfully submitted for consideration. That an urgent necessity exists for the introduction of some new and effectual means to promote the improvement of Canadian agriculture, there can be no doubt. And if His Excellency the Governor General should adopt the means that will produce the required improvement, it will not be the least of the benefits his Lordship will confer on the Canadian community.

It is not by cattle shows that the general improvement of our agriculture will be effected. The Canadian farmer must first be instructed to drain, plough, and clean his land properly, and to crop it judiciously, before he can have a stock of cattle fit to exhibit as a competitior for premiums. Instruction and encouragement should be brought to the most remote log-house in Canada. It is those poor farmers who are settled at a distance from our cities that most require instruction and encouragement. If a portion of the public funds should be granted to advance agricultural improvement, it will be of the greatest consequence that it should be expended in such a manner as to encourage a better system of agricultural management among those who now understand it very imperfectly either in theory or practice; and we humbly conceive that under the superintendence of a Board of Agriculture, this result will most certainly and effectually be attained.

We cannot conclude this article without expressing our surprise and regret that the improvement and

prosperity of Canadian agriculture should appear to be a matter of perfect indifference to the better informed portion of this community generally, with a very few exceptions. —This statement would not be made had we not constant opportunities, during a long residence in Canada, of *knowing* that it is correct. And we make the statement now only to show the necessity that exists for the interference of the Government in this all-important subject, than which no other is of equal consequence to the Canadian people, whether they may think so or not. The matter has been left in the people's own hands a sufficiently long time to have afforded ample opportunity to show some progress in agricultural improvement, and certainly they cannot boast much of what they have effected in that way, or of the exertions that have been used, by any portion of them, to encourage improvement. We would, therefore, most respectfully submit the subject to the consideration of his Excellency the Governor General, and it is with this view that this article has been written. From past experience, we could not hope to attract much attention in any other quarter to a subject, that has been so long neglected by even those who had it in their power to have acted differently.

(To be continued.)

NEW SOUTH WALES AS IT IS.

Honamt Town, October 8, 1837.

My Dear Sir,—I have delayed writing to you thus long in order that I might be able to state facts from personal observation, and give you my *own* opinion upon this country in preference to that of other people, which I find very difficult to come by; and after you have been at infinite pains to collect ideas and experience of others, I have invariably found their statements in direct opposition to my own senses, and in most instances perfectly useless to a new settler, or as they call us, *new chomis*. After a tedious and uninteresting passage, we arrived here on the 6th of December, having sailed from Portsmouth on the 12th of August: my family bore the disagreeables of such a long voyage much better than I anticipated, and all landed in good health and spirits. I was so very fortunate as to meet with a very good mercantile engagement before we left the ship, and where I still continue. I at once took a cottage outside the town with four rooms, kitchen, and garden of about an acre, well stocked with good fruit, but no vegetables, the place having been sometime unoccupied and suffered to run wild. I had the whole dug up for a fallow, after which I undertook to cultivate it myself, rising before daybreak and working hard till breakfast, and after I returned from the office resumed my task daily till dusk, which produced good appetite, sound sleep, and excellent health. The soil is various and not good, requiring much manure, and I have very little to give to it; but my crop of every thing promises well. I keep two goats which supply us with milk, and pigs for bacon and porkers, one of the latter I have killed a week ago, and shall slaughter another in three weeks; as feed is very dear, these pigs cost me eight pence per lb.; but they keep me (at this scarce season of the year) out of the butcher's shop, where I should have to pay 10d. per pound for beef not good, and 8d. per pound for scraggy mutton. As the spring advances meat becomes better and cheaper, and in early summer is most excellent. The farmers confine themselves almost exclusively to grazing sheep and cattle; in consequence cultivation is most shamefully neglected, both as to extent and management. They say money is more easily earned by growing wool

than cultivating grain, turnips, &c., ultimately this evil will produce its own remedy, one step towards which is the great fall of wool in our market. Although turnips succeed admirably when sown in proper season, there is very little stale fed meat produced. I know of nothing that would pay so well, as really good beef would sell in any quantity at this moment to the butchers at 10s. 6d. per stone of 14 lbs., and they would retail it at 10d. to 1s. per lb. Tallow always sells well, and the hides find a good market. Good land is not in abundance in this Island, and you rarely meet with ten acres of equal quality. The black soil is extremely productive of grain, and the sandy soil on the coast produces most delightful potatoes. The bread, potatoes, and mutton in summer are the best I ever eat. It has hitherto been the custom here to grow wheat in successive crops as long as the land will produce any; some land that I have seen has stood this for nearly twenty years, and does not yet appear exhausted; then let it lay in wild oats, and self-sown indigenous grass which they yearly mow and call it hay, frequently selling it for £5, £6, and £7 per ton. Some farmers sow rye grass with barley or oats, which they cut sometimes green, and at others when nearly ripe, or in the milky state, and make into hay. Fallows are very rarely seen. The effect of a summer fallow is astonishing. The farmers sell all hay and straw at the nearest towns, and never take manure in return; you will readily conceive that this system cannot last long; farms to sell and let are plentiful in the market at moderate terms. A good farmer, with a capital of £600 to £1000, would do much better here than at home with three times that capital, that is, if he could be industrious, sober, and economical; dairy farming pays admirably, butter averages from 2s. to 3s. 6d. per lb.; poultry and eggs are always dear. At present this Colony is suffering and is smarting under the severe check given to it by the refusal of Government to give grants of land to emigrants. They must ultimately resort to this system, or the Colony cannot go forward, it must and will retrograde. The whale fishery is a most important branch of trade and a great source of wealth. This season is said to be more than usually productive; if oil maintains its price in Europe it will enrich the speculators. Ordinary clerks need not come to this place to seek employment, the market is over stocked already. Linen-drapers are much wanted, and I imagine a dozen good hands would find instant employment; wages, £40, £50, to £80 a-year, with bed and board; I know one or two instances where a much higher salary is paid to men who thoroughly understand the trade and are good shop-men; idlers, spendthrifts, and drunkards find no encouragement here. Mechanics of all descriptions are here in abundance. What appears to me to be most wanted is the small industrious farmer, such as once existed in England, and could rear a family in industry and decency upon 20 to 40 acres of land. This is a most excellent town, containing from 15,000 to 17,000 inhabitants, it far exceeded my expectations, and considering that 35 years ago the whole was a forest, is really a miracle The harbour, or cove, is spacious and beautiful. The river Derwent from the new wharf to Kangaroo Point, is three miles across. The utmost rise of tide is about five feet at full and change of moon. Fish is scarce, and generally of inferior quality, except crane fish, which is plentiful, good, and reasonable in price. There is not a native singing bird in this Island; quails are abundant and good; kangaroo scarce, dear, and coarse.

Groceries generally of bad quality, and not cheap according to quality, tea, 1s. 6d., coffee, 11d. per lb., both abominable. Sugar, 4d. to 5d., tolerable; loaf sugar, 11d. to 1s.; dried fruit dear and bad. Clothes dear. Shoes good and moderate. House rent much lower than it was a few years ago, I pay £30 per annum, taxes none, unless you think proper to tax yourself by drinking spirits or wine. The police is most efficient, and I believe property and person to be more secure here than in any town of equal magnitude in England; the town is ill supplied with very impure water. Filters very useful; I luckily brought a good one with me, which was a great luxury on the passage, and most useful here. Climate very changeable, but salubrious. We have summer in the valley, and upon Mount Wellington (distant about seven miles to the summit) winter. Wood dear, and not generally a good quality. Coals, Fort-Arthur, delivered at 15s. per ton, sometimes very good, and occasionally very bad; they give very little smoke or flame, burning very much like coke. The Sydney coal are dear, 44s. to 80s. per ton, according to season and supply; they are much like the Newcastle coal, blaze brightly and cake together. Sharks abound on the coast and in the river, some of them of enormous size. I have seen the head of one sufficiently capacious to take in a man at a single gulp. The houses are all covered with shingles, which, from exposure to the weather, become blue, and look quite as handsome as the best slate in England. Servants are of the very worst description, and I am told that assigned servants are preferable to such as have been sent out by the Emigrant Committee. The generality of convicts here are decidedly better off than English labourers: they are well clothed and fed for little work. Slugs rise here innumerable, a horrible scourge to vegetation, and some seasons destroy the crops. I find hot lime a certain cure for this vermin. The turnip-fly, precisely the same insect as you have in England, commits similar ravages upon turnips, and after we are rid of them come the grasshopper, a still more formidable enemy, if the turnips be not well into the rough leaf. During the summer this country is subject to occasional hot winds, a kind of sirocee, which does immense damage to grain and fruit, hundreds of acres of wheat were blighted by one of these winds last January, and it made a clear sweep of such gooseberries, currants, and rasberries as I had not taken the precaution to cover. This was the most severe one that has been experienced in this colony. When exposed to it, it was like facing the atmosphere of a furnace, and really intolerable, fortunately it only lasted a few hours. The prevailing winds here are from the north. In summer we have almost daily four or five hours south wind, or as they call it, the sea breeze, which is most pleasant and refreshing: where I now sit writing this epistle I have a view of a garden close at hand with almond, pear, and plume trees in full blossom, and in the distance, Mount Wellington covered with snow. Here it is warm as your June, and there cold as December. The two extremes not being over four miles distant as the crow flies, and a walk of about seven miles. The valleys abound with beautiful and fragrant flowers, amongst which is the gonguil in full blow; roses, sweet-briar, stocks, and geraniums have been imported, and thrive beautifully. We are ten hours earlier than you: it is now two, P.M., and midnight in London. T.

