TRANSACTIONS

OF THE

BOARD OF AGRICULTURE

AND OF THE

AGRICULTURAL ASSOCIATION

OF

UPPER CANADA.

VOL. IV.

TORONTO:
PRINTED FOR THE BOARD OF AGRICULTURE,
BY THOMPSON & CO.,
1860.

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TO THE HON. JOHN ROSS,

MINISTER OF AGRICULTURE, &c. &c.

SIR,

I have the honor to present to you herewith, in pursuance of the Act of the Legislature for the encouragement of Agriculture, the Transactions of the Board of Agriculture and of the Agricultural Association of Upper Canada, for the year 1859–'60, together with abstracts of the Reports of the County and Township Agricultural Societies for the year 1858.

I have the honor to be,

Sir,

Your most obedient servant,

HUCH C. THOMSON,

Sec. Bd. of Ag.

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Toronto, June, 1860.

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TRANSACTIONS

OF THE

AGRICULTURAL ASSOCIATION,

AND BOARD OF AGRICULTURE

OF UPPER CANADA.

FOURTEENTH YEAR,—1859.

PAPERS OF THE CENTRAL HORTICULTURAL AND AGRICULTURAL CLUB.

[The following papers were originally prepared for and read before the Central Agricultural and Horticultural Club, in Toronto, and were placed by the Committee, with the consent of the authors, at the disposal of the Board of Agriculture. Upon a further examination of these essays, it has been thought that the information and suggestions which they contain are of sufficient value and importance to persons engaged in such pursuits in this Province, as to entitle them to a place in the published Transactions of the Board. One of the writers, we regret to say, is now no more—Mr. Mundie, late of Hamilton—whose loss will be deeply and extensively felt; who commenced in different parts of the Province the laying out and the ornamenting of grounds both of a public and private character; most of which he was spared to bring to a successful and satisfactory completion.]

FIRE-SIDE FARMING.

BY J. H. CHARNOCK, AGRICULTURAL ENGINEER, HAMILTON.

When the great satirist of the day recently represented, with telling irony, the "distressed British Agriculturist" contemplating with a perplexed and troubled air the necessity of providing enlarged storage for his increased crops, and complaining at the same time in the most ill used tone that he never was to be at peace, for that even the boys in the streets insultingly saluted him with "do you bruise your oats yet?" he probably did as much to advance the science of agriculture as all the Ploughing exhibitions of the season. He is the best friend of Agriculturists who keeps steadily before them the necessities and requirements of their occupation, and the means by which to overcome the one, and fulfil the other. We live in struggling times; and every man who desires to improve, or even to maintain his position, be he what he may, has not only to work hard but to think hard, and we may add, to hope hard also. And whilst on the one hand we are not prepared to admit that there is the same amount of mental and bodily wear and tear in the life of the farmer as in that of profes-

sional and business men; we do not on the other, deny that the farmers, of this portion of the Province at least, are an intelligent and industrious body of men; but, at the same time, we may observe that there is such a thing as industry, as well as zeal, which is not according to knowledge; and it is therefore, with the view of endeavoring to stimulate, in some measure, the enlargement of the requisite knowledge that the much abused subject *Fire-side Farming* has been selected for consideration. It has been well said that "all attempts to urge men forward, even in the right path, beyond the measure of their light, must be futile; augment the light and they will follow of their own accord." And this truth applies to all, for it is impossible to compute the ill success with which the attempt is so often made. Faith is not natural to man; he wants to see where he is going, and regards it as most derogatory to his independence to be led with his eyes shut he knows not where. Work is only done satisfactorily where the result is no longer a matter of conjecture, nor the means a matter of mystery; for, if there be no definite perception of either, the result must be in a great measure one of chance and circumstances. A skilful workman must have a ready perception, an accurate eye, and a thorough knowledge of his business. And, moreover, he must not rest satisfied with what he has acquired; but, since the world does not stand still, he must be ever on the watch for improvement, and so keep pace with the times. The mechanic or artizan, who, from his knowledge thus obtained, can comprehend on paper the plans and designs of the Architect or the Inventor so as to carry them out practically, is sure to profit by his knowledge, whilst his fellow-workman, whose ambition does not lead him beyond the securing of his daily wants, will remain a mere human tool, performing by rule of thumb his customary drudgery. A systematic course of training and education is necessary for the attainment of eminence in either science or art; and this necessity is so universally allowed that in no instance, except in agriculture, would any one think of claiming proficiency without such a probation. But it may be asked, of what use is this knowledge to the practical farmer? Adam tilled the ground, in the sweat of his brow, without these acquirements, and ate the fruits thereof—and his successors have done the same ever since,—granted,—but, nevertheless, it may be well to consider for a moment the acquirements which in the present stage of the world and its necessities, are likely to be serviceable to the farmer in his vocation, and spare him some of that sweat and unprofitable toil which are ever the attendants of practical ignorance. And when we speak of acquirements we do not mean that deep and abstruse research which only very few can have either the leisure or opportunity to attain, but such a rudimental acquaintance as shall enable him to think and reason with greater accuracy on the several failures or successes in his practice, and thereby to regulate his subsequent operations; for we believe that even a little learning, instead of being "that dangerous thing" which the poet deprecates, is at all times preferable to either total or prejudiced ignorance. In the first place, then, the intelligent agriculturist will find it no disadvantage to possess such an acquaintance with *Geology* as shall enable him to judge with the greater precision of the quality and capabilities of the soil; and which he will find to be available no less in the selection, than in the cultivation of a farm. A knowledge of chemistry too, so far as to be able to comprehend in what respects it may be applicable to his art, by either teaching him what to avoid or what to adopt, will be no burthen, even should it be of little real use to him—and if it does nothing more, it may induce independent thought and enable him to spend many a leisure hour in the long winter evenings most agreeably, if not profitably, in perusing some of those fascinating little works on the subject which are now within the reach of all.

As a familiar illustration of the way in which both geology and chemistry

may be practically useful in pointing out the why and the wherefore of every-day things; we may refer to Burton ale and Dunstable bonnets—both articles of acknowledged excellence in their way, and well known to all those we are addressing, but who in all probability are not equally conversant with the reasons for their superiority. The Town of Burton is situated on the river Trent, in the centre of a large area of country on the old-red-sand-stone formation; and the Trent, for many miles of its course, flows over a similar character of country. The whole of the land on this formation is of a deep red color, partaking strongly of the colouring matter of the rock on which it rests (the red or peroxide of iron) and it is an established fact, confirmed by the experience of every practical brewer in the kingdom, that the quality of the barley grown on this land, and beneficially affected by the peroxide, is superior to every other, both as regards saccharine matter and its other malting and brewing properties. The water of which the beer is made is also impregnated with the same chemical ingredients in solution, and hence that special quality of malt liquor for which the entire district is celebrated. We must not omit to mention too that the best hops are also grown on the same description of land—in fact it is impossible to produce a fine sample from any other kind of soil—and thus by the aid of science we now know *why* it is that Burton beer possesses the excellence for which it has so long been famous. And now, let us examine the bonnets. The small town of Dunstable stands on an eminence in the middle of a range of chalk hills where the rock coming near the surface renders tha land shallow and of a white appearance from being mixed with the schale of the chalk rock. Now this chalk contains a large proportion of flint and is consequently so strongly impregnated with silicate, the glazing matter of the straw, that the wheat of this district has so highly a glazed stem as to render it peculiarly suitable for straw plait of the best quality, which is made in great abundance throughout the whole of this district. Without pretending to describe with accurary the process which nature adopts in thus fitting the straw grown on this formation for the particular purpose to which it is applied, we may notice as affording perhaps some explanation of that process, that in the art of glazing crockery and china, ground flint is used as the principal ingredient; thus assimilating, we may suppose, the process of art as nearly as may be to that of nature by reducing the silicate of the flint into somewhat of a soluble form in order to its effective application. And thus again, science points out to us why Dunstable enjoys its repute for this article of female dress. Meteorology is also a branch of science that agriculturists should not be ignorant of, for although the generality of farmers are never likely to devote that time and attention to observations which can alone make proficiency, yet a due appreciation of what it teaches will often be found of practical value in guiding their operations. We know, for instance, that the quantity of rain which falls varies very considerably in different countries, and in different districts of the same country. In the midland counties of England the average rain-fall is about 30 inches a year, whilst in the more northern it reaches 40 inches, and in many localities as much as 60 inches a year. With a knowledge, therefore, of these facts, it would be obviously incorrect in practice to drain land in both these districts in the same manner, for in the district with the smaller quantity to be carried off, it would manifestly be unnecessarily expensive to put as many drains in as would be needful for the largest rain-fall, whilst the fewer drains of the drier locality would be manifestly insufficient for the wetter district. In this country the average rain-fall, including snow, greatly exceeds the average of Great Britain in the aggregate; but the number of days on which it rains in the former, are probably 200 out of the 365, whilst in the latter it may not be over 100, and thus in Canada drainage operations, to be scientifically conducted, must be suited to the climate. The usefulness of

meteorological observations may be further illustrated by the demonstration they afford in confirmation of the world-wide fact that Canada is specially suitable for the production of wheat, and to this end we shall quote a passage from a paper on the climate of the British Islands, published a few years ago, in the Journal of the R. A. Society of England. "It is certain" says the writer, "that wheat is an exotic plant, and its cultivation artificial. Thus it differs from the natural grasses, and requires in the British Islands more care in its cultivation than it does in places more naturally fitted for its culture. Wheat requires for its successful cultivation, to the best advantage, a temperature of 54° during the year, and for two months a temperature of 68°. And this, except in very rare years, is never fulfilled in Great Britain; therefore, wheat can never be cultivated here to the same advantage as in warmer climates. A continental climate, too, is more favorable to its cultivation than an insular one; wheat requiring a greater summer heat for the perfection of its seed than any other of the cereal grasses. Wheat will not begin to flower with a less temperature than 57°, and the less moisture in the air, and the less rain falls from that time to harvest, the better for the crops." These conditions are all realized in this country, and hence Canada has carried off the prizes, both in London and Paris, for this agricultural production.

The educated farmer may also, to his other acquirements, add with advantage the sudy of animal and vegetable physiology; for if it teaches him but one fact, that as both have organs of vitality which are constantly affected favorably or prejudicially by the conditions in which they are severally placed, they require to have their sanitary condition attended to in order to their most perfect development, and in order also to prevent him from committing many fatal and unprofitable errors in farm and farm-yard economy. It will show him, as sad experience in the Crimea did, that (to commit so unpardonable an egotism as using my own words, published in the Journal of the R. A. Society of England long before the late war was dreamt of) "it is just as impossible to keep a large army in camp healthy without proper precautionary measures, as it is to grow a crop of turnip without hoeing them." At this day too, and in this free and independent country of ours, it is almost indispensable for the farmer to have such a knowledge of mechanics as shall enable him to judge, upon correct principles, between good or defective implements and machines.

Now, by far too much stress is usually laid on what the world calls *experience*, by which is meant a practical knowledge of all the routine details of farm management, in the ordinary acceptation of the term, and extending to nothing beyond. It is simply the result of continued ocular demonstration; and an *experienced man* is one who has held a particular farm for several years and cultivated it with general merit and success; and such practical knowledge is deemed by the community sufficient to ensure success for all future time If we examine critically in what this experience really consists, we shall find it simply to comprise some talent for minute observation, though necessarily of an imperfect character, a certain degree of accuracy in the external senses, and a full reliance on the mechanical capacity of the body; all of which are acquired by daily habits of active exertion, and without which mere practical skill is not to be secured at all. Qualifications of this nature may undoubtedly, in many instances, fit the farmer for some distinction; but he can never, by such means alone, be enabled to meet the enlarged demands of society, or contend successfully with his neighbour who to all his practice adds and applies those other attainments of which we have spoken "Mere experience, therefore"—as an able authority observes—"can at best only prepare the mind for the subordinate departments of life—for established routine—or for a servile repetition of common experience." And whilst on this branch of our subject we cannot refrain

from enforcing our remarks by a lively picture of a practical man, drawn by the celebrated Burke, in his speech on American taxation, to show the insufficiency of mere experience to qualify a person for new and untried circumstances; and which applies with no less significance now than in the instance to which it had more immediate reference. "Mr. Grenville," says he, was bred to the law, which is in my opinion [in which however we take leave to differ] one of the first and noblest of "human sciences, but it is not apt, except in persons very happily born, to open and to liberalise the mind in the same proportion. Passing from that study he did not go very largely into the world but plunged into business. I mean into the business of office—and the limited and fixed methods and forms established there. Much knowledge is to be had in that line, and there is no knowledge which is not valuable, but it may be truly said that men too much conversant in office have rarely minds of remarkable enlargement.—Their habits of office are apt to give them a turn to think the substance of business not to be much more important than the forms in which it is conducted. These forms are adapted to ordinary occasions; and therefore persons who are nurtured in office do admirably well as long as things go on in their common order; but when the high-roads are broken up, and the waters out—when a new and different scene is opened—and the file affords no precedent—then it is that a greater knowledge of mankind, and a far more extensive comprehension of things is requisite."

As a science then of the very first importance, the systematic cultivation of a farm is based on chemistry—for the relation of chemistry to agriculture has become a conclusive fact. The earth, the air, the water, the animal, and the plant all come within its embrace—are regulated by its laws, and continually exhibit its truths. Geology, as we have shown, must also be studied—for should the farmer, of all men, be ignorant of the raw material of his trade—the origin, formation, and nature of the soil he works! Botany he should also know something about, for it treats of the constitution, the growth and the habits of the plants he cultivates:—whilst the sister science of physiology tells him something of the animal he rears. In fact science cannot longer be despised by the farmer as the mere speculative theory of a few fireside enthusiasts; for he has at length discovered, and allowed its practical utility, and is the more willing to examine further into its suggestions and to employ them wherever and whenever he sees a probability of their being profitable. Many may still look with unreasonable suspicion on what they call theory; but let us ask them, what is true theory but that which will eventually become practice, and what is excellence in practice but that which was first theory? The application of any other than animal power was once despised theory—Railway locomotion was once despised therory—the manuring of land was once theory—and is so yet in a great measure in this country—draining was once mere theory—and each and all were in their turn laughed at as no doubt very fine—very good on paper—but either impracticable, too costly, or the time had not yet come.—If we laugh now, it is at the stupidity of those who could not see what was so obviously advantages for them—who would not eat the good meat put into their mouths, but who persisted in going their own practical way to ruin. Have we none of this school left? or are there still to be found those of the slow and sure—poh! poh! class—who, so far as farming goes, consider all knowledge except what the plough stilts afford as valueless—who still regard the farmer's best acquirements to consist in the cunning handling of a sheep; knowing the capabilities of a horse; the weight of a bullock; and the making of a stack, and a bargain. Thus much for mere practice; which may suffice for those who believe in the stationary tendency of society but happily for the prospects of agriculture in this Province, it has long been fashionable to regard society in

a more progressive light. We might enter more at length into this head of the subject, but we have probably said enough to awaken within the members of this club at least a spirit of emulation and investigation, and, it may be, discontent with things as they are, which will be as bread cast upon the waters—to be found after many days.

To those who, like ourselves, have for the past quarter of a century been intimately associated with agriculture, and been perhaps in some measure instrumental in its progressive advance, the improved practices which now more generally prevail are matters of high satisfaction and of hope — of satisfaction, because in looking back but a few years, we remember the many instances in which ignorance has given place both to the mental culture of the man, and the intelligent cultivation of the land—the darkness that has been made light—and the countless two well-filled ears which have sprung up, instead of the lean and miserable one. We recollect, too, those water-logged, unhealthy, and unprofitable acres that have been converted, as it were by magic, into salubrious or profitable farms, bringing yearly prosperity and renewed energy to their heretofore half-ruined and dejected possessors; and of hope, because in all that has been thus attained, we recognise a sure earnest of what will be progressively accomplished—the two points of past and present given, we can anticipate with greater confidence the third, the future of agricultural science. But some may possibly think these remarks more applicable to the mother country than to this. It would, however, be passing a most unjust and undeserved censure on the intelligent perseverance of the Canadian farmer, to assume that he has little or no participation in the advance which has thus been realized. It may be true that as regards scientific application, agriculture in this Province has not made any very noticeable progress; but it has by no means on this account stood still, for in the adoption of various mechanical appliances, for example, as well as in many field operations, it is at least on a par with its honored parent. And as regards the future, it possesses, as a young country, with a pliant and vigorous mind, one great advantage over the parent — it has less to *unlearn* — fewer and less deep-seated prejudices to be overcome, and is consequently the more willing and able to appreciate and adopt those modern improvements which from time to time become established as advantageous. "There are epochs in the history of the human race," says Lamartine, "when the decayed branches fall from the tree of humanity; and when institutions grown old and exhausted sink and leave space for fresh institutions full of sap, which renew the youth and recast the ideas of a people. Each decadence of effete ideas carries with it an old world, and gives its name to a new order of civilization."

It may be expected that, with reference to one of the greatest improvements of the age in agricultural operations, with which we have been more especially associated, an opportunity like the present would not be permitted to pass without a suitable mention of its numerous advantages. If our own feelings, however, were alone to be considered, the subject of drainage would be dismissed with a mere passing allusion; because, in the first place, unexpected experience shews in this as in other things, that the fact of our being supposed to have a personal interest in its advocacy, is sufficient to raise an opposition and inimical feeling, which are alike prejudicial to the individual and the cause; and in the second place, because, whether unconsciously participating in this feeling, or from not fully understanding the matter in all its bearings, the subject is one which we believe is anything but palatable to the Board of Agriculture; for when by an express resolution they consign the operation to the questionable fosterage of "private enterprize," they virtually set upon it a mark of disapproval. Out of consideration, therefore, for the Board, no less than a regard for our own integrity and singleness of purpose, we shall be as brief as the case

will admit of, in laying before you a few simple facts, in connection with the operation, which will enable you to carry the matter home, and work it out by your own firesides, as a subject which deeply concerns your best interests. It was in the year 1843 (but as yesterday when viewed in retrospect), that we first put into a tangible form, by the issue of a prospectus, for a public company in Yorkshire, the practicability of profitably applying Joint Stock Capital to the purposes of drainage, on an extensive and systematic scale. This first step met with very general approval, and the public attention was thus called to its importance. The attention of the Legislature was also awakened to the subject, and several measures, to facilitate the operation, were brought before Parliament —some of which became law. All of them, however, were more or less ineffectual, until the passing of the Public Drainage Act, with a grant of money by way of loan, simultaneously with the repeal of the English Corn Laws. By this Act, there was not only every needful facility afforded for the proper execution of the work, but the means, on easy terms, were also found for its accomplishment; and the immediate consequence was an impetus to put into practice all that had been said and written about it, and words became deeds in every direction. And, bear in mind that this had been brought about, not by the adventitious advocacy of men in high positions, for that was reserved for subsequent stages of its progress, but by the simple relation of facts and experiments by a few, for the most part unknown men, who had, from circumstances, been enabled to state clearly what had come within their respective personal observations. Such was the activity and demand for the work, that private companies obtained charters, with suitable provisions, to execute works and advance the funds, on security of the improvement; and the result thus far is—for the end is not yet—that within the brief period of the past ten years, an increase of ten bushels per acre of wheat, and other produce in proportion, has been added to the average acreage yield of England and Scotland; from this ten additional bushels, we must deduct *one*, as the annual charge in liquidation of the cost of the works, and we then have as a clear net profit 9 bushels extra average per acre. Now this is no fiction but a tangible and well authenticated reality; and our natural impulse is, with a knowledge of such facts, to ascertain whether by similar means the same satisfactory ends cannot be attained in this country. We say this is a natural enquiry from the premises; and, therefore, let us for a moment consider, and endeavor to estimate the difference it would make to this Province during the next 10 years between remaining contented with the present unprofitable average of 18 bushels per acre, and bringing it up to 28 or 30 bushels—which is the present English average. Now without taking into account the newly-cleared lands on which the operation would at first be more costly than on the older cleared farms, but simply the land under the ordinary routine of husbandry, it will probably be within the mark to assume that 800,000 acres would ere this period, if they are not already, be annually under wheat crops in this Province; if then, by the application of the same means, we can secure the same result as in the mother country, (and knowing something of the operation, we believe the real difference would be greater in this country), a net increase over the present average of 9 bushels per acre at 5s. per bushel, would add £1,800,000 annually to our national and individual prosperity. If some fine morning equally well authenticated news was to arrive from the mineral districts of Lake Superior, that a rich auriferous deposit had been discovered, which needed only to be scratched for, as in Australia, a little below the surface, there would be here as there was there a general rush to the spot, because to acquire ready wealth by picking up the precious metal itself in the lump, appeals at once to the senses of the most ordinarily gifted individual; for however dull a comprehension a man may have, he at once understands this most direct means of acquir-

ing wealth. And yet, although at the present day requiring more appliances, and to do it well more intelligence, the annual result from the earth's surface in a full crop of wheat is practically hardly any less direct in its administration to the comforts of the producer or the necessities of the consumer. Hence in every country, and more especially in one of tender age, where in the nature of things the products of art are very limited compared to those of the soil, this source of primary prosperity—this self-producing and self-fructifying Capital Fund—should be fostered and encouraged by every available means, for every additional bushel of grain that is grown is just so much new and direct wealth, as if it had been dug from the earth in the form of a glittering nugget.

Seeing but little probability that means would be early provided for carrying out the provisions of the act incorporating the General Drainage and Land Improvement Company of Upper Canada, which is already on the Provincial Statute Book, we have endeavored to direct the attention of the Minister of Agriculture to the importance of the subject; and the advantage of adopting, with suitable modifications, the principle of the general acts of the mother country. An assurance has been given that the subject will receive the best consideration of the Government; and it is hardly possible that one pregnant with more beneficial results could engage the solicitous attention of the Legislature. It has been urged as a reason for remaining in *statu quo* with regard to drainage on an extended and systematic scale, that the enormous tracts of primeval forest which remain to be resorted to as the cleared lands become exhausted or unprofitable, render it unnecessary to take any active measures for the improvement of the cleared farms; such reasoning, however, if it be worthy of any regard at all, can amount practically to nothing more convincing than that, so long as there is uncleared land to toil at, the cultivated farms of the Province shall undergo no permanent improvement. It is for those who are interested in seeing the average yield of wheat raised from its present unprofitable standard of 18 bushels, to a remunerative one of 30, to determine whether such opinions as these should prevail to their prejudice and that of the community; for the public are as deeply interested in it as the farmers themselves.

As intimately connected with agricultural progress — as in fact its very life and spirit—the agricultural literature of the day claims more than a cursory glance; for the advance which it has made, both in manner and matter, within our own times, has been in truth the pioneering vanguard of skilled husbandry. Compare, for instance, the *English Farmers' Magazine* of 1800 with that of 1840, and then again with 1856, and one can hardly suppose they had continued to emanate from the same press. Put the *Gardener's Chronicle* of the present day side by side with the *Bell's Messenger* of 20 years ago, *Stephen's Book of the Farm*, and more recently *Morton's Encyclopedia*, with the Youngs and Sinclairs of former times—and then to crown the batch, for there is nothing in former years with which they can be reasonably contrasted, peruse the journals of the Royal Agricultural Society of England, at once the most scientific and practical work on agriculture and all its operations, in the language. Add to these the works on agricultural chemistry before alluded to—not omitting the terse productions of the strop-makers; and the elegant and choice effusions of Hoskin's—and you have a library of useful knowledge and literary acquirement which can hardly be collected on any other single subject. In speaking thus, however, it must not be understood that we undervalue such works as those of Young, Sinclair, Tull, and others of former times—they were for the most part in advance of the practice of the period, and they are more especially serviceable to us as evidencing, by what we see *has* been accomplished since their day, the practicability of attaining the higher standard of excellence, which is *now* contended for.

However bold the opinion may be, or rather however bold in us to express it, we believe that agricultural writers are essentially serviceable to agricultural practitioners:—we believe that a good feeling between thinkers and workers is always of advantage to the latter in every department of action—is especially so in agriculture, and more particularly under its present circumstances. Every one values farm experience, but it is only when it conveys with accuracy agricultural truths to the mind that it is really valuable. Whilst we admit that there are some truths which words may fail to convey to the mind, and which the press is thus unable to communicate, there are others of great importance which can be most perfectly and easily made known; and they are precisely those, as we believe, of which the agricultural mind is most in want — precisely those which require to be pressed upon agriculturists at the present time. Profit is, no doubt, the proper end of farming, and we readily admit that the absence from the mind of the amateur of those truths in farming, which words cannot convey, has generally hindered his attaining it—we readily admit that there is much truth necessary for the attainment of profit of which words are very imperfect, if not altogether incompetent vehicles—but the unprofitableness of book-farming has arisen, not from its fallacies, but from its deficiencies. And whilst with the most practical we would insist on the necessity of an education in the field, we also insist that much truth equally essential to profitable results is to be sought in the study at the fireside. There can surely be no real antagonism between book and field farming—for a knowledge of sound theory cannot supplant, it only explains experience. The theorist does not the less trust his eyes, or any other of his senses, because he knows the cause of what they see or feel—nor does he the less benefit by what they tell him. And even though a knowledge of causes may not always avail to fill the purse, we still plead for its importance, on the ground of its influence on the mind; those interests of the farmer which affect him as a *man* are surely of at least equal importance to those which affect him as a cultivator. We know that to some this kind of reasoning is mere sentimentalism—quite beyond those matter-of-fact considerations which guide "men of business," but we maintain its soundness notwithstanding; and we say that until the generality of farmers acquire the higher mental status which a wider intelligence is alone able to confer, they will be continually committing errors in practice, which always result in loss. We are fully sensible that much practical knowledge, which nothing but actual sight and experience can give, is necessary for successful farm management; but, beside all the practical skill which field-work alone can impart, we are perfectly confident that there is equally valuable and equally necessary truth to be obtained from the works of agricultural writers, and that book-farming, if not based on the whole of Agricultural truth, is grounded upon much which is really necessary to success in the business of farming.

If it be not already commenced, and we might be permitted such a liberty, we would take this opportunity of suggesting in connexion with this club, and for the use of its members, the establishment of a circulating Library of Agricultural books, to consist in the first instance of periodicals, and as the means of the club increase, such standard books as may be thought most suited to our wants. By this means members would have the advantage of reading the best publications at a comparatively trifling expense, and there can be no question that here as elsewhere, the good fruits would soon manifest themselves. The establishment of this club, under the auspices of the Board of Agriculture, was a move in the right direction, and it would be matter for regret if the fullest advantages were not taken of securing all the benefits which combined co-operation for a common cause affords. It has been our good fortune to be a member of some of the largest and best conducted clubs in the mother country, and we

can speak from experience of their prompt and beneficial influence. We have often seen the heretofore easy going blundering farmer attend the meetings of these clubs with all the pompous air of practical experience, and have watched with satisfaction the gradual relinquishment of his prejudices under the inteiligent and truthful expositions of the book-farmer, till at length he could no longer restrain himself, and, to use his own expression, he "would tell his experience" of what he had learnt, and so step by step he was converted from an ignorant stick-in-the-mud into a skilful and observant, if not a scientific, farmer.

Although agriculturists, as a class, are not so readily prompted to exertion by external circumstances and influences, as the mercantile portion of the community, they cannot altogether resist the effects of passing events, nor long remain mere passive spectators of what is going on around them. It might be well, therefore, briefly to refer to some of those more important changes which of late years have tended so materially to improve the condition of this Province, and are in all probability destined to develope its resources more rapidly than may be contemplated by many who are ever slow to appreciate advantages that do not immediately promote their individual interests. Foremost of these changes, in every respect, is the introduction of Railways. But a few years ago farmers were in Spring and Autumn confined by want of passable roads within the limits of their own homesteads—and the difficulty and cost of getting their produce to market, was a serious drawback;—now, however, thanks to the confidence which has been reposed in us, and the resources of the country by capitalists at home, we possess the advantage of railway communication from one end of the Province to the other, or nearly so, with lateral branches that will continue to be multiplied as the growth of the conntry needs. To those who regard this modern mode of locomotion as it deserves to be, and the effect which it must speedily produce on all our industrial pursuits, will see in it an assurance that, with such examples of progress, the farmer cannot long remain behind the times.—As well might he attempt to turn the tides as stay the current of improvement which has set in—he must go with the stream, for if he remain obstinately wedded to the old ruts, he will inevitably be swamped never to rise again, by the great forward movement of the day. Again, a direct communication has recently been opened from the Upper Lakes with Great Britain, and thus another link in the chain of events is being forged, which, whilst it will bind us the more firmly to the mother country, opens to us new prospects, and a fresh stimulus to renewed exertion. One conclusion, as it seems to us, may be drawn in favor of this Province—that if it be profitable to ship directly from Chicago to Liverpool in one bottom, it is obviously more advantageous to do so from Lake Ontario than from Lake Michigan, depending upon the railways to bring down the produce from the interior to the port of shipment. It is very probable that such a system will be the result of the example which has been set; for it is abundantly proved by English experience that railways can, in the carriage of such articles as grain and coal, successfully compete with water transit. And once more, as the crowning point of practical science, we shall probably by this time next year be enabled to send the compliments of the season to "the old folks at home" by electric telegraph—and have the prices of produce and stocks at Mark Lane and the Exchange posted daily, if not hourly, on 'change at Toronto. Then, we ask again, is it possible that, with anything remaining to be done, the farmers can continue to be the only portion of society insensible of or uninfluenced by these achievements of modern progress? There is one other matter which, as it appears to us to have a pretty direct bearing on the interests of agriculture in this Province, we shall take the liberty of referring to, and that is the subject of immigration. If the members of the Legislature and the Canadian press combined, instead of troubling themselves and the community with

the "little Pedlington" perplexities of Grits or Grouts, Rouges and blacks, Browns and whites, would seriously and zealously set about the great work of developing the resources of this "brightest jewel" of British Provinces, we should have a far larger share of the emigrants settle permanently in the country than is now the case. Taking the Reports of the Great Western Railway for 1855 and July, 1856, as our authority, we find that in that year and a half 59,590 emigrants were conveyed upon the line—of this number 52,146 were conveyed the whole length of the railway, out of the country, either from the Suspension Bridge or from Hamilton, leaving only 7804 who remained in the Province. It would, we conceive, be well worth some trouble and equally worthy of ministerial talent, to devise some comprehensive and practical plan by which at least a reasonable proportion of these emigrants should be induced to remain in Canada. There is we know a fashion in these things, and that from various causes the extreme Western States of the Union are the destination of the bulk of the emigrating body; but, we would ask, when this migrating swarm passes through this country to its contemplated resting-place, and we have thus the opportunity of addressing them face to face, would it not be worth an effort to place before them the advantages which this country possesses, and so give them at least the means of judging whether in passing us by they are not in a great measure ignorantly leaving the substance to follow the shadow.—It is with men, in a migrating state, as it is with a swarm of bees—they cannot be driven; but sound the alluring call in their ears, if only of tinkling tin, and they will be induced to settle in the first shelter that is offered them.

And now, if what has been advanced shall tend in any degree to stimulate the ignorant or encourage the more active and intelligent, the task will have been both pleasing and serviceable. At all events it will perhaps be made apparent that fire-side farming, after all, is not a branch of his profession which the agriculturist should altogether neglect; but, on the contrary, if it were more sedulously cultivated, would most essentially promote his best interests; and at this season more especially, which ever brings with it renewed hopes and encouragements, with a train of associations which, however cold and unrelenting externally, cherish warm feelings and evergreen freshness within, we may most fittingly, and with every sincere wish for your prosperity and happiness, urge upon you the pleasurable or profitable habit of home reading and study; for, depend upon it, book-farming and field practice are not incompatible.

And, as there is no occupation under the sun which, to do it effectively and consistently with the wants of the period, comprises within the range of its operations so great an amount of diversity of abilities, so there is none which embraces within its influence so high and honorable a reward for the pains and talents bestowed upon it. There are few who have in a similar degree with the farmer, and with the same facilities of studying it, the book of nature spread out before them; and it depends upon himself whether he remain content to follow in the narrow track of the plough, "whistling as he goes for lack of thought," or to work out the great material and social problem which is entrusted to him; —given—a grateful soil, scientific truths and appliances, bodily strength, and mental vigor;—required—peace and plenty, Christian charity, and enlarged civilization.

CONSERVATION OF TIMBER AND SHADE TREES,

With observations on Planting, both for utility and ornament.

BY WM. MUNDIE, LANDSCAPE GARDENER, HAMILTON.

Trees are a wonderful production of the earth, and although, like many similar wonders, from being exhibited to our view every day, they in a certain measure cease to impress us with much astonishment; yet there is no doubt but that were any persons so placed for the first twenty years of their lives as not to have seen a tree growing, they would be greatly astonished with the first sight of a forest of trees.

Intense curiosity and wonder are often exhibited at the introduction of some minor plants, which may be foreign, or that may not have been already seen by us; yet, although we have a variety of trees exhibited to us every day, any one of which might form a profitable subject of study for at least one year of our lives, to many I am afraid the greater proportion of even these are foreign. The uses of trees, and applications of timber, are also beautifully adapted to the wants of man. A country which might be entirely destitute of trees would certainly be a very miserable place, if at all inhabitable.

We ought, therefore, to consider it a benefit of no ordinary import, (and especially in a new settling country like Canada,) that woods and forests cover so large a portion of the surface of the country. Of the natural productions of the earth, wood being the next essential to water for the use of man, it might naturally be supposed that large portions of the woods and forests with which the country abounds, would be retained and conserved with our utmost care.

National greatness, strength, commerce, wealth, beauty, and comfort to the inhabitants, almost entirely depend on the abundance and quality of the timber which the country produces; and domestically, when the settler has to make his home in the forest, the timber cut from his land supplies him with materials for building houses, fences, and furniture in all its numerous details, also with the (in this country) all important article of fuel. The standing woods form shelter and shade, and partly food for his stock, until he can raise artificial productions for that purpose. Nature having thus provided so great an abundance of this material in almost endless variety, and in the very destruction of which a great source of enrichment recurs to the soil, it is not to be wondered at, that individuals who find such a superabundance for their present wants, and who have to labor hard to clear their land for producing grain and other productions for the use of their families, should become accustomed to consider the wood as an encumbrance, seeing that to a certain extent, the more of the timber they can destroy the more it profits them, and the more their property is enhanced in value.

The cutting down of the timber to a large extent is a necessity which must and may with safety go on for a considerable time to come, but I think it should not be altogether indiscriminate as it has been heretofore. Even already, where we find any very considerable space of the country cleared, it is so thoroughly cleared, that in the cold season of the year it is bleak and barren in appearance, and in the hot season of the year it is burned with the roasting desert heat. A portion of shade trees either left, (or planted where they could not be left,) would obviate all extremes in a great measure. We would have the keen, cutting winds and storms sifted and broken by a succession of the best of barriers. We would have the heat of the sun broken and ameliorated, by the variations in the circulation of the air, from the succession of sun and shade created by those

trees. For stock, I consider three or four trees in a field equal to almost half food in the heat of summer, let alone the beauty of the trees, which enhance the appearance and value of any place very much.

But to return to timber more particularly. Until very recently, the consumption of timber has been only what might be termed moderate, considering the large supply, and has been in a great measure confined to the portions of country which it was desirable should be cleared.

Now, or very recently, a new era in timber consumption and destruction may be said to have commenced. The building and upholding of the various long lines of railroads, with all their equipments, the sudden growth of cities, towns and villages, in consequence of railroads and improvements in the country, and the many new facilities for carrying timber out of the country, by means of railroads and improved water communication, are among the list of consumptions spoken of above.

I have not any means of ascertaining what quantity of the fuel portion of our timber railroads may consume per mile, or on any given space; nor would I attempt to estimate what the aggregate might be, for the whole of the railroads now in operation, or that will be completed soon; but the quantity must be very great.

So far as I am aware, no means have yet been taken to retain or conserve any of our noble forests, either publicly or privately. This subject seems to have been entirely overlooked as yet. Certainly it is important enough to occupy the best considerations of those in power among us, as well as every one who has made this country his home; "all are concerned in it;" a noble provision and patrimony was found, and is partly remaining yet; pity it should be destroyed by neglect; those who come after us may have cause to lament the want of a material which is most essential for national independence, and for national commerce and comfort, in the most extended forms and smallest details.

It is not good argument in favor of the non-consideration of this question, or of the indiscriminate destruction of our forests, for people say that there will be plenty of timber to last our time. If that held good, as well might any one who may have just got enough to eke out an existence, give up exercising all further energy and care. Such a feeling would be very fatal to the progress of a country; but instead of this being the case, we see hundreds and thousands laboring assiduously for posterity, endeavoring to acquire houses, and lands, and titles, &c. So much for private and individual interests in the future of the country or of families. Might not this subject, with very great propriety, be laid hold of and dealt with, some little in advance of absolute necessity. No question could be of more importance; it is no theorem; it is a stern reality, which will soon force itself upon the consideration of every one.

In the fine lands fitted for cultivation, it would be unwise to preserve forests of timber; but there are in many places very fine timber, where the land is not so applicable for cultivation of other crops; in such places large portions of our forests, especially pine, ash, and other hard-woods, used in manufactories, or for ship-building, might with the greatest propriety be set apart and taken care of. It would not cost even the present population a quarter of a cent each per year.

The united voice of the people in behalf of the future greatness of the country and the comfort of those who must inherit it afterwards, if raised in a proper manner, to the legislature—impressing the importance of preserving some of our forests—would no doubt receive that attention which the magnitude of the subject would warrant, even from the following reasons:—

First class clear timber for building and commercial purposes, can only be produced in perfection in dense forests, and from natural sown seeds; all experience goes to prove that transplanting, even when done in the young state of

the trees, in a great measure spoils the timber for many of the most important purposes. In more ways than one nature seems to like her own way of growing fine clear timber. She not only likes to sow it and grow it, but so jealous is she that she likes to prune it also.

Timber trees in their young state require to stand thick on the ground—probably fifty plants for one tree that will come to perfection; these will all grow less or more for some years; by and by a portion begin to get a little in advance of the rest, after which, it is a scramble which will get the most of the pasture, and the most of the room,—the shorter ones pressing to grow up, and the stronger and taller ones growing away from and over them—many of the plants die and decay quite young; and the next weakest and so on, until probably one only stands where fifty stood as spoken of above. Yet, during all this time the weak ones which were overcome, were performing some important offices, viz: the keeping of the large trees pruned of all their under branches before they should form large knots in the timber, and by their shade and shelter—keeping their naked stems partly moist and warm, until the general mass of large trees should close at the top to shade and shelter each other.

Mostly all the now highly cultivated grain and fruit producing countries of Europe, were orignally covered with dense forests of timber; and, doubtless, were in a great measure consumed with as little regard to economy as is going on in this country in the present day, only with this very material difference in their favour, viz: of not having the vast purposes for consuming, nor the incentives to destroy that actuated the people of this country.

During the past hundred years, very large amounts of money and care have been expended in attempting to raise woods and forests, both for timber and shelter, in some of those countries; the success has been varied, but always beneficial to a very great degree; the general features of the country have been much improved and beautified—much amelioration of the climate has arisen from the growth of woods, and much timber for ordinary purposes had been produced. The general produce of the soil, and the cattle, as well as dwellings, are sheltered from bleak, blasting winds, and many otherwise rugged and sterile places have been covered and rendered ornaments to the landscape of the country.

From the manner in which the cultivated land in this country is held and occupied, any large extent of wood is not likely to be planted in one place; but much might be done by way of planting for shelter and shade; every one should plant a few trees, and endeavor to plant them well—of a right sort, and in the right places. Fifty trees well planted and well protected, are worth twice the number carelessly planted.

On this head I have found much misconception. Many ask the question why it is so necessary to make so much preparation for planting forest trees, when they grow so luxuriantly in a natural state in the woods, when there has been no preparation, and when the soil may even be poor.

It is true that every one may see and observe this, but the trees in the forest are in a natural state, and those which we may plant are to a certain extent in an artificial state. The trees in the forests have grown from seeds which fell on the spot where they now grow; and if in their young state the food was scanty, neither were their wants large, and their growth and strength would be exactly adapted to the pasture. As they increased in size the leaves from themselves and other trees, which would be charged with atmospheric stimulants, would enrich the soil and supply their increasing wants.

On the other hand, trees which we may plant are always to a certain extent, and sometimes to a considerable extent, already grown; consequently their wants are immediately large, and if not promptly and properly supplied, either stunting, disease, or perhaps death, will follow.

Although a certain amount of preparation is necessary to insure good growth and health in trees, it does not follow that manuring is to be employed for that purpose. The first requisite, where any extent or breadth of planting is to be done, is to drain the land of all stagnant water, (or otherwise to plant willows and alders) trench or stir and loosen the soil deeply, I say from 18 to 20 inches, all over; get good trees and good roots, plant rather shallow than otherwise, put some littery manure on the surface after finishing, and the work is done. These few simple but effectual directions, if properly followed up, will almost invariably insure success.

Trees almost always succeed best when planted young, and rather small than otherwise; but this cannot well be done except when an enclosure protects them; in all exposed situations, such as in streets, and single trees in fields or around dwellings for shelter and shade, there is a necessity for planting trees of a considerable size, consequently, the places where they are to be planted ought to be well prepared, for the reasons already given.

In the planting of such single trees as I have just mentioned, a space sufficiently broad ought to be prepared, as the thrusting of trees into holes just large enough to hold them, is like placing a man's feet in a tub of mud and water, and then setting him out on the side-walk, that the sun may shine upon him and make him grow; most people know what would ensue in such treatment; so will it be with trees, unless the soil happen to be very porous.

The hard and soft maples, the American weeping and wych elms, the horse-chesnut, the European lime, the birch and beech, the ironwood, and the American plane, are among the most useful of the hardy deciduous trees for shade, as they have all less or more broad spreading or umbrella shaped heads, and a plentiful rich foliage.

Where shelter from cutting winds is wanted, or in planting for ornament around pleasure grounds, the trees above mentioned, ought to be liberally mixed with Norway and Canadian spruce, the balsam fir, the hemlock spruce, the white and red cedars, the juniper, and also with the larger growing deciduous shrubs, finishing with the smaller flowering shrubs on the margin next the lawn and house. In mixed planting, such as is mentioned above, a good many more trees than may ultimately be wanted, ought to be planted; but care should be taken that the trees intended to be permanent, may stand in the right places when the others are taken away. To accomplish this properly, the trees intended to be permanent should first be planted on the ground, and then the others may be planted to fill up existing vacancies temporarily.

When it is desired to produce an effect on any large extent of ground, where it is necessary to pasture stock while the trees are young, the object must be attained by planting in groups and belts, with a few single trees, fencing all in carefully.

The placing of other groups, as also the various trees in the groups, requires careful consideration, in order that any good effect may be produced. A knowledge of the habits, the size, the measure of growth, and the ultimate appearance of the different species of trees is also necessary; this can only be acquired by observation and experience from practice. Theory utterly fails in the performance of these operations when it comes to be tested by practice; but theory is a great assistant when based upon practical knowledge.

Physiology and physiognomy, if I may be allowed to use that term, are the practical gardener's principal monitors; but more especially does physiogomy or appearance enter into all his operations. A skilful practical gardener is able to judge very correctly from appearances presented to him: he can generally tell from the most transient glance, whether his trees, or plants, or crops, are in their proper state of health. A change of appearance which by a novice could

not be observed, often requires the most prompt and immediate action on the part of the gardener.

By some, a practical Gardener may be considered as only well acting a little pantomime in such cases as the following:—

If he is consulted on the health or prosperity of certain trees or plants, or in his selection of trees or plants, generally speaking he can decide by seeing the tree at such distance as he can discern all its parts clearly; but should he be in doubt, or be questioned more closely regarding it, he then will take a branch or twig in his hand, and bringing it nearly close up to his eye, will be able almost in a moment to decide very correctly, as to its health and prospects of doing well. Now, the act of taking hold of the twig of a tree and looking closely into it, will, to some, appear trivial, and as if acting a part for effect, but it is not so; he had learned from observation and experience to judge from appearances, and in performing the act spoken of above, he can at once judge of the state of the subject, and can almost see what is going on within, and in drawing the twig through his fingers, he may be said to feel its *pulse*, as there is more in the feel and touch than can well be described or imagined.

I have mentioned the above in order to impress upon every one who aims at acquiring any proficiency in Horticulture, how necessary it is to observe the productions of nature closely. Any person may see a mass of trees, plants, or vegetables, and admire them as a whole, although as regards their structure, he knows nothing at all. This may be compared to seeing the design and knowing its appearance as a whole, but being ignorant of all its details, there is a perfect inability to put it into practice, so as to have any chance of succeeding.

The location and the nature of the improvements wished for, are the only keys to what is required to be done at each individual place, no specific directions can be given as to arrangement, as the arrangement of every place requires to be different, to suit circumstances. Copying in this line is worse than useless.

Every situation has its peculiarities and associations, all of which want to be considered in making improvements. Many places are entirely marred in their proportions and beauty by the misplacing of some permanent object, such as the House, the Gardens, or the offices, in a wrong locality. Whatever may be done to such places afterwards, is only a series of shifts and attempts to hide and cover up original blunder.

Scarcely any one attempts to build a house of any extent, without first knowing what its accommodations and appearances will be. It is no less necessary to know what is to be done with ground before we begin to expend money on it. Let the most experienced person into the middle of a piece of ground, and he will be very much at sea as to where to begin; nor is it until after a series of trials and corrections, that anything definite can be arrived at. And, after all, the results will generally be crude and unconnected, seldom presenting anything like a harmony of parts as a whole. This is a delicate point for one to speak upon and I shall say but as little upon the subject as possible. However, I think I should be guilty of want of candour, if I did not state that, as a fixed rule, the person who is to lay out ground ought always to be consulted previous to locating any object which will be a fixture. Even the shape and position of the houses and buildings ought, to a certain extent, be fixed by the designer of grounds. This is too little thought of; generally speaking, complete designs of buildings are procured, without any reference to their applicability to the nature of the ground or situation, and sometimes entirely executed before the ground has received a thought. Disappointment is sure to be the result.

The principal purpose of what I have advanced in this paper, is more to induce a general attention to the subject, (than to enter into minute details) by

alluding to requirements and defects, with the ends to be aimed at; and in general terms pointing out the right system to be pursued in order to carry out improvements with propriety and with the best chances of ultimate success.—Observation and practice, assisted by the theory procurable from proper books on the subject, will enable mostly any one to be master of a practicable portion of nature's mysteries, but not in any very short period of time, as might be expected by some.

I, as well as several others here present, have spent more than a quarter of a century, entirely occupied in the pursuit of this business, constantly practising, observing and reading, and also getting information from the practice of others, whenever we could find anything new on the various branches of the business which we may have been following, many times coming short of success, and sometimes getting information from our very failures. Even with such a schooling, we are far from perfect on many points, but is no uncommon thing in this country to see the most ordinary laborers assuming the title of gardener, and professing to be able to perform all the difficult and complicated operations appertaining to the business of a gardener. It is well that the subjects they operate upon cannot complain with loud cries and tears, or else they would have such a bellowing at their heels as would soon frighten them from further ignorant presumption.

A want of discrimination on this point has had the effect of driving many good gardeners, either out of the country or to seek other employments, leaving those presumers in the field, who will, according to circumstances, either make the greatest pretensions or descend to the most servile meniality.

This has had a very bad effect on improvement, and on gardening generally, as also on the character of gardeners as a class.

The position in which gardeners find themselves thrown into when they come to this country, (partly from the above-mentioned causes) does much to break down that spirit of self-respect which is characteristic to gardeners in Europe generally.

A good gardener is no menial, neither will he bear to be treated as such. The amount of general intelligence which he must have acquired before he could be proficient in his business, gives him perceptions and feelings which will not brook any attempt to convert him into a mere menial machine, which may be flattered to excel at one time, and cowed into subserviency the next.

To remedy this, there is a very great want of some public place or garden, where men coming here as strangers could be employed in a kind of probationary manner, and where their efficiency and morality could be rightly tested. This would at once give those who were worthy a character and a standing; and at the same time preclude the pretenders and the dissolute from palming themselves upon the public. Those who really wished to employ a good gardener, would know where to find one, with a sufficient guarantee of not being imposed upon.

Employees, fully as much as those who want employment, are deeply interested in this matter, and I have introduced it into this paper from being practically convinced that there is nothing which bears a more direct influence on all operations connected with the subject which I have been endeavoring (although in a very imperfect degree) to exemplify.

In conclusion, I would again, as on a former occasion, beg to urge on all well-wishers to the improvement and beauty of the country, the very great propriety, and I might almost say necessity, of having the teaching of horticulture, to a certain extent, introduced into the public schools. It is there that the foundation of its permanent prosperity and influence on the community can only be laid; because it is only there that any real taste for its pursuits can be engendered.

KITCHEN GARDENS FOR FARMERS.

BY WILLIAM MUNDIE, HAMILTON.

The importance of a kitchen garden to the farmer, and to every country house, is a very important subject, and ought to have been in much abler hands than mine; but as several gentlemen who were well fitted to have done justice to the subject, could not take it up, owing to their having other pressing business, consequently, it devolved upon me rather unexpectedly; and although I am sensible of being better fitted to deal with the garden practically than theoretically, yet I have most willingly made an attempt to introduce the subject; trusting, that short-comings may be excused, and also amply supplied in after discussion, by many gentlemen present, who are well acquainted with the kitchen garden.

It would in some measure be beyond the purpose of this paper, to enter into the detail cultivation of the kitchen garden crops; yet I have concluded, that a short definition (in general terms) of the essentiality of the products of a kitchen garden, what a kitchen garden is, and also some practical directions regarding its formation in order that it may be productive, might not inappropriately precede the main point of the argument, viz., its importance to the farmer and every country house.

Gardening, was the first employment which occupied the attention of man, it is therefore the most ancient. And as the cultivation of a garden was considered a fit employment, when man occupied a position in relation to his Maker, to which no mortal can now aspire; we may therefore confidently assure ourselves, that it was not on account of its fitness in one sense only, viz: the pleasure derived therefrom, as we know of nothing in this world (except some things of man's creation) of which it is within the bounds of our comprehension to judge rightly, but what has an essential usefulness and utility, as well as a pleasant fitness for the purpose intended. No stronger argument could be adduced to prove to us, that the products of a garden are of the most essential use and importance to man—than the knowledge of the fact, that the wisdom of an all-wise Providence when He had created a being in his own likeness, placed him in a garden to keep and to cultivate it.

An unbounded love for the being thus created, with a perfect knowledge of what was good and essential for his welfare, dictated this arrangement as the very best. We could have nothing more conclusive than this. Our own contracted reason tells us that it was perfect—there was no room for improvement upon such a condition. The act of cultivating was good and necessary for health, the employment was desirable because everything around was beautiful and pleasant to the sight and senses. The herbs and fruits were nourishing and salutary to the body; and the shade of the trees would be grateful in the extreme.

From what we read of the garden of Eden, it seems to have been of a mixed character; and I think there is every reason to suppose, that in a considerable degree it resembled what we now term a kitchen garden and orchard, as we are told as much as that there was everything good for food. Here we have another strong attestation of the importance of the products of the garden—as the nourishing qualities, the pleasantness to the taste, the salutary effects upon the body; in short, the essentiality of the products of a garden to the welfare of man, are all comprehended in the word *good*.

Since the days of this first garden above spoken of, down to the present time, the cultivation of gardens has been largely patronised (and in most cases prac-

tised) by almost all the wisest and most exalted of the human family in all ages; and from every account of gardening on record, we have the most conclusive evidence that the cultivation of herbs, vegetables, roots, and fruits for culinary purposes, has always had a conspicuous place—thus I am brought to speak of what we term our kitchen garden.

A kitchen garden of the present day, may be defined as a piece of land fenced in and set a apart for the growth of vegetables, roots, herbs, and small fruits, for cooking or kitchen purposes, as the name of the garden implies. The term small fruits, comprehends the various sorts of gooseberries, currants, raspberries, strawberries, &c.

In choosing a piece of land to lay out for a kitchen garden, the situation should not be very flat nor very elevated. In very low or flat situations, the moisture of the atmosphere renders the crops of all sorts more liable to be injured by frost, and on very high land the cutting winds of spring and early summer are also injurious; the blossom and young fruit are often damaged, as also the leaves of tender vegetables and plants of all descriptions, when in a young and growing state.

A piece of moderately light land, sloping very gently towards the south or south-east, avoiding the extremes of situation mentioned above, will under good management give every satisfaction. A point to the east will give increased earliness.

The farmer's, or country kitchen garden, (and of which I am more particularly speaking) should be near the dwelling house, and should occupy a position, if otherwise applicable, partly between the dwelling and barn or stock yard. If so situated, it will be convenient to manure, convenient for gathering vegetables at all times, and also convenient to cultivate, allowing every half hour to be employed to the best advantage.

The size of the garden should be regulated according to the wants of the family; for a family of six persons, half an acre will not be too much, and for any larger number the ground may be increased in proportion; always bearing in mind, that a small garden requiring to be crowded, is more difficult to keep than a larger space where there is room for proper regulation and rotation.

The shape of the garden may be adapted to existing circumstances, but if otherwise applicable, a quadrangular, or an oblong square can be cropped and cultivated to more advantage than irregular forms which should only be adopted in case of necessity, either from the lay of the land or other difficulties which cannot be controlled.

The fencing is better to be close, to the North side, and partly so on the East and West ends; a shelter of trees outside the garden fence on the North side, North-east and North-west corners, should be raised as soon as possible. The different kinds of evergreen trees (such as the balsam fir, the Norway spruce, the hemlock spruce, and the different varieties of cedar), will best answer this purpose, at least those trees next the fence should be of this kind. They give most shelter at the time when it is most wanted, and their roots and branches are not so troublesome in undermining or overhanging the borders, as deciduous trees, or those trees which throw their leaves every season.

The first step towards the cultivation of the space which may thus have been set apart and fenced for a kitchen garden, is, to drain it thoroughly; some situations and soils there are which may not require this operation, but those are rare exceptions; and as a general rule, mostly all soils will be benefitted by draining. The extent to which this may be necessary, must be determined by the nature of the soil to be operated upon; however, there is no fear of overdoing as the more drains there are put in the nearer perfection will the garden be; and on no account should draining be neglected when the garden is laying out,

as, if once it is planted and furnished, draining cannot be done so well; nor can it be done at all, without undoing and destroying much that may have been already accomplished.

Having selected a point of outlet for the drainage water at some of the lowest corners, and from whence a sufficient fall or run can be got to carry it off; a main drain should then be laid along the lowest side, to receive the water from the lateral or branch drains, which should be so laid out as to catch or intercept the natural sug or trituration of the water in the land, that is always going on from the higher to the lower levels. The drains should be extended through the border of shelter trees on the outside of the fence, which being on the North side of the garden will consequently be the highest, and the point from whence the water proceeds.

In most cases the drains will answer every purpose intended, if dug about three feet in depth; finishing the bottom to a graded slope or run, in the direction to which the land falls. The best materials for permanency are stone, or draining tiles; but no one should be deterred from proceeding because he cannot obtain any one material, as although the materials above mentioned are the most durable, yet good substitutes may be found in either fence rails or brush wood, any of which if well put in and carefully covered with a tough green turf, as all drainage for trituration should be, will drain the land effectually for a period of from forty to fifty years.

The whole garden and tree border outside, should then be subtrenched, to a depth of not less than two feet; preserving 15 inches in depth of the original surface soil upon the finished surface; the subsoil below this 15 inches should be dug and loosened to the desired depth, but left in the bottom of the trench, (hence the term subtrenching.) and 15 inches of the soil from the surface of the next trench thrown on the top of the loosened subsoil, and so on until the whole is finished.

The benefits of this subtrenching are manifold; it allows the superabundant water to percolate easily and quickly through the soil to the drains, leaving a deeply loosened porous body of soil fully saturated with moisture, but never to stagnate or get sour. It allows a perfectly free circulation of air, heat and other atmospheric influences, to pass into and through the soil, more moisture is retained and held in solution during dry weather; the evaporated moisture from the bottom, which in shallow soils is brought to the surface and absorbed into the atmosphere, being absorbed and retained by the depth of soil, in its passage upward, a small surplus only passing off by slow degrees into the atmosphere.

The roots of all plants and vegetables penetrate this loose soil to such a depth as that even during long continuance of dry weather, they are seldom or never what we would call burnt or scorched; and having a greater range of pasture, they are much increased in size and value. But this is not all, their properties are also quite different; as from being produced upon a soil perfectly drained and ventilated (so to speak) and which allows all the organic elements free scope to play a part in their growth and maturity, we may be well assured that they are as superior to the productions of an undrained, untrenched sour soil, as a man who feeds upon good, wholesome, well prepared food, and lodges in a well drained, well ventilated house, taking sufficient exercise, is superior to a man who lives upon inert matter, and lodges in an ill drained, ill ventilated house, taking little or no exercise. The cultivation of the surface represents exercise.

When the trenching is finished and the surface brought to a graded level, the walks should next be marked out. Cross walks may be put in to divide into convenient sized quarters, but one main walk all around the garden at about from 9 to 12 feet from the fence inside is essentially necessary, because the

borders next the fence being on some sides the warmest, and on others the shadiest, should be occupied with all kinds of small early and late crops, to cultivate and to gather which, it is necessary to have ready access at all times from a main walk.

Gooseberries, currants, and raspberries, with probably a dwarf pear in each corner (to break the sameness which would otherwise prevail) should occupy a border of about 5 feet wide, round each quarter, the bushes to be set in one line, about 6 feet apart, along the centre of this border; the black currant and gooseberry in the shadiest places. Raspberries should have a situation open to the sun most part of the day, as otherwise the wood will be winter killed.—They may be planted 3 feet apart in line. Strawberries will do best in one of the open quarters, they should be renewed by re-planting every second or third year, and always on a fresh quarter. Rhubarb and asparagus may be advantageously planted in two exposures, the one in the sun and the other in the shade; by attending to this, the season of these most excellent vegetables will be prolonged. The ground for these should be made very rich with old and well rotted manure; to be right, the manure and soil should be half and half.

I would not recommend planting flowers along the fruit borders, as they draw off the nourishment from and deteriorate the quality of the fruit, at the same time, from their tendency to nourish weeds and to harbor the seeds of weeds, they are often the cause of the bushes and edgings being so over-run as perhaps from a temporary neglect, to get beyond all possibility of ever being cleaned. The walks for a garden of half an acre should be about four feet six inches wide, and so in proportion in larger gardens. The soil from the walks to the depth of from six to eight inches should be thrown upon the borders and quarters of the garden and the space so excavated, filled in with broken stone and gravel on the top, or with the best hard material for making walks, which may be within the reach and means of the owner.

Good cultivation includes not only the entire extirpation of all weeds as soon as they appear, but also, (and more especially in dry weather), frequent stirrings of the whole of the surface of the ground, in the borders, and among the various crops as they advance in growth. If this be attended to, it will act largely as a preventative of weeds germinating, and also open the surface of the soil, encouraging the circulation of the air, as before spoken of, to proceed more freely, which is of essential benefit to all growing crops.

In some measure corresponding to these preliminary remarks, there must be an amount of preparatory labor before a kitchen garden can be expected to be either satisfactory or productive; and to any one not acquainted with the operations thus decribed, especially if they view the whole of the various improvements at once, garden making on this standard will appear to be a formidable business; but by directing the attention to each part of the work separately, and prosecuting that at all convenient times until finished in the best manner, and so on in succession proceeding systematically, I do not hesitate to say, (and that even to a farmer whose hands are sometimes pretty full,) that the work may be accomplished, without much inconvenience, and all the more easily from knowing, that by doing it in this thorough manner successful results are certain.

From a good kitchen garden attached to a farmer's or other country house, and having been prepared as above stated, the owner with his family may enjoy a large portion of either fruit or vegetable diet every day in the year; but that can only be accomplished by carefully attending to the sowing and planting, cultivating and gathering, storing and preserving, all the various productions at their proper times and seasons; yet, when this is gone about systematically, (proper conveniences being provided), it will rather result in being, in a great measure, a pleasure than a toil.

As early as the end of April, or at furthest in May, asparagus, rhubarb, winter spinach, lettuce, radishes, and top onions, may be gathered in profusion.—When at the same time from the former year's stores may be supplied turnips, carrots, beets, onions, parsnips, kidney beans, and cabbages, if they had been preserved in pits, with dried parsley, and all the varieties of seasoning herbs, such as mint, sage, hyssop, marjoram, thyme, savory, &c.; also preserved fruits and pickles. In addition to which, during the early winter months, celery, with the various species of squash and gourds, will have been in use.

I have mentioned the months of April and May, because most people know that in those two months vegetables are scarcer than during any other period of the year; yet, during those two months we have here a very good variety, all plain to be sure, but very valuable as an addition to a family diet: and I have taken particular care not to put down anything but what is quite easy and practicable to have at the season spoken of.

The saving effected from the addition of a plentiful supply of roots and vegetables to a family diet, will at the year's end be a very large item; as by that means, more of the products of the dairy and poultry-yard, with flour and flesh meat of all kinds, may be marketed; but the saving in point of economy is only a small portion of the benefit resulting from a proper mixture of vegetables with the aliment of a family.

In order to illustrate this to a farmer, or to any one living in the country, I would direct their attention to their stock annually about a month or six weeks after they have been turned out to grass: see what a change has come over them, how clear, how healthful, and how fresh they look, all scurfs, scars, and eruptions are thrown off; what a powerful effect the fresh vegetable productions of the earth are capable of producing.

Again, if the same class of animals are compared on two different farms during the winter months: the one farmer having grown and stored a sufficient quantity of root crops to supply his cattle with an every day portion along with their straw or hay, and the other farmer not having made any such provision, the nourishment and healthfulness to be derived from vegetable food will, I think, be very clearly manifest. And there is not the smallest reason to doubt but that a proper admixture of vegetables in the food of the human family, will be productive of effects equally striking with those which we notice in the lower animals.

I am aware that very many people object to vegetables as not agreeing with them. Certainly there may be some people so constituted as that this may be the case naturally; but in general, I think it rather proceeds from the habit of indulging in strong meats and drinks, whereby the stomach and tastes are vitiated, and upon a trial of vegetables, the stomach not being accustomed thereto, will feel uneasy for a few times, but by a little perseverance this may soon be overcome, and much benefit derived from the change.

From a well regulated kitchen garden the farmer may be largely benefitted, by attending to the raising of beds of cabbage plants to plant out in his fields for winter use for his stock, also beds of Swedish turnip plants; as should those sown in his fields fail, he might by a small amount of labor replant them, and thus secure a crop, which, but for having his plants to fall back upon, would have been out of his power. Those only who are in the habit of providing such food for their cattle, can estimate the value of being able to remedy such a defect even for one single season.

Much benefit and experience may also be derived from the testing of new manures, grains, roots, grasses, and new systems of cultivation, before operating with them on a large scale. This may be conducted with more accuracy in a garden than in the fields on a small scale.

It may be urged that at many seasons of the year the farmer and his men are so much engaged, that it is out of their power to attend to a garden. I confess that sometimes the farmer may be so occupied, as to have little time to do much in his garden, but still this drawback may, to a considerable degree, be obviated by keeping a watchful eye to the forwarding of the garden work as far as possible, before such seasons are known to occur.

The wives and daughters of farmers, or indeed of any one, might find a very interesting amusement in attending to many of the lighter operations of a garden, and might, with the greatest propriety, cultivate a taste for such healthful employment. Any lady of whatever station may be proud, (that is if pride is at all allowable), of being found attending to dressing a garden, even a kitchen garden. A knowledge of the manner of growing, storing, and preserving the various productions of a garden, is an accomplishment which by all right minded and sensible men, will be more appreciated in a lady than many other occupations which take up much time to little purpose.

I shall only mention but one department in the cultivation of a *Kitchen* Garden to excite the emulation of ladies. When a little hot-bed has been built and prepared (in as far as regards the rougher parts of the business), by strong arms accustomed to such kind of work, what lady is there, who would not envy the amount of knowledge sufficient to enable her to plant, to water, to shade, and to ventilate in a proper manner, even this little box with propriety. This hot-bed, (commonly termed a seed-bed), generally contains the germs of a great part of the season's crop—there are the early cabbages, cauliflower, lettuces, tomatoes, celery, cucumbers, melons, sweet herbs, and many of the tender annual flowers, plants, and cutting of house plants, &c. The proper management of these requires a little practical experience, as the operations are all very nice ones; all being living subjects, a move in a wrong direction, or a little neglect, is in many instances as much as the whole is worth.

Every amateur who has had any experience can testify how much he has been at a loss for a little practical experience *when* operating upon such a subject as I have just now been considering; and also how keenly he has felt the disappointments experienced therefrom. Other operations, in which dead matter is the subject, may be conducted according to the time, the convenience, or as the tastes of the operator may dictate—and may be left off or resumed at pleasure. Gardening operations do not admit of this; a single throw, so to speak, is all that is allowed in each season; if that is mismanaged, we must wait a returning season for another chance.

This much I have said with a view to induce an interest in, and to impress the importance of, acquiring at least a primary knowledge of a garden. No one is out of place when gardening; it is beneath the dignity of no one—seeing that its productions are so essential to the comfort and economy of a family, and also of the most vital importance to health and life itself.

The importance of a well-regulated and well-kept Kitchen Garden, in a social point of view, is very great; the first and the last fruits of the season generally come from the garden; and from the fact that some of its fruits are either gathered or enjoyed fresh every day, a striking instance of the goodness of the Giver of all our blessings is set before the family circle in a most acceptable manner, and a fresh opportunity afforded to the heads of families of encouraging the grace of gratitude, than which nothing is more becoming, and we are assured that no other feeling is more acceptable.

Attention to the garden makes home more pleasant and more respectable, home associations are imbibed and fostered from childhood, and we are well aware that the associations which surround a family when young never leave them altogether.

Who is there among us that does not vividly remember some beautiful garden which he may have seen in his childhood? It was finer, according to our remembrance, than any we have since seen, and in memory more attractive even now, than anything of the kind present with us, even supposing its superiority.

The value of such associations in the minds of the young is priceless; it not only creates pleasant remembrances of and attractions to home, but it also fosters pleasant remembrances of and attractions to each other.

The social condition and intelligence of a family may be very correctly estimated by their gardening. In any given locality, the amount of intelligence and civilization may be estimated by the same standard. Regarding cities and towns the same test is applicable; and it is now well understood that, owing to migration and other causes, the population of cities is displaced, and renewed by accessions from the country population in every certain series of years. How necessary, therefore, that a fundamental knowledge and a taste for an art so elevating in its contemplation and practice, should be infused as largely as possible along with this replenishment of population.

A garden is important to the farmer on account of the comforts and economy arising from it; but much more so on account of its humanizing effects upon his family and locality.

It is important to individuals as a pleasant and healthful exercise and recration.

It is important to cities and towns on account of its sanitary effects both by way of exercise and aliment.

It is important to a nation for its very large addition to the wealth and resources of the country.

The importance of garden productions as a national resource, may in some measure be estimated, from the following statistic summary of the gross propuction of one acre of garden ground in the neighborhood of London, England.

The evidence was obtained for statistic purposes from practical Market Gardeners, and is as follows:—Radishes, £10; Cauliflowers, £60; Cabbages, £30; Celery (first crop), £50; second crop, £40; Endive, £30; making a total of £220, from one acre in twelve months. The expenses of cultivation are very great, notwithstanding that labor is much cheaper and more skilled than in this country. In inferior situations the produce is much less, but the expenses are also less. From the same statistic account we learn that there are from two to three thousand acres under vegetable culture in and around London.

Such an amount of productiveness cannot as yet be attained in this country, as the price of labor at its present value entirely precludes the employment of that amount which would be necessary to such productiveness. Suffice it to say, that there is a reality in the future prospects of this branch of business sufficient to induce the most strenuous efforts for its extension and improvement.

The subject is very far from being exhausted, but in the meantime I shall leave it to other and abler hands to complete what I have humbly endeavored to introduce.

Before sitting down I would crave your indulgence for a very short time longer, in order to bring under your notice a few remarks I have made, upon what I would consider the best means of extending that practical knowledge of Gardening throughout the country, which I have recommended in the body of this paper, and which I think has also been shown to be of such importance to the community, as to induce a general desire for its diffusion and success.

Finding upon what I have advanced above, that it is only in youth that a practicable knowledge of, and a taste for Gardening can be permanently impressed, I think it would therefore be very desirable that this knowledge and taste were as generally diffused as possible.

My plan would therefore be, that to each sectional school there should be attached at least one acre of ground as a model garden for the section, and also to impart instruction from.

This garden should be cultivated by the pupils, both male and female (to a certain extent), under the direction of the school teachers, who should of a necessity have acquired a good fundamental knowledge of the art, in their preparations for becoming teachers. By this mode each set of pupils or scholars in succession, would, without any expense or loss of time, obtain a sufficient practical knowledge of all the common operations necessary to the cultivation and management of a Kitchen Garden.

I shall not attempt to estimate the good results arising from such a system, but you may in some part measure them by considering what we have met to advocate, viz., that every country house should have a kitchen garden; and then premising that good practical knowledge would be brought to bear upon these gardens.

The diffusion of this practical knowledge, in some such way as spoken of above, is the only certain means of creating an interest in, and an appreciation of a good garden attached to a homestead, as unless there is an amount of knowledge imparted, sufficient to enable those whom it is desirable to influence in this matter, to care for and manage those gardens, how can it be supposed that they will be interested in them? It is absolutely necessary that knowledge shall precede action in this matter, and also that the knowledge be of a practical nature, derived from seeing and assisting in the performance of the various operations involved in the management and cultivation of a garden, the teaching of which is second to nothing secular.

I am also inclined to estimate very highly the extended system of friendly intercourse and reciprocal feeling, which would thus be engendered between the master and his scholars, and also their parents, which would no doubt result to the greatest advantage of all the parties, and to the community in the end.

The improvement which would thus be effected in the appearance of the school-houses throughout the country, would alone be more than sufficient to many times repay the trouble or expense of this system; it would make them worthy objects of attraction to strangers passing through, or wishing to settle in the country, and also worthy objects to be retained in the remembrance of the young generations which might be educated at them.

And finally, in a few years, every home in the country might be so improved, as entirely to change the whole aspect and appearance of this great country.

REPORT OF COMMITTEE.

The Committee appointed at the meeting of the Club, to make out a list of the most useful and best kinds of vegetable seeds, roots, and small fruits, (with their proper names) to be appended to the paper read by Mr. Mundie, have recommended the following varieties as being the most applicable for the purpose. They are all of the best kinds that are now in cultivation for general crops, taking their qualities and productiveness into account.

They are placed in the order of their earliness, as also of their merit, and can be obtained from any regular seedsman or nurseryman by the names given in this list.

VEGETABLES.

Name.	Sort.
Asparagus—	Giant.
Kidney Bean—	Yellow Six Weeks.
"	Red Speckled.
"	Scarlet Runners.
Beet Root—	Early Turnip rooted.
"	Long Blood.
Cauliflower—	Early London.
"	Late French.
Carrot—	Early Horn.
"	Red Atringham.
"	Long Orange.
Cabbage (*summer*)—	Early York (small)
" "	Endfield Market.
" (*autumn*)—	Shillings Queen.
" "	Large York.
" (*winter*)—	Quintal.
" "	Flat Bunch.
" "	Savoy Dwarf Curled
" "	Red Dutch (pick'g)
Celery—	Red Solid.
"	White Solid.
Cucumber—	Short Green.
"	Long Green.
Lettuce—	Maltese.
"	Victoria Cabbage.
Musk Melon—	Scarlet Flesh Cantelup.
" Green	" Nutmeg.
Water Melon—	Long Island.
Onion—	Large Yellow.
" "	Red.
Capsicums—	Large Red.
Parsley—	Double Curled.
Parsnip—	Dutch Hollow Crowned.
Peas—	Early Kent.
"	Blue Imperial.
"	White Marrowfat.
Radishes—	Scarlet Short Top.
"	Long Salmon.
"	Red Turnip Rooted.
"	White "
"	Black Spanish (for winter.)
Rhubarb—	Myatt's Victoria.
" "	Albert.
Squash—	Scolloped Bush Squash.

Name.	Sort.
Squash—	Boston Summer.
Potatoes—	Early June.
"	Gold Finder.
"	Shaw's Seedling.
Spinach—	Round Leafed.
"	Prickly Seeded.
Tomato—	Large Red.
Turnip—	Early White Stone.
"	Golden Ball.
Herbs—	Sage.
"	Thyme.
"	Summer Savory.
"	Sweet Basil.
"	Sweet Marjoram.
SMALL FRUITS.	
Currants—	Black English.
" "	Naples.
"	Red Dutch.
" "	Grape.
" "	Victoria.
"	White Grape.
Raspberries—	Red Fastolf.
" "	Antwerp.
"	Yellow "
Gooseberries—	Red Ashton.
" "	Warrington.
" "	Ironmonger.
" "	Crown Bob.
"	White Whitesmith.
" "	Eagle.
" "	Caroline.
"	Yellow Golden Drop.
" "	Lyon.
"	Green Ocean.
"	Langleys.
" "	Gascoigne.
" "	Willow.
" "	Laurel.
Strawberries—	Early Scarlet.
"	Scotch Pine.
"	Hovey's Seedling.
"	Boston Pine.
Grape Vine—	Isabella (black).
"	Sweet Water (white).

NOTE.—Asparagus and rhubarb, when it is possible, should be purchased in roots; seeds may be used when roots cannot be had, only it should be borne in mind, that as regards rhubarb, seeds will seldom produce the same variety from which they were taken, the plants so raised being almost always a hybrid sort, and that by using two-year old asparagus plants, just so much time will be gained, unless where there may be the convenience of a hot-bed or frame. It will generally be found best to purchase celery in plants instead of seeds.

Round Spinach for summer may be sown as soon as possible in Spring; one or two successive crops may be sown at from three to four weeks intervals afterwards.

Prickly Spinach, to stand the winter, should be sown about the middle or during the latter half of September. It will come into use with the first growth in spring, and will last until the spring sowing comes in.

Peas should be sown at different times, to produce a succession of crops, say the first early sort as soon as the frost breaks up in spring, the second sort about three weeks later, and the third sort from three to four weeks later still; always proportioning the quantities to the probable wants of the family during the time that each sort may be in season.

In dry weather, such seeds as peas, beans, radishes, turnips, carrots, parsnips, &c., should be soaked in soft water from 12 to 20 hours before being sown; this will insure their coming up. In the case of turnips a good plan is to soak half the seed and sow mixed with the other half unsoaked. This will give two distinct brairds, and consequently two chances against the fly. The seed must not be left over after having been soaked.

ON GRAPE CULTURE IN COLD VINERIES.

BY JOHN GRAY, OF THE LAKE VIEW NURSERY, TORONTO.

The subject that I have the pleasure to introduce to your notice to-day is one that, up to the present time, has not received that degree of attention which its merits would seem to require. It is the cultivation and management of the European grape vine in cold vineries, as adopted to our climate, and the wants and requirements of the country. Why the grape has not been cultivated to a greater extent either in the open air or cold vineries, in this part of Canada, must arise from a belief that the vine requires a warmer cltmate than ours; but when we find that in Europe it flourishes as far as 51° north latitude, I cannot see why it should not succeed equally well here—and I think it is entirely owing to a want of knowledge as to the manner of treatment it should receive; indeed, there is no fruit of which the management is so little understood, or so well repays the labor bestowed upon it, as the grape; therefore it has in all countries and in all ages been a favorite fruit of mankind, not only as a delicacy, but as an article of food. That the European grape can be grown to great perfection here in cold vineries, and in the open air, I need only draw your attention to the fine specimens that have been from time to time shown at our Horticultural Exhibitions. The great superiority of these over the American grapes that we see imported annually in such quantities into our markets, should be some inducement to our cultivators, to endeavor to produce a supply of this delicious and wholesome fruit. A long experience in the cultivation and management of the European grape vine, both in the old country and here, enables me to state, that grapes of the best quality can be grown here in vineries without any artificial means of heating being used, at one-half the expense usually attendant on their cultivation in England, by paying proper attention to the formation of the borders, as on this entirely depends the future success of this crop. Thorough drainage is indispensable; if this is not attended to, failure is sure to take place, and then the failure is attributed to every cause but the right one.—I am very glad to find that there is the prospect of a few more cold vineries being in operation shortly in the neighborhood of this city, and that we are likely to have a little more competition at our Horticultural Exhibitions. I

believe the credit of having erected the first cold vinery in Toronto or its neighborhood, and of introducing a choice collection of European grape vines, belongs to our worthy ex-Sheriff, Wm. B. Jarvis, Esq. Subsequently there was one erected at the Grange; and I believe the grapes from those two vineries have received two-thirds of the prizes awarded at our exhibitions for the last ten or eleven years. The following was the system adopted in the formation of the borders:—The soil (which was a loamy clay) was excavated to the depth of three feet, and fifteen feet wide; there was a stone drain made along the front, four feet deep, and continued to where there was a good outlet for the water; the bottom of the border had an inclination towards this drain; there was a stratum nine inches deep, of small stones and brick rubbish, laid over the bottom of the border; there was then a layer of fresh turfy loam, from an old pasture, laid over this, grass side down, then a layer of well-rotted stable-yard manure, then alternate layers of the best of the soil that was taken out of the border, and manure, lime, rubbish, ashes, and thirty bushels of bone shavings, from a comb factory, finishing off the surface with a good layer of well-rotted turfy loam.—The vines were planted in the month of May in the borders in front of the house on the outside, and introduced into the house underneath the front sill; the surface of the soil over the roots was covered with a layer of loose stable manure, and liquid manure liberally applied throughout the growing season. The vines at the Grange were raised from cuttings of the single eye or bud, placed one in a pot, and plunged into a hot-bed about the first of March; by the middle of May they had made a growth of nearly a foot; they were transplanted on the 22d of May into the border, and by the month of August they had grown six feet; they were then stopped to harden the buds; in the month of November following they were pruned back to the second bud above the ground. The second year I allowed two shoots to proceed from these buds, the shoot from the lower bud I stopped at the fourth eye; the other I trained to the trellis, and by the middle of August it had made a growth of fifteen feet, when I pinched off the top of it also. The roots were well supplied with liquid manure throughout the growing season. When the next pruning season arrived I headed the longer shoot back to where the eyes or buds appeared sound and plump, leaving each shoot about twelve feet long. The lower shoot I cut back to the second eye. I adopted the plan of thinning out the eyes, as recommended in the second volume of "Loudon's Gardener's Magazine," that is, after the longer shoot was cut to the length I wished it to be, I left the top bud, cut out the second and third, left the fourth, cut out the fifth and sixth, leaving the seventh, and so on to the base of the vine. This thinning of the eyes causes those that are left to break more regularly, and so alternating with each other, that the disposition, whether for the sake of superior fruit, or facilitating the future management of the tree, will be found exactly what the manager would wish. After the vines were pruned they were laid along the front of the house, and covered with a bass mat; the third year they were trained to the trellis early in April, being previously well washed with soap suds and a brush, this helped the buds to break regularly. Each shoot showed two bunches of fruit, these I thinned out, leaving only one bunch on each. The temperature of the house was allowed to range as high as 85°; air was admitted freely in sun-shiney weather, and the vines were syringed with rain water of about 80° every morning, except during the time the vines were in blossom, when it was suspended until the fruit was set, and continued afterwards until the fruit began to ripen, when it was left off altogether. Liquid manure was applied as before. One third of the berries were thinned out of the bunches during the season, to give room for the others to swell. The crop averaged eight pounds net of fruit on each vine. I exhibited some of the bunches and also some from Mr. Jarvis's vineries at the Pro-

vincial Fair, held at Cobourg that year (1847), and they obtained a first and second prize. One of the bunches, a White Assyrian, weighed upwards of four pounds weight. I mention this to show that the vine can be made to produce a remunerative crop at a very early stage of its growth. I thought then that the cropping was rather heavy for such young vines; but it appears that the same vines have continued to produce good crops ever since. There are two systems of pruning the vine followed by practical gardeners, and each has its advocates; the one is the renewal or long rod system, depending entirely on the last year's wood for a crop, cutting out the old wood, (or what has borne fruit the present year,) entirely. The most intelligent cultivators of the grape give this system the preference, as it keeps the vine in a more healthy and vigorous condition, and better able to resist the mildew, which seems to be the greatest obstacle to the cultivation of the European grape on this continent. The other system is what is called spurring in, that is, the wood that has borne fruit the present year is cut in at the autumn pruning to within one bud of the old wood; this system may be continued for years, but it appears that it is not now followed by good cultivators. The circulation of the sap is more feeble and tardy through the more compact and rigid sap vessels of a vine full of old wood, than it is through young vigorous wood. The renewal system consists of annually providing a supply of young wood to bear fruit the following year, and the routine is as follows, viz:—When the vines are planted they should be headed down to within a foot of the soil. One shoot only is allowed to proceed from each plant, which at the end of the first season is cut down to the second or third eye. Next year two leading shoots are encouraged, the strongest of which is stopped when it has grown three or four joints beyond the middle of the roof, and the weaker after having grown three or four feet for the purpose of strengthening the eyes; at the fall of the leaf, the leading shoots are reduced, the main one to the length of the middle of the roof, and the lower one to the third eye. In the third season, one leading shoot is trained in from each shoot, and from the main leading shoot fruit bearing side shoots are produced. One bunch is left on each, and the shoot stopped at the first point above it. No side shoots are allowed to proceed from the spur, the leading shoot from which is to become the bearing wood for next year. Thus, in the Autumn of the third season, the lower part of the house is furnished with a crop of grapes from shoots proceeding from wood of the preceding year's growth. And parallel to this bearing shoot on each vine, is the young shoot for the next year's crop. At the next pruning the shoot from the extremity of the bearing branch is cut off at the top of the roof, and the shoot from the spur is cut off at the middle of the rafter, and all the spurs that had borne the grapes are cut out; each vine is now furnished with two shoots of bearing wood, a part of old barren wood, and a spur, for producing a young shoot the following year. In the fourth summer, a full crop is produced, both in the upper and lower half of the house. The longer shoot bearing on the upper half of its length, and the shorter on its whole length; a leading shoot is produced from the short shoot, and another from the spur.