SYDNEY, NEW SOUTH WALES, MARKET PRICES, OCTOBER 12, 1837.—Wheat has sustained little variation in price; Sydney qualities

are noted: worth 6s. to 8s.; Derwent qualities, 7s. to 9s. 6d., making a general average of 7s. 10½d. per bushel. Fine flour remains at 23s. per 100 lbs.; but in consequence of the great stock of inferior wheat on hand, the price of second flour has been reduced to 15s., and ration flour to 13s. per 100 lbs. Hobart Town wheat is noted at 8s. 3d. to 9s.; Launcestor do. 7s. 9d. to 8s. 3d.; English Barley, 4s. to 5s. 6d.; Cape wheat 57s. per quarter; oats, New South Wales, 3s. 6d. to 4s.; Derwent, 8s. to 9s. per bushel, maize, 3s. 3d. to 3s. 6d.

PRESERVATION OF GRAIN.

The apparatus lately invented by M. Vallery for the preservation of grain, has been examined by a Committee of the French Academy of Sciences, and met with approbation. M. Vallery's objects have been, first, to be able to make a given space contain four times as much corn as it would hold according to the usual method of packing. Secondly, to stir the grain with the most perfect facility without requiring an entrance into the apparatus. Thirdly, to pass a current of air across the mass of corn while it is in motion, and make every grain feel its influence. Fourthly, to preserve the grain from rats, &c., and also from insects. Fifthly, to prevent insects which have been driven out, from returning to the corn. Sixthly, to keep the corn in a perfectly healthy state. Seventhly, to preserve the corn in the dampest periods, and even to dry it when it has been accidentally wet with water. Eighthly, to restore the skin of old corn to such a degree of softness as will make it proper for grinding, by a current of dry air through it; and, lastly, to preserve small as well as large portions with the greatest economy. The apparatus intended by M. Vallery to fulfil these conditions, is a hollow cylinder of wood, turning horizontally on its axis. The grain, when put into it, does not entirely fill the cylinder, that it may likewise turn upon itself. A ventilator with centre fugal force, is placed at one of the extremities, and this ventilator, by aspiring the air contained with the grain in the cylinder, forces the external air through it. The action of the ventilator is combined with the rotation of the cylinder, and the successive movement of all the grain facilitates a thorough action of air into every portion. The ribs of the cylinder are pierced with holes, which not only give entrance to air, but serve as issues for the insects wich are disturbed by the motion of the grain; a light roof of canvass covers the whole, in order to prevent any insects from falling into the apparatus from the roof, when it happens to be at rest. The experiments already made with this machinery have proved its efficacy, and the Committee sum up their conclusions by saying that this moveable, isolated, and ventilated granary, frees the corn from the insects contained in it at the time of stowing it away, entirely shields the grain from after destruction by opposing an insurmountable barrier to fresh insects, prevents fermentation by the current of air which visits every portion, is capable of imparting humidity when it is too dry; and, by making it sufficiently dry, renders it capable of being packed in a smaller space.

HEMP AND FLAX.

In Dorsetshire, hemp is cultivated to some extent in the richest soils, which contain a considerable proportion of sand, and are too light for beans. The land is prepared by ploughing it three times; first, before winter, when it is richly dunged; and next in spring, when it is well harrowed. The direction of the second ploughing is across the former

furrows, whenever it can be conveniently done. The third ploughing is in May, when the ground is laid as level and smooth as possible, by means of the heavy hoe or hack. Two bushels of seed are then sown evenly over it, and slightly harrowed in. A slight rolling of the ground, if it is very loose, finishes the operation. Hemp completely keeps down weeds by the shade of its leaves; and the land, if very richly manured for this crop, is in good order after for any other which may suit it. An acre of good hemp produces 800 lbs. of fibre, a middling crop is 600 lbs., and a poor one, 450 lbs. The chaff of the hemp makes an excellent manure.

In Canada the land cultivated for hemp could not be left in a perfectly flat state as in England; it would require to be ridged up as for any other crop. There can be no doubt that hemp might be grown in perfection in Canada by proper cultivation. It is, however, useless for the farmer to attempt to cultivate it until there are mills erected for dressing and preparing it for exportation. Were he to grow hemp now, when there is not a mill in the Province to separate the fibre from the wood or chaff, the crop would be lost to him. It is matter of astonishment, that there is not so much of public or individual enterprize, or spirit of improvement to be found in Canada as to make the experiment of erecting *even one* mill for the dressing of hemp and flax; though neither the expense or the risk would be very considerable.

Flax is cultivated in some counties in England in the sound deep looms which have been gradually enriched by manuring the precedings crops. If the dung were not thoroughly incorporated in the soil it would make the flax coarse and uneven. The soil must be pulverized to a considerable depth, and must also be free from weeds. Two bushels of seed are sown on the acre. The best seed comes from Riga. The time of sowing in the British Isles is generally about the middle of April. Clover seed is sometimes sown among it, and succeeds very well. It is necessary to hand-weed the crop if any weeds should appear: after the flax and clover cover the ground they will keep down all weeds. The produce on good soil in England is from six to eight bushels of seed, each bushel of which is said to yield one gallon and a half of oil: and from 600 to 900 lbs. of flax fit for spinning. There is very little doubt that flax might be produced in Canada in equal perfection to what it is in the British Isles, by proper cultivation and subsequent good management. The fibre, the oil expressed from the seed, and the oil-cake for the feeding of cattle, would altogether make flax a profitable crop.

The same circumstance that would prevent the cultivation of hemp, namely, the want of dressing machinery, will, in a great degree, be an equal bar to the cultivation of flax. Hand-dressing is too great a waste of labour in such a country as this, and we need not expect to grow much flax until machinery is provided for dressing it. We did expect that before this time the necessary machinery would have been fully prepared for work in the neighbourhood of Montreal. Perhaps if the farmers were to unite and pledge themselves to cultivate sufficient flax to give employment to a mill, that we might, *at least, have one*, very soon in the County of Montreal. If they can have accommodation on these terms, let the blame not attach to them for wanting it.

SPRING TARES OR VETCHES.

In Dorsetshire, farmers have a practice which deserves notice, it is the following:—After the clover is

fed off early by sheep, the land is then ploughed about the end of May, or beginning of June, and sown with rape and spring tares, which give an abundant produce in Autumn, on which the sheep are folded, and the land is thus well prepared for wheat. A bushel of tares or vitches, and two quarts of rape-seed is sown on the acre. The crop is fed off by the beginning of October.

In Canada, land that is ploughed in the fall, intended for summer fallow the next year, might, in spring, be sown with tares and rape-seed that would afford in July, August, and September, a considerable quantity of provender for stock, when the pastures may be very poor. The land might be cleaned off in the latter end of September, manured if necessary, and ploughed and prepared for a spring crop. The tares and rape would not impoverish the soil much, and if they covered the ground well they would effectually prevent the growth of weeds.

This practice might be introduced without any difficulty, and we have no doubt that farmers would find it profitable, provided the tares and rape were sown in time, and fed off judiciously by stock, so as to allow the land to be ploughed and prepared in the fall for the succeeding spring sowing. If tares were sown alone without rape, they might be cut when green, and dried and preserved for winter food for stock. In good weather they might be sufficiently and readily dried to keep perfectly safe. We might thus add very considerably to our stock of winter and summer food for cattle, and at the same time keep our land cleaner, and in higher fertility than we do now, and without any greatly increased expenditure. Such experiments as this will be safe for the farmer, though yet untried in Canada.

ORCHARDS.

A great cause of the degeneracy of orchards is the planting of young trees on the exact spot where the old trees have decayed. Although fruit trees do not require so frequent change as herbaceous plants or shrubs, they no doubt exhaust the soil in the immediate neighbourhood of the stem, as may be observed by examining the roots, which continually spread outwards for nourishment. As a quick hedge will not grow in the bank from which an old hedge has been grubbed up, however rich and mellow the soil may appear, so a tree will not thrive on the spot where another has stood for years, unless the soil be renovated by an abundance of lime or fresh mould. Hence new orchards planted in a good deep soil where none existed before, will produce far more abundant fruit than if the trees had been planted in old orchard grounds; and the principle of change of crop extends to fruit trees as well as to herbs. In the Canadian forest the trees that are produced naturally, decay after they have been at maturity and fall to the ground, and there furnish, in due time, soil to produce new trees. There is nothing taken from the forest tree, as there is from the fruit trees in an orchard; all the leaves that are annually produced fall to the ground, and decay about the roots; and ultimately the tree itself returns to the earth which produced it, and again supplies the soil with almost all the ingredients it had taken from it during the progress of its growth. It is from this cause that forest trees are not found to degenerate in successive generations. The soil is constantly kept up to its original state of fertility, and must constantly be gaining something rather than losing. A tree that is planted by man, and when at maturity is cut down and carried away, the spot that produced it must lose some

of its fertility, and will require a new supply of manure before it will again be fit to produce a tree in the same perfection as the one cut down and carried away.

SAINFOIN.

SAINFOIN does not produce much the first year after it is sown, and consequently many farmers sow hop-clover with it, which, being an annual, gives a produce the first year, and fills the intervals of the sainfoin, which is in perfection the second. The land which has borne sainfoin for some years is not sown again with the same crop till after an interval of ten or twelve years at least.

We have no doubt that in many situations in Canada, suitable soil would be found for producing sainfoin in perfection, and by all the accounts we have of it from countries where it is extensively cultivated, there is not any herbage plant that would be more valuable to the farmer. When shall we see the useful plants of other countries introduced in Canadian agriculture, and experiments fairly made with them to test their suitableness to our soil and climate?

MANGEL WURTZEL.