In the pruning season of the fourth year, the centre shoot is entirely removed, and replaced by the side shoot, now the whole length of the roof, and this side shoot is in turn supplanted by the shoot from the spur, while a spur is prepared to succeed it. This is Mr. Mearns' practice, one of the best writers on the vine, and from my experience I consider it decidedly superior to the other system.—The routine of culture during the fruiting season, consists of syringing the vines regularly, mornings and evenings, in fine weather, except when the vines are in blossom—keeping the house at this time more warm than usual, giving air when the state of the out-door temperature will admit. To guard against sudden changes of temperature out of doors, and at the same time to keep up a moist

and warm state of the atmosphere within the vinery, as is consistent with free admission of the air during sunshine, is the great object of culture in a vinery of this kind. The shoots which produce the fruit should be stopped or pinched off at the first leaf above the bunch you wish to remain. When the berries are well set, all the smaller ones should be thinned out with a pair of scissors, leaving sufficient room for those that are left to swell to their proper size; where the bunches are large the shoulders should be suspended by threads from the trellis; this admits the air freely through the bunch, and will allow the inner berries to swell to their full size.

All young wood made throughout the season, and not required for the autumn pruning, should be stopped at the first joint, and every terminal bud that breaks should be nipped off as often as it breaks. If mildew should make its appearance on the vines, the following is an infallible cure for it. Take a peck of fresh lime and 1 lb. of flour of sulphur, put into a tin gallon vessel, place it in the vinery, and close up the house, then pour water sufficient to slack the lime, and keep the sulphur from burning; a steam will arise from this that will cover every part of the vine and fruit, and will stop the disease at once; the vessel may be filled with water afterwards, and let remain for a night, the next morning the clear water may be poured off into an earthen jar and kept for use. The vines may be syringed with one quart of this, mixed with two gallons of rain water, two or three times a week, if necessary. I have never known this to fail.

Peaches, Nectarines, and Apricots, planted against the back wall, in the inside of the vinery, will produce fine crops; and many varieties of salads and early vegetables can be grown in the beds inside, so that the house need not be entirely occupied with the grape vines.

Houses for growing the vine can be erected at a cost of from two to three pounds currency per running foot, and may be either lean-to or span roof,—the lean-to houses are the warmest, they should have a southern aspect. A description of one lately erected at the residence of Dr. Gwynne, may answer for all: the dimensions are: length, 72 feet; width, 12 feet; height of the back wall, 12 feet; front, 3 feet, from the sill to the plate; the sashes in the front are in pairs, and slide past each other; the top sashes are in pairs also, and arranged with a double groove in the rafter, so that they can slide free of each other; the rafters are 3 feet 6 inches apart; the sills are placed on brick pillars 6 feet apart; the studs in the back wall are 3 feet apart, and built in with bricks; there is a shed at the back that protects the wall. There is no necessity for having glass in the front of the vinery; it only gives a better appearance to the house, but is no better for the vine.

The span-roofed houses have a different aspect from the lean-to; they run generally due north and south, having their longest sides facing east and west, with borders of the same dimensions as the lean-to houses on each front of the house; the vines are planted on each side, and trained up a trellis underneath the sashes. Where there is a good sheltered situation, I prefer this to the lean-to roof. There are a great many houses of this description in operation in the neighborhood of Boston, New York, and other cities in the United States, and they appear to give satisfaction.

The varieties of grape best adapted for the cold vinery are Black Hamburg, Black Prince, West's St. Peter's, Zinfindal, White Sweet Water, Royal White Muscadine or Chasselas de Fontainebleu, Chasselas Musque, Pitmaston White Cluster, White and Grizzly Frontenac, White Assyrian, &c., &c. Some of these kinds will produce good crops, in well sheltered situations in the open air, if the same system of pruning and preparation of the soil is adopted. Keeping the

vines well covered up in winter, the borders well supplied with liquid manure in the summer, and giving room for the young wood to ripen in the summer.

Grape vines may be allowed to bear when the vines have attained a circumference of 3 inches at the base, 5 pounds weight of fruit, and for every additional half inch in circumference afterwards, an additional five pounds weight.

ON THE MANAGEMENT OF ORCHARDS AND FRUIT TREES.

BY GEO. LESLIE, TORONTO.

The subject I have the pleasure to introduce to the Club to-day is, Orcharding and Management of Fruit Trees, a subject of great importance to the country at large; and, I feel sensibly my inability to treat it as it should be; however, I have endeavored to put a few facts together in a plain way to open up a discussion. The climate of Canada West is particularly well adapted for the culture of the more useful and substantial fruits, namely, Apples, Pears, Plums, Cherries, and in some sections Peaches are grown to great perfection. A number of us will remember what was the general condition of fruit culture twenty years ago; it is true some among the more intelligent land-owners had planted fruit trees at that early period, but common orchards then would hardly satisfy more modern fruit growers, and of the fruits then cultivated there was no higher claim than that they were grafted fruit, all sorts being comprehended under the two names Natural and Grafted.

The few scattered cherries consisted of sour kinds, commonly called Kentish, with sometimes a few scattered May Dukes and Ox Hearts. Our Plums consisted of common blue and yellow, with a few egg and green gage. Few people had ever heard of the fine varieties that have been introduced within the last fourteen years, such as Bolmer's Washington, Jefferson, Duan's Purple, Imperial Gage, &c. The only distinction then was, wild plums, and tame plums. Of pears, there were none, and they are still scarce, and a great rarity in our markets. These remarks apply to the common practice only; there were here and there worthy exceptions, of individuals who in the face of great difficulties which have now happily disappeared, had collected many of the improved varieties which even now stand among our esteemed sorts; such as, for instance, among apples, the Fameuse, Pomme Grise, Bourassa, Baldwin, R. I. Greening, E. Harvest, &c. Last year our fruit crop was rather a failure, but in the fall of 1855 I was very much pleased to see a few barrels of fine specimens of the following sorts, grown in the neighborhood of Toronto, offered for sale in our markets, namely: Fall Pippin, Æsopus, Spitzenburg, Yellow Bellflower, Baldwin, Roxbury Russet, St. Lawrence, Ribston Pippin, &c., &c., and from the number of trees planted of late years, we may expect to see in our market a few more of the best sorts, for commerce and transportation. We have now arrived at an advanced stage of prosperity; we have means of conveying fruit and fruit trees from one end of the country to the other; we have large nurseries in Canada, and all over the United States, enabling a man to purchase within a short distance, or a thousand miles off, and we can depend on the accuracy of the names. With all these facilities we are still far behind what

we ought to be with regard to fruit culture. I have no doubt but good apples will be worth four or five dollars per barrel in this country nine or ten years hence. I will give you my reason for supposing so, our towns and villages are growing with a rapidity, never before known in any country; the people must have fruit, and where are they to get it? I venture to say not in Canada.—There are no persons within my knowledge who have gone into fruit culture as a business, and the produce of what few trees the farmers plant, will nearly be consumed by themselves. It is also a fact, that north of Lakes Simcoe and Huron, very little fruit can be grown. These are some of my reasons for thinking that fruit will be dear ten years hence. But there is another reason why we shall have a limited supply of fruit for some time to come, and that is the bad treatment trees receive after they are set out. I know in some of the older townships, in the Home District, orchards that have been set out 25 years ago, with some 50 or 100 trees, that do not produce enough for the families that own them, when they should have at least 100 barrels to sell. When travelling two weeks ago through the townships of Toronto, Trafalgar, Chinguacousy, Caledon, Mono and Etobicoke, I was struck with amazement, at not seeing a really well managed orchard; but in some half the trees had died out, others were broken down by cattle and sheep, and a few large old ones that might be renovated and improved, had tops as thick as a thorn bush, full of dead limbs, and their trunks covered with moss and rust. The most of these orchards that I saw were growing on flat clay land, soured up for want of draining, manuring and deep tillage. Now I would say to the owners of such orchards, go to work, prune your trees properly, scrape the bark clean and smooth, with a sharp hoe or scraper, then wash with the solution hereafter recommended, underdrain thoroughly, cultivate the ground in potatoes, or some other green crop, for a few years, with a good dressing of manure annually, and the trees that are of inferior fruit, and have healthy stocks, graft them with the best sorts of market apples. What we need most for our provision for the future, is such a selection as will give a varied and excellent supply through the winter and spring. Long keeping apples may be sent safely to any part of Europe, and pay better than wheat. We need not fear to plant too many of these, for a large supply will create large facilities for their distant conveyance, and open large markets for their sale.

Perhaps, what I have now advanced with regard to future supply should be left to be discussed by the Club. I shall now proceed to lay before you my views on the following subjects in the hope that it will at least create a discussion in the Club that will be edifying to the country:—

1st. The best situation and soil for an orchard
2nd. Preparing the ground, &c.
3rd. Planting, distance and mulching.
4th. Pruning, scraping and cleaning.
5th. Manuring and after management.
6th. Diseases, &c.
7th. Cost and profit of an orchard.

First then, Mr. Barry says the situation and soil of an orchard, with regard to exposure or aspect, requires but little consideration where spring frosts do not prevail. The main difficulties to guard against is the prevailing high winds, from the west and north, that injure the blossoms and blow off the fruit before it is ripe. If possible, a situation should be chosen where a natural hill or ridge protects and breaks the force of destructive storms, but where no such obstacles naturally exist, a belt or border of rapid growing trees, such as broad-leaved Poplar, Silver Maples, and Abeles, should be planted, that they may grow up

and form a protection, by the time the trees have come into bearing. I agree with Mr. Barry in this view, but I prefer for shelter evergreens, such as White Pine and Hemlock. White Cedar also makes a beautiful screen, takes up very little room, and may be clipped like a hedge. Shelter is of the highest importance to the fruit-grower, and no garden or orchard should be without it. Some people argue, that fruit trees should be planted in valleys; I maintain and say it from experience, that fruit trees should not be planted in low ground, except on very dry sandy flats, where it can be drained easily. There are many instances that we read of in the neighboring States, of orchards bearing regular crops on high hills, when on low ground they seldom bear a good crop. Mr. Thomas, in his Fruit Culturist, says, he could mention multitudes of cases, where Peach Orchards were killed to the ground by the winter, on low land, and never missed a crop on high land within 500 feet of the same place. He cites as a reason that vegetation is easier excited in spring in low situations than those more elevated and colder, and that frost always falls more heavily on low than on high grounds. This will show you, coming from such high authority as J. J. Thomas, that hills and banks unfit for other cultivation, may be turned into orchard grounds, and my own observation convinces me that he is right. The best crop of fruit that I have seen in the country, I saw in an orchard on the top of the Hamilton mountain, when on the Flats east of the town, where there are large orchards, the crop was very thin. Experience has taught cultivators that high, dry, and moderately rich soil, will produce the best crops.

SOIL.

It is only necessary here to point out the best soils adapted to the different classes of fruit trees. There are soils of certain textures, such as sandy loam, with a clay sandy subsoil, in which, by proper management, all our hardy fruits may be grown to perfection, side by side. Our country abounds in such soils, and others somewhat different in character, but equally fit for fruit trees when well managed; on the other hand there are soils wholly unfit for fruit trees of any kind, such as peaty or mucky, and damp cold spongy soils. For a pear and apple orchard, a dry, deep, substantial soil, between sandy and clay loam, is the best; on such we see the healthiest trees and the fairest fruit. Plums succeed best on a stiff clay loam. The cherry, peach, nectarine, and apricot, require a light, dry, warm soil, and will not succeed well on any other. Where the proper ingredients for fruit trees are not contained in the soil, it should be aided in the shape of manure or compost. I observed the other day some very healthy fruit trees on the Caledon hills, where the soil was a clay loam, and nearly covered with lime stone.

PREPARING THE GROUND FOR AN ORCHARD.

Every field or piece of ground, whether for garden or orchard, requires levelling more or less; it adds to the appearance of the ground, and the surface water goes off quickly. The next thing to be done, is to under drain it thoroughly, if the ground requires it, with brick, tile, stone, or pine rails. Draining is not necessary in all soils, but only in such as are of heavy clay, with a hard subsoil, or in wet, spongy, grounds. Undrained grounds again, are not fit for trees of any kind, for wet in winter has a very injurious effect on the roots of trees, whether small or large; I know this from long experience to my cost.—After levelling and draining is finished, draw out your manure, 80 cart loads to an acre, beginning on the far side, and spread it only as it is ploughed under. The ground should be at least twice ploughed with a common and subsoil plough. The best way to do this, I find, is to start two teams, one in the common plough, and one in the subsoil,—the one following the other, twice in each furrow; in

this way there is no stopping to change the horses from one plough to the other, which is a great saving of time, and you get 18 to 20 inches depth. Two teams will do half an acre in a day, and the work will be equal to two spit trenching. After ploughing is done, the harrowing and levelling the ground afterwards, completes the whole operation, and it can then be laid out in whatever form the proprietor may wish, for a garden, fruit orchard, or lawn, and if the work has been thoroughly done according to the directions here given, I have no hesitation in saying it will be in fit condition to grow any kind of crop. On grounds of limited dimensions the spade may be used in place of the plough.

PLANTING AN ORCHARD.

Having procured the trees, dig a trench and lay them in, covering their roots to prevent them from drying, then take them from this trench, according as they are planted. I am aware that some people plant trees and kill them while they are planting them, by leaving the trees exposed, perhaps a whole day, to the hot sun. Proceed now to stake out the ground at regular distances, taking great care to lay out the plant at right angles, because if this is not done the trees will not line in the different directions I think it is best to plant in squares, as this gives the best facilities for working the land where oxen and horses are used.—If a garden line is not convenient, that will reach across the whole plot, provide stakes, and set them in the ground, in squares of from 25 to 30 feet, where the tree is to be planted, as these are more easily arranged than the trees themselves. Where the ground is prepared, the holes need not be dug any larger or deeper, than just sufficient to spread the roots out in their natural position, and should be just deep enough to allow the tree to stand as it did in the nursery. The process of planting is very simple, and may be done rapidly, only keeping in view that every root and fibre must be spread out with the hand, so that each may meet the soil; then let one person hold the tree, while the other is filling in the soil. Surface soil made fine should first be put in among the roots, and then gently shake the tree that no vacancies be left, treading it gently but firmly by the foot. Previous to planting, trim the ends of the roots with a sharp knife, cutting off all bruised roots; this will facilitate the formation of new roots, and prevent the decay of the parts injured. Fruit trees of all sorts should be headed back at the time of planting, that is, cutting off one half or more of last year's growth. Planting should never be done when the land is wet, as the soil is sure to become baked and hard around the roots. After the planting is done, it is necessary to mulch all the trees. There is no method of preserving newly-planted trees like this; it is also true that no treatment is becoming so universally popular as this, and even well established trees would be greatly the better for a dressing of this kind. It seems just suited to our hot sunny climate, preserving the moisture, preventing the growth of weeds, and supplying manure. Mulching consists in covering the ground about the trees, to a greater or less distance, according to the size of the plant to be treated, with litter or long manure, and where neither is to be had, short straw or hay will do, spread over the roots to the thickness of 4 inches, and covering a space of not less than 3 feet in diameter. This will do more to preserve the trees from death, and promote their growth, than any other course I know of; it is also cheap and effectual, and no watering will be necessary. I have strongly recommended mulching, because I know very few understand the value of it. Every tree over 5 or 6 feet high ought to be staked and fastened to the stake by a straw or hay rope, and be careful to clear away suckers about the roots as soon as they appear.—If the ground is cultivated in green crops for some years afterward, all the better for the trees; but if not worked with great care, I would recommend the whole to be seeded down at once, keeping 4 to 6 feet in diameter spaded and

hard around each tree. The first disease that attacks young trees generally is the Bark Louse. They are easily destroyed by scraping, and washing with soft soap. For young or old trees, there is no wash that I know of, equal to this; should be applied at the latter end of April, before the buds begin to swell.

PRUNING.

Pruning, properly considered, is one of the most important operations connected with the growth and management of trees. In this country almost all fruit trees are grown as standards, that is to say, trees having 5 or 6 feet clear stems. In this way they develope their natural forms, attain the largest size, and produce the greatest quantity of fruit with the least care. Orchard pruning, may be considered the simplest and plainest of all pruning. There are many erroneous notions that it is a mere mechanical operation that any man may perform, and that, in rare cases only, is necessary. Nature, they say, never prunes, and why should we? There is no such thing, in reality, as growing well shaped, symmetrical trees and plants, and sustaining them in a vigorous and fruitful state without pruning. A tree is composed of a multitude of parts, each of which has its functions to fulfil, and all these parts bear relations to each other, and to the life and growth of the tree.

Trees have roots and rootlets, stems, branches, leaves, and buds, all of which are designated by certain names, and have distinct offices to perform, in the proceeds of vegetation and fruit-bearing. The intelligent cultivator must be familiar with the names and functions of all these parts, the peculiar structure, mode of growth, and bearing of the different genera and species and varieties.—Every man of experience will endorse this statement,—the pruner should know well what he does, and the precise reasons for so doing. Pruning is not lopping off a branch at random; but every cut that a pruner makes upon a tree or plant should be guided by a knowledge of the habits of growth and blossoming and bearing of the subject, and have a well understood and determined object in view. A feeble tree and a vigorous one must not be pruned alike. By way of an illustration, I may here mention, as a general rule in all nurseries where trees are cultivated for sale, that the pruning is one of the principal modes of the cultivation. We take a seedling from the seed bed, or a cutting from the nursing bed, to transplant into stationary or nursery rows, and it is an invariable rule to cut back both the roots and tops, according to what their habit may be, to cause them to increase both the size of the rootlets and shape of the tops, which is done years in succession, until they are considered saleable and fit to plant permanently. After leaving the nursery, too much neglect in many instances has been the case, in not attending to the preceding rules of cutting, or what is termed heading back the tops of the shoots or young branches, one half of the young wood of the preceding year; also shortening or cutting in the long thick roots, to cause them to establish and furnish the heads with fresh shoots or young wood, from whence the cultivator can have the desired effect of shaping the tree to his mind, and for ever keep it in a proper position. This is one of the principal objects to insure a successful growth after planting. It is no uncommon occurrence for some to plant trees as posts, neither cutting roots nor tops, consequently the extreme points are exposed to the influence of the weather, which has the effect of drawing up the sap from the roots too rapidly consequently when there is no check from not being headed back, the wood dries up and the tree dies. I might here mention that there is another bad practice in the operation of pruning, that is to say, when a person applies the knife to a branch, the thought does not strike many that are not acquainted with pruning, that there is any particular mode of cutting a shoot or branch off. Now, what I allude to is, that the cut should be clean, drawing the knife from

head to point, in a sloping position, and the cut to be made from the opposite side of a bud, so as to leave no more than a sixth part of an inch of wood, or less, if possible, to heal over.

Pruning is therefore commonly resorted to only for the purpose of increasing the vigor of feeble trees, or to regulate and improve the form of healthy, luxuriant trees, when established, to cause them to fruit. Pruning in general applies to all trees and plants less or more. We very frequently see the difference between some that have been pruned and some that have not. Pruning should invariably be done in this country in the month of April, when the severe frosts are over. Since writing the above, I find that I have extended my remarks more than I intended to have done, therefore, to leave some time for discussion, I consider it better to reserve the last three subjects mentioned above, namely, Manuring and after management of an Orchard, Diseases, &c., &c., Costs and Profit of an Orchard, to which may be added a few remarks on the gathering and marketing of Fruit, and I should feel obliged if the Club would grant me the opportunity this day four weeks to finish my remarks on Fruit Culture.

As far as my knowledge extends, the following list of apples comprises some among the best and most suitable varieties adapted to our climate :—

SUMMER VARIETIES.	FALL VARIETIES.
Early Harvest,	Fall Pippin,
Summer Queen,	St. Lawrence,
Early Strawberry,	Fameuse,
Sweet Bough,	20 oz. apple,
Duchess of Oldenburgh,	Ribston Pippin,
Red Astrachan, 6.	Porter, 6.

WINTER VARIETIES.

Rhode Island Greening,	Æsopus Spitzenburg,
Baldwin,	Newtown Pippin,
American Golden Russet,	Bellmont,
Pomme Grise,	Swaar,
Roxbury Russet,	Northern Spy,
White Bellflower,	Dutch Megnonne, 12.

ON THE MANAGEMENT OF ORCHARDS AND FRUIT TREES.

(SECOND PAPER.)

In my remarks on Orcharding and Fruit Culture in a former paper, I endeavored to explain briefly the nature of soils adapted to Fruit Culture, and the process of preparing the ground, planting, distance, mulching, pruning, &c. I proposed in continuation of the subject to make a few observations on the following important points, viz., Manuring and after management of an Orchard, Diseases Cost and Profits of an Orchard, with a few remarks on gathering, preserving, and marketing of Fruit.

First then, manuring and after management of an Orchard.

Where the soil for an orchard has been properly prepared and cropped with green crops, the manure necessary for growing these crops, will materially help the trees, but no season should be lost without annual manuring of the trees, and this should be done early in November. It may be done cheaply and expeditiously in the following manner: Take a waggon load of barn-yard or stable manure, driving close alongside one row of trees after another, throwing out about a wheel-barrow full, more or less, according to the size of the tree, to each, then level it down smoothly and evenly with the fork to the extent of from four to six feet or more in diameter; this will keep down the weeds and nourish the tree, and the next November it should be dug in by the fork, and renewed every year. The kind of manure should be changed two or three years after the orchard is planted. There are manures and composts of various sorts recommended for fruit trees, all of which are good if properly applied. For the last ten years I have used swamp muck, ashes, leached and unleached, cowdung and lime all mixed together and laid over for a year, and find it superior for all kinds of trees. The lamented Downing, who has done more than any other man to create a taste for fruit culture, recommended the following mixtures for fruit trees, after they are well established in the orchard: for apple trees, to every cart load of muck or peat, five bushels unleached ashes, and two bushels good air-slaked lime; for pear trees, to every cart load of peat and ashes add a bushel of ground bones; for plums the same, adding a peck of salt. These I believe will produce the fairest fruit, and are not so liable to create insects as pure manure; indeed, how to prepare and apply manure is a matter in which every cultivator of the soil must feel interested. It matters not to what expense and trouble we go to procure the finest fruits and vegetables, unless we study the nature of our soil and the manure to apply to it, we must fail to a certain extent. Solid manures and composts of every kind should be applied in the autumn, so that during winter and spring they may be dissolved and fitted to yield nutriment to plants when active growth commences. The snow and rains of winter and spring dissolve and wash down its most soluble parts and place them within the reach of the roots by the time they are ready to take them up. These are the main points with regard to manure, and the remark is merely intended to draw attention to their importance. Young trees when they start to grow should receive an annual pruning, and washing of their stems, and the thick part of their limbs, with soft soap reduced one-half; and also a scraping and cleaning from filth of all sorts, from the bark of the trees, to prevent the lodgement of insects After-management of trees, consists in the cultivation of the soil among the trees, and pruning them to regulate their growth. For the first five or six years after planting, the ground among orchard trees may be advantageously cropped with potatoes, turnips, carrots or mangel wurtzel. This will assist in defraying the expenses of the orchard. Grain crops should never be planted among trees, as they prevent the circulation of air, which is so neces-

sary to them. There is one fatal error common to most people in planting fruit trees, which is that they never can get trees tall enough. When they go to the nursery to purchase trees they pick out those that have eight to nine feet stem. Such trees, let me tell you honestly, will never be profitable, because, if they live, when they begin to bear they get top heavy and the fruit is sure to be blown off by storms. Standard trees for a good profitable orchard should not be more than four feet stem. The plough will get as near to the roots of trees four feet high as it should to trees of ten feet height. I make these remarks here in order to show, if possible, the foolishness of having high stemmed trees for a profitable orchard.

DISEASES.

In addition to the ordinary obstacles to the cultivation of fruit, the special difficulties of diseases, and the attacks of insects, require to be well attended to. The work of destruction from either of these causes is often rapid and complete, but if watched and proper remedies applied promptly, each of these may generally be overcome without great loss. The great evil is delay; insects multiply with such astonishing rapidity, and diseases spread so rapidly, that the dilatory man sees his fruit and his trees pass away before he is fairly awake to the danger. Be sure to meet these foes at their first appearance, and commonly you will get the better of them; but if once they get established it will be hard to get rid of them.

Fire Blight is a disease that is not very common in apple orchards in this country, but in the States of New York and Ohio, three years ago, it threatened to destroy thousands of orchards, and cut away all the pear trees about Cincinnati. Its ravages are confined to apple, pear, and quince trees. I have heard no complaint about this disease among apple trees in Canada, but I have seen great ravages done by it among pear trees, large and small, in my own nursery. It generally makes its appearance on the young shoots or smaller branches, causing them to turn black and die in a few minutes. It is very contagious and spreads like wild-fire, and the only remedy is quick amputation and that without hesitation, down to the ground if required.

Black Knot or Wart on the Plum.—This disease is truly fearful in some sections of the country. I travelled a good deal during this last winter, and found the plums dying everywhere. Its first appearance is in the shape of a wart during the summer, and increasing during the growing season, which, in winter becomes black and very unsightly, as far as my observation goes. It is pretty nearly confined to the common Blue Plum, so much grown in the country. The remedy for this is the same as for the fireblight, namely, cut off all affected limbs and burn them. I have found no difficulty in keeping my trees free from it by cutting the wart clean out with my knife and applying a plaster of cow-dung and ashes.

Bursting of the Bark of Cherry Trees.—This is a disease common to all cherry trees in Canada that have a high naked trunk. It is supposed to be caused by the action of the frost and sun in the month of March. I find by various accounts from different parts of the country, that dwarf trees are not subject to the bursting of the bark, and I am inclined to this belief, as my own dwarf trees have always kept free from it. I have known cures by removing the dead bark and gum, and applying a plaster of cow-dung, tied round with a bandage to keep it in its place. Mr. Barry prefers a plaster of grafting wax or a solution of gum shellac put on with a brush as recommended by Mr. Downing.

INSECTS THAT ARE INJURIOUS TO FRUIT TREES.

Bark Louse.—This is a brown flat scale often the same color as the bark of the tree, and is not seen easily unless looked for. It attaches itself to the bark

of the tree, and is more injurious to apple trees than any other insect. It preys most severely on sickly stunted trees, and seldom appears on thrifty growing trees. Where they are thick, the only remedy is to scrape them off with a sharp instrument, and wash with soft soap and tobacco juice.

The Apple-tree Borer.—I find this insect is becoming very troublesome in some sections of the country. I never heard of it doing any harm in this neighborhood, until last year, though it has been known in the States for a number of years. Downing says it is a striped brown and white beetle, and is three quarters of an inch long. It deposits its eggs in June, in the bark of the trees near the ground. Here the larva is hatched and becomes a whitish grub, which saws its way into the tree, sometimes girdling it completely round. The most effectual method of destroying it, is to insert a small wire into its burrow, and kill it. Since writing the above I have received a communication from W. Allan, Esq., Cheltenham, wishing information about a certain insect that destroys great numbers of fruit trees in his neighborhood, working its way between the bark and the tree, eating the inner bark and sometimes girdling the trees all round. This I think is nothing more or less than the Apple-tree Borer described above. When lately in Streetsville, a gentleman told me that he had lost a number of trees by the same insect. Trees in the neighborhood where this insect works, should be kept clean and smooth near the ground, thereby preventing a lodgement for the eggs, with a sharp look out, with a wire or a shoemaker's awl, piercing into all the small holes.

The Apple Worm.—This insect deposits its eggs in the eye or calyx of the young fruit. The grub is there hatched and eats its way into the fruit, leaving behind it a brown powder, the fruit sometimes dropping off before it is half grown. Early apples are more subject to be affected than late ones, because they are in a more forward state when the eggs are deposited. Professor Harris says, when the fruit falls to the ground, the grub leaves immediately, prepares itself a place in some crevice in the bark of the tree, and spins a paper like cocoon in which it spends the winter, and comes out in spring. There are two ways of destroying this insect, one is at pruning time, in April, to search carefully for the cocoons and destroy them, the other is to pick up all fallen fruit and feed them to the pigs or otherwise destroy them. The increase of this insect is creating great alarm among fruit-growers in the Southern States.

Caterpillars.—Of these there are many kinds more or less destructive to fruit trees, some are large, jet black, and others striped of all colors. They are soon observed, and when they commence feeding on the foliage they weave themselves a bag to live in during the heat of the day. In the evening they spread out on the leaves till they fill themselves, then return to their bag again. They are easily destroyed by cutting off the branch they live on, or by taking bag and all and putting them in a tub of water.

The Cherry and Pear Slug.—This is a most destructive insect, which appears first in June and July, and a second brood afterwards. They are small slimy dark brown insects like snails, on the upper sides of the leaves of cherries and pears, and sometimes on plums and quinces. They devour the leaves rapidly, leaving only the bare net-work, which stops the growth immediotely. We destroy them by throwing dry earth, ashes or lime on them with the hand, and if they are looked after in time they are easily overcome.

The Curculio or Plum Weevil.—This is a small greyish brown beetle, a quarter of an inch in length, with wings and power of flying, but is not at all active, and by jarring the tree or a branch of it at a time, they suddenly fall to the ground, draw in their legs and appear to be dead. It is the most troublesome of all insects injurious to fruit. They destroy nine-tenths of the plum

crops all over America, and sometimes attacks the peach, nectarine, apricot, and even the cherry. I shall say but little about this worst of all insects, it has baffled the world; volumes have been written about it, and no effectual remedy found out. The only but too troublesome way to destroy them, is by spreading a sheet under the tree, and shaking or jarring it. This operation must be done about dark in the evening, or very early in the morning.

There are a few animals that are injurious to fruit and fruit trees.

Birds—The early cherries are generally the greatest sufferers from birds, and various modes are taken to frighten them away, but as a general thing birds do more good than harm, as they pick up insects that would otherwise destroy a large quantity of fruit and vegetables.

Field Mice.—The most effectual way to prevent depredations by field mice is clean culture. If you leave no grass, weeds, rubbish, heaps of brush or stones around the garden or orchard, the mice will not trouble you. A good old plan also, is, to tread the snow after falling. In these few remarks on diseases and insects, I only mention those more common in our own country.

COST AND PROFITS OF AN ORCHARD.

For information on this subject I must go abroad to older countries and older fruit-growers than we are, and in doing this I think I cannot quote or refer you to a more intelligent class of fruit-growers than "The Fruit-growers' Society" of New York State, and I may say a more intelligent convention, perhaps, never sat in any country, to discuss on the cost and profits of orcharding. This congress of Fruit-growers was composed of two members from each county in the State of New York. They met at Rochester, and sat two days, in February, 1856. Their proceedings are published in a pamphlet form, and ought to be in the hands of every fruit-grower in the country. I think I cannot do better here than to allude to some of their remarks on the profits of fruit culture as applicable to our own country. The first question discussed was, "Can the cultivation of fruits for market on an extensive scale be recommended to the farmers of Western New York?"

Mr. Barry was called on to open the discussion on this question, and he answered without hesitation, yes. He said that the farmers of Western New York were placed in a different position to what they were a few years ago. The great west has been opened up by railroads, and the farmers of Illinois, Wisconsin, and the Western States, can send forward their wheat and other grain crops to the sea coast, with rapidity and at cheap rates. This has created a great competition for our farmers. Here our farming lands are worth from $50 to $100 per acre, while they are worn out and need manure, but in the west the richest and finest soil under the sun can be bought for $4 or $5 per acre, ready for the plough. The weevil too, of late years, has made sad havoc among the wheat crops, and is it not high time that the farmer should make some enquiry concerning other objects of cultivation to which he may appropriate his lands and invest his skill and capital to greater advantage. It seems to me it is the duty of this society to come forward and suggest a more extensive culture of fruits.

Mr. H. C. Smith, Monro county, said: Our friend, Mr. Barry, has advocated the culture of fruits on a large scale. I would ask him and others whether in point of fact, the farmer would reap more reward from ten acres of good orchard than by applying the same land to the raising of corn or wheat crop under good cultivation, where apples are selling for what the cost of picking comes to? I know some farmers who sold their apples for five or six shillings per barrel this year. I think the ground would pay better in potatoes

I make this enquiry and would be happy to have it answered by those who have the statistics in relation to it.

Mr. Barry said, I hope some other speaker will reply to this question. I would say with regard to the marketing of fruits that three-fourths of our farmers who raise fruit, or, on whose farms fruits grow, take no pains in marketing.—They let them hang on their trees until somebody comes and asks for them, and then they let them go for what they are offered for them. They make no arrangements to sell their fruit until they are too ripe, and then rush them into town all in one day, glutting the market, so that they are obliged to sell them for what they can get, then the word goes round that there is no sale for fruit, consequently nobody brings any to town for a few days, and they are up again $3 or $4 a barrel.

A gentleman here arose to ask Mr. Smith two or three questions. First, how many barrels per acre did these orchards turn out, the kind of apples produced, which sold for five or six shillings per barrel. Second, what was the cost of picking per barrel?

Mr. Smith. I am very happy to answer the gentleman's questions. One orchard that I know contains a little less than two acres, and I understand the proprietor picked from that orchard one hundred barrels of good fruit and sold them for six shillings a barrel, the purchaser finding the barrels. It is well known that an orchard that has been planted for 50 or 80 years, and the trees grown to a great height, is very difficult to pick, and therefore afford but little profit to those who pay pickers for gathering their apples. I wish to hear both sides of this question fully discussed, so as to draw out every point involved. I have no figures to show what the cost of cultivation of this orchard was, but supposing the man could have raised there as he might in some soils, 100 bushels of corn, we have to look about and see whether the corn would not be as much profit as the apples.

Mr. L. Burtis.—I would remark that I take a very different view of the cultivation of fruit to what some people do. I was in hopes Mr. Barry would go into the profits of fruit growing, besides that derivable from their sale. I believe they can be made to produce more wealth than any other crop by feeding them to stock. At the small price of 25 cents per bushel they are more economical to feed with than potatoes, and are much more pleasant to cultivate. In the feeding of swine where apples are taken and boiled they will make more feed than potatoes. You cannot raise a potato or a corn crop on the same piece of ground, year after year, and have a good crop, but with apples you can. On the whole, I think and know that it is a very profitable business, the raising of fruit for feeding stock as well as for the use of man. [Mr. Burtis calculates the price of apples very low, namely 25 cents a bushels, and maintains that they are more profitable than corn or potatoes, but the true way to calculate is to reckon so much on every tree. I know in Toronto there are apples trees that yield from eight to twelve barrels a year. For example we shall take an acre and 50 trees to the acre, yielding annually two barrels each, clear of all expense, they are worth when picked 7s 6d per barrel, which is a very low figure. If they are keeping fruit save them until spring, and then they are worth 10s currency, leaving a profit of £50. This is no exaggeration, as every person of experience must know. The Hon. George Crookshanks told me, (and I saw the crop myself), that he picked 12 barrels of Snow apples from one tree in his garden, and reckoned the windfalls at about 3 barrels. He sold them when picked for 11s 3d per barrel, amounting to £6 15s, from which deduct for barrels 12s, for picking 6s, leaving a clear profit of £5 17. This tree don't cover over 20 feet square of ground. I have a Baldwin apple tree in my nursery, planted 11 years, and in 1855 I picked 3 barrels from it besides windfalls. I

know an old orchard in my neighborhood covering about an acre and a half of ground, and the tenant on the farm informed me that he gathered 32 barrels of apples from three trees, and that he made more of the orchard than from fifty acres of farm land. He took care of his fruit and knew when to sell it.]

Dr. E. Ware, Wayne county, said at the convention above mentioned, that the question which was asked, namely, how much it cost to have such an orchard cultivated, was one which struck at the root of the matter. If people do not cultivate and take care of their orchards they cannot expect good fruit from them. I picked from one of my Spitzenburg trees 5 barrels. I have forty trees to the acre that will give me 200 barrels of apples, and these apples I sold at $1 a barrel, and barrels found me. My man picked from 8 to 10 barrels per day and headed them up. The cost was then probably one shilling (7½d) per barrel. The total amount therefore for fruit $200 per acre, from which deduct one shilling (7½d) per barrel for picking, and you have left as the profits of one acre $175. This I acknowledge is a true statement. I also know an orchard five acres in extent, the owner of which pocketed the year before last $1.000. [I think the Doctor has estimated the products of an orchard at a low figure.]

Col. E. C. Frost of Schuyler county, said in relation to the relative profits of orchards and corn and other grains. I have made an estimate, setting 50 trees to the acre, with the yield of 3 barrels to the tree, which is very moderate. An orchard well cultivated ought to produce three times that quantity; but at this rate it will produce 150 barrels, which, at six shillings, will amount to $125.—In my opinion no person in the State of New York has ever put up a hundred barrels of the best apples, and sold them as cheap as this. The same acre planted with corn producing one hundred bushels, 75 cents a bushel, would of course yield $75, and the ground must be in good order to do that. It certainly costs more to till an acre of ground in corn than in orchard. Even supposing it costs the same, we then would be largely the gainers with an apple crop, but we would not give in to this either, for any one would take the orchard ground and till it for the crop it would produce in addition to the fruit.

Mr. Ainsworth of Bloomfield, said. One of my neighbors, Samuel Millington, has three acres of orchard that he has taken some little pains with within the last two or three years, but previous to that it received scarcely any attention.—Last year he sold the fruit from those three acres for $525. He thinks that another year he will realise from $700 to $1000 from that orchard. It is an apple orchard entirely, composed of Northern Spy and Roxbury Russet.

Mr. Burtis said. A few years ago I advertised, in the *Rural New Yorker*, the production of a Baldwin tree, as also a Rhode Island Greening. The fifth year after I set out the former I took 3½ bushels from it, and from the Greening 2½ bushels. I differ from those gentlemen who consider 25 feet too nigh for apple trees. I have travelled through every county in the State of New York, and through a large portion of several other fruit-growing States, and where I have seen trees growing close together I have always found them loaded with fruit, while I have also found many orchards with trees thirty or more feet apart with little or no fruit. I have therefore come to the conclusion that by setting trees close they protect each other from the wind and storms, and are consequently in a better condition for bearing and sustaining a heavy crop. Travelling through Columbia county, I spoke with a gentleman who told me that in the year 1853 he sold from three acres of land $450 worth of apples. Previous to that year the apples were almost worthless, from their having had no attention paid to their improvement. If I were setting an orchard I would plant my trees twenty feet apart. They would then fully protect each other, and could be cultivated as well as if they were farther apart.

Another gentleman in the court said, our soil will soon be worn out in the

growing of wheat, and our grain crop will begin to degenerate and fail, as the potato crop has done in Ireland. Therefore, I say, we should make calculations to grow fruits and of such a quality as to secure the best market wherever they may go. We shall soon do much towards supplying all England as well as other countries with choice varieties of fruits from Western New York.

Mr. Arch. Stone of Himmanville, Oswego County. In our section of the country we have had no market for fruits, and have had no apples that were worth marketing until within a few years. Now, however, our prospects are coming up, and we are paying more attention to the subject of fruit culture. We have formerly got a dollar a barrel, but since the railroad company has established three depôts in the county the price has ranged about twelve shillings per barrel. The Roxbury Russet is considered as the best winter apple we have, but selling it in the fall is almost throwing it away. When kept till spring, as it can easily be, it will fetch thirteen shillings a bushel. I have known some of the best sorts selling as high are $3.50 per bushel. The Baldwin I should think best adapted to our soil and climate. I know one tree that two years ago produced twenty-eight bushels! Twenty-five bushels were sold for a dollar and a half per bushel, which would pay for the cultivation of two or three acres of orchard, leaving the product of the rest of the trees clear profit! There is now more money probably brought into Oswego County for fruits than from all other sources put together. Nearly everything produced in the county, with the exception of this crop, is consumed at home. There was in the neighborhood of $150,000 brought into the county for fruits that were sent out; and yet Oswego County *has* been behind in this respect. The committee of Oswego County have made their estimates, and their figuring is to the effect that one acre produced more money than twelve acres of the ordinary crops. We reduced our figures down, however, considering that it would appear large enough to call it five to one.

Dr. Long said he considered fruit-growing as at least ten times as profitable as grain-growing. If I had land of the right character I should have no hesitation in planting the whole of it in fancy sorts of apples, pears, and peaches, expecting to reap nearly ten times as much from it as from any other crop.

Mr. L. B. Longworthy, of Greece. As to the profits of raising fruit, I have always supposed that an ordinary apple tree that will produce five bushels does not use up more than a square rod of ground, and one square rod does not produce more than a bushel of potatoes in this country. If this is so then the apple trees that produce but *one* bushel give as much return as potatoes. I have sent apples to the West Indies two or three times, and they paid me well. I have known ordinary pears to sell in New York for $18 per barrel. From these facts, that cannot be denied, our fruit, if properly cultivated, is the fairest in the world, and will take precedence in the best markets in Europe.

Mr. Ainsworth—Now, if you please, I will make a few remarks with regard to the cultivation of the pear. Of pear orchards we have but every few in our country. One is that of Mr. Thaddeus Chapin, of Canandaigua, which has now been set nine years. Six years after being set out, he sent some of the fruit to New York, and obtained $8 a barrel for it. The next year he had thirty barrels of fine pears from his three acres. For these he obtained $15 a barrel from a market woman in New York, making $450 from his three acres. This was his own price, and after paying him for them, the woman remarked that if he had asked $18 she would have paid him that amount quite as readily. The year before last he had fifty barrels, which he took to New York and sold for from $18 to $20 a barrel, making nearly a thousand dollars. There were three pear trees of the Virgalien sort on Judge Howel's farm, the products of which were sold for several years for $60 a year. A gentleman of Canandaigua sold from three trees $137 worth of pears.

I have now endeavored to give you the experience of the older and most intelligent fruit cultivators in the States, in order to show the cost and profit of fruit-growing; and I believe they are correct in all they say.

They estimate the value of fruit so low, that any one must believe it. They, however, boast of the fair complexion of their fruit; but I am proud to say we can beat them in Canada, in what Downing calls, "the renowned fruit of all the civilized world," the Apple. I know this, as I have seen theirs and ours side by side more than once at our Provincial Exhibitions, and some gentlemen here present know this to be true. The object of this Society is, and always should be, to elicit all the information on the subject we can, and bring it publicly before the people of this country. We should at once establish a Provincial Pomological, or Fruit-growers' Society, the object of which should be the advancement of the Science of Pomology, and the Art of Fruit Culture, to meet once a year where the Provincial Exhibition is held, and each country to send one or two delegates with specimens of fruit, with all local names to be corrected by this Society.

GATHERING, PRESERVING, AND MARKETING OF FRUIT,

Are questions of the greatest importance to the Fruit-grower, and are worthy of serious attention. How many of those who have orchards and a little fruit to spare, know how and when to gather it, in order to secure a good price and a ready sale. Those who grow for the market must, therefore, make up their minds at once, that they must prepare their fruit properly, just as farmers prepare their other productions for market. I always observed that when fruit is offered in barrels or basket, without a bruise, it commands a good price, while another who has shaken his fruit, thrown it into a wagon-box, and brought it into the market in this condition, can hardly give it away. All the fruit that is grown, and ten times as much more, would not be enough to supply the public wants, were it all properly ripened and cared for. With a majority of those who supply our market with fruit, it is not a profession, but a sort of subordinate, incidental business. They think that other branches of their pursuits are more important, and the fruits are passed over hurriedly and carelessly, the object being to get rid of them with the least possible waste of time. Fruit for market should be always assorted into grades, and never mixed nor put into bags. In gathering summer apples or pears for market, the barrel or basket in which they are to be carried to market should be taken to the tree, the fruit hand-picked and carefully put into the barrel. Fallen and bruised ones should be put into a separate cask. Fall and Winter Fruit, as a general thing, should be gathered about the tenth of October. Barrels should be provided and taken to the trees, also good step-ladders. Pick into small baskets and fill the barrels, every sort by itself, keeping out all the small ones, as they would materially injure the sale of the others. Head up the barrels, and mark the sorts. Carry them to a barn or shed, till frost sets in; then put them into a dry, cool cellar, selling off all fall fruit in proper time. Every one should ascertain the keeping qualities of his sorts, and never dispose of keeping fruit in the fall; for one barrel of apples in May, is worth two in November. In these brief remarks, I have alluded more especially to the staple fruit of the country. A great deal more might be said on the Gathering, Preserving, and Marketing of Fruit, but I fear I have already trespassed on your time for discussion on the different points alluded to.

THE CULTIVATION OF ROOT CROPS.

BY W. H. BERESFORD, ESQ., OF NEWMARKET.

The uses of roots were as well known to the ancient Romans as to any British farmer, and the winter-feeding of cattle with roots was practised even among the ancient Gauls. Pliny remarks that "some Roman authors have treated of rapa in only a cursory way, the Greeks more particularly; but if a just order were observed, it should be mentioned immediately after wheat, or at least after the bean; for no other plant is so well adapted for food to all sorts of animals." But though the cultivation of the turnip was known to the ancients, it has been left to the British husbandman to make manifest its importance, and in the words of an English writer:—"Turnip husbandry greatly aided the transition from the barbarous agricultural usages of the middle ages, to the enlightened ones of the present day, and is now well known to every good farmer to be the sheet anchor or *sine qua non* of the modern alternate and convertible husbandry."

At what time the field cultivation of turnips was begun in Britain, is not, I believe, exactly known. They were employed for domestic purposes at an early date. The field cultivation seems to have been introduced from Flanders, and to have taken special root in Norfolk. Woolidge, in his "Mystery of Husbandry," printed in 1669, says:—"In Holland they slice their turnips with the tops, and rape-seed cakes and grains, and therewith, make mashes for the cows, and give it them warm, which the cows eat like hogs." And he complains of the great neglect of all similar uses of turnips in the farm economy of England. The usual mode of sowing turnips, both in Flanders and in Norfolk, was broadcast, and continued so for many years, until the introduction of the drill system, and the benefits which that system confers in respect to quantity of produce and economy of labor, together with the facility it affords to hand-hoeing and horse-hoeing, and the land thereby being cleaned and fertilized by this important crop, cannot be too fully appreciated. Under due management it may be considered that almost all kinds of soils which are capable of thorough tillage may be cropped by some kind of root, either turnip, parsnip, carrot, or mangel-wurzel. In Britain the practice is to fall plough the land intended for roots; in this country, the earlier in the fall this operation is performed the better, to allow time for the grass and weeds to decompose, and as early in the spring as the season will permit, the land should be ploughed again, and well worked with harrow and cultivator. With regard to the question of the most efficient system of manuring land for a root crop, an enquiry into it is so vast, and contains within it such abundant matter for discussion, that I shall not enter into it. We should have to take into account that which is best adapted to promote rapid and early growth, to assist the plant to escape destruction from insect depredation,—the effect upon the development of the root, the influence over the chemical constitution of the root, both with regard to the general feeding and fattening powers on the live stock,—and lastly, to its adoption to the uses of the succeeding crops in the rotation. In it is contained almost the entire science of agricultural chemistry; still, without entering upon it, thus much, I believe, is recognized: that well-rotted dung is essentially necessary to the culture of the turnip, where it is used at all; the turnip is the most important root cultivated, and whatever relates to it may be applied to the culture of mangold-wurzel, carrots, etc., and as barn-yard manure is generally employed in this country, I shall direct my remarks to the mode of cultivation under which I have seen raised large crops of these roots. When farm-yard manure is used,

the raised drill or ridge method is probably the best. The ridges are made either with a single cast of the double-mould board plough, or a double one of the common plough, a cart with manure follows, the dung is deposited in the seams made by the plough, the plough again follows, closes the ridges, covering the manure, and the drill succeeds,—a light roller goes over the sown ridges to cover the seeds. The distance between the drills should not be less than 27 inches. Tull appears to have used intervals of three feet. Mr. Dawson, of Gradan, in Roxburghshire, after some residence in the County of Norfolk, adopted the drill system in preference to the mode which he had seen practised in that county. Mr. Dawson began the drill turnip husbandry in 1764, growing nearly 100 acres yearly. He fixed upon 30 inches as the best interval for the purpose, and his practice has been followed in all the border counties. Stevens remarks, "it is not an unusual practice in England to sow turnips broadcast in the flat ground, instead of on drills, and the reason I have heard stated in vindication of the broadcast method is, that it resisted the bad effects of drought; but, for my part, I cannot see how a broadcast crop can screen the ground from drought more effectually than one in rows, since the plants have to grow and be thinned out to proper distances, and the ground stirred to get rid of weeds, in both cases; and as the weeding is done by hand instruments, in the case of the broadcast crop, it is not so effectually done,"—and, I may include, so economically done,—"as with horse-hoes in the crop in rows, and I think it cannot admit of doubt, that the same quantity of manure placed immediately under the seed should promote the growth of the young plant more rapidly than when spread over a large surface of ground."

I trust we shall have some remarks by some of the gentlemen present on this point, also with regard to preparing the land in the fall. The after culture of the turnip crop consists in thinning or singling the plants to the proper distances, and in a series of operations for destroying weeds and stirring the soil. The first hoeing is generally done by a horse-hoe, when the plants have acquired the rough leaf, or are about two inches high; a few days after this operation, the hand-hoes go to work and so hoe the turnip plants as to leave them standing singly at the distance from each other of not less than 12 inches between the plants of Sweedish turnips and 9 inches between those of the white. This operation of singling is most important. Much must be left to the judgment of the farmer. To show how important careful attention to this point is—it has been shown that the effect of one or two inches between the turnips has influenced the weight of a crop by several tons per acre; it is a delicate operation, and requires the superintendence of the master and the hand of a skilful labourer.

The raising of stock in this country is an important and interesting question. Is sufficient attention directed to this important point? It was likewise a difficult task in Britain to support live stock through the winter months, and the practice of feeding cattle and sheep for market was hardly even attempted until turnip husbandry commenced. The Canadian farmer experiences the same difficult task, and why? Because he affords his stock nothing but dry food. How many cattle are there in this county who, from the time the snow falls on the ground in December, until the month of April, never partake of any vegetable food. Is it possible to maintain the milch cows and other stock in a healthy condition without a portion of roots with their dry food. I heard a gentleman, an agriculturist, not however a Canadian, say at a public meeting held during the time of the Provincial Exhibition at London, "that turnips were a nasty cold food—that he was surprised the farmers of Canada grew them." In Mr. Hall Maxwell's Report, from the Highland Society of Scotland, presented to the Commissioners of Privy Council for Trade, he reports, that the total average

number of acres under crops was, in 1856, 3,545,721¾ ; wheat, 263,328 ; turnips, 459,741¼ acres. What has not root culture effected in Scotland. What has not the same system wrought in England. England, by maintaining a considerable area in green crops, maintains the fertility of her soil, and according to the *Journal of the Royal Agricultural Society*, produces four times more wheat per acre than France, yet the climate of England is not particularly adapted for growing wheat. In the United Kingdom there are 35,000,000 sheep—France has only an equal number, and a French sheep is only half the size of an English sheep. I confess I view these facts as showing the importance of root cultivation. The land is cultivated, an abundance of food is provided for man and beast; the fertility of the soil is maintained; the land is cleaned by this preparatory crop, and a bed is provided for grass seeds, in which they grow and thrive with greater vigour than after any other mode of preparation. There are many persons here present who saw the Toronto Christmas market. Was it a show of Canadian beef? The Canadian farmer appears to be giving up raising stock, arising from his neglecting his root crop. I have stated that in England, by attention to green crops and raising cattle, four times as much wheat per acre is raised as in France. We import our beef. Soon we may have to import our wheat. Every Canadian farmer could, with perfect ease, devote every year a portion of his land to roots, five acres at least to every hundred in cultivation ; by so doing he will be able to maintain more stock, obtain more manure, and produce more wheat per acre than under the present system. The nutritive matter contained in an acre of turnips is great. In a crop of 20 tons, or 45,000 lbs., there are 900 lbs. of thick or woody fibre ; 4,000 lbs. of starch, sugar, gum, 670 lbs. gluten, 130 lbs. of fat or oil, and 300 lbs. of saline matter; total, 6,000 lbs. A crop of 25 tons or 56,000 lbs. per acre of carrots contains 1680 lbs. of husk or woody fibre ; 5,600 lbs. of sugar ; 840 lbs. gluten ; 200 lbs. of fat, and 800 lbs. of saline matter ; total 9,120 lbs. The quantity of nutritive matter afforded by a crop of mangel wortzel of 20 tons, or 45,000 lbs. per acre, consists of 900 lbs. of husk or wood fibre ; 4,950 lbs. of starch, sugar etc.; 900 lbs. gluten ; 450 saline matter ; total, 7,200 lbs. From a crop of oats at 50 bushels per acre, the 50 bushels weighing 2,100 lbs., we obtain 420 lbs. of husk or woody fibre ; 1050 lbs. of starch ; 300 lbs. of gluten ; 100 lbs. of oil, and 80 lbs. of saline matter ; total, 1,870 lbs. A heavy crop of wheat, at 60 lbs. to the bushel, the weight of grain per acre would be 2,700 lbs. The amount of nutritive matter from an acre of Indian Corn at 30 bushels, amounts to 1,703 lbs. From an acre of peas, at 25 bushels per acre, 1,392 lbs. We have therefore 6,000 lbs. of nutritive matter from an acre of turnips ; 9,120 lbs. from an acre of carrots ; 7,200 lbs. from an acre of mangel wortzel ; 1,870 from an acre of oats ; 1,703 from an acre of Indian Corn ; 1,392 from an acre of peas. An acre of good turnips is calculated, in Scotland, to keep four oxen—would an acre of wheat, or oats, or Indian corn, maintain that number? I am indebted to Stevens for these calculations, taken from Johnston's Lectures on Agricultural Chemistry.

The use of carrots on a farm is well known to those who cultivate them. The seed should be sown early in the spring, the land having been well worked, for the carrot delights in depth and openess of soil. The grand use of carrots on a farm is for strengthening and medicinal food to horses and cattle. A gentleman of my acquaintance was very successful in giving them last spring to his horses when they were recovering slowly from the influenza ; they greatly promote the health of all animals. The difficulty attending the sowing of the seed of the carrot operates against any large breadth of land being devoted to its culture. They should occupy however, some space in every root field of the farmer. The long red mangel wortzel, the globe orange, and the red turnip rooted are

eminently suited for culture in this country; they are suited to a much greater diversity of soils than the turnip. On peaty soils on the reclaimed bog lands of Ireland, they have produced a large amount of food. Equally a cleansing crop with the turnip, the mangel stores as well, if not better, is excellent spring food, can be sown earlier, not being subject to insect depredations. Experiments have been made of late in Ireland of substituting the mangel for part of the daily allowance of oats to working horses, and a calculation made that by consuming in this way the mangel produced by half a rood of land a quantity of oats will be saved which it would require two acres to produce. This crop should be harvested early, I found them more tender than the swede, the yellow globe more than the red; in pulling them, care must be exercised to inflict upon them as little injury as possible.

The Parsnip is even more productive than the carrot; in the south of England and in the Channel Islands it is much cultivated. In a trial of the Altringham carrot and parsnip, in Jersey, in 1834, the same quantity of land which produced 261 lbs of carrots, produced 840 lbs of parsnips. The Alderney cows are fed on these roots, their milk is surpassingly rich, and yields more butter in proportion to quantity than that of any other kind of cows. Colonel Le Couteur, an experienced agriculturist, states, that out of three crops of parsnips in the Island of Jersey, in competition for a premium, the prize crop amounted to 27 tons 8 cwt per acre, a quantity nearly sufficient for 10 cows, during the six winter months. The methods of culture practised in the channel Islands, is both broadcast and drill; deep trench-tillage is adopted, from 1 foot to 18 inches deep. In the spring of 1854, also in the spring of 1855, I partook of the parsnip root which had been all winter in the ground, they were free from decay and of excellent flavor. That the cultivation of roots has proved itself of extraordinary service to the farmers of Britain is evident to every intelligent mind. It has enabled them to provide a supply of food for their stock, and maintain them in good condition during, even in that country, the trying season, before the commencement of the spring feeding, to maintain the fertility of their land, produce more wheat and keep more stock per acre than even France. I am well aware that in this climate we cannot carry the culture of roots to the same extent as is followed in Britain; but when we look to the amount of nutritive matter to be obtained from an acre of roots, and that by their culture they are the procurers of other future good crops, I am impressed with the opinion that every farmer should cultivate in certain proportions the mangel wurzel, the carrot, Swedish turnip and some variety of the white. By commencing in May with the mangel and carrot, in June with the Swede, and even as late as July with the white turnip, he will be able to some extent to avoid those difficulties which we have to encounter in this country with regard to labour, and attend to each crop in its several stages of growth, feeding out these different roots in their several seasons, and by it turn the earth to the uses for which it is intended, and avoid those evils which the wretched system of a continual growing of wheat is certain to insure, which has reduced the average yield in parts of the neighboring State of New York to 10 bushels per acre, and taking the whole state the average to be under 15 bushels, and even the great State of Ohio, is said, will soon have to become an importer of food. In Scotland, where turnip husbandry is so much considered, the average yield of wheat in the 32 counties is over 28 bushels per acre, and this includes the northern counties and the Orkney Isles. I allude more particularly to Scotland, as that country through the Highland Society affords agriculturists a large and valuable amount of useful information.

The question, can you grow roots in this country, can you harvest them and store them, I shall not discuss. I am fully impressed with the opinion that we can do so, and that turnip husbandry is the sheet anchor or *sine qua non* of the

modern alternate or convertible husbandry; that the operations of a farm cannot be conducted with profit without it; for the production of one description of food produces another. Vegetables are converted into mutton and beef, to be again returned to the land in the shape of manure. Production and re-production thus follow each other; ill-conducted farms are made to produce waving fields of grain; the cultivated grasses to take the place of those which possess no nutriment, and render no return. This is the result that turnip husbandry has wrought in Britain, where great flocks of sheep and improved breeds of cattle are spread over the country, and whose farmers make yearly profits exceeding the rent-rolls of some of the petty Princes of Europe.

In Ireland, the increase is most striking with respect to root crops. No longer ago than 1847, the proportion was an acre of green crops to every four acres of corn or wheat. There is now in 1856 an acre of green crops to every two acres of wheat. The value of live stock in 1841, was computed to be £19,339,000; in 1855 it was computed at £33,508,000. Thus it is where turnip husbandry exists and the culture of roots considered, the toil of the husbandman receives a return; where the culture of roots is neglected we descend to 10 bushels per acre of wheat, and the toil of the husbandman receives no return.

THE HORSE.

BY RICHARD L. DENISON, ESQ., TORONTO.

At the special request of the Club I promised a paper upon the Horse, which promise I the more regret since I find my utter inability to do that most noble of all animals justice, or indeed anything like justice. But if it were in my power to convey to you in a word, my love and admiration of that noble animal, then indeed would he have justice done him.

Claiming the indulgence of the Club, I give you such a paper as I have been able to prepare. The horse has been almost my daily companion since I was ten years of age. I have always had one horse which I considered my pet amongst animals, and ranking before all others on the farm. My brothers also had each their own horse or poney, as soon as they were able to ride and manage one; from then till now we have never been without horses, and this, I think, is to be attributed in a great measure to the affection we formed for them in our youth. I intend to practise the same with all my boys, and do so now with the eldest, and trust that they may always be the friends and admirers of that noble beast. I think it part of the education of a gentleman to be a good horseman, to have a knowledge of the diseases and treatment of the horse, and be able to select when required, a good and valuable one, that fills the eye, free from blemish; and also to be judge enough to come pretty near his age—the more necessary in a country like this, where horse jockeys and traders are so keen and cunning,—and beside all this it is really pleasant to understand and know a good horse, and to feel that the horse himself can appreciate every kind of treatment, whether good or bad. How often have I seen a horse shrink from one that had treated him unkindly, flying from him when he could, and trembling at his presence in the stall; whilst, on the other hand, pawing and neighing to acknowledge a kind master's presence, and turning a beautiful and intelligent eye and ear upon him. Youatt says, "from the nobleman, with his numerous and valuable stud, to the meanest helper in the stable, there is scarcely

a man who would not be offended if he were thought altogether ignorant of horse flesh. There is no subject upon which he is so positive; there is no subject on which, generally speaking, he is so deficient; and there are few horses on some points of which these self-sufficient judges would not give a totally opposite opinion." My second horse was given me when I was 13 or 14 years old. She was a filly of the get of Sultan, a celebrated Arabian Stallion, imported into this country by Col. Smith, about the beginning of this century. Sultan was the progenitor of the best road horses ever owned in this district, and I say this without fear of contradiction. My filly was named "Milkmaid," a mare I rode and drove for more than twenty years, always, as they say in racing language, *placing* me well upon all trials, and never surpassed in endurance. During her long life she never took medicines or was bled; indeed was never sick or lame, nor so far used up as to require a whip or spur, though I have driven her to a cutter nearly 90 miles in a day. My present Milkmaid is her daughter (by Cadmus) inheriting the same constitution and indomitable spirit of her dam, and able to do her mile considerably under three minutes, if not in the usual "two-forty."

The horse is universally known and as generally liked; more useful, obedient, intelligent and beautiful than any quadruped bestowed by a kind Providence upon man. "In gracefulness of form and dignity of carriage he is superior to almost any other animal, he is lively and high spirited, yet gentle and tractable, keen and ardent in his exertions, yet firm and persevering. The horse is equally qualified for all the various purposes in which man has employed him, he works steadily and patiently in the loaded waggon, or at the plough, becomes as much excited as his master in the race, and appears to rejoice in the chase." Beside his valuable services when alive, after death, his skin, hair, mane and tail are valuable, and his flesh is becoming fashionable food for man, highly prized in France by epicures, and I should not object to partake of it myself, only however for the principle, or the rule, that, "dog won't eat dog"—I suppose having too much respect for him.

Wild horses, I believe, are to be found in all parts of the world, and in great numbers on this continent. Those to be found in the North and West which are best known to us, are of a small but hardy form, covered with a shaggy coat, and not unlike the Welsh Poney, suiting themselves in growth and covering to the herbage and climate they inhabit. Desmaret gives upwards of twenty varieties of the horse, and his catalogue is by no means complete. The history of an animal so beautiful and valuable must necessarily be interesting.

"The first allusion to the horse subsequent to the flood is a mere incidental one. This was fifteen hundred and ninety years before the birth of Christ, in the time of Isaac, when the son of Gibeon is said to have found mules in the wilderness, the progeny of the ass and the horse; as he fed the asses of that Patriarch. When Jacob lay on his death bed he called his sons around, giving them his parting blessing, and prophesied what would be their fate and character. In speaking of Dan he said, 'Dan shall be a serpent by the way, an adder in the path, that biteth the horse's heels, so that his rider shall fall backward."

From this it is seen that the horse was then used as a beast of burden. Job, too, spoke of the horse and his rider. Pharoah's horsemen perished in the Red Sea. Many very beautiful and interesting anecdotes are told of the faithfulness and sagacity of the horse; often fighting for his master and in various ways protecting his life; and frequently have I given my horse his head when I dare not trust myself to guide him. The memory of the horse is also very great, especially for places. Milkmaid never forgot a place she had called at though years had elapsed, and I have known a horse return to his birth place and former master after an absence of many years.

The most valuable horse for this country, in my opinion, is one that can not only draw a great load, but can can also go at a good pace without injury to himself. For the farm horses here, are road horses as well, as every farmer must go to mill, and markets, fair and church, with his farm horses, and then, unless loaded, expects his team to carry him at the least seven or eight miles an hour, and when loaded, something above five. But in England, where the roads are so good and the wagons so strong, I should say that they were content, with the loads they carry, to make from two to two and a half miles per hour, and to plough and harrow at the same rate. Such movements would never do in this country, where wages are so high and the farming season so short. This being the case we must content ourselves with a less powerful but more active horse, something in the neighborhood of sixteen hands high, with a clean flat leg, and lofty carriage, sparkling eye, and lean face, thin and open jaws, and roomy nostrils. In fact what is considered in England a good carriage horse, is the very animal we want, and in many respects have now. Indeed, the horses of this district will compare well with any I have yet seen. Of course, when I say this, I do not mean to put them in competition with the draught horses of Liverpool, London, and Manchester, or with the racers of Epsom, Doncaster, and Ascott.

The breeds of horses in this district, and indeed throughout Canada, are fast improving—thanks to a few spirited importers, such as Cooper, Ward, Blanchard, Roundtree, Crew, and many others who deserve to be named.

The stallions in this district are so deservedly well known that they can be sold at excellent prices as soon as brought into the market, and are now taken to all parts of Canada, and many to the United States. Ward's horse, imported "Clyde," was of infinite service in increasing the size of our horses, and many stallions of his get were, in my opinion, far his superior. At the Exhibition of the State of New York Society held in Rochester, he and four of his sons exhibited together in a ring, were the admiration of the crowd, and the pride of the Canadians. I have attended the New York State Shows for many years, and also our own, and frequently as a judge of horses, and I do not consider them as any longer leading us in horses, but rather think that we are heading them. To keep up this class of horses in Canada we must continue to receive fresh importations from England, but not to run too much upon the very heavy draught horse, now so much in vogue there. A good Cleveland bay with the well grown mares of this country would, in my opinion, be just what we want for general purposes. Heavier horses may do for millers and lumberers, on good roads and short distances, but not for fast driving or bad roads.

Another class of horse we much need in this fast country is a saddle or buggy horse; and for that purpose we should have a dash of blood, and that not a slight one;—for instance, such as one bred between our best mares, tolerably well off for bone and muscle, and a thorough-bred stallion.

The breeding of good horses should be much increased in this district. The demand has almost outgrown the supply, notwithstanding many thought the railroads would diminish the demand. Such will not soon be the case in this new country, where the railroads open up the wilderness for settlement and increase the demand every day. A horse that would fetch twenty pounds before we had railroads—say four or five years ago—will now readily command fifty. And every good farm horse in the country under ten or twelve years of age is now worth that price.

Many people are in the habit of breeding from old mares; and the common thing in this city is to sell them to country people when they get into years, saying they are now only fit to breed from, and will do well enough for that purpose. This may be true enough, and we must breed from them as long as they will breed. Horses we must have; and, though they may not be the best, yet

they are worth all they will sell for to a judge. But at the same time I would not advise to keep for stock a colt from an old mare, but one from a dam full of vigour, youth, beauty and constitution, free from vice, and from five to ten years of age. The first axiom, says Youatt, that we should lay down is, that "like will produce like," and that the progeny will inherit the general or mingled qualities of the parents. There is scarcely a disease by which either of the parents is affected that the foal does not often inherit, or at least occasionally show a predisposition to it. Even the consequence of ill-usage or hard work will descend to the progeny.

When you have a good colt, to do justice to him, the dam should roam at grass, and not be worked or overheated, nor the colt allowed to run all day after its mother when she is worked, but closed up in a paddock or building and not put to the dam until she is perfectly cool. I have frequently seen colts in dangerous places about the ploughs, harrows, waggons and harness and often wonder more accidents do not happen. I always close mine in a building when the dam is at work, and find that they keep more quiet, fret less, and in many respects do better.

When the young one is taken from its mother it should not be allowed to fall back, but be kept generously, giving it a fair share of succulent food, and the less raw grain the better, till it is put to work. I would never keep colts in a small or close place, or not well lighted, but give them a yard and loose box, always separating them from horned cattle, from whom they often receive serious injury.

Next to rearing comes the breaking in of the young horse or mare, either for the saddle or collar; and this is a more serious matter than many imagine. In the old country none but skilled hands are entrusted with such a job, while in this, any man that owns a horse thinks himself or his sons quite suited to the task, and frequently they are,—for the Canadian is so reliant upon himself for everything, that he seldom thinks of looking beyond his farm fences for assistance, unless requiring more power than the farm can furnish, such, for instance, as the gathering of a "bee" for some grand threshing, raising or logging, followed by a jolly, happy evening. Notwithstanding the want of skill in many to break young horses, I consider the farm and road horses of this country very respectable in their carriage, head and tail pretty well up, and neck arched; but again there are many to be seen slouching along the road with their noses in a line with the pole of the waggon they are harnessed to.

I am of opinion that a horse is just as easily set up in figure and taught in movements as a man, and as soon filled with pride; and there is as much or more difference between horses well broke and those not, as between a soldier well drilled and a labourer. It all depends upon instruction in youth and not upon the occupation they follow. If a driving horse has been taught his paces well in his youth, and always driven at a good speed after, it will be no more difficult for him to keep it up all day long than it will for a negligently trained and carelessly driven one to do half the work in the same time. I have always acted upon this conviction, and in consequence got out of my horses as much as most men and with as little injury. Of course no one would expect a horse to do all he was capable of, but to be kept at a good fair pace, stepping off gaily all the time, but not labouring. How often have we all seen horses jogging along the road, tripping just from sheer carelessness, worrying themselves and their drivers by their own laziness. Just look around amongst your friends, and you will find the habitual fast walker looking as fresh and well as the sluggard. In a farm horse the same argument holds good; horses broken to walk well soon show their superiority over others in the plough; frequently doing a fourth more work in the week. Knowing this, do you think that careless, old or indifferent people should be charged with the early training of the noblest of animals?

I would not advise to break in colts or fillies till they are three years old, and then very little more than to mouth them, and set them up, with a little harrowing or rolling upon the farm through the summer for farm horses, and gentle driving, or riding by a light weight, for a saddle or buggy horse. During the winter that they are coming four, farmer's teaming will not hurt them, and after that they should be able to do a fair day's work without injury. But heavy draught or weights with over driving might be very injurious to any horse under five, at which time they are said to be fully developed or furnished, or, in other words, arrived at *Horsehood*. The foundation is laid for many of the diseases that the horse is heir to, before he arrives at that time of life; such as spavins, splents, windgalls and broken-wind I look upon a horse at three as comparing in point of maturity to a lad of fourteen or fifteen; at four, to one of eighteen; and at five, to a young man come of age. The most serviceable time in a horse's short life is from seven to fifteen or even twenty, and yet I dare say that most horses in this country die before they are twenty-five. It seems a great pity that many people have so little respect or compassion for old servants such as the horse. The common practice is to sell them for little or nothing when they begin to fail, so that everything may not be lost by their death. This is cruelty to make money of. Look about you in the wood market of Toronto—I might rather say ship market, for the wood teams have frequently good farm horses—I refer to the horses in single waggons and carts loaded with chips, faggots and rubbish, poor old creatures looking as if they would die before they reached home—and many do—they are badly fed and worse housed and groomed; poor old things, after working faithfully for a life time for a master well off and able to feed them well, and at a time too when they can eat or live on almost anything, they are sold to a poor man who can scarcely find food for himself and family, putting them off with bad hay and little else; leaving them to die, as they frequently do, as often from want as old age or disease. Keep your old servants a year or two after they begin to fail, grind their corn and cut their food that they may get the good of it, and have the more time to rest, and they will repay you for the extra trouble; after this you can afford to shoot them and protect them from any further trouble. I think the certainty of three or four years of misery and want in old age, would over-balance and throw a gloom over a life time.

Good care will tell as much upon the horse as upon any animal. I know an old horse in Toronto, the property of T. G. Ridout, Esq, B. U. C., thirty-five years of age, and he is as fat as a seal; but then he has done nothing for many years. Dr. Widmer's old horse, that many of you know and see him drive every day, is about thirty years old and as fat or fatter than any horse in the town.—One of the old black carriage horses of my father is still alive though 30 years old, and as frisky as a colt. I saw an account some time ago of a horse that went in a market gardener's cart in New York for forty years. "Old Brock," that went through the late war with the Americans in 1812-'15, the charger of the late Colonel Givens, was the admiration of my youth and died at a great age. Youatt says, of the natural age of the horse, "We should form a very erroneous estimate from the early period at which he is now worn out and destroyed."

Mr. Blain speaks of a gentleman who had three horses that died at the ages of thirty-five, thirty-seven, and thirty-nine. Mr. Cully mentions one that received a ball in his neck at the battle of Preston in seventeen hundred and fifteen, and which was extracted at his death in seventeen hundred and fifty-eight, and Mr. Percival gives an account of a barge horse that died in his sixty-second year.

The best paces to cultivate in the horses of this country are the trot and walk, for many reasons, (unless it be in the case of a bit of blood); first the walk, for most of the work is done at that pace, and next to this the trot. The Yankee

Americans discovered this long ago, and in consequence have now the best trotters in the world, of which I will name a few. Lady Suffolk, in May 1842, did her mile in 2 minutes 19 seconds; Americus, October 1841, doing his first five miles in 13 min. 58 secs., and his second in 13 min. 58½ sec.; Edwin Forrest did his mile in 2 min. 37½ sec.; Dutchman his three miles in 7 min. 32½ sec.; Tom Thumb was driven, in England, 16½ miles in 56 min. 45 sec.; he was only 14½ hands high, an Indian poney, and in 1829 on Sanbury Common, England, he did his 100 miles in ten hours and seven minutes in a cart of 108 lbs., and driver of 140 lbs., and in 1828 a pair of horses trotted their 100 miles in 11 hours 54 minutes. In June, 1834, Mr. Thral drove his pair the same distance, 100 miles, in 10 hours. Since then a Canadian horse, bred in Prince Edward District, called Tecona, has done his mile in 2 min. 25 sec., and I was told that he afterwards sold for 7,000 dollars. I have now a plough horse on my farm, a half brother of his, which I bought to match Milkmaid, can any day do his mile in about three minutes and ten seconds, and my neighbour, Robert James, from whom I bought him, has a mare that can do her mile in 2 min. 28 sec., and not more than 14½ hands high. Last year Flora Temple trotted in harness her mile in 2 min. 24½ sec., beating the whole world. A horse has paced or racked a mile in the United States in 2 minutes and 17 seconds. All this goes to prove what can be done by good training and driving at the best pace for use. Racing, with us, is almost out of the question, and quite out of fashion. We have few thorough bred horses, no good courses, and very little time, money, or inclination for the sport, and racing horses in this country are good for little else, so we will return to the horse and pace best suited to our wants. Trotting is practised by most of us, and slow indeed is the man who never becomes excited enough to try his horse or team against some fellow traveller, and I do believe that a day never passes without a trot or more across the front of my farm, it being the first clear place on the road after turning out of the city throng, and not seldom with some sober grey headed farmer with his wife beside him, who generally looks the more excited and anxious of the two. Women have great spirit and ambition, (I think this will not be contradicted), and I will, to prove it, give you a sample: An old Jersy woman, for the first time in her life, went on board a north river steamer; she sought out the Captain, informed him of her presence, and enjoined great caution in consequence. Soon after, and when the steamer was at the top of her speed, (notwithstanding the caution), she saw another steamer passing, and every one running about excited, she also became excited and went to the Captain and begged him not to mind her longer but to "let the boat slide."

FOOD.

When not required for work, and when grass can be had, the horse requires nothing else, nor is any other food so natural, or so wholesome. Give a horse but a good sweet pasture, running water, a few shade trees, and he will never upbraid you with a look; but horses required to work hard should be well fed on clean dry oats and hay, with a bran mash on Saturday nights. There is no occasion to weigh or measure their food or in any way stint them. Just see that nothing is wasted, and when fed in this way, and worked in the same manner, a horse will use about 24 lbs. of oats and the like quantity of hay per diem. The oats may be kept back when the bran is given. The ordinary driving horse should be fed in like manner, but in most cases 12 lbs. of oats and sixteen pounds of hay will be found sufficient. I should not object to giving a few Belgium carrots in either case. To an idle horse, kept in, I would give no raw grain, but simply feed him on hay, carrots, and bran, giving him more or less exercise every day; and timothy hay alone will keep such a horse very well. If you

should give grain to idle horses, have it cooked; but never so feed a horse tasked highly. Give your horses clean cold water, for they are so dainty that they will suffer before they will drink anything else, and not much of that while on the road. The hard worked horse, fed as directed, will cost for food, per annum, about £50. Oats at 2s. 6d. per bushel, £34; hay at £3 15s. per ton, £15; and straw £1, for bedding. Keep your manger and box clean, free from dust, and seeds, and leave salt within reach. An over fat horse I consider precarious property, and, besides, there is no occasion for obesity, for he can neither work or travel so well, is easily overheated, and susceptible of inflammation.

STABLES.

In building your stables, always provide for ventilation—and if you don't understand the principle apply to Sheriff Ruttan, of Cobourg,—do not make port holes just in front of your horses' eyes, for if you do, look out for colds and inflammation in that organ. Give your stables good light, for dark ones have often injured good eyes, and more especially in the country, when snow is on the ground. Youatt says the breathing of pure air is necessary to the existence and the health of man and beast; it is comparatively lately that this has been admitted, even in the management of our best stables. They have been close, and hot and foul, instead of airy, and cool and wholesome. The effect of several horses being shut up in the same stable is completely to impoison the air, and yet, even in the present day, there are too many who carefully close every aperture by which a breath of fresh air can by possibility gain admission. In effecting this, even the key holes and the thresholds are not forgotten. What of necessity must be the consequence of this? Why, if one thought is bestowed on the new and dangerous character that the air is assuming, it will be too evident that sore throat, and swelled legs, and bad eyes, and inflamed lungs, and mange, and grease, and glanders, will scarcely ever be long out of that stable. Have a tight floor over head to protect the horse from dust, and seeds, make your feeding box on the floor, with a front so high that a horse cannot put his fore feet over it. Feeding out of a rack high up is hard work for a tired horse, and besides, likely to fill his eyes and nose full of seeds, and is an unnatural position, and therefore should not be practised. Overhead feeding may answer very well with the Giraffe, or sloth, to which animals such a mode is natural, but it is not suitable for the horse.

Give to your stable floor slope enough to carry off the urine, but nothing more, for a steep ascent is hard upon the back sinews, and an unnatural position likewise. Build your stables to be warm in winter, and they will be cool in summer, and if you have room, always provide for a loose box or two in case of lameness or sickness or for an idle horse. I have two in my farm stable, and from one cause or another they are never empty. Single stalls should be five, and double stalls eight feet at least in width; the division between stalls being both high and long to prevent kicking or biting.

SHOEING.

More importance attaches to this than many think. I have seen infamous blacksmiths go savagely at a horse's foot, doing more harm by cutting, burning, and nailing, than the animal would suffer if he went half a year without a shoe of any kind, and endeavoring to stave in the poor fellow's ribs with his hammer if he would not quietly submit. The shoe should never be heavier than required for the work to be done, or the strength of the horse.—The nails should be carefully driven, and never far back or high up. The shoe should be made to fit the foot after proper paring, and not the foot to fit the shoe. The toe or front cork, should be kept well under the foot, and never to

advance or project the least in front, or your horse will travel at a great disadvantage. The shoe should be flush with the wall of the foot, unless a little projection just at the heel, and that is not necessary; the sole should be pared level, and the foot shortened a little in the front where the foot will allow of it; none but the ragged part of the frog should be cut away; the sole should be pared down so that the pressure of the thumb will be perceptible, and the less taken from the bars of the heel the better. I think I know better how a shoe should be put on than to describe it, and I have myself fitted a new shoe, pointed and driven the nails, and completely dressed one of the fore feet of my old mare. In the office of the Board of Agriculture in Toronto, a stud-book is now open and has been for a year past. Of course no horse can be entered in that book unless of pure blood; the slightest stain excludes them. To enter, they must trace directly back to the English stud-book. Every owner of blood horses should avail himself of this opportunity and forward their pedigrees to be entered.

The very liberal contribution of George Alexander, Esq., President of the Provincial Agricultural Association, added to the first premium for the best agricultural Stallion, imported since the last show, makes the first prize now for that class fifty pounds. This, it is to be hoped, will induce some of our importers to try again. It is worthy of mention here that the Association has always encouraged the importation of horses by giving a triple premium when they took the first prize. The triple prize to fresh importations when confined to the animal taking the first prize only, is of great service and prevents people from bringing out second class horses. I have heard that a new horse carrying the Society's head prize will almost make a fortune in a few years for his fortunate owner. The Society's standard in this class is, I am pleased to have it in my power to state, a high one, and will compare favorably with any Society whose shows I have visited.

One of the best opportunities ever known for improving the horses of this country was lost some years ago through what may be considered want of forethought.

In 1838 the British Government sent the Dragoon Guards to this country, both horses and men. The horses were chiefly geldings of a very superior class, and these horses were left behind when the Regiment returned to England. Now, a little consideration might have shewn the Home Government what a benefit they could confer on this colony by sending mares in place of geldings, and at the same time do no harm to the regiments at home. I believe that mares are always rejected for the service, if geldings equally as good can be obtained, still many mares get into the service Now if orders had been given to draw mares from the other Cavalry Regiments, replacing them with the geldings from the Dragoon Guards en route for Canada, the undertaking would have been as simple in its detail as beneficial in its results to Canada and the service.

ON THE ANALOGIES OF ANIMAL AND VEGETABLE PHYSIOLOGY.

BY R. DAVIS, ESQ., TORONTO.

Our incessant and intimate association with all the results of animal life, bears the customary fruit of great familiarity, and we live and pass away our being amidst the most startling phenomena with the coldest indifference. Human physiology should seem at least to human beings an important and interesting study, yet how comparatively few give themselves the slightest trouble to acquire the most superficial knowledge of the structure of their own bodies, or of the functions they momentarily exercise. If man is thus apathetical concerning his own nature, it can be matter of little surprise that he evinces but small desire to investigate an organization the consideration of which the presumption of ignorance induces him to regard as unimportant and profitless. And although the analogies existing between the human body and all other things in relation to structure and growth are numerous and striking, and do moreover address themselves with a peculiar force to the agriculturist, it is still an indisputable fact that no conviction of the desirableness or necessity of acquaintance with animal or vegetable physiology has impressed itself upon his mind. Surrounded by all the beautiful and ever varying phenomena of nature, he is content to behold with listless unintelligence the beneficial and endless miracle. A very slight acquaintance with physiology, while correcting many errors both preceptorial and practical, would teach of the offices and functions of the structure and its component parts, would guide the judgment and direct his energy, would tend to unfold the mysteries of his craft and offer to his labors a more certain and better assurance of success.