The following observations on the cultivation, preservation, and use of this root is from an English paper:—

"Those who have not a depth of mould free from couch, and a good supply of manure, had better not attempt the cultivation of mangel. It will grow on soils where swedes will not grow. Mangel improves by keeping. For lambing ewes in the spring it is invaluable, filling them with more milk than turnips would do. It should be drilled or dibbled about one inch deep. Soak the seed till it sprouts. I dibble in single seeds 3½ inches apart, in a hole made by a boy pressing down, by a handle about four feet long, a piece of wood sixteen inches long, and about four feet broad, with three pegs in, seven inches asunder, to make three holes an inch deep, one seed put in each hole, (two if the seed does not appear good) and rake the holes in. When taken up at the latter end of October, strip off every leaf, and throw into furrows, two rows pull up by hand, the other with double-mould-board-plough, with shell-board off. Dig pits two or three feet deep and twelve wide; in these the roots are stacked, and ridged up to the height of ten or twelve feet from the surface of the earth; faggots should be set upright about every two yards in the centre of the pit, and continued to the roof, all along which faggots should lie, by this contrivance the heat is carried off, and rotting prevented; cover up with dry straw or haulm, then cover with mould, allowing a little time for the heat to escape before completely covering the top for winter store."

This mode of preserving mangel may answer very well in England, but it is doubtful if they could be preserved so in Canada.

It was found in process of manufacturing white beet-root for sugar in England, that the sugar could not be extracted from it after the spring months had commenced, and whilst the vegetative process was going on in the roots; but from that period the *fattening* property is *increased*, and continues to increase even up to the middle of the ensuing summer, and if stored in a cool situation, and air and light be excluded, they may be easily kept throughout the succeeding winter. Another beneficial application may be made for fattening pigs by boiling it with a small quantity of meal of linseed, in the proportion of one quart to a cwt., or by further adding meal of corn, &c.

The manufacture of sugar from

beet is said not to succeed well in England, though it is successfully manufactured in France. The difference of climate, or some defect in the process of manufacture, must be the cause. It may be necessary that the beet from which sugar is manufactured should be grown in a warmer climate than England. The Canadian climate probably is suitable for producing beet that will yield sugar in profitable proportion.

We have seen several samples of raw and refined beet sugar of most excellent quality, with Mr. Robert Handyside, who lately visited the beet sugar manufactories at Aris, in France, and obtained the samples on the spot. Mr. Handyside's report is most favourable of the complete success of the manufacture. It was stated to that gentleman that the profits of the farmer who cultivated the beet, and of the manufacturer who extracted the sugar from it, was amply satisfactory.

The beet, after the sugar has been extracted, affords excellent food for the feeding of stock, and the manure made by this stock greatly contributes to keeping up the fertility of the soil in which the beet is cultivated.

It would be well to make a fair experiment of this manufacture in Lower Canada, particularly if we are unsuccessful in growing wheat. It would afford employment for labour —it would be occupying some of our soil with a green crop that is always necessary to be cultivated in a good system of husbandry—it would give us a home manufactured article of indispensable necessity—and it would leave us an excellent food for feeding cattle, an object of great importance to the Canadian farmer. To attain all these advantages would be of some consequence to us, and we should endeavour to ascertain whether it is possible for us to have them. An experiment might be made without incurring any great risk or large expenditure.

The agricultural class in Canada will have to exert themselves, if they desire to be prosperous, and attain to that rank in this community which they ought to hold. There is nothing to prevent their prosperity, their respectability, and their influence in society, if they will only make a proper use of the advantages that are in their power.

FROM ROGET'S BRIDGEWATER TREATISE.

As the art of the husbandman is exercised chiefly to procure sustenance and comfort for the human body, and to afford pleasure and delight to the senses, it would be perfectly reasonable that he should desire to know as much as possible of this wonderful machine, the human body, for which his whole temporal care, while living, is occupied. It was not intended to devote this work *exclusively* to subjects connected with agricultural improvement. We hope, therefore, that it will not be deemed mis-placed to introduce here a few pages from the work of a highly gifted author, Dr. Roget, "On the Power, Wisdom, and Goodnes of God, as Manifested in the Creation." We have made our selections from the chapter "On the Comparative Physiology of the Nervous System," and that part which refers to the Functions of the Brain—Perception of Animals—the Sensorial Functions—and Intellectual Faculties of Man.

"Physiologists have in all ages sought for an elucidation of the functions of the brain by the accurate examination of its structure, which evidently consists of a congeries of medullary fibres, arranged in the most intricate manner. Great pains have been bestowed in unravelling the tissue of these fibres, in the hope

of discovering some clue to the perplexing labyrinth of its organization; but nearly all that has been learned from the laborious inquiry is that the fibres of the brain are continuous with those which compose the columns of the spinal marrow; that they pass, in their course, through masses of nervous matter, which appear to be analogous to ganglia; and that their remote extremities extend to the surface of the convolutions of the brain and cerebellum, which are composed of a softer and more transparent gray matter, termed the *cortical* or *cineritious substance* of the brain.

It is a remarkable fact, that in vertebrated animals all the organs which are subservient to the sensorial functions are double, those on one side being exactly similar to those on the other. We see this in the eyes, the ears, the limbs, and all the other instruments of voluntary motion; and in like manner the parts of the nervous system which are connected with these functions are all double, and arranged symmetrically on the two sides of the body. The same law of symmetry extends to the brain; every part of that organ which is found on one side is repeated on the other; so that, strictly speaking, we have two brains, as well as two optic nerves and two eyes. But in order that the two sets of fibres may co-operate, and constitute a single organ of sensation, corresponding with our consciousness of individuality, it was necessary that a free communication should be established between the parts on both sides. For this purpose there is provided a set of medullary fibres, passing directly across from one side of the brain to the other; these constitute what are called the *commissures* of the brain.

The question, however, still recurs:—What relation does all this artificial intertexture and accumulation of fibres bear to the mental operations of which we are conscious, such as memory, abstraction, judgment, imagination, volition? Are these localities set apart for our different ideas in the store-house of the cerebral hemispheres, and are they associated by the material channels of communicating fibres? Are the mental phenomena the effects, as was formerly supposed, of a subtle fluid, or *animal spirits*, circulating with great velocity along invisible canals in the nervous substance? or shall we, with Hartley, suppose them to be the results of *vibrations* and *vibratiuncles*, agitating in succession the finer threads of which this mystic web has been constructed? But a little reflection will convince us that these, and all other mechanical hypotheses, which the most fanciful imagination can devise, make not the smallest approach to a solution of the difficulty; for they, in fact, do not touch the real subject to be explained, namely, how the affections of a material substance can be influenced by an immaterial agent. All that we have been able to accomplish has been to trace the impressions from the organ of sense along the communicating nerve to the sensorium; beyond this the clue is lost, and we can follow the process no farther.

The exact locality of the sensorium has been eagerly sought for by physiologists in every age. It would appear, from the results of the most recent enquiries, that it certainly does not extend to the whole mass of the brain, but has its seat more especially in the lower part or basis of that organ. It differs, however, in its locality, in different classes of animals. In man, and the mammalia which approach the nearest to him in their structure, it occupies some part of the region of the medulla-oblongata, probably the spot where most of the nerves of sense are observed to terminate. In the lower animals it is not confined to this re-

gion, but extends to the upper part of the spinal marrow. As we descend to the inferior orders of the animal kingdom, we find it more and more extensively diffused over the spinal marrow; and in the invertebrata the several ganglia appear to be endowed with the sensorial property; but, becoming less and less concentrated in single masses, the character of individuality ceases to attach to the sensorial phenomena; until, in Zoophytes, we shall lose all traces of ganglia and of nervous filaments, and every part appears to possess an inherent power of exciting sensation, as well as performing muscular contraction.

Beyond this point we can derive no farther aid from anatomy, since the intellectual operations of which we are conscious bear no conceivable analogy with any of the configurations or actions of material substance. Although the brain is constructed with evident design, and composed of a number of curiously wrought parts, we are utterly unable to penetrate the intention with which they are formed, or to perceive the slightest correspondence which their configuration can have with the functions they respectively perform.

The map of regions which modern phrenologists have traced on the surface of the head, and which they suppose to have a relation to different faculties and propensities, does not agree either with the natural divisions of the brain or with the metaphysical classifications of mental phenomena. Experiments and pathological observations, however, seem to show that the hemispheres of the brain are the chief instruments by which the intellectual operations are carried on; that the central parts, such as the optic lobes and the medulla oblongata, are those principally concerned in sensation, and that the cerebellum is the chief sensorial agent in voluntary motion.

Of the perceptions of the lower animals, and of the laws which they obey, our knowledge must, of necessity, be extremely imperfect, since it must be derived from a comparison with the results of our own sensitive powers, which may differ very essentially from those of the subjects of our observation. The same kind of organ which, in ourselves, conveys certain definite feelings, may, when modified in other animals, be the source of very different kinds of sensations and perceptions, of which our minds have not the power to form any adequate conception. Many of the qualities of surrounding bodies, which escape our more obtuse senses, may be distinctly perceived, in all their gradations, by particular tribes of animals, furnished with more delicate organs. Many quadrupeds and birds possess power of vision incomparably more extensive than our own; in acuteness of hearing, we are excelled by a great number of animals, and in delicacy of taste and smell, there are few quadrupeds which do not far surpass us. The organ of smell, in particular, is often spread over a vast extent of surface, in a cavity occupying the greatest part of the head; so that the perceptions of this sense must be infinitely diversified.

The wonderful acuteness and power of discrimination which many animals exercise in the discovery and selection of their food, has often suggested the existence of new senses, different from those which we possess, and conveying peculiar and unknown powers of perception. An organ which appears to perform some sensitive function of this kind, has been discovered in a great number of quadrupeds by Jacobson. In the human skeleton there exists a small perforation in the roof of the mouth, just behind the sockets of the incisor teeth, forming a communication with the under and fore part of the nostrils. This canal is perceptible only

in the dried bones; for, in the living body, it is completely closed by the membrane lining the mouth, which sends a prolongation into it; but in quadrupeds this passage is pervious even during life, and is sometimes of considerable width. Jacobson found, on examining this structure with attention, that the canal led to two glandular organs of an oblong shape, and enclosed in cartilagious tubes; each gland has in its centre a cavity which communicates above with the general cavity of the nostrils. These organs lie concealed in a hollow groove within the bone, where they are carefully protected from injury; and they receive a great number of nerves and blood vessels, resembling in this respect the organs of the senses. Their structure is the same in all quadrupeds in which they have been examined; but they are largest in the family of the *Rodentia*, and next in that of the *Ruminantia;* in the horse, they are still very large, but the duct is not pervious; while, in carnivorous quadrupeds, they are on a smaller scale. In *monkeys* they may still be traced, although extremely small, appearing to form a link in the chain of gradation connecting this tribe with the human race in whom every vestige of these organs has disappeared, excepting the aperture in the bones already noticed. Any use that can be attributed to these singularly constructed organs must evidently be quite conjectural. The ample supply of nerves which they receive would indicate their performing some sensitive function; and their situation would point them out as fitting them for the appreciation of objects presented to the mouth to be used as food; hence it is probable that the perceptions they convey have a close affinity with those of smell and taste. * * *

Confining our inquiries, then, to the more intelligible intellectual phenomena displayed by the higher animals, we readily trace a gradation which corresponds with the developement of the central nervous organ, or brain. That the comparison may be fairly made, however, it is necessary to distinguish those actions which are the result of the exercise of the intellectual faculties, from those which are called instinctive, and are referrible to other sources. Innumerable are the occasions in which the actions of animals appear to be guided by a degree of sagacity not derivable from experience, and apparently implying a fore-knowledge of events, which neither experience nor reflection could have led them to anticipate. We cannot sufficiently admire the provident care displayed by nature in the preservation both of the individual and of the species which she has entrusted, not to the slow and uncertain calculations of prudence, but to innate faculties, prompting, by an unerring impulse, to the performance of actions required for those ends. We see animals providing against the approach of winter, the effects of which they have never experienced, and employing various means of defence against enemies they have never seen. The parent consults the welfare of the offspring she is destined never to behold; and the young discovers and pursues without a guide the species of food which is best adapted to its nature. All these unexplained, and, perhaps, inexplainable facts, we must content ourselves with classing under the head of *instinct*, a name which is, in fact, but the expression of our ignorance of the nature of that agency, of which we cannot but admire the ultimate effects, while we search in vain for the efficient cause.

In all the inferior orders of the animal creation, where instincts are multiplied while the indications of intellect are feeble, the organ which performs the office of the brain is comparatively small. The sensitive

existence of these animals appears to be circumscribed within the perceptions of the moment, and their voluntary actions have reference chiefly to objects which are present to the sense. In proportion as the intellectual faculties of animals are multiplied, and embrace a wider sphere, additional magnitude and complication of structure are given to the nervous substance which is the organ of those faculties. The greater the power of combining ideas, and of retaining them in memory, the greater do we find the developement of the cerebral hemispheres. These parts of the brain are comparatively small, as we have seen, in fishes, reptiles, and the greater number of birds; but in the mammalia they are expanded in a degree nearly proportional to the extent of memory, sagacity, and docility. In man, in whom all the faculties of sense and intellect are so harmoniously combined, the brain is not only the largest in size, but beyond all comparison the most complicated in its structure.*

A large brain has been bestowed on man evidently with the design that he should exercise superior powers of intellect; the great distinguishing features of which are the capacity for retaining an immense variety of impressions, and the strength, the extent, and vast range of the associating principle, which combines them into groups, and forms them into abstract ideas. Yet the lower animals also possess their share of memory, and of reason; they are capable of acquiring knowledge from experience; and, on some rare occasions, of devising expedients for accomplishing particular ends. But still this knowledge and these efforts of intellect are confined within very narrow limits; for nature has assigned boundaries to the advancement of the lower animals which they can never pass. If one favoured individual be selected for a special education, some additional share of intelligence may, perhaps, with infinite pains be infused; but the improvement perishes with that individual, and is wholly lost to the race. By far the greater portion of that knowledge which it imports them to possess is the gift of nature, who has wisely implanted such instinctive impulses as are necessary for their preservation. Man, also, is born with instincts, but they are few in number, compared with those of the lower animals; and, unless cultivated and improved by education, would, of themselves, produce but inconsiderable results. That of which the effects are most conspicuous, and which is the foundation of all that is noble and exalted in our nature, is the instinct of *sympathy*. The affections of the lower animals, even between individuals of the same species, are observable only in a few instances; for in general they are indifferent to each others joys or sufferings, and regardless of the treatment experienced by their companions. The attachment, indeed, of the mother to her offspring, as long as its wants and feebleness require her aid and protection, is as powerful in the lower animals, as in the human species; but its duration, in the former case, is confined, even in the most social tribes, to the period of helplessness; and the animal instinct is not succeeded, as in man, by the continued intercourse of affection and kind offices, and those endearing relations of kindred, which are the sources of the purest happiness of human life.

While nature has apparently frowned on the birth of man, and brought him into the world weak, naked, and defenceless, unprovided with the means of subsistence, and exposed on

* All the parts met with in the brain of animals exist also in the brain of man; while several of those found in man are either extremely small, or altogether absent in the brains of the lower animals. Soemmerring has enumerated no less than fifteen material anatomical differences between the human brain and that of the ape.

every side to destruction, she has, in reality, implanted in him the germ of future greatness. The helplessness of the infant calls forth the fostering care and tenderest affections of the mother, and lays the deep foundations of the social union. The latent energies of his mind and body are successively, though slowly, developed. While the vital organs are actively engaged in the execution of their different offices, while the digestive apparatus is exercising its powerful chemistry, while myriads of minute arteries, veins, and absorbents are indefatigable at work in building and modelling this complex frame, the sentient principle is no less assiduously and no less incessantly employed. From the earliest dawn of sensation it is ever busy in arranging, in combining, and in strengthening the impressions it receives. Wonderful as is the formation of the bodily fabric, and difficult as it is to collect its history, still more marvellous is the progressive construction of the human mind, and still more arduous the task of tracing the finer threads which connect the delicate web of its ideas, which fix its fleeting perceptions, and which establish the vast system of its associations, and of following the long series of gradations by which its affections are expanded, purified, and exalted, and the soul prepared for its higher destination in a future stage of existence.

Here, indeed, we perceive a remarkable interruption to that regular gradation which we have traced in all other parts of the animal series; for between man and the most sagacious of the brutes there intervenes an immense chasm, of which we can hardly estimate the magnitude. The functions which are purely vital, and are necessary for even the lowest degree of sensitive existence, are possessed equally by all animals in the distribution of the faculties of mere sensation a greater inequality may be perceived; the intellectual faculties, again, are of a refined and nobler character, and being less essential to animal life, are dealt out by nature with a more sparing and partial hand. Between the two extremities of the scale we find an infinite number of intermediate degrees. The more exalted faculties are possessed exclusively by man, and constitute the source of the immense superiority he enjoys over the brute creation, which so frequently excels him in the perfection of subordinate powers. In strength and swiftness he is surpassed by many quadrupeds. In vain may he wish for the power of flight possessed by the numerous inhabitants of air. He may envy that range of sight which enables the bird to discern from a height at which it is itself invisible to our eyes, the minutest objects on the surface of the earth. He may regret the dullness of his own senses, when he adverts to the exquisite scent of the hound, or the acute hearing of the bat. While the delicate perceptions of the lower animals teach them to seek the food which is salutary, and avoid that which is injurious, man alone seems stinted in his powers of discrimination, and is compelled to gather instruction from a painful and hazardous experience. But if nature has created him thus apparently helpless, and denied him those instincts with which she has so liberally furnished the rest of her offspring, it was only to confer upon him gifts of infinitely higher value. While in acuteness of sense he is surpassed by inferior animals, in the powers of intellect he stands unrivalled. In the fidelity and tenacity with which impressions are retained in his memory, in the facility and strength with which they are associated, in grasp of comprehension, in extent of reasoning, in capacity of progressive improvement, he leaves

all other animals at an immensurable distance behind. He alone enjoys in perfection the gift of utterance; he alone is able to clothe his thoughts in words; in him alone do we find implanted the desire of examining every department of nature, and the power of extending his views beyond the confines of this globe. On him alone have the high privileges been bestowed of recognising and of adoring the power, the wisdom, and the goodness of the Author of the Universe, from whom his being has enanated, to whom he owes all the blessings which attend it, and by whom he has been taught to look forward to brighter skies and to purer and more exalted conditions of existence. Heir to this high destination, man discards all alliance with the beasts that perish; confiding in the assurance that the dissolution of his earthly frame destroys not the germ of immortality which has been implanted within him, and by the developement of which the great scheme of Providence here commenced, will be carried on, in a future state of being, to its final and perfect consummation.

EMIGRATION TO BRITISH NORTH AMERICA.

When the last number of this work was published, we did intend to discuss this subject fully in the present number. Circumstances have since occurred, however, that prevents us from doing as we then proposed. His Excellency the Governor General has lately issued a "Commission of Inquiry for Crown Lands and Emigration," and the Commissioners we believe are now occupied in this inquiry. While the subject is in such competent hands, it would be great presumption in us to offer any opinion. In former publications, particularly the Supplement to our Treatise on Agriculture, we did submit, as an agriculturist, our opinion on the present mode of disposing of the Wild Lands of the Crown, their settlement. &c. What we advanced on that occasion must suffice for the present. We may rest satisfied, that the matter is under consideration with those who will make a wise and judicious report on the subject. For our own part we must say that the Commission we refer to, and the "Commissin of Inquiry on Education," has given us more gratification and more pleasing anticipations for the future happiness and prosperity of Canada, than any act of the Government during our residence in the country. We hope we may be pardoned for thus expressing our satisfaction on these subjects.

EDUCATION.