"As in the animal economy, so in the vegetable, a certain organization is requisite, and this system of organs is required in the vegetable for purposes analogous to those performed by the organs of animals." I purpose, Sir, on the present occasion, to invite attention to the analogy to which allusion is here made, and by the identity of their elementary constituents, as well as by a comparison of their vital functions, to attempt to show how cognate, and dependent, yet, to our finite appreciation, how marked and distinct are all the varied links of that interminable, and golden chain, which the great God of nature has forged in mercy and omnipotence.

Our daily and most familiar experiences confirm us in the belief, that vegetable vitality and organization result in the sustentation of life, and the procreation of the species; the same undeniable evidences lead to a conviction that the animal economy has for its objects the same appointed issue. Thus, then, in these two great divisions of nature's kingdom, the *consummation* of their physiology is identical.

The most simple and limited apprehensions will readily perceive that any mechanical structure can only consist of those materials which are to be found on taking it to pieces. Applying the same unsophisticated reasoning to the present enquiry, the following deduction is forced upon our conviction, namely, that the four elementary constituents, carbon, oxygen, hydrogen and nitrogen are the sole materials from which all vegetable structure is built, for such does analysis shew to be its primary constituents. These elements, however, are generally met with in combination, as carbon and oxygen forming carbonic acid, hydrogen and nitrogen constituting ammonia &c., &c. And it is by combinations of these four simple elements that all those beneficial and beautiful results of the vegetable kingdom are attained. We have seen how by the influence of

light, carbon is assimilated, and becomes woody fibre; how gum, starch, sugar, and gluten are formed by the combination of carbon, oxygen and hydrogen—gluten alone requiring the presence of nitrogen. It is a generally received opinion that wheat owes most of its nutritious quality to the large amount of gluten, or, as it has not inaptly been called "vegetable albumen," which it contains; and that the gum, starch, sugar, and gluten, are the embodiments of the nutritive properties of all the cerealia and esculents of the soil, which serve for the food of either man, or the lower animals.

In like manner, as in the vegetable so in the animal organization, the structure is to be built up and sustained, not by any capability of reproduction or sustentation inherent in itself, but, simply and solely by the absorption and assimilation of those bodies compounded of, or containing the elementary material necessary to the formation, the growth, or the support of animal organizations. "Which of you, by taking thought, can add one cubit to his stature." There is no difficulty in the belief in the necessity for food; weakness from long fasting, the exhaustion consequent upon continued exertion, press the fact too closely home to admit of scepticism, and prove too irresistibly, that wear and tear of the animal frame goes on in much the same way, but with more rapid and certain destruction, as in those of mere mechanical construction. All power is obtained at the expense of the producing agents. The activity of the vital principle itself is in some measure destructive of the animal organization with which it is in connection; but when by the energy of this principle the functions of the physical structure are powerfully excited, the system necessarily suffers by expenditure of those constituents, of which the organized agents of animal power, nerve, muscle, bone, sinew, are composed. The more palpable evidences of this consumption are a quickened respiration, increased heat, a heightened pulse, perspiration and eventual weakness; and when the progress of the development of the organization is not more active than the consumptive process, decline, emaciation, and decrepitude, are the natural consequences, even unto dissolution. These symptomatic evidences are common to the lower animals, as well as to man.

We have seen that the constituent elements of vegetables are only four in number. Let us now take a view of the animal structure, or at least such parts thereof as may facilitate an enquiry after such likeness, or identity, as may exist. Taking them in the order in which some of them have just been mentioned, we have nerve, which according to Dr. Thomson, is like all cerebral substance, composed of water, fatty matter, and albumen; muscle or fibrin consists almost solely of albumen; bone is composed principally of phosphate and carbonate of lime, with a proportion of gelatine or albumen; sinew is fibrin; the teeth are phosphate and carbonate of lime; nails, horn, feathers, hair, all consist principally of albumen.

Now, what is this important ingredient, this albumen which we find figures so conspicuously even in this cursory glance? Albumen is the principle ingredient in the serum of the blood, forms the caseous or cheesy property in milk, constitutes the greater part of the white of eggs, and is composed of carbon, oxygen, hydrogen and nitrogen. Here, then, we have all the constituent elements of the chief material of the animal structure precisely identical with those of the vegetable organization. All compound bodies are resolvable into their primary elements only by some process destructive of those affinities by which the simple constituents are held in combination. And it is by a freedom thus attained, either wholly or in part, that animal food is capable of assimilation and becomes a portion of the animal body.

Both the process of resolution and of assimilation of the food of man is effected somewhat in this wise. It is first prepared by mastication, and then

passed into the stomach to undergo a further disintegration, and that more elaborate process of digestion by which it is converted into a pulpy mass called "chyme;" this again passes into the smaller intestines, undergoes some change by admixture with the biliary secretion of the liver, and is then called "chyle;" in this state it is taken up by glands or absorbents, to be subsequently delivered to the exhausted blood returning to the heart, supplying again the nutritive and healthful elements with which, in its course, the blood has parted in support of the body, and the renovation of those parts which have suffered in the execution of the functions of its various organs; but, the blood in this crude state of renovation is yet unfit for its important office; it is carried by the veins to the right auricle of the heart, from which it is in a manner pumped and injected through innumerable small blood vessels that pervade the lungs; here, by the action of the air respired, or by some other mysterious agency the former crudity is rectified, a change of color takes place, and the new or renovated blood returns to the left ventricle of the heart to be again pumped through the aorta or great artery, and its manifold ramifications to every portion of the body. The blood, now charged with the component elements of the digested food, circulates throughout the entire body, to the most remote and minute extremities, parting in its passage with all the necessary material for the support and re-establishment of those parts of the physical organization, which, by muscular exertion or other derangement, have suffered deterioration. Such is the mode briefly and imperfectly sketched, of the conversion of animal food from their former compounds into combinations of a new and widely different character. Nor, unlike to this are the results with lower grades of animal existence. The mechanical process differs occasionally, but tends invariably to the same issue, the assimilation of the elementary ingredients forming the food into a creature of different and distinct organization.

Now, if as here stated, the blood restores to the muscular structure the loss or wear it continuously sustains, it can only do so at the expense of its own constituents; and we have seen in its return to the heart, that it really has suffered a diminution of its life sustaining elements; in order to restore which the elements of food are absorbed in the shape of *chyle*. Moreover, if muscular structure be restored it must be by the deposit of fibrinous, or flesh-producing materials, which is in fact albumen. Hence, it follows, that muscle or flesh is in elementary constituents identical with all those nitrogenous products whether animal or vegetable, which are used as food, and which in graminivorous animals can only be vegetable.

Thus far the consideration of this subject refers solely to the support and reparation of the physical structure, by the supply of the material of which it is composed. But another phase of interesting character presents itself in the phenomenon of the generation of animal heat. Various have been the theories and hypotheses concerning its production; the more generally received view is, that respiration has much to do in its accomplishment—that the carbonaceous portions of the food, as starch, gum, sugar, furnish to the lungs the elements of a combustion, which, aided by the inspired oxygen, attains, by an inscrutable process, the creation of animal heat, and the formation of arterial blood. Much laborious and tedious investigation has taken place upon this highly important branch of physiology; the results of which have led to the marked distinction of the *azotised* and *non-azotised* substances used as food, the former nutritive, flesh-producing, the latter respirative, or heat-producing.—Such food, therefore, as contains azotised or nitrogenous elements, contribute to the production and support of muscle or flesh; while that, whose constituents are carbonaceous and non-azotised perform a less marked, though no less important office by the supply of the material for effecting one of the most wonderful

of nature's phenomena, wherein, as it were, by one operation, respiration is performed—venous blood is changed to arterial—and that genial warmth is generated without which vitality would cease.

From the Carbonaceous elements of food is also formed the fat of the animal body, which is not an organised tissue like the muscular reticulated fibre, but is an oleagenous substance, filling up the interstices of the cellular tissue; and being formed principally of carbon, it naturally follows that those substances used as food containing and yielding this element will be the most highly conducive to its formation;—such as gum, starch, sugar, &c.

There are two very simple modes of arguing the subject of likeness, or identity of the primary elements constituting vegetable and animal organization; the one, by reference to chemical enquiry, which shews us that the vegetable structure is formed by carbon, oxygen, hydrogen and nitrogen. Chemistry also teaches us that the animal structure is built up from similar materials, and is reducible, more or less perfectly, to these primary elements. This is one of the modes of deducing the conclusion, that, the constituent or elementary substances of which both the animal and vegetable body is composed, are identically the same. The other, though not so practical, is perhaps equally logical. It has been stated that the animal has no inherent power to create the substance of his own body, but that resort must be had to some extraneous source for a supply of material wherewith to develope and uphold it; this supply he derives from food, and because the food would be innutritious, or useless for the purpose, did it not contain the elements of the body, it follows, that to be beneficial and nutritious it must in its elementary constitutents be the same:—and, since he can obtain no food but such as is composed of similar ingredients, it likewise necessarily follows that, *cæteris paribus*, all food is nutritious and supporting; that doubtless most so which may be most readily assimilated and converted into animalized matter. Thus do we trace the same elements in the food as are contained in the body for whose sustentation the food is required.

It is worthy of remark also, that what we call digestion in the animal economy, has a cognate or corresponding process in that of the vegetable; for, as by the inspiration of the oxygen of the atmosphere is the crude venous blood rectified in the lungs, and made available for the growth or restoration of the animal body, so, through absorption and exhalation by the leaves, is the crude sap relieved of its oxygen, and its carbonaceous property fitted for assimilation to the multifarious forms of vegetable organization;—a process, so similar both in its *modus operandi* and its results as almost to constrain us to the admission of its identity with animal digestion. Nor must it be forgetten, that all food is originally vegetable; that vegetables, like animals, to live and grow must feed and breathe; that they can be formed only of those elements by which they are fed, and that they can yield to the animal body in their turn only those ingredients of which they themselves are composed; neither can the animal structure consist of other components than those which are contained in the food. If this be true—and how is it to be doubted—hath it not indeed been wisely said that "all flesh is grass."

For the rest, let us then assume this fact of identity, and proceed to seek out the practical advantage derivable from its admitted existence. The most ordinary and unintelligent feeders of stock know from experience that there is not only a great difference in the fattening properties of the various kind of food, but that failure frequently arises under circumstances that appear almost entirely similar to those of former or subsequent success; and, as ignorance commonly seeks to exonerate itself by a resort to folly, the disappointment is not unfrequently ascribed to causes which mark the grossest superstition.

In Canada, feeding for market, as a business, is quite in its infancy; and it

would be well if those of our brother farmers who are giving their attention to this important branch of their calling, were to make their starting point from some definite and intelligent principle. Both in England and Scotland enlarged intelligence has been brought to this subject, and much expense incurred to ascertain the fatting propensities of animals, and the feeding properties of the nutritive substances used for food. These very interesting and important enquiries have tended greatly to the extension of agricultural and physiological knowledge. Among those substances, commonly forming the food of fatting animals, which have been subjected to analytical investigation are—

Oats	containing	90 to 95	per cent	of nutritive matter.
Barley.....	"	87 to 90	"	"
Linseed	"	95 to 96	"	"
Linseed Oil Cake.....	"	80 to 85	"	"
Peas & Bean Meal...	"	75 to 76	"	"
Turnips.....	"	10 to 11	"	"
Mangold.....	"	15 to 16	"	"
Carrots.....	"	19 to 20	"	"
Potatoes	"	20 to 25	"	"

In looking at this list one cannot avoid being struck with the highly nutritive qualities of the oat, as well as with those of the seed of flax; while the swede, which we credit for almost miraculous virtues, figures but somewhat insignificantly by the side of the potato, the carrot or the mangold. The feeder, however, must bear in mind that nutritive qualities do not necessarily imply fattening qualities. Those substances most abounding in *protein* (that is in nitrogenous or flesh-producing compounds) are not necessarily and in equal ratio fat producing also. Such substances, it is true, contain the elements of fat, but would seem from their compounded form to be more readily available for the augmentation or development of the muscular structure. Neglect of this and similar observation might possibly entail disappointment; might, indeed, in an experiment, if not utterly falsify, tend to pervert the judgment from a legitimate deduction. In the above list, for example, we have the nutritive property of the potato at 20 to 25; that of the mangold at 15 to 16; but we find in *Johnston's Agricultural Chemistry* that the mangold "exceeds the potato in protein compounds in the ratio of 15½ to 9;" yet in laying on fat, when animals are well entered, the potato yields weight for weight a much larger increase. It is true, the question of cost may come in to interfere with profit, but we have here to do only with the simple facts. For profit in feeding, joined with all other considerations for practically conducting the general business of the farm, turnips are, or ought to be considered the farmer's stand-by; they place at his disposal a large amount of very valuable winter food, and leave his land in the best possible condition for future operations.

If the identity between the primary elements of food, and those of the animal structure be established, we may safely infer that animals of all ages require, as indispensable to condition, a due supply of food rich in albuminous compounds, and in the young and immature this quality in the food may not be dispensed with, but at the permanent cost of the whole organic structure. May it not be from a disregard of this principle that the progress of imported stock always deteriorates with us? Is it not notorious that young stock has to "rough it" through our long winters, frequently upon very scanty supplies of substances almost destitute of nitrogenous elements? With such neglect and indifference can we fairly hope to rival the productions of a more methodical and intelligent management?

I need hardly repeat that the development of the muscle or flesh does not necessarily, and in the same ratio, entail the formation or deposition of fat; the former depending upon the available protein, the latter upon the carbonaceous principles of the food.

It is a proud consideration, but ill appreciated I fear, that of the two grand divisions of nature the farmer's province lies in that primitive and essential one, upon which the other is wholly dependent. All sustenance springs from the soil; the carnivorous races could not have existed had not the graminivorous preceded to furnish them with flesh, nor could these have been but for the produce of the earth. Ought we to pass unnoticed this simple, this wonderful, this admirable provision of wisdom and omnipotence. A species of gradation connects and renders mutually dependent the three kingdoms of nature. Among the elements of the animal body are to be found those of the mineral. But as these cannot be transmitted or assimilated directly, the agency of vegetable nature is made available both for their transmission and their adaptation. Their conversion into vegetable organization is the preparatory process of assimilation into the animal structure. And thus is the animal supplied indirectly, with those indispensable elements which directly were unattainable. How beautifully grand, and yet how simply beautiful are all the arrangements of the mighty creation! Each succeeding link throughout the chain of animated nature depending upon its predecessor in endless continuity, until the last reaches again the first, to recommence the never-ending round of simplicity and grandeur.

Surely such considerations ought to stimulate enquiry amongst us, ought to incite us to a more perfect knowledge of the true objects and importance of the farmer's calling. It is upon this very calling alone that, practically speaking, the subsistence of the whole human race is dependent; the tiller of the soil is the purveyor of food for all mankind; without the exercise of this calling man would utterly perish from off the face of the earth, and yet is this honorable, important and indispensible avocation conducted in a more palpable and inexcusable ignorance, with less knowledge of fundamental principles, and with less scientific appliance, than is brought to the coloring of a doll's eye, or the manufacture of a match.

Farmers in Canada, have, it is true, heretofore had but little opportunity for mental improvement, or the acquirement of any theoretical knowledge of husbandry;—the urgent necessities of the physical man pressed too immediately upon the hardy pioneer of the "bush" to leave much time for the cultivation of his intellectual nature. He warred with the mighty forest, and converted the lair of the wolf and the den of the bear into those fair fields and pastures which now supply food and happiness to his own species, and to those which contribute to his comfort, or convenience. But that state of things, necessarily incidental to the settlement of a new country, can hardly be said longer to exist, or at most forms the exception only: comfort, independence and even wealth, have superseded laborious drudgery and stern privation. Schools are in every township, and newspapers carry enlightenment and information into every cottage; the rising generation can at least have no excuse for ignorance; nor are the more advanced in life wholly excusable. It is not even necessary for them to seek their knowledge upon subjects of Agricultural interest through volumes of scientific disquisition, which would certainly prove to the uninitiated tedious, if not incomprehensible; this labor is already done for them; the chaff is already winnowed from the grain, the more available portion is carefully and simply arranged in form and phrase, familiar and comprehensible to the most ordinary capacity, in the agricultural periodicals of the day. To these very useful and interesting publications there is no intelligent farmer but ought to be a subscriber; the cost is so trifling that if we glean but a single idea from the perusal,

which we did not before possess, we are most amply repaid our paltry subscription.

I am aware, sir, that there has been a great deal said in derision of what the self-sufficient are pleased to designate as "Book Farming;" this silly prejudice, though still in existence, is fast passing away; ignorance, in this case, as sooner or later in all others, succumbing to intelligence. Book-wisdom, if not "Book-Farming," in conjunction with more frequent intercourse among the farming community, would, I am convinced, greatly tend to the advancement of those interests for which we are all deeply and naturally anxious. I trust, sir, the time is not far distant when every man who holds land in Upper Canada will consider it his duty, as well as his interest to be enrolled as a member of the society of his district, and to subscribe to, and read one periolical, at least, devoted to agriculture.

In the remarks, sir, to which the club has kindly listened, my object has been simply to direct the attention of those engaged in feeding to the unerring principles of nature's laws—not to teach them. I would incite inquiry, and, while inducing investigation, would urge the paramount importance of their observance; for from their violation, whether in presumption or in ignorance, failure will most inevitably follow. Truth is ever truth, immutable and fixed—the tablet upon which the laws of nature are graven by the finger of "Wisdom, Power and Goodness infinite."

ESSAY ON THE ENEMIES OF THE WHEAT CROP.

BY E. W. THOMSON, ESQ., YORK TOWNSHIP.

MOTTO:—"*They all are the work of His hands.*"

[The following Essay was sent in in competition for the prizes offered by the Government Department of Agriculture and Statistics, and is one of those reported upon by the judges as worthy of "honorable mention," as containing much valuable information.]

The insects herein described, though differing to some extent in appearance, habits, and amount of their devastations, are all less or more formidable, and much to be dreaded by the wheat-grower, wherever they have made their appearance. Hence it is they forced themselves prominently upon the notice both of agriculturists and men of science, and have attracted a degree of attention and called forth an amount of research and observation that would not have been assigned to so diminutive a portion of the creation had they not proved themselves so very formidable and destructive.

From a careful perusal of scientific magazines, agricultural journals, and newspapers, it will be found that almost every point in their history has been carefully noted and observed. Very little, therefore, that is new, could have been discovered, even had time and the season permitted observations to be made, and therefore in this essay use will be freely made of the articles that have heretofore been given to the world (so far as they agree with the writer's opinions and observations as a practical agriculturist), relative to the weevil, grain-worm, or grub, wheat-fly or midge, and the Hessian fly.

As the Weevil is the first mentioned in the advertisement calling forth this Essay, a few extracts relative to a description of this insect, will first be given, and then of the others, naming each in their turn.

The true grain weevil of Europe, or more properly the wheat weevil, in its perfected state, is a slender beetle of a brownish color, about one-eighth of an inch long, with a slender snout, slightly bent downwards, an evenly punctured and very long thorax, constituting almost one-half the length of its body, and wing covers that are forward and do not quite cover the tip of its abdomen. This little insect both in the beetle and grub state, devours stored wheat and other grains, and often commits much injury in granaries and brewhouses. Its powers of multiplication are very great; for it is stated that a single pair of these destroyers may produce above six thousand descendants in one year. The female deposits her eggs upon the wheat after it is harvested, and the young grub therefore, immediately burrows into the wheat, each individual occupying alone a single grain, the substance of which it devours so as to leave often nothing but the hull, and this destruction goes on within while no external appearance leads to evidence of the mischief that has been done to the grain until it is proven by the loss of weight. In due time the grubs undergo their transformations, and come out of the hulls in their beetle state, to lay their eggs for another brood. These insects are effectually destroyed by kiln-drying the wheat, and grain that is kept cool and ventilated is said to be exempt from their attacks.

Various remedies have been resorted to for the destruction of this insect, such as sprinkling it with snuff, sulphur, lime, &c. But no method seems to be preferable to that adopted by a highly intelligent and successful farmer in the State of New York. In mowing or stacking his wheat he sprinkles a small quantity of salt over each layer of sheaves; four or five quarts to each hundred dozen, he has found quite sufficient; by this method he has preserved his wheat entirely free from weevil, while his neighbors have complained of great destruction; of the security thus afforded, he is altogether convinced from experiments made; one year having neglected to salt a small part of his wheat he found it on examination very much eaten, while the salted wheat remained entirely undestroyed, though in the same mow.

One advantage it is to be noticed this method possesses over every other is, that the straw is rendered much more valuable for fodder, the cattle eating it with as much avidity as they will hay; this method is easily tested and cannot result in loss. Another grain weevil hardly differing from the foregoing, except in its colour, which is black, is found in New York State, and no doubt in Canada. Whether wheat or other grain suffers to any extent from the depredations of either of them is hard to determine, as it is very difficult to give a correct description of the enemy that does the mischief, though the effect is too sensibly felt in the destruction of the crop.

The Corn Moth. Among the insects most injurious in their attacks on grain when laid up in the magazine, is the larva of this small moth, the caterpillar of which is called in England the White Cornworm. The perfect Moth measures from the tip of the wings six or seven lines. The insect appears in that country as a moth in May, June, and July; it frequents granaries and other buildings where grain is stored; sits at rest in the day time, and only flies about at night; it is in the summer months from May to August, and sometimes in September, that the larva devours the different kinds of grain, and they attack rye, oats and barley with the same zest as wheat, from September to May. The larva is sought for in vain in corn-heaps; it has retired into the cracks and fissures of the floor and walls, and moreover has concealed itself in its cocoon. It does not reappear till April or May, and then in a very different form, namely as a moth, which flutters about the heaps of store corn, and deposits upon them the invisible germ of future destruction. After a few days have elapsed, small whitish worm maggots, or more properly speaking larvæ, proceed from the eggs,

and immediately penetrate into the grain, carefully closing up the opening with their white roundish excrement, which they glue together by a fine web.

The European grain Moth in its perfect state, says Dr. Harris, is a winged insect between three and four-tenths of an inch long from its head to the tip of its wings, and expands sixteenth of an inch; it has a whitish tuft on its forehead, its long and narrow wings cover its back like a sloping roof, are a little turned up behind, and are edged with white fringe; its fore-wings are glossy like satin, and are marked with white or grey, light brown, and dark brown, or blueish spots; and there is always one dark square blueish spot near the middle of the outer edge; its hind wings are blueish.. Some of these winged moths appear in May, others in July and August; at times they lay their eggs; for there are two broods of these insects in the course of the year. The young from the first laid eggs come to their growth and finish their transformations in six weeks or two months, the others live through the winter, and turn to winged moths the following spring. The young mothworms do not burrow in the grain as has been asserted by some writers, who seem to have confounded them with the Angoumois grainworm, but as soon as they are hatched they begin to gnaw the grain and cover themselves with the fragments, which they line with a silken web. As they increase in size they fasten together several grains with their webs so as to make a larger cavity, wherein they live; after a while becoming uneasy in their confinement, they come out and wander over the grain, spinning their threads as they go till they have found a suitable place wherein to make their cocoons; thus, wheat, rye, barley, and oats, all of which they attack, will be found full of lumps of grain cemented together by these cornworms, as they are sometimes called, and when they are very numerous the whole surface of the grain in the bin will be covered with a thick crust of webs and of adhering grains. These destructive cornworms are really soft and naked caterpillars of a cylindrical shape, tapering a little at each end, and are provided with sixteen legs, the first three pair of which are conical and pointed, and the others fleshy and wartlike; when fully grown they measure four or five tenths of an inch in length, and are of a light ochre or buff color, with a reddish head. When about six weeks old they leave the grain and get into cracks or around the sides of corn bins, and each one then makes itself a little oval pod or cocoon, about as large as a grain of wheat. The insects of the first brood, as before said, come out of their cocoons in the winged form in July and August, and lay their eggs for another brood. The others remain unchanged in their cocoons through the winter, and take the crysalis form in March, or April following; three weeks afterwards the shining brown crysalis forces itself part way out of the cocoon by the help of some little sharp points on its tail, and bursts open at the other end, so as to allow the moth therein confined to come forth.

The foregoing account will probably enable the reader of this essay to determine whether these destructive insects are found in our own country. From various statements (deficient however in exactness) that have appeared in some agricultural journals, I am led to believe that this cornmoth, or an insect very like it in its habits, prevails in all parts of the country, and that it has been generally mistaken for the grain weevil, which it far surpasses in its devastations.

There is another grain moth which at various times has been found to be more in granaries in some of the provinces of France than the preceding kind; it is the Angoumois moth (*anacampsis cerealella.*) The winged moths of this group have only two visible feelers, and these are generaally long, slender, and curved over their heads, their narrow wings most often overlap each other, and cover their backs horizontally when shut. The Angoumois grain moth probably belongs to the modern genus *anacampsis*, a word derived from the Greek, and signifying recurved, in allusion to the direction of the feelers of the moth. In

the States of Connecticut and Maine, and also in Lower Canada, it existed as far back as 1769. In the Transactions of the Philosophical Society of Philadelphia, will be found some interesting remarks upon this fly weevil, as it has been called; and in 1760 its ravages in France called forth the following description of it.

The Angoumois Moth in its perfect state, is a four-winged insect about three-eighths of an inch long when its wings are shut; it has a pair of tapering curved feelers turned over its head; its upper wings are narrow, of a light brown color, without spots, and have the lustre of satin. They cover the body horizontally above, but droop a little at the sides. The lower wings and the rest of the body are ash colored. This moth lays its eggs, which are from sixty to ninety in number, in clusters, on the ears of wheat, rye and barley, most often while these plants are growing in the field, and the ears are young and tender, sometimes also in stout grain, in the autumn; hence it appears that they breed twice a year; the insect from the eggs laid in the early part of the season coming to perfection and providing for another brood of moth worms in the autumn. The little wormlike caterpillars, as soon as they are hatched, disperse, and each one selects a single grain into which it burrows immediately, at the most tender part, and remains concealed therein. After the grain is harvested, it devours the mealy substance within the hull, and this devastation goes on so secretly that it can only be discovered by the softness of the grain or the loss of its weight. When fully grown this caterpillar is not more than one-fifth of an inch long; it is of a white color, with a brownish head, and it has six small jointed legs, and ten extremely small wart-like prop-legs Dehamel has represented it as having two little horns just behind the head, and two short bristles at the end of the tapering body. Having eaten out the heart of the grain, which is just enough for all its wants, it spins a silken web or curtain to divide the hollow lengthwise into two equal parts, the smaller containing the rejected fragments of its food, and the larger cavity serving instead of a cocoon, wherein the insect undergoes its transformations. Before turning to a chrysalis, it gnaws a small hole nearly or quite through the hull, and sometimes also through the chaffy covering of the grain, through which it can make its escape easily, when it becomes a winged moth. The insect of the first or summer brood comes to maturity in about three weeks, remaining but a short time in the chrysalis state, and turns to a winged moth in the autumn, and at this time may be found in the evening in great numbers laying their eggs on the grain stored in barns and granaries. The mothworms of the second brood remain in the grain through the winter, and do not change to winged insects till the following summer, when they come out, fly into the fields in the night, and lay their eggs on the young ears of grain growing. When damaged grain is sown it comes up very thin; the infected kernels never sprout, but the insects lodged in them remain alive, and finish their transformations in the field, and in due time come out of the ground in the winged form. It has been proved by experience that the ravages of the two kinds of grain-moths whose history has been given, can be effectually checked by drying the damaged grain in an oven or kiln; and that a heat of one hundred and sixty-seven degrees by Fahrenheit's thermometer continued during twelve hours, will kill the insects in all their forms; indeed the heat may be reduced to one hundred and four, with the same effect, but the grain must then be exposed to it for two days.

The other means that have been employed for the preservation of grain from these destructive moths it is unnecessary to describe, they are probably well known to millers and farmers, but are not so effectual as the method above described when it can be carried out, but the practical man will see that it would be attended with much difficulty.

From these considerations the means which the agriculturist must employ to secure his grain from so dangerous an enemy are clearly deducible. First of all, the lofts, before the grain is placed in them, must be carefully examined, and the cocoons, if any are discernible, got rid of. Sprinkling the floor with a mixture of strong vinegar and salt before laying up the corn is strongly to be recommended; sweeping the floor and walls thoroughly should not be neglected, and the dust should be removed immediately in order that the larvæ may not find their way back into the cornheaps. Common salt will also purify the infected grain. One of the surest remedies appears to be a free ventilation by means of an artificial degree of cold, as the larva can only live in a temperature of fifty-five to sixty degrees of Fahrenheit.

Bats and spiders are the principal natural enemies of the Cornmoth, and some small birds also feed on them. The writer of this essay has no hesitation in saying that as a security against this insect as well as others of a similar nature the use of salt liberally applied, when mowing or stacking, will be found not only the most economical but the most effectual remedy against, or rather security from, the depredations of these destructive little marauders, as it will not in the least injure the grain, whilst it will increase the value of the straw and chaff as fodder to an extent that will be more than equivalent to the cost of the salt.

THE WHEAT FLY, OR MIDGE. (*Cecidomyia Tritici.*)

The following description of this very diminutive fly or midge, seems to apply to that which has in times past proved so very destructive to the wheat crop in eastern Canada, and the most easterly counties of Canada West.

It is said that in England when the wheat is in blossom it is sometimes attacked by this small beautiful fly, with an orange colored body and white wings, which lays its eggs in the middle of the blossom by the means of a long retractile ovipositor; when the eggs are hatched the larvæ, which are very small, from 10 to 15 being sometimes found in one grain, prevent the fructification of the grain, probably by eating the pollen, and have frequently destroyed some part of the harvest.

Mr. Sherriff's Quarterly Journal of Agriculture, vol. 3, page 501, says, the fly generally appears when the wheat plant comes into ear; in 1829 and 1830 flies were first seen by him on the 21st of June, and in 1831 on the 10th of the same month. The larvæ after a period fall to the ground and burrow in the earth, where they remain till the following summer. According to Mr. Gorrie (in the Magazine of Natural History, September, 1829, page 324) all the larvæ have quitted the ears of wheat and descended to the earth by the 1st of August, going into the ground to about the depth of half an inch, where it is probable that they pass the winter in the pupa state. The extraordinary smallness of this insect, both in the larva state and perfect state, with the circumstance that the destruction of the wheat takes place when it is in blossom, and that not all the ears on one and the same field are attacked, allows of but little that can be effected by human aid against the enemy of the grain; the safest and almost only means of diminishing such an evil for the succeeding year consists in not sowing wheat again in the same field, or in the immediately adjoining field, for in all probability the pupæ lie in the earth and will only become flies next year at the season when the wheat is in blossom.

Fortunately nature has in this case provided another still smaller parasite insect, allied to the family of Inchneumons, to keep the midge also within its proper bounds. Mr. Kerby, who first made us acquainted with the natural history of this insect, calls the parasite Inchneumon Tipulæ; it is a species of the genus Platigaster Latreilla belonging to the family Practotrupida. Mr. Gorrie states

that, from the experiments he made in the season of 1831, the variety of wheat cultivated under the name of cone wheat is not liable to the attacks of the fly. Mr. Sherriff also considers the Polish wheat to be in a measure secure from its attacks. The ravages committed by the wheat fly in Scotland are sometimes very extensive. It is stated by Mr. Sherriff that throughout the whole of Scotland during the years 1827, '28, '29 and '30, the fly injured the wheat crop to the extent of 30 per cent. Should destruction to this extent be experienced in any country for a few years it becomes a serious loss to the community.

Mr. Gorrie seems to think that the wheat fly maggot might be so buried as not to be able to work its way through the superincumbent soil, if in ploughing in the wheat stubble a scarifier or skinner were fixed upon the beam before the coulter, so constructed as to lay about an inch of the surface in the bottom of the furrow. This is a description of plough much used in the west, and in some parts of this Province, and highly prized by some of our best agriculturists. An insect resembling the European wheat fly in its habits, and known in its maggot state by the name of the grain worm, has been observed for several years in the northern and eastern parts of the United States and in Canada. It seems, says Dr. Harris, to have been mistaken by some for the grain weevil, the Angoumois grain moth and the Hessian fly, and its history has been so confounded with that of another insect also called the grain worm in some parts of the country, that it is difficult to ascertain the amount of injury done by either of them alone. The wheat fly is said to have been first seen in America about the year 1828, in the northern part of Vermont and on the borders of Lower Canada; from these places its ravages have gradually extended in various directions from year to years. Considerable parts of Canada, of New York, New Hampshire and Massachusetts, have been visited by it, and in 1834 it appeared in Maine, which it has traversed in an easterly course at the rate of twenty or thirty miles a year. The country over which it has spread has continued to suffer more or less from its alarming depredations, the loss by which has been found to vary from about one fourth to nearly the whole of the annual crop of wheat; nor has the insect entirely disappeared in any place till it has been starved out by a change of Agriculture or by the substitution of late sowing of Spring wheat, a resort to which has proved to a very considerable extent successful in Lower Canada. Much valuable information has from time to time been given in the columns of the *Genesee Farmer*, *Yankee Farmer*, and other papers of like character; some of those articles are by men of undoubted ability, such as the late Judge Buel, who was in his lifetime one of the most observant and successful cultivators in America.

The American wheat insect is stated by Judge Buel and by Mrs. Gage—a lady who has attentively studied the habits of insects—and others, to agree generally with the description of the wheat fly, being a very small orange colored gnat, with long slender legs and two transparent wings, which reflect the taints of the rainbow. Immense swarms of these orange colored gnats infest fields of grain towards the last of June. While the sun shines they conceal themselves among the leaves and weeds near the ground, they take wing during the morning and evening twilight, and also in cloudy weather, when they lay their eggs in the opening flower of the grain. New swarms continue to come forth in succession till the end of July, but Mr. Buel says that the principal deposit of eggs is made the first half of July, when late sown Winter wheat and early sown Spring wheat are in the bloom or milk. The flies are not confined to wheat alone, but deposit in barley, rye and oats, when these plants are in flower. At the time of their appearance the eggs hatch in about eight days after they are laid, when the little yellow maggot or grain worm may be found within the chaffy scales of the grain; being hatched at various times during a period of four

or five weeks, they do not all arrive at maturity together. Mrs. Gage says, they appear to come to their full size in 12 or 14 days; specimens of these maggots which she had preserved were found to agree in every particular with the description of the European wheat fly. They do not seem the eighth of an inch in length, and not provided with feet. From 2 to 15 or 20 have been found within the husk of a single grain, and sometimes in every husk of the ear; after a shower of rain they have been seen in such countless numbers on the beards of the wheat as to give a yellow color to the whole field. The insects prey on the grain in the milky state, and their ravages cease when the grain becomes hard. They do not burrow within the kernel, but live on the pollen and on the soft matter of the grain, which they probably extract from the base of the germ. It appears from various statements that very early and very late wheat escape with comparatively little injury; the amount of which in other cases depends upon the condition of the grain at the time the maggots are hatched. When the maggots commit their depredations soon after the blooming of the grain, they do the greatest injury, for the kernels never fill out at all—pinched or partly filled kernels are the consequence of their attacks. When the grains are more advanced the hull of the impoverished kernels will always be found split open on the convex side so as to expose the embryo. This is caused by the drying and shrinking of the hull after a portion of the contents thereof has been sucked out by the maggots. Towards the end of July and beginning of August the full grown maggots leave off eating and become sluggish and torpid, preparatory to moulting their skins; this process, which has been alluded to by Judge Buel and some other writers, has been carefully observed by Mrs. Gage, who says, within two or three days after moulting the maggots either drop of their own accord, or are shaken out of the ears by the wind and fall to the ground; they do not let themselves down by threads, for they are not able to spin. Most of them disappear before the middle of August, and they are very rarely found in the grain at the time of harvest. Several cases of the efficacy of fumigation in preventing the depredations of these insects are recorded in our agricultural pub lications. For this purpose brimstone has been used in the proportion of one pound to every bushel of seed sown. Strips of woollen cloth dipped in melted brimstone and fastened to sticks in different parts of the field—and particularly on the windward side—are set on fire, for several evenings in succession at the time when the grain is in bloom; the smoke and fumes thus penetrate the standing grain and prove very offensive and destructive to the flies which are laying their eggs; a thick smoke from heaps of burning weeds sprinkled with brimstone around the sides of the field has also been recommended, lime or ashes strewn over the grain when in blossom has in some cases appeared to protect the crop, and the Rev. Henry Coleman, Commissioner for the Agricultural Survey of Massachusetts, says, that this preventative if not infallible, may be relied on with confidence. For every acre of grain, a bushel or five pecks will be required; if ashes are used one and a half bushels will be required, and this should be scattered over the plants when they are wet with dew or rain—two or three applications of it have sometimes been found necessary. Whether it is possible to destroy the maggots after they have left the grain and betaken themselves to the ground just below the surface to occupy their winter quarters, remains to be proved; some persons have advised burning the stubble and ploughing up the ground soon after the grain is harvested, in order to kill the maggots or bury them so deep that they could not make their escape after they were transformed to flies. Perhaps thoroughly liming the soil before it is ploughed may contribute to the destruction of the insect. It is stated that our crops may be saved from injury by sowing early in the Autumn or late in Spring; by the first, it is supposed that the grain will become hard before many of the flies make their ap-

pearance; and by the latter, plants do not come into bloom until the flies have disappeared. In those parts of New England where these insects have done the greatest injury, the cultivation of Fall wheat was for some time given up, and it was found that the insect had disappeared, and the cultivation in many of those localities where lime has been used liberally as a fertilizer has been resumed with success. This will be found the safest course. The proper time for sowing Spring wheat will vary with latitude and elevation of the place and the forwardness of the season; and it must also be borne in mind that some varieties of spring wheat come to maturity in a much shorter time than others. From experiments in Lower Canada and Vermont it is found that wheat sown from the 15th to the 20th of May, generally escapes the ravages of the fly and other insects, and that late sowing has almost entirely banished the wheat fly from those parts where it first made its appearance, and no doubt the same means may prove successful wherever its depredations have been committed. That very intelligent lady, Mrs. Gage, has discovered other pernicious insects in the ears of grown wheat, it seems to agree with the accounts of the Thripsciliam, which sometimes infest wheat in Europe to a great extent. This insect belongs to the order Hemiptera; in its larva state it is smaller than the wheat maggot, is orange colored, and is provided with six legs, two antennæ and a short beak, and is very nimble in its motion; it is supposed to suck out the juice of the seed, thus leaving it to shrink, and become what the English farmers call pungled; this little pest may possibly be destroyed by giving the grain a thorough coating of slack lime, an application at all times safe and beneficial.

The insect which has been found preying upon wheat the growth of 1856, is, in my opinion, identical with the one described as follows: It is much larger than the maggot of the wheat fly, growing to the extent of three eighths of an inch or more in length, and devouring the grain in the ear and after it is housed. The insects to which I allude have received the names of wheat worm, gray worm, and brown weevil, and although these different names may possibly refer to two or more distinct species, I am inclined to think that all of them are intended for one kind of insect, which has been called the grain worm, whereby it becomes somewhat difficult to separate the account of its history and depredations from those of the Cecidomyia, or wheat insect described in the foregoing pages. From the description of it published by Mr. Gaylord this depredator appears to be a caterpillar or span worm, being provided with twelve feet, six of which are situated near each extremity of its body like other span worms or geometers; it has the power of spinning and securing itself by a thread. Mr. Gaylord says, it is of a yellowish-brown or butter-nut color, that it not only feeds on the kernels in the milky state, but also devours the germinating end of the grain, without, however, burying itself in the hull, and that it is found in great numbers in the chaff when the grain is threshed. He says, morover, that it has been known for years in the Western part of New York, and that it is not so much the new appearance of this insect as its increase which has attracted attention, and created alarm respecting it. This remark is strictly applicable to Canada at the present period, as well as the following: On threshing the Winter wheat immediately after harvest, there was found amongst the sweeping a vast array of this enemy, and it is described as a caterpillar about three eighths of an inch in length when full grown, and apparently of a straw color, but when seen through a magnifier was found to be striped lengthwise with orange and cream colors, its head was dark brown, it was provided with legs, could suspend itself by a thread and resembled a caterpiller in all its motions. This description is by Mr. Sill, of Pennsylvania. It appears highly probable that Mr. Gaylord's and Mr. Sill's wheat caterpiller are the same, notwithstanding the difference in their colour. Insects of the same size as these caterpillers and of a brownish color,

have been found in various parts of Maine, where they have done much injury to the grain; unlike the maggot of the wheat fly with which they have been confounded, they remain depositing upon the ears of grain until after the time of harvest. Immense numbers of them have been seen upon barn floors when the grain has been threshed, but they crawled away and secreted themselves in crevices, where they probably undergo their transformations.