Education was a subject we proposed to have considered in this number of the Magazine. The same cause which prevents us from offering any observations on Emigration, or the settlement of the Wild Lands, will also prevent our interfering with education for the present. We have already published a small manual on education. The Commissioners that have been appointed are much more competent to do justice to the subject than we could pretend to be. The general and the *judicious* education of the Canadian people, and particularly the agricultural class, will, in a few years hence, produce more beneficial results than any other measure that can be introduced; because the complete success of all other measures will in a great degree depend upon the people being educated properly. To educate the people *properly*, however, would require the establishment of a system very different from any that was heretofore observed in the common schools in Canada, and a very superior class of school-masters to those who

have been generally employed hitherto in the common schools.

APPLICATION OF CAPITAL TO AGRICULTURAL PRODUCTION.

Continued.

We have endeavoured to show the great want there is of additional capital to be employed in the improvement of agriculture, in order to increase its production to what it is capable of. We see no probability that the required additional capital will be furnished by any money-lending establishment at present in Lower Canada. Banking establishments might afford considerable aid to agriculture, but it should be in the way of granting cash credits, as is done by Joint Stock Banks in the British Isles. No other mode of accommodation would be suitable for the farmer.

If we had Offices of Registry, and we may hope to have them soon, there is abundance of unemployed capital in England that might, to a certain extent, be safely and profitably invested in banking in this Province. Banks commencing business with real capital in specie lodged in their vaults, might do as safe and profitable a business with the agricultural class, as with any other class.

If a bank grants a credit, or discounts a bill, they issue their own notes, and receive the full interest on the amount, and for the full time, the accommodation is given. Though their notes should return to them the next day, yet they have received interest for their capital for all the time it is out of their hands. It is by no means probable that any bank entitled to the public confidence, would be called upon constantly to pay their notes in specie the moment they were issued. The people would find it their interest to support the banks, and give circulation to their notes, while they continue to transact business with them. But suppose cash was demanded for their notes soon after they were issued, those who were indebted to the bank should discharge their debts in specie, when there was no bank notes in circulation to pay with, and hence specie must return to the banks. All that is necessary to successful and profitable banking would be, that banks should possess *real* capital when they commence business, and, of course, observe the necessary caution in granting accommodation to their customers.

In commercial transactions in Canada, bills of exchange and promissory notes are passed from the retail shop-keeper to the importing merchant. These bills and notes find their way to the banks. From what funds are these bills and notes ultimately paid? It must be *chiefly* from funds *produced* in Canada, and paid by those who purchase and consume imported goods. And who are the producers? The agricultural class, *chiefly*, for there are no manufacturers. It is clear, then, that the funds for the payment of a large proportion of the bills and notes that are at present discounted at our banks must be derived directly and indirectly from a produce raised or obtained from the lands of Canada. We are not to estimate the benefit which the agricultural class is to commerce and trade, by the amount which they actually purchase of foreign commodities, but by the value of the produce which they raise from their lands and sell. If this produce is large, though the agriculturist may not expend all he can spare on the purchase of foreign commodities, yet he will pay it away for labour to those who will purchase foreign goods. He can only consume a certain portion of it, all that remains will pass into other hands, and increase the general stock of working

capital. The sale and transfer of imported goods, from hand to hand, creates no capital, and can never make funds to pay for imported goods. It is only by the sale of these goods to the *actual consumer*, who has an equivalent to exchange for them, that the *real* funds can be provided. It is from the soil of Canada that these real funds must be chiefly obtained, and to employ capital to produce these funds in abundance, must be beneficial to this community. In an agricultural country that has only a scanty annual produce, the inhabitant must necessarily be poor. They have only the amount which they obtain from their lands to expend for their comfort and enjoyment, and if that amount be small, their comfort and enjoyment must be in proportion.

If these facts be admitted, and we do not see how they can be disputed, it is the agricultural class that must *now* be depended upon for the success of banking, as well as of commerce.

Again: If it be the agricultural class that now produce, in a great measure, the means that must directly and indirectly enable the merchant to make returns for his importations, it must be for the advantage of the merchant, as well as the farmer, that this produce should be abundant and excellent. And if the agricultural class, at present, indirectly supply the means for the payment of bills negociated by others, what would prevent them from being able to pay advances made by banks directly to themselves, particularly when this accommodation would enable them to augment their produce perhaps to a much greater value than the amount of the loan they received.

Gold, silver, or bank notes, are of no value in themselves, but as they afford the means of purchasing things that are valuable. We employ labour with either of them in the improvement and cultivation of a waste piece of land, and we make it produce things that are valuable, and that can never again be annihilated, except so much of it as is consumed in food by those employed in the cultivation and management of the land.

It is thus that real capital is created by the surplus that is obtained from the land over what is consumed in *food* by those who cultivate it, and capital cannot be otherwise created in Canada at present.

In some provinces of the Russian Empire, Loan Companies are established, who grant loans to proprietors of the soil, some at an interest of five, and others at six, per cent, annually. The principle, in some instances, never can be demanded; in others it can, after a lapse of a few years, be demanded in instalments of a certain proportion of the sum advanced. In either cases the proprietor cannot be deprived of his lands. If the interest is allowed to go into arrears, the land can be taken possession of by the Company until the proceeds obtained from it pays up the interest due; the proprietor then gets back his land. It is said that these Loan Companies have produced immense improvement in the countries where they have been established. It cannot fail to be so, when loans are granted on such liberal terms. Land that would remain idle and profitless to its owner for years, for the want of capital to improve and cultivate it, can, by means of a loan of this kind, be at once brought into a productive state, and may remain ever after, yielding a valuable annual product, and be constantly augmenting the gross capital of the country, as well as the capital of the individual.

There may be an objection to this mode of loan, that it brings the borrower into a state of dependance. It is better, however, that he should be in this state, which in reality is not one of dependance, than to be in

poverty, in consequence of the want of capital to improve and cultivate his own estate that is lying waste, and yielding no valuable produce. Let us suppose that previous to his having received a loan he might have been able to raise, from the part of his land in cultivation, an annual produce of two hundred pounds value. After he had received a loan of perhaps two, or three, or five hundred pounds, which he had *judiciously* expended in improving and cultivating his land that had previously been waste; he had raised an annual produce worth five hundred pounds from his estate, would not the circumstances of this man be greatly benefited? Most certainly, and not only himself, but the community to which he belonged would be benefited. When his produce was only two hundred pounds, he had no more to expend upon himself or others. When it was increased, he had five hundred pounds value to expend for his benefit, and that of others.

The increase of the husbandman's produce from the soil constitutes his income, and is much more beneficial to the community to which he belongs, in a country like this, than the increase of the profits of the merchant can be to the same community; because, the increased income of the former consists of a new produce created that was not before in existence, while the increased income of the latter consists of profits made on the purchase and sale of commodities already in existence, and does not increase the produce created for the benefit of all.

We do not make these comparisons with a view to depreciate commerce and trade; on the contrary, no man can estimate them more highly than we do. But our object is to show the true value of prosperous agriculture to this country, which very few appear *willing* to acknowledge, if they properly understand it.

The present banking establishments of Lower Canada have been instituted by commercial men, for their own convenience, and we cannot complain that they should appropriate all the advantages to themselves. We only wish that agriculturists had the same advantages; and it is our desire to prove, that these advantages might be safely and profitably extended to them, under proper regulations of banking. We are aware that, in the British Isles, banking accommodation has been productive of some evil to agriculturists during the last war. It encouraged them to pay high rents for lands, and at the general peace the value of stock and grain was so much reduced, that it brought ruin on thousands of farmers. There is no danger of similar results here. There is no rent to pay, and he must be a very bad farmer, who on cleared land, that is his own estate, will not be able to raise crops, and keep stock, that will repay the expenditure upon them and a fair profit. In England capital is so abundant, that there cannot be any want of it in agriculture. The great landed proprietors will never allow their tenants who occupy their lands to want capital to cultivate and farm them successfully, because the payment of their rents and taxes depend upon their possessing sufficient working capital. Here we have no wealthy class, who are interested in the same way in the prosperity of agriculture, as the English landed proprietors. We have, however, lands that are free from rent and taxes, and these advantages ought to procure us others that are wanting to us, to enable us to make a profitable use of those we do possess.

Our motive in writing this article, was to show first that there is a want of additional capital to be employed in agriculture, to insure its profitable improvement, and next, that there is ample encouragement to introduce capital to be thus employed. We

may have failed in proving satisfactorily the latter proposition to those who have capital to invest. If so, it must be owing to our inability to discuss the subject, and do it justice.

We will conclude for the present by stating, that we confidently hope to see very soon, the class to which we are proud to belong, in the full enjoyment of equal advantages with other classes. And if privileged Banks are established for the convenience and benefit of one class of this community; we trust that similar privileges will be sought, and granted to institutions that may be established for the convenience and benefit of another class—the agricultural—who are, and must be, the chief producers of what constitutes the wealth and resources of the inhabitants of Her Majesties dominions in North America.

As to any danger existing from the political state of the country, to the investing of capital in Canada, we would say there is none. On the contrary, we would confidently hope that this country will shortly be in a more healthy and prosperous state, and more firmly established as a part of the British Empire, than she ever has been hitherto. There are measures about to be adopted, that cannot fail to produce favourable results—results that must convince the inhabitants of these provinces, that their best interests will depend upon their continued connection with Britain.

MISCELLANEOUS ARTICLES.

EXTRACT.

From the Memoir of LUCIEN BONAPARTE, lately published by himself.

"Until my residence in England, there still remained in me a great deal of the old republican, and public liberty appeared to me to be almost incompatible with royalty. But in England I have been convinced that a monarchy really constitutional is requisite for a great people, as much, and more, perhaps, than any other form of government. We see here the best of republics, not in a programme, but in facts and manners. The legislative power wisely divided amongst three authorities, who exercise without obstacle their own prerogatives:—the executive power having all the authority to do good, and not having, and not seeking to do evil. The judiciary power is so completely independent, that the most obscure individual, as well as the richest lord, as the most illustrious or the most humble exile of the continent, reposes equally in security, beneath the guarantee of the jury, that no sacriligious attack can tarnish, and beneath the inviolability of the domicle, that no wretch can violate. The elective chamber, named by eight hundred thousand electors over a population of twenty-five millions, which, without being the universal suffrage, approaches five times nearer to it than we (the French) do, since we ought to have in that proportion more than a million of electors! The chamber of peers, in fine, is accessible to every citizen, and too powerful and too enlightened to yield to the seductions of courts, or the clamors of the multitude. These hereditary magistrates have been for above a century and a half the defenders of the charter, the immortal work of their ancestors, their tutelary supremacy will long continue to be the palladium of British liberties. Provided they never cease to oppose an immoveable resistance to the overflowing torrent of demagogical opinions, that a social overthrow can alone satisfy. Provided they do not abandon their ground to defend themselves feebly against that of their adversaries. Provided they follow always the high state reason which judges, in the first place, of the effect of a new law upon the whole of the con-

stitution, instead of considering solely the absolute perfection of theory, illusory enough sometimes to insinuate into the political body a mortal germ of dissolution, seductive appearance of salutary amelioration. Provided, above all, that they do not arrive, *some day*, even to suffer them to drag in the dirt the patrician togo, or at least cease to have the same respect for it as for the royal mantle and the elective chamber; for, *(if by timidity,)* by indifference, or by a false popularity, to provoke or contribute to the profanation of one of the three fundamental authorities, would that be walking in the road to a wise reform? Would it not rather be completely turning the back upon old England to follow the errors of a democracy without controul?—Would it not be denying that charter, as yet without a rival in the ancient world, and whose vital strength resides in the *equal* independence, the *equal* respectability, the *equal* inviolability of the King, the Lords, and Commons. Nothing is perfect on earth, either in men or in laws. But where, when shall we approach nearer to perfection?"

Lucien Bonaparte, in concluding his first volume, wishes that the French Throne might be surrounded with democratic and aristocratic institutions, wisely balanced;—that is a complete elective representation, and a hereditary magistrature, powerfully conservative. And he believed that a mixed Government so constituted, is the only one where constitutional liberty can live and prosper in the midst of the iniquities and passions inseperable from humanity."

TRADE AND NAVIGATION.

The annual accounts of imports and exports, customs duties, the number and tonnage of vessels, &c. which were recently presented to Parliament by Her Majesty's command, are just printed. We propose to notice the principal points in each.

The first is, "An account of the *imports* of the principal articles of foreign and colonial merchandise, of the consumption of such articles, and of the customs duties received thereon, in the year ended 5th January, 1838, compared with the imports, consumption, and receipts of the preceding year, ended 5th January, 1837." While there is a decrease in the quantity of *coffee* imported, from the British possessions in America and Africa, of 3,600,000 lbs. there is an increase in the imports of this article from India, of 6,000,000 lbs.; so that the total imports of coffee in 1837 exceed those of 1836, by 2,346,193 lbs. There appears an increase, compared with 1837, of 1,500,000 lbs. in the quantity of coffee entered for home consumption. Of *wheat* the imports in 1836 were 168,647 quarters, of which 19,554 quarters were entered for home consumption, and the duty paid was £5603. In 1837, the imports of wheat were 455,828 quarters, of which 232,993 quarters were entered for home consumption; duty paid £303,179. Of the *silk manufactures* of Europe, the following are the quantities imported in the two years:—

	1836. lbs.	1837. lbs.
Silk or satin, plain	65,418	80,735
—— figured or brocaded	71,633	40,215
Gauze, plain	458	1,225
—— striped, figured, or brocaded	14,691	22,063
—— tissue, foulards	15,399	8,164
Crape, plain	3,242	4,696
Velvet, plain	13,405	16,798
—— figured	3,099	1,773

Of bandannoes and other silk handkerchiefs, the manufactures of India, there were imported in 1836, 351,066 pieces; in 1837, 560,398 pieces. There appears to be some diminution in the import of *spirits*. The total imports of 1836, including rum, brandy, and geneva, were 7,486,535 gallons; in 1837, 6,991,730 gallons. Of *sugar*, the imports from the British possessions in America have

decreased, as compared with those of 1836, nearly 300,000 cwt. the gross amount of duty received being increased nearly £300,000; while the imports from our East Indian possessions have largely increased in quantity, those of 1836 being 152,229 cwt. and those of 1837, 296,677 cwt. There is on the total imports of sugar a considerable decrease, however; the quantity in 1836 being 4,649,161 cwt. and in 1837, 4,481,474 cwt. There is a larger quantity entered for home consumption, and the gross duty received in 1837 was £5,270,117, while that of 1836 was only £4,754,958. Of *tea*, the imports in 1836 were 49,307,701 lbs.; in 1837, 36,765,735 lbs. The quantity entered for home consumption in 1836 was 49,841,507 lbs.; in 1837, it was 31,872,516 lbs. The duty in 1836 was £4,728,600; in 1837, £3,319,665. There is an increase in the imports of Cape and French wines, and a still greater decrease in "other sorts," the total decrease being nearly 1,500,000 gallons. Of *cotton*, we need only notice the totals:—Imports in 1836, 406,959,057 lbs.; 1837, 407,268,952 lbs. Entered for home consumption in 1836, 370,951,124 lbs.; in 1837, 378,019,680 lbs.; gross duty received, 1838, £431,398.; in 1837, £451,718.

The *second* of these papers exhibits the exports of foreign and colonial merchandise from the United Kingdom in the years 1836 and 1837.

The *third* is "an account of the (declared value of the) exports of the principal articles of British and Irish produce and manufactures" in the same two years. We subjoin it entire:—

	£	£
Coats and Culm	332 861	431,780
Cotton Manufactures	18,511,692	13,625,464
——Yarn	6,120,366	6,953,467
Earthenware	837,774	558,682
Glass	553,384	474,582
Hardwares and Cutlery	2,271,313	1,458,666
Linen Manufactures	3,645,097	2,613,298
Metals, viz.—Iron and Steel	2,342,674	2,069,865
Metals:—Copper and Brass	£1,072,314	1,181,732
Lead	224,981	156,009
Tin, in Bars, &c.	61,847	76,316
Tin Plates	368,843	347,433
Salt	173,923	192,969
Silk Manufactures	917,822	494,569
Sugar Refined	698,190	602,377
Wool, Sheep's or Lambs'	332,374	190,657
Woollen Manufactures	7,998,044	4,993,313
Total of the foregoing articles.	£46,463,529	36,421,129

The *fourth* exhibits the produce of the customs duties in the United Kingdom in 1836 and 1837. In the former the gross receipt was £23,795,295; the net receipt, £22,887,590. In 1837, the gross receipt was £22,786,908, and the net receipt, £21,943,089. The difference between the gross and net receipts arises chiefly from the drawbacks and bounties on British refined sugar and other articles.

The account No. 5 exhibits the number and tonnage of British and foreign vessels entered inwards and cleared outwards, exclusively of vessels in ballast, and those employed in the coasting trade. Of those belonging to the United Kingdom and its dependencies, there were entered inwards, in 1836, 11,644 ships, of 2,250,173 tonnage; in 1837, 12,252 ships, tonnage 2,346,300. Cleared outwards, 1836, 10,216 ships, of 1,828,501 tonnage; in 1837, 10,614 ships, 1,861,121 tonnage. The totals of all nations entered inwards were, in 1836, 17,603 ships, 3,132,367 tonnage; and in 1837, 18,113 ships, 3,215,829 tonnage. Cleared outwards in 1836, 14,654 ships, 2,495,517 tonnage; in 1837, 15,526 ships 2,578,018 tonnage.

The *sixth* account shows the number and tonnage of vessels employed in the coasting trade of this kingdom. In 1836 there were entered inwards 123,795 ships, 10,337,545 tonnage; in 1837, 128,011 ships, 10,409,370 tonnage. Cleared outwards in 1836, 133,341 ships, 10,762,690 tonnage; in 1837, 138,796 ships, 10,901,187 tonnage.

LIVERPOOL.

PROGRESS OF IMPROVEMENT IN THE TRADE OF LIVERPOOL.

		Vessels.	Tons.
1813 to 1817	inclusive	30,451	3,273,900
1818 „ 1822	„	37,850	4,159,791
1823 „ 1827	„	48,947	5,869,184
1828 „ 1832	„	58,765	7,243,525
1833 „ 1837	„	70,346	8,958,354
		246,362	29,504,754
Increase of			
„ 2d over 1st five years,		7,396 1-24	885,891 1-27
„ 3d „ 2d „		11,097 1-29	1,709,393 1-41
„ 4th „ 3d „		9,818 1-20	1,374,341 1-23
„ 5th „ 4th „		14,581 1-20	1,714,829 1-23

Increase on 25 years. 1812 to 1837, 10,439, or 226 per cent, 1,512,166 or 338 per cent.
1812, entered 4,599 vessels, averaging 97 tons each.
1837, „ 15,033 „ „ 130 „