These wheat worms, or wheat caterpillars as they ought to be called, if the foregoing accounts really refer to the same kind of insects, are supposed by some persons to be identical with the clover worms which have been found in clover in various parts of the country, and have often been seen spinning down from lofts and mows where clover has been stowed away.

Another insect has done serious injury to the wheat crop at different periods, and was very much felt last year in the State of Illinois. It is not unlike a common flea in appearance, has a hard shell and when cracked emits the disagreeable smell of the bed bug; it preys upon the wheat in a milky state and causes the grain to perish.

THE HESSIAN FLY.

The Hessian fly, since its appearance in America, has been more dreaded than any other of the numerous insects that attack the wheat crop, though it is not unlikely it has been charged with a greater amount of mischief than it really committed, as it is probable that its near kindred which have been described committed a considerable portion of the ravages with which it has been charged. It is, however, a most formidable enemy to the wheat grower and consequently much dreaded.

Dr. Fitch says, in a very lengthy and able essay, that "for several years subsequent to the first appearance of the Hessian fly in America, it was universally believed to have been derived from abroad. When, however, the severe devastation which it was committing upon this continent became known in Europe, public attention was so strongly excited as to lead to an extensive and thorough search for the insect there. The result of this investigation as given by Sir Joseph Banks in his report to the British Government, was, that no such insect could be found to exist in Germany or any other part of Europe; it was in consequence viewed as an established fact and assented to on all hands, that this was exclusively an American species. Of late years, however, new light has been shed upon this subject, and we now proceed to detail the evidence which induces us to believe that the Hessian fly is indeed a European insect."

"It appears that this insect, or one identical with it in its character and habits, did exist, and committed severe ravages in Europe, long anterior to its appearance in America. In Duhamel's Practical Treatise on Husbandry, London, 1759, 4to. page 90, and also in his Elements of Agriculture, London, 1767, 8vo. vol. 1, page 269, after alluding to a worm in the root of oats, he says: I suspect it to have been an insect of this kind that destroyed so much wheat in the neighbourhood of Geneva, and which Mr. Chauvreau describes thus,—Our wheat in the present month of May, 1755, sustained a loss, which even that cultivated according to the new husbandry has not escaped; a number of small white worms have been found on it which, after a time, turn to a chesnut colour, they place themselves between the leaves and gnaw the stalk; they are commonly found between the first joint and the root—the stalk on which they fix are immediately at a stand, they grow yellow and wither—the same occurred in 1732. These insects appeared about the middle of May, and did so much damage that the crops were scarcely worth anything. This account, though perhaps too brief and imperfect to justify a decided opinion, corresponds much more exactly with the Hessian fly than with any other insect of which we have any knowledge.

Acquainted with it, as the men of Geneva were, we are surprised that they so readily succumbed to the sentiment that the species was indigenous to America."

Several other authorities are also quoted by Dr. Fitch, embodying evidence quite sufficient to prove that an insect very similar, if not identical, did exist and commit serious depredations on the wheat crop in Europe long anterior to the date of the appearance of the Hessian fly in America. These quotations are drawn from the writings of men of known character and scientific attainments. The Dr. goes on to say, the existence of the Hessian fly in Europe being premised, so many circumstances conspire to render it probable that it was introduced into America by the Hessian troops, that scarcely a doubt can be entertained upon this point.

When the habits and transformations of the insect itself are considered, it will be perceived that there interpose great obstacles to its being transported across the Atlantic, at a period when two months or more were required for the voyage: its passing through two generations in a year; its continuing in any one state of its existence brief. The first of these generations occupies about seven months, from October to April inclusive. This generation is nurtured at the roots of the young plants, and there is no probability that any of these plants would be taken up, so that the insect could thus be conveyed away. The second generation is nurtured in the lowest joints of the straw. The worm attains maturity in May, becomes a dormant flax-seed in June, and continues in this state till August. When the fly comes out to deposit its eggs in September, the most of these flax seeds remain in the stubble. When the grain is harvested, numbers of them are so high in the straw as to be gathered with it; but they are so firmly imbedded in the straw, and enveloped within the sheathing base of the leaf, that it must be rarely that any of them are detached by the flail, by threshing, so as to find their way among the grain, and thus with it be carried to a distance. As the flax-seed moreover becomes the perfect insect in August, it must be equally rare that a solitary fly comes from the straw after that date. These facts clearly show that there is but one way, and but one month in the year, in which this insect could possibly have been conveyed to America at that time. To wit: in straw landed upon our coasts in August. If landed at a later period, the flies would have completed their transformations and made their escape or perished in their confinement. If earlier, there is no probability that the straw could have been of the growth of that year, consequently it would have contained no live insects. Our present knowledge of the habits of this insect, thus affords us a singularly accurate test for ascertaining the mode in which it was introduced.

The history of the revolutionary war affords ample testimony that the Hessian troops did embark at the season indicated, judging from the time they arrived in America; and it is presumed that the soldiers, needing straw for packing, were allowed to cut a field of wheat some weeks before the usual time of harvesting, and use it for packing, and that thus the insect was transported across the Atlantic. Be this as it may, it is a well authenticated fact, that it was not known in America until after that period, yet the same Omnipotent power that caused it to appear on one side of the ocean, could also cause it to appear on the other, without the agency of man.

Another theory is, that its appearance may be the result of cultivating wheat a long time on the same land, and thereby exhausting some of the constituent elements of the soil, by which means it is permitted to come forth. It seems to be an admitted fact, that it only appears on lands that have been long under cultivation, and its first appearance in America was in those parts that had been a long time under cultivation; but without speculating further upon the place or cause of its origin, the year 1779 appears to be the date at which its ravages seriously commenced in America. The crops of wheat in that year were seri-

ously injured or entirely destroyed by it and in particular sections during severa of the following years; and each succeeding generation regularly enlarged the sphere of its devastations in every direction. Quite early in its history the important fact became accidently discovered, that certain kinds of wheat are capable of withstanding its attacks. In the year 1781, a prize schooner load of wheat was taken in the Delaware River, and carried to New York, where the cargo was sent to the mill to be ground, and the crop of the owner of the mill having been destroyed he took a portion of the cargo for seed, the produce from which was entirely exempt from injury, while his neighbours in every direction suffered severely. This person, whose name was Underhill, liberally supplied seed from his crop to the farmers around him, and in every case it proved exempt from the depredations of the fly, and the Underhill wheat became famous for its exemption from the losses occasioned by the Hessian fly.

In 1786 the fly had progressed in the State of New Jersey, about forty miles south of New York. Eastward, it is said to have progressed much more rapidly, for this same year it had reached a hundred miles nearly to the east end of Long Island, and made a gradual advance of twenty or thirty miles a year.

In 1788, so great was the alarm created by the very extensive depredations of the Hessian fly, that a proclamation was issued by His Britannic Majesty, prohibiting the entry of wheat, the growth of any of the territories of the United States, into any of the ports of Great Britain. This so alarmed the United States that measures were immediately taken to ascertain the habits of the insect.—The Philadelphia Society for promoting the interests of Agriculture having been requested to report upon it, and particularly whether the quality of the grain is affected by it, the Society replied that from every communication made to them on the subject, they were decidedly of opinion that it is the plant alone that is injured by this depredator or insect; that what grain happens to be produced from such plants is sound and good, and that this insect is not propagated by sowing wheat which grew in a field infected with it.

Dr. Currie took an active part in showing the Government and people of England, that the information which had led to the closing of the ports against the entry of American grain was wholly erroneous, and in eight months the Government bought the stored wheat at prime cost, kiln-dried it and sold it at a great loss. The prohibition was taken off almost immediately thereafter.—(Memoirs of Currie, 11, 65.)

In 1789 it seems the Hessian fly first reached Saratoga, two hundred miles north of its original station, and continued to be less or more destructive in that and adjoining countries, until about the year 1803, when their depredations ceased there, the last having been committed in that year, and did not again appear until 1845. About the commencement of the present century it appears to have been very destructive in several of the States, and attracted much attention and called forth numerous articles from very intelligent and scientific persons. From 1803 to 1817 it does not appear to have attracted much attention, but in the latter and subsequent years, its power was again felt in many places to a serious extent. It was on the 24th of June, in this year, that Mr. Jay read before the Philadelphia Academy of Natural Sciences, a paper entitled, "Some Account of the Insect known by the name of the Hessian Fly; and of a Parasite Insect that feeds on it." This contains an accurate, technical description, of the insect, on which he bestows the name of Cecidomyia Destructor, and also of its common parasite, referred by him to the genus Ceraphron, and also named Destructor. This paper was published, and followed by a copper-plate illustration of these insects, drawn and engraved by Mr. C. A. Lesueur. A local habitation and a name were thus conferred upon this world-renowned species, by which it has ever since been definitely specified and arranged in works of science.

In reference to various publications, it will be found that at one period or another almost every State in the Union has suffered from the depredations of this insect. On the western prairies it has been very destructive at times. Various remedies have been recommended and resorted to, but none of them have been universally successful. The most effectual seems to have been provided by the benificent Creator, in the numerous parasites that prey upon it, and seem to follow it in such numbers, that it has invariably been exterminated in a few years from those localities where its depredations have been the most formidable. In the case of this insect, as well as the others that have been named, it appears to be the most judicious plan not to be too anxious to grow wheat too frequently on the same ground, and to cultivate the field for sowing at as great a distance from the growing crop of wheat, as the farm will admit of.

But let us now enter into a more specific description of the insect, and then mention the remedies that have been proposed.

ITS CHARACTER, HABITS AND TRANSFORMATIONS.

It is said, as a general rule, the Hessian fly passes through two generations annually. The first of these occupies the autumn, winter, and fore part of the spring, and is reared at the roots of the young grain, slightly below the surface of the ground. The second occupies the remainder of the spring, and summer, and is chiefly nurtured at the first and second joints of the straw. The time when its several transformations occur is not perfectly uniform, being varied by the climate, the state of the weather, and perhaps other contingences; and it is not improbable that individual specimens, placed in circumstances unfavourable to their development, have their growth retarded so much as to require a whole year to complete their metamorphoses.

The eggs of the first generation are deposited chiefly in the fore part of September. Doctor Chapman says the deposit is made from the latter end of August till the 20th of September, and most other accounts coincide with this, though some extend the time into October. On the 8th of October the fly was seen evaporating in Eastern Pennsylvania in 1819, and it had wholly disappeared on the 11th, (Am. Far. 11, 180). The deposit is doubtless made later at the south than in the more northern localities. Mr. Tilghman's description of this process (Cultivator, vol. 32,) will convey so much more distinct a view to the general reader than any other that has ever been published, that it is here inserted. He says, "By the second week of October, the first sown wheat being well up, and having generally put forth its second and third blades, I resorted to my field to endeavor to satisfy myself by ocular demonstration, if I could do so, whether the fly did deposit the eggs on the blades of the growing plant. Selecting what I deemed a favorable spot, I made my observations. I placed myself in a position, by reclining in a furrow between two wheat lands; it was a fine warm calm forenoon, and I had been on the watch but a minute or two before I discovered a number of small black flies alighting, and sitting on the wheat plants around me, and so strong seemed to be their predilection for the wheat, that I did not observe a single fly to settle on any grass or anything within view but the wheat. I could distinctly see their bodies in motion when settled on the leaves or blades of wheat, and presently one alighted and settled on the ridged surface of a blade completely within my reach and distinct observation; she immediately commenced disburthening her apparently well stored abdomen, by depositing her eggs in the longitudinal cavity between the little ridges the of blade. I could distinctly see the eggs ejected from a kind of tube or sting, or by the elongation of the body. The action of the insect in making the deposit being similar to that of a wasp in stinging. After she had deposited as I supposed, some eight or ten eggs, I easily caught her upon the blade between my

finger and thumb. After that I continued my observations on the flies, and caught several similarly occupied, and could see the eggs uniformly placed in the longitudinal cavities of the blades of the wheat, their appearance being that of minute reddish sparks.

Mr. Herrick says, the eggs are laid in the long creases or furrows of the upper surface of the leaves of the young wheat plant; while despositing the eggs the insect stands with its head towards the point or extremity of the leaf, and at various distances, beetwen the point and where the leaf joins and surrounds the stalk. The number found on a single leaf varies from a single egg up to thirty or even more; the egg is about the fiftieth of an inch long, cylindrical, rounded at the ends, glossy and transparent, of a pale red color, becoming in a few hours regularly spotted with red between its exitation and its hatching. These red spots are continually changing in number, size and position, and sometimes nearly all disappear. A little while before hatching two latent rows of opaque white spots, about ten in number, can be seen in each egg. In four days, more or less, according to the weather, the egg is hatched, the little wrinkled maggot or larva creeps out of the delicately formed membranous egg-skin, creeps down the leaf, enters the sheath and proceeds along the stalk, usually as far as the first joint below, or in other words to the base of the sheath, which in the young autumnal wheat is at the crown of the root; here it fastens lengthwise and head downwards to the stalk, and lives upon the sap. It does not gnaw the stalk nor does it enter the central cavity thereof, but as the insect increases in size it gradually becomes embedded in the substance of the stalk. After taking its station the larva moves no more, gradually leaves its reddish color and wrinkled appearance, becomes plump and torpid, is at first semitranslucent, and then more and more clouded with internal white spots; and when near maturity the middle of the intestinal parts is of a greenish color. In five or six weeks, varying with the season, the larva begins to turn brown, and soon becomes of a bright chesnut color, resembling a flaxseed. When freshly taken from the root of the wheat the mature worm measures about fifteen hundredths of an inch, by about six hundredths in breadth. It shows no signs of life when placed upon paper and turned over with a needle point. It is soft, glabrous, whitish, and apparently composed of but nine segments, although twelve can often be distinctly perceived before its growth is completed; these are quite slightly marked by faint transverse lines of a greenish brown hue. Its underside is flattened and has an oblong grass-green cloud or spot in the middle, placed longitudinally. No regular contractions or extensions along the margin occur, to mark the segments; though after the worm has lain exposed to the air an hour, the color of the transverse lines above spoken of becomes bleached out as it were, and then perhaps from the worm having become somewhat dried, faintly impressed transverse lines are perceptible at the junction of each of the nine segments, faint longitudinal stripes are also discernible as though produced by the pressure of the parallel veins or ribs of the sheath and culm, between which the worm had laid. It has been sought in vain to ascertain by ocular and microscopic examination, how it is that the worm imbibes its nourishment from the stalk. To expose it to view, it must be placed in circumstances so unnatural to it that it apparently refrains from feeding. That it gnaws the stalk, as some writers have asserted, is an error; some have supposed that it absorbs its nourishment through the pores of its skin; but we incline to the belief that Dr. Lee's opinion is nearest the truth of any that has been hitherto advanced, that it takes in its nourishment by suction in a manner more analogous to the leach than any other familiar object.

The autumnal attack of the fly is in a double sense a radical one, each par-

ticular shoot at whose root one or more of these larvæ settle, is commonly destroyed by the time the worm has attained its growth. The presence of these worms is therefore readily detected by an examination of the young wheat in October or November. Individual shoots will be found here and there in the field, withered and changed to a light yellow color, strongly contrasting with the rich green of the vigorous uninjured plants. The frost or some other casualty may cause the ends of some of the other leaves to be of a pale yellow color, but here the whole plant is of that hue; and where a field is badly infested this yellow sickly aspect is perceptible from a distance. On examining the withered plants, the worm or flaxseed, if it has advanced to that stage, can be readily found; it is situated a short distance below the surface of the earth in the crown of the root. One or two radical leaves start from this point, their bases forming a cylindrical sheath around the central or main shoot, which as yet is but in its infancy. It is within this sheath, at its base, that the worms repose, one, two, three or more, and by imbibing the nutricious juice of the young shoot cause it to wither and die.

The mechanical presence of the larvæ so frequently spoken of as impeding the circulation of the fluids of the plant and thereby causing it to perish, I think has had too much importance assigned to it; the young plant being so soft and pliant that they would readily accommodate themselves to this process if they received no molestation beyond this.

The vigor and luxuriance of the uninjured shoots from the same roots, contrast so strongly with the wilted and feeble appearance of those attacked by the worms, as to have led some to believe that the unaffected shoots were stimulated to a more rapid growth in consequence of the pruning given by the fly; and that a better crop is thus sometimes produced by the presence of a moderate number of these worms among the wheat plants. The correctness of this opinion we very much doubt. The worm is nourished and reared upon those very fluids that are absorbed by the plant and elaborated for its own sustenance and growth. Every particle of this nutricious plant therefore, that is consumed by the worm, is a direct loss of so much material that would otherwise become straw and grain. At all events we think our farmers generally will prefer that nature should be left to her own undisturbed course in rearing their wheat plants, and will be by no means solicitous to have this renowned guest take any part in the operation.

When the worm or active larva has fully completed its growth, a slight diminution in the dimensions of the inner soft parts of its body commences, in which the outer and harder skin does not participate; this latter retaining its original full size. The result of this contraction is, that the worm gradually clears from its outer skin. If examined with a microscope when this change has recently commenced, a slight translucent space is observable at the head end, and a larger and more obvious one at the pointed or tail end, plainly indicating that the enclosed worm does not fill its outer skin. This contraction continues until the worm becomes entirely separated from its outer skin, and lies within it like the finger within the glove. The outer skin at the same time changes in color; from its original whiteness and transparency it gradually becomes opaque brown, and finally of a dark bay or chesnut color. Though much less flat than a flaxseed, its resemblance in color, size and form to that familiar object is so striking, as at once to be remarked by every one. This larva or flaxseed case is comparatively tough or leather-like at first, but becomes more brittle and also darker with age. On carefully opening the larva case a worm is found within it scarcely differing in any respect from what it was immediately before entering upon this flaxseed state. It has the same oval form, opaque milk white color, and green cloudlike visceral spot or line

beneath. The nine segments into which it appears divided, however, are now much more distinctly marked than they previously were, the transverse lines being more deeply impressed, and the margins shewing corresponding indentures. No traces of the numbers of the future fly are yet discernible. The insect now undergoes no further change for a period of five months, and reposing at the root of the now lifeless grain, it is buried beneath the snows of winter; over one half of its entire term of life is therefore passed in this state. This is the stage of this insect which has been spoken of by writers generally as its pupa or chrysalis state. On the access of the first warm days of spring as soon as the weather becomes sufficiently genial for some of the earliest plants to put forth their blossoms the larva of the Hessian fly is rapidly stimulated into life and maturity. The present year may differ from the last as to the exact period. It may be stated however, that in all parts the Hessian fly will probably be found in its full pupa state about the time the earliest forest trees and shrubs appear in blossom. It continues in this state about ten or twelve days, and then sends out the winged fly, after passing through the following minutely described process: The flaxseed shell has now become quite brittle, breaking asunder transversely if rudely handled, slipping off from the enclosed pupa like a thimble from the end of the finger. On removing the pupa from its case it is found to be thirteen-hundredths of an inch long, and five-hundredths broad, of an oval form, with rounded ends, and having its limbs and body enveloped in separate membranes. The thoracic is slightly narrower than the abdominal; the wings do not quite attain the middle of the length of body; the outer pair of feet come out from under the tips of the wings, and reach to the anterior margin of the penultimate abdominal segment, slightly curving inwards at their tips. The next pair of feet are somewhat shorter, and the inner pair are shorter still; they all lie in contact with each other, and in a direction parallel with the body. The abdominal segments are distinctly marked by strongly impressed transverse lines, and are of a milk-white color, the thorax and head being of a delicate pale pink red, and the feet translucent white; on the anterior margin is a chestnut brown cruantiform mark. It will hence be perceived that in all the details of its form the pupa of the Hessian fly coincides precisely with those of the other species of this genus that has been described. The time for its final transformation having arrived the pupa breaks open and crawls from its puparium or flaxseed case, and works its way upwards within the sheath of the leaf until it arrives at some cleft in the now dried brittle and elastic straw. Through this cleft it gradually, by bending from side to side, crowds its body until all except the tip of the abdomen is protruded into the air; the elasticity of the straw causing it to close together upon the tip of the abdomen so much as to hold the pupa in this situation, secure from falling to the ground; and, as if to preserve the body in a horizontal position the feet are slightly separated from the abdomen and directed obliquely downwards, with their tips pressed against the side of the straw, thus curiously serving like the braces to the arms of a sign-post to support the body from inclining downwards. Thus securely fixed and now freely exposed to the drying influence of the atmosphere, the outer membrane of the pupa exhales its moisture, and as it becomes dryed cracks apart upon the back part of the thorax. Out of this cleft the enclosed fly protrudes its head and thorax more and more, as it gradually withdraws its several members, antennæ, wings and legs, from the cases in which they are respectively enveloped, a process analogous to that of withdrawing the hand and its several fingers from a tight glove until at length entirely freed, the now fully fledged and perfectly formed fly leaves its pupa skin and mounts into the air.

From this description it will be seen that there is very great difficulty in

applying an effectual remedy for the destruction of this enemy of the wheat grower; none ever has and probably never will be discovered that can be infallibly relied upon. The most effectual remedy is provided by Providence; other insects having been created apparently for the express purpose of keeping this one in check.

Mr. Herrick says the Hessian fly is preyed upon and devoured by at least four other insects. When its eggs are laid upon the wheat leaves they are visited by an exceedingly minute four-winged fly, (a species of platygaster) which punctures the egg and deposits in it four or six of its own. The Hessian fly worm hatches, grows, and passes into its flaxseed with those internal foes feeding upon it. It now dies and its destroyers in due time escape from the flaxseed shell. Three other minute four-winged flies or bees as they would be called in common language, destroy the fly when in its flaxseed state. The most common of these is Say's *ceraphron destructor*. Alighting upon the wheat stalk, instinct informs them precisely where one of these flaxseeds lies concealed; they thereupon sting through the sheath of the stalk and into the body of the worm, placing an egg therein which hatches to a maggot, lives upon and devours the worm. Such are the means which nature has provided for preventiug this pest from becoming unduly multiplied; and so efficient and inveterate are these foes that more than nine-tenths of all the Hessian fly larvæ that have come into existence are probably destroyed by them. Mr. Herrick thinks, and we have strong reason for believing, that this estimate is within the truth.

Now, from these and other statements that have come under the observation of the writer of this essay, it seems conclusive that the circumstance of these enemies of the wheat crop, invariably diminishing after two or three years, may be accounted for from the fact that those parasitical insects, their natural enemies, increase in a ten-fold ratio, and while they are continually receiving reinforcing numbers the others are rapidly diminishing. Such are the beneficent provisions made by him who created them all, and it is therefore quite clear that burning of stubble is not wise, for while we by this means destroy thousands of our enemies we destroy tens of thousands of our allies.

A rich soil is a safeguard which has been strongly urged by almost every one who has written on the devastations of this insect. Other things being equal the crops on impoverished lands invariably suffer most. Hence those on sandy soils have in numerous instances been remarked as most severely devastated. A striking contrast even, may very often be perceived in different parts of the same field; the summits of knolls and ridges, situations where the soil is the most meagre, almost invariably show the greatest amount of damage, whilst the intervening hollows to which the fertilizing matters are washed from surrounding acclivities, sustain a comparatively slight if at all sensible injury. Yet the latter situations are the very ones which insects of this family are most prone to frequent, being low, shady and damp. There can be no doubt therefore, that the flies are as numerous in the hollow of a grain field as upon its ridges, and that it is only in consequence of the great fertility of the former situation that the crop there is enabled so effectually to withstand this enemy. Indeed farmers in districts where the fly has prevailed, have learned from experience that it is only upon fertile lands that it will do to sow their wheat. Hence it was long ago estimated by an intelligent individual that the Hessian fly on Long Island, by driving the farmers to manure their lands, instead of a curse had actually been a blessing. He says the lands in Suffolk county and other parts of Long Island were easily tilled, and by continued cropping with wheat so reduced that on an average not more than five or six bushels were raised to the acre. This mode of husbandry was still pursued,

and although the land was gradually impoverished, the farmer found the crop, although small, more than would pay for his labor and expenses. The Hessian fly put an end to this kind of husbandry, and in that respect has proved a blessing instead of a curse; no other way being found to prevent tne injury done by this insect but by highly manuring the land.

A writer in Delaware a'so states that the universal predilection there was to have large rather than rich fields of wheat, but the insect was counteracting this by compelling them to cultivate less land in order to cultivate it well, and that its tendency consequently was to make our population more dense by making it the interest of every man to own no more land than he could manure highly and till successfully. We thus have even in the devastations committed by this destroyer evident indications of that

All partial evil universal good,

which is every where manifest in the works of the supreme architect of nature. It is doubtless the additional strength and vigour enjoyed by plants growing upon rich soil, which enable them to withstand the depredations of this insect; those shoots which are commonly attacked in an impoverished soil are destroyed, and the plant itself thereupon perishes, whilst in a rich soil its vitality continues, and other shoots are sent forth by it which grow vigorously and unmolested. In the Spring attack, also, the weak and slender stalks growing upon a poor soil are much more liable to become broken and incapable of maturing any grain, than the large, robust well nourished stalks of a fertile soil. Hence a rich soil enables a plant to elaborate a sufficient amount of fluids for its own sustenance in addition to that which is abstracted from it by a few of those insects.—We therefore regard this as a primary and indispensible condition, and one which must accompany others next to be considered in order to their full success.

It is suggested that an effectual preventative against the Fall attack of this insect is late sowing; because the wheat does not in that case acquire a sufficient growth to afford a lodgement for the eggs before the Fall frosts disquailfy them for making the deposits. This is very likely a correct theory, but involves the risks to which we know in Canada late sown wheat is liable; yet when the fly induces the necessity of resorting to this remedy it is likely to be effectual, and here again, the chances are very much in favour of a rich soil. Experience has proved that a small portion of a field sown early has proved a protection to that which was sown later by attracting the fly entirely to itself, and affording employment for them while they did not touch the late sown. Another method recommended is sowing early and then pasturing off the crop very close in the Fall and Spring, and if the land is rich the stalk will spring up with vigor and the worms do not injure the second growth. It is plain that a close fed crop will furnish few leaves for the fly to place its eggs upon, and these leaves will commonly be consumed before the eggs are hatched. An individual who strongly recommends this method states, that six years' experience has convinced him of its efficacy; but if in autumn it be omitted until after the eggs are hatched and the worms have descended to the roots it can obviously be of but little service. When, therefore, an attack of the fly is feared—as the exact time of the deposition of the eggs is somewhat variable in different seasons—it will be necessary to watch the young wheat as soon as two or three blades from each root appear, and if the fly is discovered profusely depositing its eggs, sheep or light stock should at once be turned upon it in such numbers, if possible, as to eat it off in a few days. The same process may be repeated in the spring if found necessary. No injury to the crop need be apprehended from its being thus grazed down; if the soil is of due fertility it soon and entirely recovers from this operation. Moreover, if the soil is poor the fly will be sure to injure it to a much greater extent than

the sheep will do. I fully concur that this is to be regarded as a most judicious and important measure; care should, however, be taken not to allow the sheep at first to remain on the wheat long at a time, as the change from their ordinary food would be apt to do them harm without proper caution, but if judiciously managed they will thrive very fast upon it.

Passing a heavy roller over the wheat has been recommended as a means of destroying the eggs of the insect by crushing them. We apprehend this would be done to a very limited extent; but rolling the wheat, especially on loose porous soils, will do the crop service.

Mowing off the wheat at a certain stage before the heads have formed, has been practised with good effect, the depredators being thus removed, and a fresh growth of the crop springing up too late to be again infected by the deposits of the spring fly. The mowing ought to be performed before the heads are formed or it must prove detrimental to the crop.

A good deal has been said and written as to the different varieties of wheat being, some of them, entirely exempt from the effects of the insect, but it is doubtful whether there is any variety entirely exempt. General Harman, of Genesee, is of opinion after long experience, that the best variety, namely, white flint, resists it as effectually as any other. Sowing a strip the whole length of the field very early, to serve as a decoy for the fly, seems to be a reasonable plan, and sowing the remainder rather late it may entirely escape. The strip early sown as a decoy can be ploughed and sown with late fall wheat, or instead, with spring wheat. The supposition is that, the flies having all been attracted to the strip of early sown wheat they are turned under by the process of ploughing, and with their larvæ prevented from doing further injury as no spring generation can come forth; this measure is, therefore, worthy of being fairly tested by intelligent farmers.

The brief summary of the history of the Hessian fly may be given as follows: It was first known in Europe; was not known in America until after the period at which the Hessian soldiers landed in the United States. Its first depredations were commitied in the neighbourhood where those troops were encamped; its depredations commonly continue in a given place for several years and it then disappears, having been subdued by parasitic insects that preyed upon it, increasing in such numbers as to nearly exterminate it. It is frequently reappearing in excessive numbers in one and another localities, doing immense damage until it is again overcome by its natural enemies.

There are two generations of this insect annually. The eggs resemble minute reddish grains, and are laid in the creases of the upper surface of the leaf when the wheat is but a few inches high, mostly in the month of September; these hatch in about a week, and the worms crawl down the sheath of the leaf to its bare part just below the surface of the ground, where it remains subsisting upon the juices of the plant without wounding it but causing it to turn yellow and die. It is a small white maggot and attains its growth in about six weeks, it then changes to a flaxseed-like body within which the worm becomes a pupa the following spring, and from this the fly is evolved in ten or twelve days; the fly closely resembles a musquetoe in its appearance, but is a third smaller and has no bill for sucking blood; it is black, the joints of the body being slightly marked with redish hues; it appears early in May, lays its eggs for another generation and soon perishes. The worms from these eggs nestle at the lower joints of the stalk weakening them and causing them to fall down from the weight of the head, so that towards harvest an infected field looks as if the cattle had passed over it. Wheat can scarcely be grown except upon a fertile soil in those districts where this insect is abundant. The sowing should be defered until about the last of September, the season then being past when the fly usually

deposits its eggs. If at any time in autumn the eggs of the insects are observed to be profusely deposited upon the leaves, the crop should be speedily grazed down by sheep and other stock, or if this cannot be done, a heavy roller should be passed over it, that as many of the eggs as possible may be crushed or dislodged thereby; one or the other of the same measures should also be resorted to in the spring if the contingencies occur; or if the worms are at a later date discovered to be numerous, at the first and second joints of the young stalks, the experiment may be tried of mowing as close down as possible the most infested portion of the field; a top-dressing of salt and ashes will benefit the crop and possibly destroy the insects.

Western Canada suffered a greater loss last year from the ravages of the fly or worm, probably, than in any one year previous, particularly in that part formerly known as the Niagara District, where, in many cases, the quantity sown was not reaped, and in other cases, only from 5 to 10 bushels per acre, where, we know from reliable information, 50 years ago a yield of from 40 to 50 bushels was obtained and was not uncommon. It is notorious that the alarm in the early part of the season was very general, but in the more recently settled parts and where the soil was rich the vigor of the growth overcame the insect; but in all probability, judging from the experience of other sections where these marauders have committed their depredations, they have not yet entirely disappeared; and, therefore, it is important that some of the remedies suggested should be resorted to with a view to checking their operations. Sowing the field with a compost of salt, sulphur and ashes will unquestionably have a good effect in checking the insect in the fly state, and salting the wheat when mowed away, will check the worm or caterpillar. Should their ravages still continue late sowing should be resorted to, say the last week in September for the general crop, and for the purpose of stimulating the growth of the wheat and destroying any insects that may be lurking about the seed, a caustic steep would be advisable, lime, wood ley, arsenic or blue vitriol, or any other remedies that have heretofore been resorted to as a preventative of smut may be used with advantage; but above all, the ground prepared for next year's crop should be as far as possible from the field from which this year's crop is taken, and every available means used to make the soil sufficiently rich to produce strong healthy crops; this seems all that is in the power of man to do, trusting to the blessing of Him who is the maker of them all.

In conclusion, the writer of this essay does not give the matter of it as original, he having availed himself of the numerous articles that have been published from time to time relative to the several insects here treated of, and it cannot be supposed that any of those who have written on this creature can have derived their information in any other way, as it would require at least two seasons to acquire a personal knowledge of the enemies of the wheat grower, and a degree of attention and observation that few men could bestow upon it in such an eminent degree as has been done by Dr. Fitch and some others, of whose labors I have made free use in this paper.

ROUGH NOTES ON THE PROGRESS OF AGRICULTURE AND HORTICULTURE IN SOME PARTS OF ENGLAND.

BY THE HON. G. W. ALLAN.

(*Read before the Central Horticultural and Agricultural Club, Feb.* 26, 1859.)

Mr. President and Gentlemen,—At the request of several of the members of this Association I have undertaken the duty of addressing the Society on this their first general meeting for 1859. From the title of my paper many of you will, I am afraid, be led to expect a communication of a much more valuable and interesting character than the one I am now about to bring before you.

You will doubtless think that during my visit to England I must have observed so much of progress and improvement both in Agriculture and Horticulture, that I could not have failed to gather some imformation which might be imparted with advantage to my stay-at-home friends. The improvements in Agricultural machinery, in steam cultivation, in drainage, in the treatment and propagation of the various treasures of the forcing house and conservatory, are indeed so many and so great that they can hardly escape the notice of even the most causal observer. But although I gladly availed myself of the many opportunities afforded me of observing all that was new in the management and cultivation both of the "Field and Garden," I nevertheless feel that, not having made these subjects a special study, I do not possess a sufficiently accurate acquaintance with them to warrant my addressing you in any other spirit than that of a humble amateur, desirous of communicating a few facts which I may have gleaned during my wanderings abroad, in the hope that they may perhaps be turned to some practical account by those whom I have now the pleasure of addressing.

One of the first changes that struck me in the aspect of many of the best farming districts in England, as compared with former years, was the alteration in the size of the fields, the grubbing out of the hedge-rows, and the extensive felling of hedge-row timber.

I well recollect being asked on one of my first visits many years ago, whether I did not miss the woods I was so accustomed to in my native country, and I rather astonished the querist by replying that, so far from that being the case, I looked upon England as being rather the better wooded country of the two. This may probably be thought a broad assertion, but compare some of our oldest settled townships with the rural districts of England,—what a contrast between our wide bleak fields with their rail fences and treeless expanse, exposed to the rays of the burning summer sun and to cold driving winds of spring and autumn, and the green and sheltered English pastures, surrounded with trim hedges and shaded by many a noble oak, or elm or spreading beech.

We in Canada seem to have looked upon everything in the shape of a tree as a natural enemy, and, with few exceptions, have done but little towards preserving or replacing them, either for shelter or ornament; forgetful of the value of shade for our cattle during the hot summer months, and of the shelter and protection which a belt of wood would often afford to both cattle and crops in winter.

In England the fault has generally been in the opposite direction. In many counties the small inconveniently shaped fields, with their close hedges and belts of hedge row timber, keeping out the sun and air, were in that humid climate a serious drawback to good farming. The trees not only took more than their fair share of nourishment from the soil, but by their drip and shade otherwise injured the crop. The evils arising from these causes have attracted a good

deal of attention within the last few years; and the introduction of steam cultivation and labour-saving machinery, requiring large surfaces and regular shaped enclosures for their successful working, has also contributed to hasten the change, and in many counties the work of grubbing out and felling has been carried to an extent, which, however agreeable to the eye of the practical farmer, is certainly not equally so to that of the lover of the picturesque.

Among other advantages gained by this alteration in the size and form of the hedges, is the greater facility which is thus given for the cultivation of every foot of the land; no corners or narrow strips are left untouched by the plough, to become, as they too often are, nurseries for weeds. In Upper Canada, at all events, we are not open to the charge of laying out our farms into small or inconveniently shaped fields; but we should do well to bear in mind that a slovenly mode of enclosure is almost sure to be followed by slovenly cultivation. Even in old settled townships, round many a field covered with golden grain may often be seen thistles and every species of noxious weeds, growing undisturbed in the angles of those Canadian agricultural deformities, rail fences, and as the season advances scattering their seeds far and wide, and poisoning the land around them.

Of all the agricultural operations which I witnessed while in England, none gave me greater pleasure than the *ploughing matches* at the various agricultural meetings at which I had the good fortune to be present. Indeed I know of no sight in the whole range of farm operations more interesting both to the amateur and the practical man. The beauty, docility, and good training of the horses, the skill displayed by the sturdy ploughmen, and the precision with which the work is executed, all combine to interest and delight the spectator. So far as the picturesque was concerned, it was, therefore, no change for the better to watch the *Steam Plough* doing its work; it was a complete transition from the poetry to the prose of farming. In the place of the gay teams there was the engine puffing and snorting in the centre of the field, while the huge plough bearing up four furrows at a time was forcing its way through the soil at the rate of an acre an hour.

Fowler's Steam Plough, the one I saw in operation, consisted of an ordinary ten-horse power engine, with windlass to attach and detach, and anchor, with four-furrow balance plough frame, with scarifier tines, to take the place of the plough-mould board. The work was performed on a field of tolerably light land at the rate of seven and a half acres per day of ten hours, including stoppages. The actual rate of travelling while the ploughs were in full swing, would give, I believe, over an acre an hour! The soil moved by the four ploughs was three feet four inches wide by six inches deep. On a field of very heavy land, such as we have not very much of in this country, 4 acres, 3 roods, and 12 poles, were ploughed in 9 hours, and 39 minutes, equal to 5 acres per day of 10 hours. It was afterwards tried with Cotgreave's Trenching Plough, when of course the rate of work was greatly diminished; the furrow was from 12 to 14 inches deep, while the width, two ploughs only being used, was 20 inches.

It was calculated that the light land could not have been done by horse-power for less than 8s sterling per acre, while the steam plough did it for 6s. 6d. sterling, and in the case of the heavy land the difference would have been still greater, probably as much as 3s. sterling per acre, in favor of steam.

There was another species of steam plough, or rather cultivator, it would more properly be called, which was exhibited at the Royal Agricultural Society's Meeting in August last: Ricket's Rotary Steam Cultivator, consisting of a ten-horse power locomotive engine, with a horizontal shaft behind, driven by pitch chains, and revolving in a direction contrary to that in which the wheels were

travelling; it was steered and worked by three men. I am so little of a mechanician that I cannot pretend to describe it to you more particularly, but the chief peculiarity about its working appeared to be the way in which the cutters entered the soil or furrow from below, and working upwards to the surface, carried with them the separate pieces, and dropped them as their revolution continued, in an inverted position. Unfortunately, the chain connected with the shaft of the engine broke during the trial, so that the machine was not fairly tested, but it appeared to be very highly thought of, and no doubt seemed to be entertained of its ultimate success.

I shall not attempt to do more than allude to the immense variety of portable engines, threshing machines, clod crushers, drilling machines, scarifiers, oil-cake breakers, root pulpers, &c., &c., which modern science and ingenuity are now constantly producing to assist the agriculturist in doing his work more cheaply and effectively. Even if I felt that I could venture to trespass so long upon your time, I do not possess a sufficiently accurate acquaintance with their construction and working, to attempt to describe them to you with any degree of minuteness, but there is one consideration which the labor-saving machines suggest, which I would take this opportunity of bringing before the Society. Many of these machines are doubtless not adapted for our purposes in the present state of our farms, even in the oldest settled agricultural districts; but there are many others which, if introduced here, would prove an immense boon to the Canadian farmer. By their aid he would be enabled to perform various important agricultural operations, much more thoroughly, and at the same time much more speedily, than at present. They would render him in some degree independent of the uncertain supply of labor, and would thus enable him to bring a much larger breadth of land into cultivation. Could we not then, as a society, do something towards promoting the introduction of these machines, either by premiums to those who would be willing to incur the expense of importing them and setting an example of their use, or by inducing the various branch societies to attempt something of the kind for the benefit of their immediate neighborhoods.

Among other important results of the great improvements which have been made of late years in agricultural machinery, more especially in subsoil ploughs and cultivators, is the present system of deep ploughing, which is now so extensively practised in the best farming districts of England, the good effects of which cannot be too highly rated. By increasing the depth of the soil from which the plants draw their nourishment, it gives their roots wider range, and so conduces to their vigorous growth. The land too being more thoroughly pulverised, is so much the more easily worked, the water percolates more freely through it, air is admitted to the subsoil, and when the work is done with the trench subsoil plough the lower stratum is brought up and mixed with the upper, and so operates as so much fresh soil. The effects of this system I had an opportunity of observing upon the farm of the well known agriculturist Mr. Huxtable, in Dorsetshire. The soil, naturally stiff and difficult to work, was as mellow and almost as thoroughly pulverized as that of a garden, and the root crops more especially attested by their vigorous growth and abundant yield the excellent results of the system.

Deep ploughing has, of course, been followed generally by deep draining, and, indeed, in no respect does modern farming show its superiority more than in the improved system of thorough drainage which now so generally prevails. In some of the wet, stiff clay soils of Essex the produce has been doubled by the attention which has been paid of late years to the drainage of the land. The trenches are generally made about 25 feet apart, and about 4 feet in depth, so that not only is there no possibility of surface water lodging in any part of the

field, but every shower of rain after penetrating through the ground and doing its work, is carried off without stagnating round the roots of the plants. No matter how far down these roots go in ground that has been thoroughly drained they will not meet with a subsoil saturated with moistur', and the deeper they go under such circumstances the more healthy and vigorous will be the growth of the crop. I am convinced that if more attention were paid by our agriculturists to this first requisite of vegetable health, our crops would be infinitely more certain, and the productiveness of our soil would be increased fourfold. I fear that drainage is too apt to be looked upon here as a sort of luxury, like the eradication of stumps and the doing away of snake fences, which wealthy farmers and men of large capital may perhaps indulge in, though even in their case this most essential requisite is often sadly neglected. On some of the oldest farms in the best agricultural districts you will see fields without a stump, and otherwise exceedingly well cultivated, yet disfigured by patches and hollows in which, for want of proper drainage, the water collects after every heavy rain; and the yellow and sickly appearance of the plant tells plainly enough of the mischief that is going on.