IMPROVEMENT IN SHEEP.—It is really surprising the improvement that has taken place during the last few years in the management of sheep; and if a farmer of the last generation were to come again, he would be quite at a loss to know how to act, and would, we think, cut but a sorry figure in our day. The first and greatest improvement in the dipping of the sheep in autumn, whereby all the vermin are destroyed, and the poor animals can lie down in quiet without doing as they used to do, namely, by rubbing down the hurdles, or lying down and kicking, and gnawing the greater part of the wool from off their backs. Formerly it was a rare thing on the chalky soils of this country to see a flock of sheep without torn coats, and now it is a rare thing to see any part of the coat torn or displaced. If you go to the fold of a spirited farmer, in this our day, you will perceive one trough with salt for them to lick to keep them healthy, and another trough well supplied with water, and most likely you will perceive a number of other troughs filled with chaff cut entirely from hay; and some proud and high keepers are not content even with this, but they even mix with the said cut hay large quantities of malt dust, pollard, bran, and even oats, peas, beans, barleymeal, and vetches, and every thing else, that can be thought of; and then you see several women, and boys, and even men, pulling up the turnips, and scraping off the dirt, and others busy with a machine cutting them in slices. In the spring also you will find provided for the flocks large pieces of vetches, rye, winter barley, winter oats, trifolium, Italian rye grass, and many other things which the farmer of the last generation never even heard the name of; the last, though not the least, you will find in every village, and in almost every field, rape, the plant so highly extolled by shepherds, and yet so greatly dreaded. It is universally acknowledged, that nothing will thrive a sheep like rape, not even corn, but that its blowing quality is so dangerous that the shepherd and master are both extremely anxious during the time that their sheep have the same for food, and with every care there will be a few losses. It is considered that the cultivation of rape has increased tenfold within these ten years, and the threshers speak in praise of this plant, for they all know that no wheat yields so well as that grown after rape.—*Berks Agricultural Report.*

AGRICULTURE IN SWEDEN.—The entire soil of the kingdom is portioned into divisions called *hemmans*, or small districts of indefinite extent, containing woods, lakes, arable pasture lands. This territorial arrangement is attributed to Sten Sture, although it is probably of Gothic origin, and was applied to the domains of the Crown, of which the peasants were merely the cultivators, and could be removed at pleasure. Some important alterations were introduced by Charles XI., and in 1723 the states decided that the farmers might become proprietors by paying a sum equal to six years' rent. The leaseholders of these royal domains were obliged to contribute, not only to the support of the troops, but of the cler-

gy and civil officers. The whole number of *hemmans* is 65,265, and the average extent nineteen square miles to each; 50,000 of them belong to private individuals, 4,045 are assigned to the army, 359 to the Crown, 374 to the universities and academies, and 27 to hospitals and different public institutions. It rarely happens that a single family possesses an entire division; more frequently it is parcelled out among a great many, in lots scarcely sufficient to accommodate the increasing number of children, to exercise one plough, or pasture a few cows and sheep. In Dalecarlia this process of dismemberment is carried so far, that properties are broken down into fractional parts of acres and roods, not worth two or three rix-dollars, a state of things hostile to all improvement, and the source of much poverty and distress to the country. In consequence, the produce of their scanty harvests was long insufficient for the subsistence of the inhabitants, who were compelled to purchase foreign grain to a considerable extent, and even, in the northern districts, to grind the bark of the fir to eke out the stinted supply of their natural food. Every year it became necessary to import from Dantzic or Holland to the extent of £400,000 sterling. The commercial scale in this respect has of late completely turned in favour of Sweden. Numerous societies have been instituted for the encouragement of agricultural enterprise. Government has zealously seconded the exertions of private individuals; and the King has set a personal example to his subjects, in purchasing experimental farms (particularly that of Engetlofta, near Helsinborg), that he might exhibit the developement of the art on the most approved principles. The nobility, by their fortunate preference of rural pursuits, have also contributed powerfully to the diffusion of the same habits among the inferior orders. Since 1803 upwards of 6000 farms have been created out of large tracts of Crown lands previously lying waste. The result has been of immense value to the agricultural prosperity of Sweden. Instead of depending upon foreign supplies of grain, she affords abundant provision for the inhabitants, and annually exports a considerable surplus. In 1829, the deficient harvest of France was recruited from the produce of Scandinavia; and in 1830 the ports of Malmo, Landscrona, and Wisby alone sent to England 32,500 tons of oats, and 3000 of barley.—*Edinburgh Cabinet Library.*

WINTER IN SCANDINAVIA.—The winters are long and severe, lasting from November to April or May, and sometimes extending their dreary reign over the half of June. Frost and snow commence in November, when the whole earth is enveloped with a white mantel. The lakes and rivers are converted into solid ice. The clouds of vapour sent up by the dashing cataracts return in showers of silvery sand, reflecting in the solar rays all the prismatic hues of the rainbow. The trees and objects in the fields are fringed with hoary ornaments; carriages pass noiselessly over layers of snow in the streets; and the houses, decked in the fantastic embroidery of shining icicles, resemble enchanted palaces. To protect their apartments against this intensity of cold, the inhabitants use stoves, which are ingeniously contrived to diffuse a large degree of heat with a small quantity of fuel. They also fortify their persons with a double or triple supply of apparel, consisting of furs, pelisses, gloves, galoches, jack boots lined with flannel, and other requisites, which extend a Swedish wardrobe to an inconvenient size. In Jamtland and around Tornea, the climate is so rigorous that the lakes sometimes remained congealed during the whole

year; and the natives are obliged to cut their crops green, before they are buried under wreaths of snow. Over all Scandinavia, the dreary season of nature is the most favourable part of the year for the activity for commercial transactions, and the mutual intercourse of the inhabitants. The merchants find a path to distant markets across the solid gulfs, and over hardened snows, which no other process could render accessible. Pleasures and amusements are kept up in constant succession. In the environs of the towns, the plains and borders of the lakes are converted into frozen race-courses, where the elegance and richness of the sledges, the splendour of the harnessing, and the beauty of the horses, fleet as the wind, and making the air resound with the clear tinkling of their little bells, present a scene surpassing in gaiety and animation the more brilliant assemblages that crowd the public promenades in softer climes. Military bands often accompany these lively fêtes; and the contest is occasionally prolonged by torch-light, which gives a picturesque effect to the trains of joyous carriages, moving with great velocity over the whitened fields.

IMPROVEMENT OF TIME.—"Fragments of time, like pieces of money, individually of trifling value, long saved, and well improved, at length amount to great and useful increase. Let the thrifty of time, and desirous of improvement, be persuaded to lose no hour, any more than the covetous of money can be prevailed not to lose any opportunity of saving or accumulating. Let small and select reading be employed, where leisure admits not of larger. Let close and cogent reflection supply the place of deep thought, where that is admissible. Let every hour, and every occurrence, add to the stock of knowledge already acquired. From every lapse of time, however small, and every accident, however uninteresting, let something be learnt—some store laid up for future use."

Many persons will endeavour to excuse themselves for not reading, by telling you "they have not time to read;" but were you able to observe those people constantly, you would probably find that they wasted many hours in the week, in which they were not employed usefully, either for themselves, their families, or for their country. The common excuse that is given, the want of time, for leaving undone any thing we ought to have done, is generally not a sound or a just excuse. Poverty, and other unfavorable circumstances, may prevent many from learning to read in their youth, and all such are precluded from this pleasing and profitable employment all their lives. But for those who have been taught to read when young, if they neglect to improve themselves in after life by reading, it will be rather from the mis-application of time, than from the want of it, that they do not read. Every man and woman that is properly brought up, will in general find through life, sufficient opportunity to perform all the duties of their stations, and spare some time for reading, and obtaining useful and entertaining knowledge. Indeed, without some reading and study, it is difficult to conceive how human beings can have any real enjoyment in this life, or be in a proper state of preparation for the enjoyments of a life of happiness and glory with the angels and saints in a future state of existence.

CROPS, AND PRICES OF AGRICUTURAL PRODUCE IN ENGLAND.

By the latest accounts from England it appears that the prospect of the wheat crop is not flattering. All

other grain crops are said to be good. Apples are reported to be a failure. Pastures not good, and beef and mutton rather a high price in the London markets. We do not think it necessary to state the prices of butcher's meat in the Smithfield market. The reported prices on the 2d of July differ very little from those given in the last number of this Magazine. They are from a farthing to a half-penny per lb. lower for both beef and mutton. The Liverpool prices of grain on the 3d of July was reported as follows :—

	s.	*d.*		*s.*	*d.*
Wheat, per 70 lbs., English White..	10	2	to	10	8
Do. Red....	10	0	—	10	3
Irish White.....	9	2	—	10	2
Do. Red	9	4	—	9	10
Canada	9	8	—	10	0
Foreign in Bond	6	0	—	7	3
Oats, per 45 lbs. Irish.....	2	10	—	3	2
Barley, per 60 lbs., Irish.....	4	6	—	5	0
Beans, per imperial quarter.....	42	0	—	45	0
Peas, do. White Foreign	35	0	—	40	0
Flour, per 280 lbs., English Superfine	52	0	—	57	0
Irish do.	50	0	—	55	0
Seconds do.	42	0	—	46	0
Foreign per brl. in bond.....	25	0	—	30	0
Oatmeal, Irish, per 240 lbs.....	25	0	—	26	6

Hay from.....	0	7	to 0	11	per 20 lbs.
Clover, ...	0	7	— 0	10	do.
Grass, ...	0	1¼	— 0	2¾	do.
Straw-wheat	0	7½	— 0	9	do.
Oats	0	5¾	— 0	6	do.
Potatoes	2	2	— 3	6	per 90 lbs.
Manure	5	0	— 7	0	per ton.

The price of flax in the English market in February last was from £37 10s. to £45 the ton for foreign flax. For. tow, £23 to £27. Hemp from £33 to £35 per ton.

Electoral Saxony wool, from 4s. to 5s. 2d. per lb. Australian, Bohemian, and German wools, 3s. 2d. to 4s. do. second do., 2s. to 3s.; inferior, 1s. 6d. to 2s. German lamb, 2s. to 3s. per lb. Hungarian wool, 2s. to 3s. German and Spanish crop, from 2s. to 3s.

Cattle bones, £5 to £6 per ton. Linseed Cakes, English, per ton, £10 10s.; foreign, £8 to £9. Rape Cakes, foreign, £5 5s. per ton.