No one question in the whole range of agricultural statistics has attracted more attention of late years in England, than the comparatives merits and advantages of different kinds of manure, both natural and artificial. The crops of wheat, barley and oats, and the mangnificent turnips and mangel-wurzels which I saw growing on the naturally poor soil of the Tip-tree Hall farm, in Essex, went far to convince me of the superiority of liquid manure over all other fertilizers.

The liquid is pumped up from an enormous tank or reservoir, in which all the solid manure of the farm, refuse, and offal of every description is liquified, and then conveyed in large iron pipes to hydrants, and by them distributed in fertilizing but rather unsavory showers through gutta percha hose to every part of the land.

Mr. Mechi's system has but one drawback—expense. And judging from his experience, it would still appear doubtful whether liquid manure alone can take the place of all other fertilizers, with a view to ultimate profit as well as to immediate results in the growth and excellence of the crop. At Meyremil, in Ayrshire, however, the same system is pursued, and is said to answer perfectly in a pecuniary point of view. There the liquid manure is applied to growing crops with such success, that when parched up with drought everywhere else, there all is green and luxuriant; and so the nearest approach is obtained to that artificial climate which enables the gardener to do what he likes with the plants which he grows; and it would seem as if the farmer, in spite of drought or changing weather, might almost produce as certain results in the cultivation of his crops, as the horticulturist achieves in his forcing houses and conservatories with his plants and flowers.

Of the beauty and variety of the stock which may now be seen at every agricultural gathering in England, it is impossible to speak in too high terms.

Among the different breeds of horned cattle, the short horned still maintains the chief place of honor, and for perfect symmetry, fineness in handling, and general excellence in all points most valued by breeders, they can hardly be surpassed. Herefords as a class, however, are every day advancing in public estimation. Though not possessed of the same extraordinary fattening qualities as the short horned breeds, they carry a great quantity of flesh, are a strong and vigorous race, good milkers, and seem to excel in arriving at a profitable maturity under disadvantageous pasturage. I saw some remarkably fine animals of this breed at the great Exhibition of the Royal Agricultural Society, at which I was present after my arrival in England, and I confess that I was much struck with their great beauty both of colour and frame, and their many other excellent

points, and I should much like to see the breed more extensively introduced into this country. The Ayrshire and Devon cattle still continue in high favour amongst English breeders; the former must always hold the first place for dairy purposes, but the Devons, both as fat stock and dairy cattle, are excellent. Some of the animals of other classes which I saw exhibited, both at the Royal Society's Exhibitions and at Smithfield Club Show in '56 and '57, were perfect in symmetry, and, to adopt the expressive phrase made use of by a critical butcher who was examining them, "every ounce of flesh appeared adapted for roasting." I have often been surprised that the hardy Highland cattle have not been more extensively introduced here, as they have always appeared to me to possess qualities which fit them admirably for roughing it in the backwoods. They are generally of strong and vigorous constitutions, pick up a living readily anywhere, fatten readily and yield most excellent beef. Indeed no bad proof of the goodness of their meat is the estimation in which it is held in the London Market.

Among the sheep which I saw exhibited on various occasions, none impressed me more than the Cotswold. I suppose, of course, the Leicester combine all those qualities of form and feeding in the greatest perfection, which entitle them to stand at the head of "the long wools;" but the Cotswolds are certainly magnificent looking animals, of great size, with fine wool, and producing excellent mutton. I do not wonder at their having become a very favorite stock.

I ought not to pass over the pigs in enumeration of improved stock, more especially as they are a class of animals of very considerable importance and value to the Canadian farmer, and I should be heartily glad to see some of the best Dorset, Bedfordshire, and the improved Suffolk and Berkshire breeds take the place of the long legged animals which still hold their ground in some parts of the country.

I hope however, we shall never be tempted to follow the example of some English breeders, and carry the fattening process to the absurd extent to which it had been practised upon some of the animals which I have seen exhibited at the various shows. To such a disgusting state of obesity were many of these unhappy porkers brought, that standing up was almost an impossibile feat! and the huge mass lay stretched out in its pen, incapable of moving, and almost equally incapable of breathing! The Judges have, of late years, however, set their faces resolutely against this absurd practice of over feeding, not in the case of pigs only but in regard to stock generally, so that we may hope to see it by degrees altogether abandoned.

We have gratifying evidence in the character of the horned cattle, sheep and pigs, at our various Provincial shows, that the pains which our farmers have taken of late years to improve their stock, by importing animals of the best breeds, have been attended with the most satisfactory results. But in our horses, more especially in hack and carriage horses, we fall far behind the English breeder. The generality of our farm horses are good and admirably adapted for their work; and the heavy Suffolk punches, and Clydesdales, taking as they are to the eye, would certainly not answer nearly as well for our new lands and back country roads. But in heavy horses for town work, and more especially in good hacks and roadsters, we are exceedingly deficient. It is to be presumed that the animals exhibited at the Provincial Show are to be considered as a fair sample of what we can produce in those particular classes, and a miserable lot, taking them as a whole, were the horses which I saw being trotted round the ring at the fair ground in September last. I may, perhaps, be thought to be doing an injustice to our Canadian breeders, but from the enquiries which I have lately made, it really appears to be much more difficult to obtain a good hack or a pair of well bred carriage horses, in this part of the country at all events, than it was half a dozen years ago. At most of the agricultural shows in England,

premiums are now given for first class hack or roadster stallions, and every possible encouragement is given to that class of animal likely to produce good carriage horses. Can nothing be done with us to remedy the deficiency which exists, and to arouse a greater spirit of enterprise among our breeders?

There is one point connected with the rearing and management of stock, more especially of fat cattle and sheep, which I would desire to draw your attention to before I leave the subject. It is this—All the best agriculturists in England seem now quite agreed that animals should be kept in good condition and never suffered to lose flesh from their very birth. They no longer allow young cattle and sheep to be half starved until they are nearly old enough to be fattened for the market, and then take them up and bring them into proper condition, but the system is progressive from the very first month of their existence, and the animals are brought forward to the condition in which they are ultimately intended to be without losing a day. This has been proved to be the truest œconomy, and is well worth our attention, not only in the cases to which it is more strictly applicable—animals intended for the market—but in the management of young stock generally, which in too many instances are stinted in their growth, and never reach that degree of excellence which they might attain but for the pinching and starving they have undergone in their youth.

One of the last things I would biefly allude to as characteristic of modern agriculture, is the degree of nicety with which all questions of cost and profit, as connected with the management of the farm, are now calculated.

Formerly, farming was looked upon by many, even in England, as an occupation which required but little work on the part of the head, whatever it might require from the hands, and farmers generally were supposed at all events to have "a soul above figures!"

But the most careful tradesman does not more closely scrutinize every item of incomings and outgoings, than does your prudent agriculturist every particular of his expenditure with a view to the returns which he expects to receive. The cost of rearing and fattening every ox, sheep and pig, and the profits expected to accrue from them, the comparative value of different kinds of manure, the relative proportions of the amount of stock to the size and capabilities of the farm, the comparative degree of profit to be derived from the cultivation of different crops, are all carefully calculated and pondered over, with a view to the greatest possible production at the smallest possible cost. I do not mean to assert that the agriculturist takes a niggardly or narrow view of the profession, or is simply intent upon making money at the least possible risk to himself—far from it. On the contrary, there are no more liberal minded men in England than are to be met with in the hands of her leading agriculturists. But in the present state of the farming interests, with the competition too which free trade has entailed, careless expenditure or unscientific management could no longer be tolerated. It is true, "high farming," as it is commonly termed, pays the best; and a liberal expenditure, if understandingly made, is sure to be followed by liberal returns; but "the figures and statistics" must be well weighed and carefully considered, and all that science can effect must be called in to aid in solving the all important problem, "how to attain increased production at a diminished cost."

As yet, we in Canada know comparatively little of the burdens upon land which press so heavily upon the farmers of England, and the circumstances of the country have hitherto been such that there has not been the same urgent necessity for carefully calculating the cost of production, or for a careful study of the best modes of applying all resources which science can furnish to guard against destructive influences, or increase the productiveness of the soil.

But I think the time has now arrived when these means can be no longer

neglected. The repeated failure of the wheat crop in various parts of the Province —the increase in the number of insect pests destructive to cultivated crops of all kinds—the evils arising from slovenly cultivation or a pernicious and exhausting system of over-cropping, all call loudly for reform ; and unless our agriculturists bestir themselves, diminished production, short harvests, and all the distress and misery which inevitably follow in their train, will come upon us with crushing force, and the prosperity and resources of the country may receive a shock from which it will take years to recover.

Let us turn now from the Farm to the Garden ; and if English agriculture has raised itself to the rank of a science by the aid of chemistry and mechanics, the horticulturist certainly brings to bear upon the cultivation of his fruits and flowers a degree of botanical and scientific knowledge wholly unknown twenty years ago. The results of this improved and scientific cultivation, as exhibited at any of the great horticultural exhibitions, are such as must astonish and delight any one who may not have had an opportunity of visiting them for some years past. The first of these shows that I attended after my arrival in England, was the so called exhibition of American plants in the Regent's Park Gardens. Under an enormous tent, arranged so as to form a sort of amphitheatre of the most glorious masses of flowers, were hundreds of azaleas and rhododendrons of immense size, and covered with bloom ; groups of the same magnificent plants so disposed as to present the most harmonious and beautiful assemblage of colors, occupied the central space, the whole as you entered forming as lovely a *coup d'œil* as the heart of an horticulturist could possibly conceive.— The only drawback to my enjoyment of these rhododendron shows, was the vexatious remark that was constantly being made to me, " Oh this is nothing new to you ; you must have them in such abundance in your part of the world !" I don't believe that I ever had the courage to confess that I had absolutely never seen even the commonest of the hardy rhododendrons grown here. Of course a moment's reflection would have suggested to my friends that " American " was a wide term, and that the geographical range of these lovely plants might possibly be confined to the central and southern portions of this vast continent. Indeed it is not to America only, but to India, that the English horticulturists are indebted for some of the most valuable additions to their collections. The Himalayan rhododendrons, first, I believe, introduced to the notice of the English public by Dr. Joseph Hooker, are magnificent specimens of this beautiful tribe of plants, and have proved most invaluable acquisitions both to the shrubbery and conservatory.

I had the pleasure of seeing one of the Sikhim rhododendrons last year at a friend's place in Surrey, which had just bloomed for the first time in England. I am ashamed to say that I have not been able to recall to my recollection its proper botanical name, but I may perhaps give you some idea of its beauty when I tell you that the blossoms were in clusters of four and five, something like the Bourbon lily, of a pure white, at least four times the size of those of the common rhododendron, and of a most delicious fragrance.

But although the rhododendrons at these exhibitions were principally half-hardy, or stove-plants, there are still many varieties which are perfectly hardy, and it would certainly be well with the whole of our horticulturists to attempt at least to introduce some of those beautiful shrubs into our Canadian pleasure grounds and shrubberies. Rivals in beauty, and equally valuable both as stove and out doors plants, are the Azaleas. Among those which I have noticed as particularly beautiful at the various exhibitions, were the Azalea triumphans, and the Azalea Rosea punctata; the former was at least 5 feet in height, a perfect pyramid of bloom ; the latter was but little inferior in size, and perhaps even more striking from its brilliant colours and profusion of bloom.

Amongst the class of stove plants the Ixoras struck me as being very handsome and showy. They require, I believe, extremely good management to bring them satisfactorily into bloom; but when skillfully treated they will begin to shew their fine salmon and orange coloured flowers as early as April, and will continue in bloom until July. I noticed also several splendid species of climbing and half climbing plants belonging to the genus Allamanda and Diplodenia, of the former the Allimanda grandiflora, producing abundance of large yellow flowers, is perhaps the most beautiful. The Dipladenia splendens and Dipladenia crassinoda are both very fine varieties. The crassinoda which I saw in the July exhibition of last year, covered with bright rosy convolvulus-like flowers from top to bottom, was one of the most charming stove plants in the Exhibition. I must not forget to mention also the Hoyas, which seemed to be especial favorites with some of the exhibitors, and the gardenias. Of one of the latter, the Gardenia fortini, I saw a very fine specimen, covered with large ivory white flowers which were so deliciously fragrant that the air for many yards round was filled with their perfume.

But I come now to a class of plants some of which are of singular beauty, and all of these most curious in their habits of growth. I allude to the Orchids—those beautiful natives of India and China, of Japan and the Brazils, which modern science and skill have brought to almost as great a degree of perfection in cold and foggy England as in their own tropical woods. I fear the expense and trouble attending the cultivation of these beautiful exotics will long render them comparative strangers to our collections; and I confess I lingered over that part of the tent more especially devoted to them at the Regent's Park Exhibition, with the sort of feeling, that, without another voyage across the Atlantic, it would be many years before I should "look upon their like again." In their native country some of these plants have, as it were, three seasons; in the rainy and warm season they make their growth, in the cool season they rest, and in the hot and dry season they flower. By careful attention to these peculiarities, and by imitating as far as can possibly be done by artificial means the various conditions of their native atmostphere, the English horticulturist has succeeded in growing and bringing into bloom not only the commoner kinds, but even the most delicate varieties of these rare plants.

Among the different classes of Orchids which I have had an opportunity of seeing at the exhibitions, the most conspicuous appears to be the Catleyos, the Dendrobriums, the Saccolabiums, the Oncidiums, and the Vandas. The first genus, the Catleyas, are the most easily cultivated of all the Orchids, and are grown readily in pits in well prepared composts. The flower of all the varieties of this genus are extremely beautiful. The Catleya skinneri, the flowers of which are of rich purple, may perhaps be instanced as one of the finest and most showy. And among the Dendrobriums the Dendrobrium Devoniensis and Dendrobrium Nobile, producing magnificent spikes or clusters of pendulous flowers, are both very beautiful. But, although in all probability some time must yet elapse before we can hope to see Orchids and Orchid-houses forming part of our horticultural establishments, the day, I hope, is not far distant when the increasing taste for horticultural pursuits, aided by increasing means, will lead to the introduction of these lovely exotics into our Canadian collections. In the meantime we have much to learn and many improvements to make in the cultivation of the hardier and less rare plants. Take for example the Roses and Pelargoniums. It is doubtless attributed to superior skill in growing and pruning, that the plant which one sees in the various English exhibition are so much finer in form, and in the profusion of bloom which they exhibit, than the majority of specimens to be met with among Canadian growers In the English plants not a single stem or spray seems to be

out of its place, and the flowers are produced in such profusion, and at the same time with such regularity, (if I may use the expression) as to cover the plant with a mass of bloom, such as we seldom see on the same kind exhibited here.

I would also venture to call your attention for a moment to English practice in another particular, and that as to the manner in which the modern gardeners lay out their parterres, so that they may be said to resemble lovely natural carpets or ribbons of the most exquisite and delicate hues. One of the best specimens of this style on a large scale, which I had the pleasure of seeing, were the gardens at Trentham, the Duke of Sutherland's seat in Staffordshire. But the principles upon which they were laid out apply equally well to the smallest and most unambitious flower gardens. The great object is to produce an agreeable effect by masses of different colored flowers so arranged as to avoid all inharmonious contrasts, while the more delicate gradations are attained by different hues of the same color, and of different degrees of brightness, being carefully grouped together.

The plants principally used are the several varieties of scarlet geraniums, and verbenas, the Lasthenia Californica, Calceolaria Amplexicaule, Nemophila Insignis, common white Candytuft, Sylvia patens, and Eschscholtzia Californica.—There are of course several others, bedding out plants and different kinds of annuals, which are also used constantly, and with excellent effect; but I have mentioned these names more particularly because they are all inexpensive plants and easily grown. I should much like to see the experiment tried here, if not by some of our professional gardeners, at least by some of our amateurs; and I am convinced that the results will give so much pleasure and satisfaction that they will consider themselves amply repaid for the time, and thought and trouble they may have bestowed upon the arrangement of their flower beds.

I shall now briefly allude in the last place to the improvements in the cultivation of the various classes of hot house and hardy fruit which have been made within late years in England. Foremost in the rank of hot-house productions stands the pine, which horticultural skill and science have now brought to such perfection, that five, six and even eight pounds, are not an uncommon weight for them to attain, and in point of flavor and lusciousness, those that I have tasted in England would bear favorable comparison with any of their out-door brethren that I have met with in Cuba, where a congenial soil and climate enable the cultivator to grow them with very little more trouble than an ordinary garden vegetable.

Grapes, notwithstanding the mildew and other diseases from which the vines have suffered so much of late years, are produced in greater perfection than ever, thanks to the unwearied patience and skill which have waged such successful war against the numerous enemies the grape has had to contend with. Nor must I omit to mention those elegant little vines in pots, each bearing from four to eight bunches of fruit, and intended I suppose, to grace some goodly feast, which are generally to be seen ranged down the centre of the fruit tables at the various exhibitions.

Of the peach, the apricot and the nectarine, I shall say but little except that every year seems to bring them to a higher degree of excellence. The former more particularly, both in size and flavor, have now been brought I should think to as great a degree of perfection as they are capable of.

Among the hardy fruits none attracted my admiration more than the strawberry. I should think this delicious fruit in point of variety and excellence has made greater admirers than almost any other in the whole catalogue. Up to the beginning of the present century there were not more than three or four kinds known. In 1842, the London Horticultural Society published a list in their fruit catalogue of thirty-one recognized sorts, of sufficient merit to

justify their cultivation, and a supplement was published, not very long ago, to that catalogue, in which twenty-nine new sorts are enumerated, making somewhere about sixty sorts in cultivation. In the gardeners' catalogues, indeed, the numbers have risen to over a hundred; but no doubt there are in all of them a host of synonyms which go to swell the total. The different varieties are now generally divided into 7 classes :—

1. Scarlet Strawberries. 2. Black Strawberries. 3. Pine Strawberries.—4. Chili Strawberries. 5. Hautbois. 6. Green Strawberries. 7. Alpine and Wood Strawberries.

Of the 1st class, Cuthill's Black Prince and Prince of Wales, and the Grove End Scarlet, sometimes called Atkinson's Scarlet, appeared to me to be the finest varieties.

Of the 2nd, Myatt's Pine and the Elton, and of the 3rd class, Myatt's British Queen; the latter, indeed, is probably the most popular of all strawberries, and its high flavor, large size, and its character as an abundant bearer, justify its popularity. I will not take up your time by attempting to enumerate the many other valuable varieties which are included in the classes I have named; but I cannot refrain from urging upon my brother horticulturists the claims of this delicious fruit to their especial attention; our climate and soil are well suited for its growth, its cultivation entails comparatively little trouble or expense, and there is certainly no good reason why we should be so far behind the English growers, in the cultivation of a fruit which requires neither forcing nor extraordinary care or protection of any kind to bring it to perfection.

And now, gentlemen, in bringing these desultory remarks to a close, I feel that I must crave indulgence for this very meagre and imperfect attempt at a sketch of the progress which agriculture and horticulture are making in our Fatherland. To do justice to such a subject, requires a much more practical acquaintance with the operations both of the farm and the garden than I pretend to possess; and I must, therefore, only conclude as I have begun, with expressing the hope, that those whom I have addressed may perchance have picked out some stray facts, or gleaned some scattered hints, which their practical knowledge may enable them to turn to useful account hereafter.

ON THE DRAINAGE OF LAND, AND ITS NECESSITY IN THE PRESENT STATE OF THE AGRICULTURAL INTERESTS OF CANADA.

Read before the City of Toronto Electoral Division Agricultural and Horticultural Society, 12th March, 1859.

BY H. J. BOULTON, ESQ., OF HUMBERFORD.

The exceedingly depressed condition of every interest of the Province of Canada must be a matter of great anxiety to every one interested in it, either as the country of their birth, or of their temporary or permanent adoption; and in seeking for the cause of our destitution, we should look to the source of our wealth, and enquire what is its condition. High authorities hold that the produce of the tillage of the earth is the foundation of the wealth of all nations, and it surely may be assumed without any elaboration of argument that the paramount interest of Canada is its agriculture. Our population is thin and scattered, our lands are more abundant than we can occupy and subdue, our very towns and cities do not exclude from their limits, nay, almost centres, the occupations of the country; yet, with all these circumstances surrounding us we have an absolute scarcity of every article in the commonest demand for the support of both man and beast, and instead of drawing upon the fund of our agricultural products to pay for the luxuries or rather for the very necessaries of life, we are on the eve of having recourse to a foreign market for what should be produced in excess of the demand at home. A paper relating, as this does, to the general subject of farming, may at first sight appear more suitable to be read before an association of a rural district than one the majority of whose members probably restrict their practical operations to the garden and the green house; but the very liberal manner in which it is well known many of the townspeople of Toronto have supported some of the neighboring township societies, removes any hesitation in addressing them on the subject. Independent of the fact that farming ought, after all, to be gardening on a large scale, there is another indirect interest. A few days ago a friend was speaking of Rochester as he knew her when the Genesee valley poured its treasures of wheat into her mills, and the difference now, when one rarely sees a wagon load of wheat in the street.—Rochester had her manufacturing power to fall back upon, but what will become of our towns if the produce trade fails them. Here is a powerful incentive, and the inhabitants of Toronto as the centre of perhaps the most influential farming district of the Province, should at once take up the subject of the present failing interest of agriculture, and discuss and devise and advocate measures for its relief. For many years past the very high price of wheat has tempted the whole farming population almost to abandon every other article of cultivation, and consequently the other grains, with all roots, vegetables, dairy produce, hay and fodder, have become so scarce as to have reached almost fabulous prices, and now as an overwhelming misery comes the blight and failure of what was expected to be the golden harvest.

As the inhabitants of a young country, and a people who have, as a majority, carved out for themselves competence and comfort, we have too easily and generally given way to a practice of self gratulation, laudation and complacency, which has been too readily encouraged in all addresses made to large gatherings of our people. A very little practical thought would teach us that we have yet a vast deal to learn, and immense improvements to accomplish. Compare any English farm steading with our barn premises. In place of roofed buildings

here, barely filled with the crop of whole farms, there one finds in a rick-yard, dozens of stacks large enough each to fill a moderately sized barn, and the straw when thrashed, instead of being cast out to decay in the course of perhaps two or more seasons, or at best thrown to be partly eaten, partly trodden under foot by a few half-starved cattle, is carefully preserved to absorb the liquid, and be mixed with the solid manure produced by cattle fed on the richest and most nutritive food.

Our productions in the aggregate have been very great, but the extent of the lands from which they have been drawn has been generally unknown, and their gradual fall from fertility to impoverishment has been unnoted. By the census return of the year 1851, (which was before our wheat was attacked by the ills with which it seems at present threatened,) it appears that the yield of wheat in fourteen counties in Upper Canada, varied from 16 to 20 bushels per acre. The County of Bruce, in which the total yield was small, averaging 20 2-60 bushels, while among the older counties, Brant, Halton, York, Oxford, Kent and Peel, ranged next in the order in which they are placed, from 19 2-60 bushels down to 18 3-60 bushels; the total average of Upper Canada being 16 14-60 bushels per acre, while in Lower Canada it is 9 50-60 bushels, and in Ohio 12, about the same period. While for Scotland for the year 1854, the average is no less than 28 56-60, and in England, I believe, the average is set down at the same period by Mr. Caird at 3½ quarters or 30 bushels. While dwelling upon these figures it may not be uninteresting to state the relative proportion of land occupied in England and Canada in the growth of grain and root crops, which will easily be seen in the following tables:

	Root and green crops.	Grain.	Grasses.	Pasture.
England, acres,	3,069,215	8,476,592	2,820,066	8,874,946
Upper Canada,	96,285	1,593,482	693,727	1,361,346

The proportion of the first two columns being for England, about as 1 to 3; for Canada, as 1 to 16. The tables from which the above statements are collected, set down the acreage under tillage, irrigated meadows, and permanent pasture.

England	17,484,144
Upper Canada	3,702,783

These remarks are not applicable solely to Canada. In a late paper, (*Leader*, 3rd March) was published an extract from an Ohio agricultural journal, showing that the same results are to be observed there. Although from the year 1840 till 1850, there had been a large addition to the number of acres under wheat, yet there had at the same time been an actual diminution in the amount of the produce, to the enormous extent of over 2,000,000 of bushels. This is attributed by the Ohio editor to bad farming, but the remarks upon the extract doubt this, throw all the blame upon the soil, and express an opinion that while all the west and so many acres of wild lands remain open for cultivation high farming does not pay.

In the first place, I would ask, how many and where are the instances in which high farming has been tried in this country, and where are the returns on which to ground the assertion that it does not pay? As a second question: is the mission of civilization in this continent to pass over the face of the country from east to west, like a desolating cloud of locusts, to exhaust the natural richness of the soil, and leave nothing behind but a barren and profitless waste. It would be far easier to husband and sustain the strength of our lands than resuscitate it after once suffering it to sink.

This unfortunately has been the too common course, but is not to be attributed entirely to the improvidence of our farmers. In many, nay, almost all cases, they

have had to struggle with the disadvantage of empty pockets, if not indebted for their very lands, and attention has been paid necessarily only to those things which would bring an immediate remuneration, therefore the bulk of their timber has been early disposed of, and the riches of their lands drained by continual crops of what formed the most ready source of a money return, no attempt at the same time being made to sustain the once teeming earth with those manures which should have been accumulated in reserve for its refreshment, and no rest being afforded by that judicious rotation of crops which the power of landlord has long enforced upon the tenant farmer of the old countries. There, in addition to the great efforts which have been made by private individuals, the Government have not and do not think it beneath their notice to discuss in all its bearings every question connected with agriculture in the halls of the legislature, and from discussion to proceed to action, to encourage and assist and impel the farmer to improvement.

If this course has been considered advantageous and necessary in a country where the control of, and the motive to amelioration, is centralised to a certain degree as it were in the hands of a few large landed proprietors, who certainly have in England most nobly fulfilled their duty, how much more imperative should be the necessity for our Canadian legislature to take a leading part in the same direction, in a country cut up and divided amongst a population personally independent of and uncontrolled by any mutual bond or united action. In the early settlement of the country, it was well, in fact it was useless and impossible to do otherwise than, to leave the hard working and skilled pioneer to reclaim in his rude way the virgin soil from the gloom of the forest; for in this early stage of the earth's subjugation, and for many years after, there was no scope for the application of the niceties or the science of agriculture. Time alone was necessarily the main agent for the removal of the deep rooted stumps, that imperturbable obstacle to the refinements of the art. Tillage crops could not be thought of among the wide spreading roots, and the only resource was the bare fallow and the cultivation of grasses. Here consequently was no field for the capitalist or the man of science, all was to be accomplished by simple labor, and the exercise of frugal patience; and a large portion of our farming population have commenced their agricultural career, placing more reliance in, and in many cases having more knowledge of the use of the axe, than perhaps the plough, or the hoe, or the spade. Many even of those who came to their new homes accustomed to the labor and practice of farming in the old countries, from force of the entirely different nature of the new from the old sphere of action, being compelled to abandon their accustomed method of working, have apparently lost sight of their ancient usages, or cannot now realize that with land in the same condition, at all similar systems are necessary or applicable to the two countries; and, after them, newly arrived colonists either fall into the same course of husbandry as their predecessors, or failing to appreciate the points of difference between their new circumstances and what they have been accustomed to, fail of success, and so serve to discourage any attempt at changing the prevailing course.

This, however, might have been attended with better results, had greater attention been bestowed on surface drainage, and more care and seed been used in the laying down of meadows, and by abstaining from too soon breaking them up for the careless and hasty growth of grain crops. As a counterpoise to this faulty system of management, the earth had not yet lost its youthful strength, nor that free and permeable state which can easily be imagined to have existed in its primeval forest days. This natural condition no doubt may be reckoned among the principal sources of the fertility of newly cleared land. In the unbroken forest, although the water may be retained by natural encumbrances of

fallen timber and leaves, the soil is not subject to that rapid evaporation which takes place when once exposed to the scorching sun and no less scorching wind. A large portion of water which does not escape over the surface, is taken up by the roots and fibres of the trees, and so consumed, while the remainder sinks to a much greater depth into the soil, in its natural light and open state, than it does in cleared lands. These, as soon as the timber is removed, are thereby exposed to the sun and wind, and lastly to the treading of cattle, both at pasture and in the ordinary operations of culture, until the subsoil is at last reduced, at least in the strong and heavy soils, to a state of consolidation, alike impenetrable to the roots of crops sought to be grown upon the surface, and hostile to the fertilizing effects which would otherwise be produced by the percolation of rains through them.

One of the most important operations in husbandry, is the provision of adequate and advantageous means for the escape of superfluous water from the soil, and, for the most part, and until comparatively late years, even in England, this was considered to be fully accomplished by large open drains at the bottom of each field, into which the water was discharged by open furrows between the ridges into which the land was formed. This open furrow is intended not only to receive the water which flows over the surface, but being ploughed slightly lower than the depth to which the ridges are tilled, should also prevent the accumulation and consequent stagnation of water under the surface of and through the stratum of ploughed soil. It is then, in proportion as the bed upon which this cultivated soil lies is shaped so as to promote the escape of water into the open furrow, that ploughing may be to a certain extent, deemed good or bad, and in order to attain this object all the furrow slices should be of the same thickness, which, of course will ensure the ploughing to be of the same depth, and the surface level, or perhaps rather higher in the centre. Instead of this shape being given, we often see lands formed with the borders thrown up higher than the portion immediately within, and perhaps level with what should be the crown of the ridge, and thus an obstacle presented to the ready flow of the water from the seed bed. This perfection, however, could not be expected to be attained where land is encumbered with such obstacles as the roots and stumps of trees, but should never be wanting in lands free from such impediments; and it is for this reason that wheel ploughs have been adopted, even in England, where, although the best of ploughmen are to be found, there is not perfect certainty of getting workmen who are capable, or at least careful enough to accomplish this most important requisite of good ploughing. Another point to be observed in the laying out of the ridges in a field, is the direction in which they should be drawn, in order to afford the greatest facility for the collection of the water. It will easily be seen that if the furrow be ploughed across the slope of the land, the water can only be drawn from the land on the upper side of the open furrow, and consequently will have to find its way across the whole ridge, whereas if the lands be layed out as near as possible in the direction of the greatest fall of the surface, the water will naturally be drawn from the centre only of the lands on each side of the open furrow. When these objects are not or cannot be attended to, in many cases there have been and will be constant failures and disappointments of the results sought after with much other careful and well bestowed labor. The finer the tilth to which some soils may be reduced, the more injurious will be the effects of the accumulated rains stagnating in the finely powdered mass, which will then run together and become consolidated into a substance more fitted to resist the pressure of a well loaded waggon-wheel than to afford a medium through which the buried seed should send forth its delicate germ, or the struggling plant should penetrate its tender rootlet in search of nourishment. The water being

now collected, ready to be discharged from each individual field, or it may be the whole property of one owner, we come to a point when the assistance of the legislature is absolutely necessary in this country, where, as has been remarked before, no man is constrained by any force but that of his own will, to advance the interests either of himself or his neighborhood, which are so closely connected. There are at the present moment and have been for years, thousands of acres of the best lands in the Province almost valueless for want of proper regulations for general drainage, either by opening outlets where necessary, or by the disencumbering and keeping clear of natural courses for the flow of the water. In the municipal corporations' acts, to be sure, a hint has been as it were casually made at the subject, but the remedy pointed at has been directed to commence at the wrong end. The clause to which I allude asserts that when drainage is required, the land which lies at the highest level is to be drained first, and then the drainage of the lower level may be compelled by certain round-about means. A subsequent enactment (22 Vic., ch. 99, s. 271) provides that where a majority in number of resident owners of property in any part of a township, petition for the drainage of the property, the council shall have power to pass a by-law to carry out their wishes. Now, in a matter of such great public utility, it should not be left to the judgment or discretion of the unthinking, careless, and unenterprising majority of a community, if such happen to be their character, to exist, by their simple *vis inertiæ*, as a bar to the exertions and progress of their more energetic and improving neighbours, who, unfortunately, may form the minority. Facilities for drainage are necessarily an advantage and profit to every portion of every neighborhood, and when the natural fall of water lies from one farm or piece of land through or across another, and this fall is required to be made by the owner of the higher land, the proprietor of the land on the lower level should be compelled to construct an out-fall of the requisite depth to afford efficient drainage, from that on the higher level; and as this should be done between individuals, the same regulations might be applicable between municipalities. A few days ago some resolutions were introduced into parliament by Mr. Malcolm Cameron, to authorise municipalities to impose special rates for certain local improvements; perhaps they were intended among others, to touch this particular case, and to no more important measure could the attention of the parliament, the municipalities, and the public be called. In no other work connected with the improvement of land is a general unity of action so absolutely necessary as in that which is now under discussion. Individual labor to a great extent is unavailing, if not assisted; but on the contrary, perhaps, counteracted by idleness, inactivity and neglect around. Well would it be then if the attention of our legislators could be enlisted for this subject, and as they have been sent to make laws for the general good, let them think for the thoughtless, force action upon the indolent, and compel the careless to provide as well for his own as the public good.

Let us now return to an earlier point in the discussion of our subject. A description has been given of what for a long time was the only method adopted for the carrying away of superfluous moisture. Is this method then effectual, or unattended by inconvenience or loss in its operation? In the heavier classes of soils which, on their reclamation from a state of nature, have become greatly consolidated and compressed below in course of cultivation, the water may perhaps be too soon and easily gathered in the water furrows, and led off before it has had time to sink into the impervious substratum; but in lighter soils a large portion of moisture will at once be absorbed beneath the surface, out of reach of the influence of the shallow water furrow, unless the soil has been previously charged with water, and then of course the superfluity must escape over the sur-

face. In the latter case this may be caused by the superficial strata being underlaid by an impervious substratum, forming a barrier below which the moisture cannot penetrate, and that portion consequently becomes stagnant and can only escape by evaporation. Here are at once two conditions most detrimental to and destructive of vegetation. The well known effect of evaporation is the production of cold, or, rather, the removal of heat from the body which gives off its moisture by this means; and the most active stimulant of vegetable, as of all other growth is heat. It is indispensably necessary to decompose, and thereby prepare and assimilate for food, those matters which are contained in the soil and furnish nutriment to the plant, and also to promote an active circulation of the sap, by which alone a healthy condition can be maintained, and the body of the plant supplied with its sources of increase. By the retention and stagnation of water again, the earth becomes soured, and at the same time the pores of the soil being thus obstructed, and the air excluded from the roots of the crops, from all these united causes vegetation languishes or entirely ceases, decay ensues, and the sower is disappointed of the fruits of his labour.

In the instance of clay and the heavier soils, and whenever the water escapes over the surface, whether during periods of heavy rain or rapid thaw, the water becomes filled with the soluble portions of the soil, the more rapid its escape the more injurious its effects, the land becomes furrowed with deep irregular channels, through which are hurried into the ditch—ultimately, perhaps, to the main water course of the district, at any rate away from the field they were intended to enrich—many natural fertilizing substances, and, perhaps, also many which have been collected and incorporated by much care and labour with the soil.—In a climate like that in which we live, these effects are more particularly observable, in the spring of the year. The ground being thoroughly soaked by the autumnal rains, the frost takes a deeper and firmer hold on it, and many inches, in some cases it may be said feet, are thereby reduced to a solid and perfectly impenetrable substance. On the approach of spring the immediate surface passes into an almost liquid state, in consequence of no portion of the thawed snow or falling rain being able to penetrate the soil beneath, and if there be any chance for the flow of the water this destructive process commences, and the earth then loses its most valuable soluble ingredients. Besides the inconvenience produced by the accession of larger quantities of water than are immediately required, or are beneficial either by the fall of rains or from other temporary sources, another is met with by different strata of the earth coming irregularly to the surface, through which water is brought down from a higher level and perpetually oozes over the lower lands. To remedy all these evils different methods have from time to time been ingeniously devised for preventing this water from coming to the surface and by laying dry the earth to the depth of some feet, to leave an opportunity for the surface water to be conducted below at once instead of injuriously flowing over the top. These methods have been applied and attended with varying expense and success; but at last, in England, Scotland and Ireland, a system has grown up and been perfected, which seems to meet with universal approbation, and is now confidently adopted in all cases. I mean the system of deep drainage by pipe tiles. To describe the growth of this system, I can do no better than quote from an article on the "Progress of English Agriculture," which will be found in the *London Quarterly Review*, for April, 1858. The author says:—"Attempts to drain have been made from the earliest times. Specimens may be seen of very clever workmanship more than a hundred years old; but the when it should be done, and the why and the how, had never been reduced to rule. Lord Bacon, who had a large collection of works on agriculture, had them one day piled up in the court yard and set on fire, for, said he, 'In all these works I find no PRINCIPLES; they can, therefore,

be of no use to any man.' This was just the deficiency with respect to drainage, and it could not therefore progress until Josiah Parks, in 1843, expounded the 'principles,' and in 1845 made suggestions which led to the manufacture of the steel tools which were necessary for forming the deep cuttings, and the cheap pipes which were essential to carrying off the water from them when formed.—Up to 1843, little was done beyond tapping springs, or endeavouring to convey away the rain which fell on the surface, by drains so shallow that the plough frequently spoiled them, it being the popular belief that water would not penetrate through retentive clay beyond twenty or thirty inches. By experiments continued for several years, Mr. Parks found that a deep drain began to run after wet weather, not from the water above, but from the water rising from the subterranean accumulations below, and that by drawing away the stagnant moisture from the three or four feet of earth next the surface, it was rendered more friable, easier to work, more penetrable by the rain which then carried down air and manure, and much warmer and more suitable for the nourishment of the roots of crops. He came to the conclusion that the shallow draining advocated by Smith, of Deanston, was a vital error; and that four feet, which left a sufficient layer of dry warm surface earth, after allowing for the rise of the water by capillary attraction above the water level of the drain, should be the minimum depth.

"In 1843, at the Derby Show of the Royal Agricultural Society, John Read, a gardener by trade, a self-taught mechanic, exhibited cylindrical clay pipes with which he had been in the habit of draining the hot beds of his master.—His mode of constructing them was to wrap a lump of clay round a mandril and rub it smooth with a piece of flannel. Mr. Parks showed one of these pipes to Earl Spencer, saying, 'My Lord, with this pipe I will drain all England.'—The work from that time went rapidly forward. Drain-cutting implements were brought to perfection, and tile-making machines have been invented which now make pipes rapidly and cheaply. In 1846, Sir Robert Peel, whose management of his own property had made him thoroughly alive to the national importance of the subject, passed the act by which four millions sterling were appropriated towards assisting land owners with loans for draining their land, with leave to repay the advance by instalments extending over 22 years. Nearly the whole of the first loan was absorbed by canny Scotch proprietors, before Englishmen had made up their minds to take advantage of it. When it is remembered that the principle on which these results depend was not enunciated till 1843, it will be seen how rapid and mighty has been the recent progress in agriculture. A second public loan of four millions was granted in 1856, and it has been estimated that in the ten previous years upwards of sixteen millions had been invested by the nation, and by private companies and individuals in thorough drainage."

Knowing as we do the benefits and success of this system of drainage in England, and the other old countries, it will only remain to examined whether the same be adapted to the circumstances of this country, and I think it can be shown that where it is beneficial in milder climates, it is doubly so in ours.—What are the evils which we have specially to encounter? In the first place we are subject to loss by the young wheat plant, and even clover and other mature grasses, being thrown out in the early spring. This, I believe, to be entirely occasioned by the ground being at this season saturated with moisture, which renders it more susceptible of expansion and contraction by the alternate processes of freezing and thawing. Secondly, at present our damp and compact earth is frozen to such a depth, that before the frost is conquered by the warmth of spring, the surface is robbed of its riches by the rushing flow of water liberated by the thaw, but unable to find its way through the frozen mass beneath. Both of these evils would be cured by the soil being kept dry underneath, especially

if it were left well loosened in the autumn by proper cultivation, it being a matter of experience that dry soil loosely thrown together is much more impervious to frost than that which is left in a contrary condition, and at the same time, although the ground be frozen, yet if there is a way for the water to escape beneath, it assumes and retains a porous condition, which I have found in practice admits of a most perfect filtration of water through it. The next evil which the want of efficient drainage entails upon us is the length of time which elapses in the spring before the soil is dry enough to be usefully worked, or warm enough to promote vegetation. Before the plant attains any degree of strength during the temperate warmth of spring, so as to be able to push a vigorous root through the soil in search of nourishment, or expand a broad healthy leaf to be refreshed by the dew, the hot dry summer is upon it, checking its growth and bringing it to a hurried and imperfect maturity. By means of drainage, on the contrary, as soon as the snow and ice disappear and settled weather sets in, the ground would be in a state immediately to profit fully by the genial state of the atmosphere. This would lengthen the growing season of the year at least a fortnight, at a most important period, giving the young plants an early development, and ensuring them strength to pass through the subsequent stages of vegetation to a full and timely maturity. And it would not perhaps be a vain conjecture that we might thus escape the scourge with which we are at present threatened, namely, the wheat fly; for, if by this means our seasons could be advanced to the extent even of ten days, these and similar insects would not then be able to do the plant or the fast ripening seed any material damage. One more material advantage remains to be mentioned. The presence of water and moisture has a tendency to attract frost, and consequently in localities which are subject to these inconveniences, delicate crops which come to maturity at a late season of the year, such as Indian corn, potatoes and buckwheat, are constantly liable to serious damage from the early autumn frosts. This damage also would be warded off by the removal of the origin of the evil.