FARMING IN THE OLDEN TIME.—From an ancient Latin tract, supposed to have been written about the latter end of the thirteenth century, and which, though chiefly a treatise on law, yet contains many passages relating to rural economy, we learn that husbandry was conducted with more regard to precision than might be thought consistent with the rude habits of the times. It points out the several duties of the steward, the bailiff, and the labourers, from which it appears that even in that age, when education was so rare, the farm accounts on large properties were kept with scrupulous accuracy; and it gives many directions respecting the tillage of land and management of cattle, that are not unapplicable to the practice of the present day. Yet the learned author estimates the possible returns from the soil so low as to inform us that unless an acre of wheat yielded three times the seed sown, the farmer will be a loser, if corn were not unusually dear. His calculation is as follows :—

	s.	*d.*
Three ploughings	1	6
Harrowing.....	0	1
Two bushels of seed.....	1	0
Weeding	0	0½
Reaping.....	0	5
Carrying.....	0	1
	3	1½

which is about the value of six bushels of wheat at the time he wrote, and exclusively of rent, of which nothing is said. But Sir John Cullom and Sir F. M. Eden, who have devoted much attention to the subject, assume the average crop to have been about twelve bushels; and the former remarks, that, "supposing 4s. 6d. to be about the mean price of the quarter of wheat, and fourpence the year's rent of an acre of land, the disproportion between the produce of the land and its rent is almost incredible; and if an acre in general produce only a quarter and a half, or twelve bushels, it would, if the ground was cropped only two years together, give the husbandman thirteen times the rent of his land, one year with another;

a profit which the best farmer in the present state of improved agriculture can rarely reach;" for a very good reason that the rents are generally much higher than they ought to be.

BUTTER AND CHEESE EXPORTED FROM HOLLAND.

Years.	*Butter.*	*Cheese.*
1833....	5,600,000 Dutch lbs.	11,365,000 Dutch lbs.
1834....	5,725,000	13,365,000
1835....	6,370,000	13,700,000
1836....	8,616,000	14,840,000
1837....	9,745,000	17,232,000

There is a vast increase in the shipping and in the exports from Holland since the separation of that country from Belgium. The above is a proof of it. The value of cheese and butter exported annually from Holland cannot be much short of £1,000,000, a very large amount indeed for this description of agricultural produce.

AGRICULTURAL REPORT FOR JUNE AND JULY.

The months of June and July were very favourable to vegetation. Wheat, though generally sown late, advanced rapidly in growth, and at the beginning of July, had a promising appearance, when it was attacked by the fly as it came into ear, and throughout a large portion of the District of Montreal, all that was in ear previous to the 15th of July, is nearly destroyed. There are some fields of wheat that was not fully in ear on the 15th, that have, in a great measure, escaped the fly, and may yield a fair produce, if the season is dry and favourable. There is, however, a considerable risk that the crop of wheat that is so late will be, if it is not already, injured by mildew or rust. Wheat that has grown rapidly, and is at this moment green and luxuriant is very liable to mildew in damp warm weather, or even from heavy dews. It is this risk that will always make late sowing of this grain a precarious experiment for the farmer in Canada. To sow wheat in drills about nine or twelve inches apart, would, we are convinced, be a good plan. It would enable the farmer to keep the crop clean and give a free circulation of air, that, perhaps, would be the means of checking the fly, as well as preventing mildew. Indeed we have no doubt that it would greatly diminish the number of the wheat-fly, and their power to do injury. Of course the land that would have a drilled crop of wheat could not be sown down with grass or clover seeds. This is an experiment that it is our duty to make at the first opportunity.

So long since as 1835, we stated in an Agricultural Report, that there was a species of wheat in England known as the "Cone Rivet, Anti-fly, or German Thickset Wheat," that was proof against the ravages of the fly. It certainly does not show that there is much interest felt in the success and prosperity of agriculture that no exertions have been made to import some of this wheat for seed, though since that period many cargoes of foreign wheat have been imported for consumption here. This circumstance, with many others, proves the necessity that exists, that some effectual measures should be adopted for the better care and encouragement of Canadian agriculture than has hitherto been bestowed upon it.—Our wheat crops have been almost a failure for the last three years, and yet no steps have been taken to introduce a new seed that is reported would be proof against the insect that destroys our wheat. There may be other varieties, also, that on trial might be found to resist the fly better than those we have. The stronger and coarser the ear of wheat, the less liable it will be to injury, as the fly cannot so easily deposit its eggs or larvæ within the glums. Unquestionably it is a matter of some

importance to ascertain whether, by a change of seed, or other means, we can successfully grow wheat in Lower Canada.

Barley has been greatly injured by the wheat-fly, much more so than is suspected. Many ears that appears to have the full number of grains, it will be found on close inspection, that several of these grains are only empty husks, and that the inside or kernel, is destroyed by the larvæ of the fly. We have seen in some fields, many ears entirely destroyed, particularly where the field was sheltered, and had not a free circulation of air. Indeed, we regret to state, that from the injury that barley has sustained this year in many places, we very much fear that it will be as precarious to cultivate as wheat, unless sown at such a time that it will come into ear too early, or too late for the fly, that is, before the 21st of June, or after the 15th of July. After the latter day the danger is past. The fly appears only for the purpose of depositing its eggs; it is only for that it comes into existence, and when it has accomplished that, it is no longer to be found. There is not one to be seen in a field, after the crop gets into that forward state that the grain is not fit to feed its larvæ. While it is in existence, its only employment is to steal up late in the evening from its place of repose or concealment during the day, and deposit its eggs in the ear of wheat or barley, and when this is done, without any further apparent enjoyment of its existence, the insect dies.

We have observed, that the stronger ears of barley are not so much injured by the fly, as the ordinary or smaller ears. Perhaps if there was as much wheat sown this year as usual, the barley would have suffered less. There is no doubt they would have deposited their eggs in the former rather than in the latter, if growing in the same field or neighbourhood. We had satisfactory proof of this in other years.

Rye is not much sown in this neighbourhood. We have been told, that where it is cultivated, it has suffered great injury from the wheat fly this year. We would suppose our information was correct, as the grain is more suitable to receive the eggs or larvæ of the fly, than the grain of barley.

Oats look well where sown on thin lands that are even moderately fertile. They are a useful and certain crop when properly cultivated, and they do not require such careful cultivation as other grain. To drain the land sufficiently, plough it well, and sow in proper time, will insure a good crop, on any soil that is not completely exhausted. There is no crop that is more slovenly cultivated, or done less justice to generally in Lower Canada, than oats. Probably it will be more carefully cultivated, if the farmers find they will have to make use of oat-meal as their food, instead of the flour of wheat. There is a vast difference in the quality and quantity of oat-meal made from early sown oats that ripens perfectly, and that made from late oats, that does not ripen properly or come to maturity.

Peas are generally excellent on suitable soils, so far as we had an opportunity of seeing them. Buckwheat is sown extensively this year, and looks well. If the fall is favourable it will prove to be a good crop.

Indian corn is not much cultivated in this neighbourhood. We would suppose this a favourable year for it.

By the reports we have from the District of Quebec, and from Upper Canada, it does not appear that the crops, in either places, have suffered by the wheat-fly. We may hope, therefore, that the plague is confined chiefly to the District of Montreal and Three Rivers.

There is a report from Hamilton, Upper Canada, that "the wheat is

suffering considerably from the effects of a small worm of about ¾ of an inch long." We believe there must be some mistake. We have never seen a worm of that large size attack wheat in the ear. We fear it is none other but the worm produced from the wheat-fly; the size of which has has not been correctly given.

The late rains have considerably broken down the barley that was nearly ripe, and other grain crops that were heavy. The crops that are so broken down, if in a green state, will never come to the most perfect state of maturity; and the barley that is ripe, or nearly so, it will be difficult to harvest, and impossible to prevent wasting.

Potatoes have partially failed by the dry-rot in the seed, throughout a large section of this district. We have seen some fields where the seed will not be obtained from the crop. Where seed has to be planted a second time the crop is seldom good, very productive, or fit to keep. We have a remedy for this evil in future, that is to plant whole potatoes. The farmer who neglects to do this, and who is disappointed in his crop by dry-rot in the cut seed, can only blame himself. Turnips are, we believe, nearly a total failure. Even on new land that had ashes upon it, the turnip-fly has destroyed the plants as they came up.

Hay has been abundant on all lands that were sufficiently fertile to produce it. Last spring was cold and late, and the provender for cattle was all consumed before the pastures had sufficient feed for the cattle. The consequence was, that the meadows were pastured to the end of May. This checked their growth very considerably, and where the land was not so fertile as to produce a rapid growth after they were preserved, they did not yield a heavy crop of hay. Clay lands that are not properly drained, when they are exposed to the heat of a Canadian summer before they are covered with sufficient grass to save them, becomes hard, and incapable of producing a large crop of hay. It is from these causes that the crop of hay is not so great, generally, as we might expect in such a year as this.

Pastures in favourable situations are good, but on dry exposed lands that were in tillage last year, and left for pasture without grass seed of any kind sown upon them, do not produce much grass for stock, and we could not expect they would with such management. The late rains will improve pastures, and forward the growth of the aftermath on meadows that have been cut.

The dairy produce is abundant, and brings a fair price for the farmer and the purchaser.

Butchers' meat is higher than it generally is at this season of the year. The consumption is larger, and will be likely to increase. The farmer has every reasonable encouragement this year to feed cattle for the market. There is scarcely a doubt that there will be a fair demand for beef and mutton throughout the year.

Apples will not be a plentiful crop. On some orchards there is scarcely any fruit. This is a crop, however, that the farmer does not depend much upon for profit in this country.

Upon the whole, the prospects of the farmer are not so flattering as we were led to hope they would be at the latter end of June, particularly as regards wheat, barley, and potatoes, throughout a large portion of this Province. The other crops are fair, and if we have a favourable harvesting time, we may realize a produce altogether, with the exception of the deficiency of wheat, that will suffice for the consumption of all who have their present residence in Lower Canada. The Canadian market prices will be given in our next.

COTE ST. PAUL, *August* 6, 1838.