We will now turn briefly to consider the practical work and expense by which the system is to be carried out, and the means by which, in a country where capital is deficient, we are to be enabled to apply it.

The general principles laid down for surface drainage will apply here. A proper outfall must be established, a main drain laid along the bottom of the field and branches run into it at regular distances throughout. The limits of a communication of this nature would not admit of my now refering to the great variety of circumstances, of position and quality of soil which necessarily alter the distribution of the drains. The details of a practical system of drainage would of itself form a subject for a separate paper. I now give an estimate of the cost at which the work can be done.

In England I have found that at a depth of four feet an average day's work is from five to seven rods, for which a price is paid of from 6d to 8d sterling, per rod, the latter price being the highest paid for digging in the very heavy stiff and tenacious wealden clays of Sussex and Oxfordshire. This includes opening and filling the drain, and laying the pipe. The price of the tiles varies according to the price of fuel and other circumstances, from 16 to 22 shillings per thousand, and the drains being generally laid at a depth of 4 feet, and 20 feet apart, (in Scotland in very heavy soils 3 feet deep, and 14 feet apart), the cost of draining will be from five to seven pounds sterling, per acre, or in our money from twenty-five to thirty-five dollars. In this country the work might be done at from thirty to forty dollars per acre. In England the daily wages of men engaged in this work are from 2s to 2s 6d stg., a day; and here if farmers were to provide work for their laborers all the year round instead of paying enormous wages in the summer, and none in the winter, a great part of this work might be done

at a no very great advance in prices, by taking proper precautions to enable it to be done in the winter. For instance, the plan of drainage might be laid out in the autumn, and the line of the drains covered with litter or manure, which will be useful in the field the following spring, and thus prevent the frost from impeding the work. The main difficulty in this matter is, that few persons, if any, have means to meet this very large outlay, and the only measure which I can conceive to remove it, is for our legislature to follow the example of the British Parliament, and pass an act to provide means to be placed at the disposal of every landholder for the accomplishment of this special purpose.

The provisions of the English Act 9 and 10, Vic. c. 101, can with very slight alterations, be made perfectly applicable to this country. The most important among them are the following. Any owner of land desiring to obtain a loan under the act, must make an application to the commissioners appointed for the purpose, containing a statement of the particulars of the land to be drained, of the manner of draining, of the estimated expense of the work, and of the estimated increase of the value of the land by the same, also the estate and interest of the applicant in the property, and whether the advance is to cover all or what portion of the expense of the work. If the application be entertained, the land, plan, estimate and specification of the proposed drainage, are to be inspected at the expense of the applicant, by an assistant commissioner, surveyor or engineer, and a report by them to be made and sent in with the plan and other documents accompanying the application, attached.

If the advance be deemed expedient, the commissioner is to issue a provisional certificate, that on the work being satisfactorily performed the advance asked for and approved of will be made, or, as the work proceeds, not over two-thirds of the sum actually expended.

This provisional certificate, however, cannot be issued until notice of the application has been duly published for two successive weeks, and two months have elapsed after the last publication, and in case any other person having any estate in or charge upon the land, sends in a dissent to the loan being made, no certificate can issue until the dissent be withdrawn, or an order be made in court, upon the matter being referred to the Master in Chancery to report whether it will be beneficial to all parties interested in the land that such advance be made.

The commissioners are to cause the work to be inspected, and all particulars of the execution and expense ascertained, and for this purpose may take declarations from any parties in any matter of enquiry under the act. Upon the issue of the advance in order to pay the debt, the land becomes subject to a rent-charge of six and a half per cent on the amount of the loan for twenty-two years, and a certificate of the advance is registered against the land.

This rent-charge has priority to all other charges upon the same land, and is collected half-yearly by the collectors of other land and assessed taxes for the several districts in which the lands are situated.

The out-falls for the drains are to be kept open and clear, and a yearly certificate of their condition is to be sent in to the commissioner.

Two objections have been urged against the propriety of the government of the country making any advance for this purpose. The first is the financial position of the Province, and the second the difficulty of ensuring the proper expenditure of the money, and afterwards of collecting the charge for re-payment. The first part of the latter difficulty is removed by the precaution of not paying the money until the work is done, which might be further strengthened by making it a penal offence to make a false declaration, and to draw any money under such false pretence, and the collection of the charge can be made equally regular and certain with that of the ordinary municipal taxes of the country.

Serious consideration will easily remove the first objection. The Province has not hesitated to incur a very large debt for the construction of our canals and railways, an immense proportion of the remuneration of which, is but indirect and speculative, in so far as they have very largely increased the value of our lands and of the products of them; but how will even this benefit be realized if no effort is made to stimulate and ensure the due improvement and cultivation of these lands, or their fertility be allowed to fall off, as has been gradually the case throughout this continent, and if the sudden failure of the last two harvests become a permanent affliction, and it should be remembered that this failure is not without its procedent—as witness the cases of Lower Canada, a great part of the Niagara District, and portions of the State of New York. On the other hand, the investment of money in the manner now proposed will undoubtedly bring its own return and reproduce itself. In the old countries where this system of underdraining has been so universally adopted, and forms the very basis of modern farming and of that enormous increase of prosperity of the agricultural interest which has accrued during the last few years, it is a matter of unquestioned profit, generally reckoned to be equal to twenty per cent. on the outlay when the land is properly managed afterwards, and in the case of lands highly cultivated draining has frequently been known to repay its expenses in a single season. The profits of draining in other instances have been estimated at thirty, forty and fifty per cent. on the outlay, the land having been increased in annual value to that extent, without greatly altering the former mode of culture; and when we see that a great part of the benefits of manure is lost where proper drainage is wanting, it becomes evident that the poorer the soil the greater will be the improvement of it by this means. It follows, therefore, that the adoption of a measure of this nature, instead of increasing the difficulties of our financial position, would but tend to relieve this Province from its present embarrassment; and the sale of Government debentures under a Canadian Drainage Act, instead of lowering our credit, would be hailed by English capitalists as an evidence of the earnest and enlightened attention paid by our legislators to the most vital and material interest of their country.

MEETING OF THE BOARD OF AGRICULTURE.

TORONTO, March 8th, 1859.

A meeting of the Board was held this day, pursuant to notice from the Secretary, at 12 o'clock, noon.

PRESENT :—Messrs. E. W. Thomson, Hon. Adam Fergusson, H. Ruttan, R. L. Denison, Hon. G. Alexander, Wm. Ferguson, President of the Provincial Association ; Professor Buckland ; Dr. Beatty, President of the Board of Arts and Manufactures ; J. E. Pell, Vice-President of Do. ; Hon. John Ross, Minister of the Bureau of Agriculture.

E. W. Thomson, Esq., in the Chair.

The minutes of last meeting were read and confirmed.

The Secretary read an official communication from the Secretary of the Bureau of Agriculture, stating that Hon. Adam Fergusson, Hon. David Christie, J. B. Marks, Esq., and Asa A. Burnham, Esq., who were the retiring members by rotation, from the Board, at the close of the year 1858, had been re-elected.

Moved by H. Ruttan, Esq., seconded by Hon. Adam Fergusson, that E. W. Thomson, Esq., be President of the Board for the ensuing year—Carried.

Moved by R. L. Denison, Esq., seconded by Professor Buckland, that Hon. Adam Fergusson be Vice-President—Carried.

Hon. Adam Fergusson then moved the following resolutions :—

Resolved—1. That the establishment of a Veterinary School in Canada would be attended with great benefit to the agricultural and general population.

2. That a communication shall be opened with Professor Dick, of Edinburgh, regarding the arrangement.

3. That a Committee shall be appointed, consisting of the President, Professor Buckland, Mr. Denison, and the mover, to correspond with Professor Dick upon the subject, and to ascertain the expectations of a competent person in regard to emoluments, and to report Mr. Dick's answer to the first meeting of the Board after receipt of the same.

Hon. Mr. Fergusson, in moving these resolutions, expressed to the Board his deep anxiety to have a respectable Veterinary School established in Canada, and his conviction that if properly conducted it cannot fail to be followed by most important and beneficial consequences. Mr. Fergusson further stated that he had received a communication from Mr. Dadd, of Boston, highly recommending a young man from the township of Dumfries, Canada West, as a pupil of his, and qualified, in his opinion, to become a highly useful veterinarian. Mr. Fergusson had also received a letter from the young man's father upon the subject. The Board, feeling much impressed by the importance of the subject, resolved to communicate with the original Veterinary School of Edinburgh, and requested Mr. Fergusson in the meantime to intimate these resolutions to Mr. Dadd and Mr. Gibb.

The resolutions were then put from the Chair, and carried.

The Secretary read a communication from Mr. Anthony Burgon, of Thornhill, stating that he had discovered a mode of completely eradicating Canada Thistles at a small cost, and offering to dispose of the process to the Provincial Agricultural Association.

The question of the disposal of the balance which had been received by the Treasurer of the Board, under the Act 19th Victoria, chapter 47, was then taken up and discussed.

Hon. Mr. Ross intimated to the Board, that in consequence of the depressed condition of the public finances, it would probably be necessary to curtail the

amount of the public grant to the County Agricultural Societies, and requested to obtain the views of the Board as to the mode of carrying out such curtailment.

After some discussion of the matter, the Board adjourned at 2 P. M., for one hour.

3 o'clock, P. M.

The Board resumed.

The Secretary read a letter from Mr. Burnham, stating, that owing to pressing engagements, he was unable to attend the present meeting of the Board.

The President presented a copy of a Bill introduced into the Legislative Assembly by Mr. Carling, M.P.P., for London, entitled "An Act to amend the Law respecting the Agricultural Association of Upper Canada," the object of which was to limit the places for holding the Provincial Exhibition, by statute, to Kingston, London, and Toronto, respectively, in rotation, which was ordered to be laid upon the table.

Professor Buckland submitted the Report of the Judges of the Essays sent in, in competition for the Prizes offered by the Board in the Spring of 1858.

Resolved,—That the report of the Judges on Prize Essays be adopted.

The discussion of the subject of the disposal of the balance, under the Act 19 Vic. cap. 47, was resumed, and in connection with it the questions of the relation of the Board of Arts and Manufactures with the Board of Agriculture, in regard to the future management of the Provincial Exhibitions, and of the disposal of the receipts at the Exhibitions, as between the local committees and the Association, were introduced and discussed.

Moved by Mr. Denison, seconded by Professor Buckland, and

Resolved,—That in consequence of the valuable services rendered by George P. Ridout, Esq., in auditing the accounts of the Provincial Agricultural Association for a number of years past, that he be elected a life-member of the Provincial Association, and that he be presented with the life-member's medal of the same.

Moved by Mr. Denison, seconded by Mr. Wm. Ferguson, and

Resolved,—That the Secretary of this Board be instructed to write to the proper authorities, with the view of ascertaining how far Canada is represented in the Sydenham Palace, England.

Professor Buckland offered some remarks in reference to offering a series of Prizes, of small amounts, for the best County and Township Agricultural Society Reports, sent in to the Board in accordance with the Statute, with the view of improving the character of such reports, and obtaining useful and interesting matter thereby for publication in the Transactions.

Dr. Beatty submitted the following communications from the Board of Arts and Manufactures:—

"*Board of Arts and Manufactures for Upper Canada.*

"TORONTO, October 21st, 1858.

[Extract from Minutes of Committee of the above date, Oct. 21, 1858.]

"*Resolved*,—That the representatives of this Board at the Board of Agricul-
"ture, be instructed to bring before that body at its next meetiug, and obtain a
"decision with reference to the position this Board is to take at the next Pro-
"vincial Exhibition, with respect to the management of the Fine Arts and
"Manufacturing Departments."

(Signed,)

WM. EDWARDS, *Sec. B. A. & M.*

The Board then adjourned to 2 p. m. the following day.

WEDNESDAY, March 9, 1859, 2 P. M.

The Board met pursuant to adjournment from previous day.

PRESENT:—Messrs. E. W. Thomson, President, R. L. Denison, H. Ruttan, Hon. G. Alexander, Wm. Ferguson, Hon. J. Ross, Professor Buckland, Dr. Beatty, J. E. Pell.

Also in attendance, Hon. P. M. Vankoughnet, Minister of the Crown Land Department; John Carling, Esq., M. P. P. for the City of London; and Mr. McBride, Mayor of London.

The minutes of previous day were read and approved.

The question of the curtailment by the Government of the amount of the public grant to the Agricultural Societies, was again considered.

Professor Buckland, Hon. Mr. Ross, Hon Mr. Vankoughnet, Mr. Denison, the Bresident, Hon. Mr. Alexander, and others, stated their views upon the subject.

Mr. Carling's proposed Act for the fixing of the location of the Provincial Exhibition at Kingston, Toronto, and London, alternately, was then taken into consideration.

On request of the Board, Mr. Carling explained the intention of the Bill.

Mr. McBride, Mayor of London, also, on request of the Board, stated his opinions in regard to the objects and effect of the Bill.

Some discussion then took place upon the subject.

Moved by Mr. W. Ferguson, seconded by Mr. Pell,

That this Board has learned with much satisfaction, that a Bill is now before the present Parliament to fix the holding of the future Provincial Exhibitions at three places, respectively, and it is the opinion of this Board that such a measure will have the effect of increasing the usefulness of the Association, and benefitting the whole country, should the Act be limited to nine years.

Moved in amendment by Mr. Alexander, seconded by Mr. Ruttan,

That in the opinion of this Board, it would be for the best interests of this Province, that the Legislature should pass a measure giving power to the Directors of the Provincial Association, at their annnal meeting, to name three, or more permanent places for the future exhibitions, if they should see fit.

Moved in amendment to the amendment by Mr. Denison,

That this Board do now adjourn. Lost.

Mr. Alexander's amendment was then put from the chair, and also lost.

The resolution was then put from the chair, when Mr. Ruttan moved in amendment, seconded by Mr. Alexander,

That a call of this Board be made for to-morrow, for the purpose of deciding upon the matter of one or more places permanently to hold the Provincial Exhibitions of the Agricultural Association.

On which the yeas and nays were taken as follows: —

Yeas—Messrs. Ruttan and Alexander—2.

Nays—Messrs. Ferguson, Buckland, Denison, Pell, Beatty—5.

The amendment was therefore lost.

The original resolution was then again put from the chair and carried.

Moved by Professor Buckland, seconded by Mr. Ferguson,

That the following prizes be given to the four best County Agricultural Society Reports sent in to the Board of Agriculture in March, 1860, viz:—

1st, $30; 2nd, $20; 3rd, $15; 4th, $10; and for the four best Township Society Reports. 1st, $20; 2nd, $15; 3rd, $10; 4th, $5. Carried.

Moved by Professor Buckland, seconded by Mr. Ruttan,

That this Board award two premiums of $10, and $5 respectively, for the two best essays on specific subjects in relation to Agriculture and Horticulture, and that the President, Treasurer, and Secretary be a committee for deter-

mining the subjects, the number of prizes and the necessary regulations; the total sum not to exceed sixty dollars. Carried.

The Board then adjourned to 9 a. m. the next day.

THURSDAY, 10th March, 9 A. M.

The Board met, pursuant to adjournment.

PRESENT:—The President, Hon. Mr. Alexander, Mr. Denison, Mr. Ruttan, Mr. Buckland, Mr. Wm. Ferguson, Dr. Beatty, Mr. Pell.

The Minutes of preceding day having been read and confirmed, it was

Moved by Dr. Beatty, seconded by Mr. Ferguson,

That in reference to the motion of Mr. Ferguson, to hold future Provincial Exhibitions at certain localities, passed yesterday, Mr. Ruttan moved in amendment, that a call of the Board might be made for this day; Mr. Ferguson proposed to defer his motion until the next day, upon condition that Mr. Ruttan would withdraw his amendment, and Hon. Mr. Alexander, the seconder of the amendment, also requested that it might be withdrawn, which proposal was positively refused by Mr. Ruttan, whereupon the vote as recorded yesterday was taken.

Which resolution being put from the chair, the yeas and nays were taken upon it, as follows:—

Yeas—Messrs. Denison, Alexander, Ferguson, Beatty, Pell, Buckland—6.

Nays—Mr. Ruttan—1.

The resolution was accordingly carried in the affirmative.

It was then moved by Mr. Ferguson, seconded by Mr. Ruttan,

Whereas it appears from information received from the Minister of Agriculture, that it is the intention of the Executive to place the grant to the various Agricultural Societies of the Province on the reduced scale of the public estimates for the current year, whereby the allowance in the present depressed condition of the Agriculture of the country, and at a period of the year when the various societies have been already organized, and calculations made for expending their money, based upon receiving from the Government a similar amount as that of last year, would be so much diminished as to render their usefulness under the existing law for the management of Agricultural Societies comparatively trifling—

Resolved,—That in the opinion of this Board, this will be felt as a grievance by many of the Societies, and particularly by those of the Electoral Division of the City of Kingston, and the Counties of Frontenac, Lennox, and Addington, whose contributions from their general Agricultural funds, were looked upon as a chief means of paying the debt due to this Board, incurred in erecting permanent buildings for the use of the Provincial Exhibitions; that this Board, though sincerely regretting that any necessity should exist for the curtailment of those grants to Agricultural Societies, which have hitherto been so efficient in promoting the cause of Agriculture, and the prosperity of the Province generally, recommends that application be made to the Executive to place on the estimates of the current year the usual annual grant to the Board of $4000, to meet the requirements of the Provincial Agricultural Association for 1859, by which means the anticipated difficulties of the Association would be met, and the Association be better prepared for any alteration the Government might think fit to introduce as a future measure; and that a copy hereof be presented to the Minister of the Bureau of Agriculture, requesting his concurrence, and that the President of the Board of Agriculture, the President of the Association, and Hon. Mr. Alexander, be a Committee to present the same. Carried.

Professor Buckland read a communication received from Mr. Gibson, of St. Catherines, on the subject of the cultivation and manufacture of flax, whereupon it was

Resolved,—That Mr. Gibson's letter be referred to a Committee to report upon to this Board, if possible, to-day, after the recess, that the Board may adopt some course that may have the effect of encouraging the production of flax and hemp, and that Mr. Ferguson and Professor Buckland be such Committee. Carried.

Moved by Mr. Pell, seconded by Mr. Denison,

Resolved,—That the Board of Arts and Manufactures be authorised to draw up a Prize List in the Departments of Arts and Manufactures to the extent of ——— Dollars, and submit the same for the approval of this Board. That the Secretary of the Board of Arts be authorised to receive all entries in the said departments. That the Board of Arts be requested to furnish a list of Judges in these Departments for approval by this Board, and that the said Board of Arts be requested to take charge of and manage the said Departments of the Exhibition on behalf of this Board, and that it be so published accordingly. Carried.

Communications were read from Mr. Marks, now in London, England, and from Judge Campbell of Niagara, on the subject of the By-laws of the Association, and offering suggestions in reference to a revision of the same.

Moved by Mr. Ferguson, seconded by Mr. Pell,

That Mr. Marks's letter now read, and other communications upon the same subject, be referred to the Committee appointed to draft By-laws and Rules for the government of the Association. Carried.

Moved by Mr. Pell, seconded by Mr. Ferguson,

That the President of the Board, Mr. Denison, Professor Buckland, and the mover, be a Committee to consider all suggestions and drafts of By-laws submitted, and therefrom to draft a code of By-laws for the Association, and submit to this Board for its approval at its next meeting, and that the Committee appointed at the Annual Meeting be requested to co-operate with the Committee in this work. Carried.

Moved by Mr. Denison, seconded by Mr. Ferguson,

Resolved,—That a Committee of three be named by this Board, to confer with the Government with the view of obtaining free offices for the accommodation of this Board, and that such Committee consist of the President, Professor Buckland, and the mover. Carried.

The President submitted a bond given on behalf of the Treasurer of the Association for the due fulfilment by that officer of his duties, which was approved of and accepted by the Board.

The Board adjourned at 2 p. m. for one hour.

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3 o'clock P. M.

The Board resumed.

Mr. Ferguson submitted the following list of persons proposed to be placed upon the Local Committee for the approaching Provincial Exhibition at Kingston, viz:—The Mayor of the City of Kingston, Alderman Flanagan, Alderman Meagher, Alderman Allen, A. Cunningham, Capt. Drummond, Thos. Briggs, Sheriff Corbett, Dr. Richmond, and it was

Resolved,—That the gentlemen named by Mr. Ferguson be appointed members of the Local Committee for the approaching Exhibition at Kingston.

The Committee to whom was referred the communication of Mr. Gibson, relative to the cultivation and manufacture of flax, not being prepared with a report, stated their views briefly, verbally, and it was

Moved by Dr. Beatty, seconded by Mr. Pell,

Resolved,—That the sum of Five Hundred Pounds, out of the special fund,

be placed at the disposal of the Board of Agriculture, from the funds of the Agricultural Association, for the purpose of affording encouragement to the cultivation of Flax, or the introduction of improved machinery for dressing Flax, or both, and that the President of the Board, the Secretary, the President and Treasurer of the Association be a Committee to receive the Report of the Select Committee appointed by the Board to report thereon, with power to act in the matter. Carried.

Resolved,—That the President, Messrs. Alexander, Buckland, and Denison, be a Committee to revise the Prize List, and report at the next meeting of the Board, and that the Board of Arts and Manufactures be requested to prepare their portion of the list, and report at the same time, taking the amount last appropriated in the Prize List as their basis in fixing the amount of Prizes. Carried.

Moved by Dr. Beatty, seconded by Mr. Ruttan,

Resolved,—That the Committee appointed to invest the special fund be instructed to make the best investment in their power of the amount thereof, less the sum necessary to pay for the printing of the Transactions, and the sum appropriated for the encouragement of the growth and manufacture of Flax. Carried.

Moved by Mr. Denison, seconded by Mr. Pell,

Resolved,—That this Board learns with regret that the Executive Government has deemed it necessary, in consequence of the state of the public finances, to restrict the public grant to the Agricultural Societies, under the Act 20th Vic., Chap. 32, for the present year. That the Board, however, is not unaware of the probability that, owing to the great difficulty of obtaining subscriptions in the present depressed condition of the country, the amount which the Societies may be able to claim, under the existing Act, may be much less than the amount drawn by them last year, and that it is quite possible that the amount named in the public estimates may be nearly sufficient to meet their demands. That the Board is therefore of opinion that it would not be expedient to make any essential change in the law at present in respect to the amount of subscription required, as it is possible that such a measure might so restrict the Societies that they could not even draw the reduced amount named in the estimates; but, if it is the distinct determination of Government to limit the grant to that amount, the Board would recommend, with the view of ascertaining how much will be claimed by the Societies, and also of obtaining an equitable basis for its distribution, that the law be so amended as to require that the affidavits under Schedule B, should be sent in to this Board not later than the 1st July, and that the appropriations should then be made *pro rata*, as far as the amount would go, under the present Schedule, as in clause 55 of the Act, and that a copy of this resolution be forwarded to the Minister of Agriculture. Carried.

Resolved,—That a circular be addressed by the Secretary of this Board to the several County or Electoral Division Agricultural Societies, informing them of the reduction made in the estimates for the support of Agriculture, and requesting them to send up their affidavits by the first of July. Carried.

Resolved,—That it is with feelings of deep regret that this Board has learned of the death of the late President of the Provincial Agricultural Association, D. B. Stevenson, Esq., that the Board sincerely condoles and sympathises with his widow, Mrs. Stevenson, under her great and irreparable loss, and that a copy of this resolution be forwarded to her by the Secretary. Carried.

The Board then adjourned.

PRIZE ESSAY ON THE PRACTICAL ADAPTATION AND MONEY VALUE OF SCIENCE TO THE CANADIAN FARMER.

BY J. E. FAREWELL, OSHAWA.

"Agriculture can only be carried on economically and successfully when considered as a Science, nay! as the most important of all Sciences."—[*From Prize Essay by Mr. Hutton.*

"Art and Science have no enemies except the ignorant."

Were a person of a reflective and unprejudiced mind asked as to whether the abstract and speculative principles of science can be applied to the art or practice and performance of agriculture, he would naturally be led to consider the nature of this science. In making this enquiry he would find that the object of science is the laying down of abstract and speculative principles for the performance of art of different kinds. For example, the mathematician professes to be able in his study to lay down principles by which the merchant shall be able to estimate his profits in trade; to compound ingredients of different prices, and to give at once the value of a given quantity of the mixture To the surveyor, the rules by which he is enabled accurately to survey lands. To the engineer, the means of estimating the advantages of, or the difficulties to be overcome in selecting a certain route for a canal or railway. The contractor is enabled to compute with much accuracy the amount of earth to be removed from a given hill, to make a certain embankment, and to give the cost of this transportation, by means of rules laid down by the mathematician. The sailor is enabled to calculate his position with respect to the sun and north star, as well as his distance either east or west, from a given point. These being known, he has the means of ascertaining his exact situation, though on the sea for months, and yet, the man that enables him to do this may have no knowledge of practical navigation, or of any other of the operations referred to; yet, by using the tables or "principles" of scientific men, practical men are enabled to effect their purposes with ease and accuracy.

Having glanced at the aims and professions of science, we may now turn our attention for a little to what she has done.

If we question the persons just named, as to the utility of the rules by which they are being guided, they acknowledge their correctness. If we look around upon the busy operations of the manufacturer, we find him indebted to science in a greater or less degree, so much so, that he is willing to acknowledge this obligation, by taking advantage of every new discovery, the work of her hands. "Eli Whitney raised more cotton with his head, than ever was raised before his time," is a common saying and one that speaks volumes for science. Whitney, though unacquainted with practice, applies the principles of science to a desired purpose, and successfully accomplishes his object. In mining, science lays down rules of great importance, which must be followed in order to success in this branch of industry. Our great public works, are necessarily all superintended by scientific men. In short, throughout the whole circle of the operations of men, engaged in professions or manufactures relating to the "consuming world," we find that science is ever present to direct their exertions, to suggest new trains of thought, and to follow up these and turn them to the use of man; in a word, in the consuming world we find that science plays a prominent part; is the presiding oracle, and to her suggestions due deference is justly paid.

If science is capable of such an application, and has done so much for the consuming world, is it not reasonable to suppose that she has not withheld her

powerful arm from the producing world? May we not claim that there is an application at present existing, and that this may be amplified by the perseverance and energy of those interested therein. If we reflect upon the object which the manufacturer has in view, in conducting his various and important operations, viz: the *changing* of the form of the raw material into a shape more suitable for the use of man, and then consider the mission of the Agriculturist, that of *creating* from the dead and inert matter of earth, air and sea, the highest specimens of organized life, viz: plants and animals, *we see the importance of Agriculture.* And when we examine the various means by which the farmer is to effect this truly wonderful metamorphosis, viz: Chemical and Mechanical—*Mechanical*, by the means of implements and machines, of different materials, forms, and modes of contrivance, which are to be impelled by different propelling powers, for the purpose of preparing the land, according to certain rules with regard to its texture—*Chemical*, in procuring for the land certain organic and inorganic ingredients, which are demanded by the plants for their successful cultivation, and the maintaining of these in their proper proportions, so that there may be no excess of any of them, we acknowledge that a wide field is open for the application of the abstract and speculative principles of science, to the actual practice or performance of the art of culture. Not only the possibility of this application, but its necessity becomes the more apparent, when we examine the position of the tiller of the soil, and the extent and importance of the art of culture. A slight investigation is sufficient to convince any one that the farmer holds a high place in the economy of the nation; he alone *produces* the raw material, all other professions and trades consume. They may change the form of the raw material, and thus render it more subservient to the wants of man, may add to its value by means of these changes, and yet be only "consumers." I need say but little of the importance of an art, so well known as the culture of the soil; one cotemporary with the creation, one that produces food—the life of the world—one in which nine-tenths of the capital of the world is invested, and three-fourths of its population engaged—one upon which more thought is bestowed than upon any other, for upon its prosperity the pulses of the world beat with renewed vigor; on its misfortune the world looks with pity, and trembles for the consequences; the art which was the occupation of the first man in this world, and one that must be continued till the last shall leave it.

We shall now proceed to the discussion of some of the branches of science, that are, or should be applied to agriculture, mentioning the wants of agriculture, and the objects of these branches of science, showing the application of the latter to the former, taking care, however, to bear in mind the limited space allotted for this essay, and acting in accordance with its design, viz: that of illustrating the *money value* of an application of science, to the practical agriculture of Canada. Before doing this, however, it would be proper to take a glance at the present position of agriculture, with regard to its general conditions, diverse objects and results, to examine it with a view of ascertaining whether any of the phenomena or ordinary occurrences connected with it, fall within the range of science, and whether she can afford a satisfactory solution of these, can suggest new modes for arriving at desirable results, illustrating these by examples, in such a manner as to show the *money value* of its application. Commencing with the soil, which has been called the store-house of the farmer's wealth, we shall notice, without much observation, that it is of different varieties, considered in a general sense. There is a science which professes to explain the different varieties, conditions of occurrence, and the history of the formation, and the agricultural capabilities of the different soils. We ask, can a knowledge of this science be anything but advantageous to the farmer? It is called *Geology*. Again, the farmer's occupation leads him to cultivate certain vegetables for the

support of animals, but he finds after continuing this cultivation for some time, that his success is but indifferent, that his crops are growing smaller by degrees, and "beautifully less." What is the cause? all effects are produced by causes. The farmer has obeyed the command of the Creator in making use of "seed-time and harvest," yet the soil fails to produce abundantly. Science tells us that the plants he cultivates, draw certain substances from the soil, in order that they might grow, and that having drawn too freely, the soil has no more to supply, and hence the poor return for his labor. That science, which analyses the plant, tells us of its composition, and of the composition of the soil on which it was grown, is *Chemistry*. The farmer pays particular attention to the general Geological, and particular Chemical composition of the soil, so well, that an abundance of vegetation is produced from it, large crops come forth, and as far as the soil is connected with their nourishment, they grow well, but a disease is seen to affect the crop, the heads of the grain are light, while the grain is turned to a dusty black powder, and is of no use, or perhaps the stem has been attacked by another disease which retards its growth; weeds too, "which were never sown," have sprung up, and are actually robbing the soil of the nourishment intended for his grain. The science of *Botany* explains the structure and character of all plants, while that of vegetable *Nosology*, describes their diseases and points out their remedy. However successful a farmer may be in raising large crops, it is an indisputable fact, that they are liable to be attacked by insects of various kinds. The farmer is the sufferer. One of the many branches of scientific research professes to explain the history, habits, and mode of exterminating insects. The name of the science which investigates the important matters referred to, is *Entomology*. This is, however, a branch of another science, which explains the history and habits of all animals; their food, their manner of taking this, &c. This is *Zoology*. Every farmer must have observed a marked difference in food required by different animals, and that too, by those of the same class, of different ages. If he were as careful as he should be, he would notice that the manures derived from different animals, possessed different values for restoring the fertility of the soil; also, that the different kinds of animals pastured for a long period, produce different effects upon the fertility of the soil. This may seem very complex and difficult to understand, yet there is a science which is able to explain all these phenomena, and afford many useful hints to the farmer, upon these and other kindred subjects. This science is called *Chemical Physiology*. In short, from the physical condition of the soil, to its chemical composition to the plant, from this connecting link, to the animal kingdom, in the growth and maturing of these forms of organized life, we observe the connection of science; that she claims to be able to explain the phenomena, to assist in remedying the accidents, and to admit of a general application, as connected with the art of culture. We shall now examine the sciences referred to, as well as others admitting of an application to Canadian agriculture, somewhat more definitely.

GEOLOGY.

"The Soil bears the same relation to Agriculture, as the raw material does to Manufactures in general."—(*Thaer.*)

"This science, as its name implies, treats of the solid materials of the earth, their present order of arrangement, and the causes that have produced that arrangement, as well as of the organic remains contained in them." If this be the correct definition of the science, it is but reasonable to suppose that its application in a proper manner to the art of culture must prove beneficial. If the language of the motto be correct, viz., "that the soil of the farmer is his raw material," (to be manufactured,) it must be patent to all that there is a necessity

for exercising care in the selection of this if he would succeed in his operations. In manufactures, it is held as an axiom that the more perfect the knowledge of the manufacturer the better will he be enabled to conduct his operations, and hence the more profit will ensue. A perfect understanding of this subject will guide him in a judicious selection of materials, (for without this, no matter how carefully the operations may be performed upon it, the manufactured article will be inferior,) and to the best system of treating these so as to arrive at a desirable result. Enough has been said of the relation of the farmer and his soil to the manufacturer and his raw material, to convince any one of the importance of a thorough understanding on the part of the farmer, of the material which he has to use, and the necessity of making use of every means by which this knowledge may be obtained. Geology then, treats of the soil as it is, and likewise gives a history of its formation, and being understood by the farmer must, we think, materially aid him in making his selection. But it may be remarked that the choice is of en made, owing to his being influenced by the circumstances with which he is surrounded, as the amount of money to be immediately paid for the land, the amount of land to be obtained for a given sum of money, the contiguity of this land to some city, town or other market. That this is true to a certain extent must be admitted, but in many of our new settlements these are scarcely ever taken into account.—How often do we hear practical men (after having occupied a farm for a considerable time during which the country has become settled, and the respective merits and demerits of the neighboring farms have been tested) remark that if they "had only known that there was such a 'hard pan' below the surface of their soil they would not have taken it;" or another, that says "he might as well have taken Mr. B's farm as his own," and remark, "how he missed it." Professor Johnston gives an instance of a selection that was *not* made in accordance with the teachings of *agricultural geology*. I say agricultural geology, because the science of geology alone cannot be expected to do much from its principles, especially for the farmer; but join a knowledge of practice which tells us the wants of the farmer, and the science which teaches us what we may expect from these principles, and the result of the two must of necessity be beneficial. Professor Johnston was one day conversing with an excellent practical farmer upon the subject of geology as connected with agriculture, when the latter remarked as follows: "when I came to look at this farm the grass was beautifully green, the clover shooting up strong and healthy, the whole farm had the *appearance of being good land*. Had I come in June when the heat of the sun had drank up all the moisture which the sandy subsoil had left, I should not have offered so much for it by ten shillings to the acre! Had this excellent practical man taken a spade and made a few holes eighteen or twenty inches deep, and then applied the principles of this science, he would have known what amount of moisture would probably characterise the soil, and consequently that he might expect burnt crops, and he would have been spared the mortification of a disappointment. And here it is but just to remark that we cannot expect to derive as much from the teachings of science in this department, nor can the practical man depend so securely on its teachings in this country, as in most parts of Europe and America. The cause is, that many parts of Canada are covered with a *drift* which conceals the underlying rocks, and consequently prevents our understanding the history of the formation of the surface soil.

We shall now offer a few remarks as to how geology can be of any value to the farmer in enabling him to select his soil. All soils are derived from the disintegration of the rocks on which they lie; this statement is subject to the exception just mentioned, viz., *drift*. All know that there is a difference in

soils, and this difference is the result of the different constituents composing them. Thus we have granite soils derived from the crumbling down of granite, &c. If this be the case then, by knowing the geological structure of the country we should know where to settle so as to find a soil similar to the one with which we are acquainted, or any particular variety which we might desire. The ruins of granite form a poor soil, owing to the want of lime, although if a mixture of these take place a fertile soil is the result. Science explains the cause of this. In so short a space we cannot attempt an explanation of the causes which produce these results or the premises on which scientific men have founded their deductions. We might mention numerous instances in illustration of the truth of these principles, but a few must serve the purpose. Observation and statistics prove conclusively that the farms that bring the lowest rents in England (where these matters are well understood) are in those counties in which chalk predominates, which confirms the teachings of science. The geological formations of Canada are not numerous, yet it will be improper, under present circumstances to give a description of them. We may say that the *Laurentian and Huronian* series, with the *ancient granites*, so largely developed in the east, north, and north-western parts of Canada, form poor soils. One remark may here be introduced in illustration of the cause of the sterility of these soils (which cause has been already explained) viz., want of lime, and of the use of science to the farmer. The *Laurentian* rocks form poor soils for culture, except where they are traversed by bands of limestone and their associate strata; the lime and granite being here intermixed form a most fertile soil. From Sir Wm. Logan's report on the geology of Canada we find "that all the farms that have been established on these formations (granitic) have been over the bands of limestone and their associate strata, and this affords a distinct proof that the distribution of these being once known it would not be difficult to decide in what direction to push settlement," (Report of 1852). As another illustration of the money value of this science to the Canadian, we may notice another remark from the same work, to the effect that the inhabitants of this section of the country, viz., that through which the bands of *chrystaline limestone* pass, were ignorant of the value of the rock on which they lived for the purpose of obtaining lime, although well acquainted with that of the *fossiliferous* limestone, (Trenton and Chazy groups,) and on this account they were in the habit of sending some thirty miles for limestone for the purpose of building chimneys, plastering houses, &c. The geologists took great care to point out the value of the rock on which they lived for these purposes, and were much gratified to find soon after, limekilns erected and lime burnt in them. Here then we have an example of the value of this science, for the inhabitants can now obtain whatever amount may be needed for building, decomposing manures, preparing seed wheat, &c., cheaply, which, of course must result in their general use for the purposes mentioned. It may be mentioned that the principal formation of Canada, besides those referred to, is the *silurian;* the soil derived from this is fertile and productive of the best wheat in the world; our soil being the same as that on which the celebrated "Genesee Valley Wheat" is raised, also as a portion of that of the superior Michigan wheat, and it is well known that Canada has succeeded in bearing off the palm in this department. These remarks respecting the geology of Canada have not been written so much for the practical man who is settled on his farm and intends to remain; but for those who are likely to remove we would desire to show that a distinction exists between soils on different formations, and that these should be considered in removing to another part of the Province, for it has been proved that the practical man is often placed in difficulty as to the manner of proceeding

when placed on a different formation. Perhaps this cannot be better shown than by the following circumstance used as an illustration by Professor Buckland, of University College.

It appears that a certain nobleman, or large landholder, had for some time been harassed by a difficulty with his tenants. The nobleman appointed Prof. Buckland to investigate the difficulties, hear grievances, and report to him with suggestions as to the mode of proceeding. If I remember correctly, Prof. Buckland's report was more in favor of the tenants than the landlord—the Professor reporting in favor of the expenditure of considerable money that he might place the farms in good condition. This advice was not followed, but a change of tenants took place. The new tenants came from the north of England, where the carboniferous limestone, new red sand-stone, and silurian series abound, while the predominating strata in Kent, the place of their destination, was the cretaceous or chalk group. The result was, the new tenants brought with them a new system of husbandry, which being put into action under circumstances peculiarly unfavorable, did not produce the desired results, nor could it prevent the disappointment which ensued, and which was not prevented till they saw fit to adopt a system of culture suited to the soil on which they were placed; thus giving a proof that practice does not always secure success unless directed by judgment, and that circumstances may occur which, although they seriously disturb the calculations of practical men, yet science is generally able to go to the cause and afford an explanation. From the remarks made, with reference to the limestone, it might be supposed that *all* farms situated over a *limestone* would be valuable for culture, but this is not the case; some limestones contain much magnesia, which, when in excess, is highly injurious to agricultural productions. Without a knowledge of the difference between these varieties the settler might purchase a piece of land on a magnesian limestone or *dolomite* formation, and be ignorant of the character of his purchase.

Geology in addition to rendering assistance to the art of culture by describing the different varieties of soils, renders important aid with regard to the improvement of the soil by mechanical means, as in draining, subsoiling, &c.

DRAINAGE.

"And drains, while drawing noxious moisture off, serve also to diffuse a due supply."—*Graham.*

Draining has been defined as "the art of removing the superfluous and noxious moisture of the soil by means of artificial conduits or otherwise."—Assuming it to be an axiom that drainage is of utility in cultivating the soil, we shall defer any remarks that have to be offered respecting *how* it acts in producing such beneficial results as are ascribed to it. We now proceed to the consideration of the manner by which it is to be effected, and the assistance that geology should render in carrying on these operations. It has been roughly estimated that of all the water falling on the earth's surface, one-sixth is absorbed by the soil, a similar portion is carried off by rivers, while the remainder is re-evaporated. Now, the object of this draining is to remove the moisture from the soil. Our draining then will be of two kinds, according to the objects intended.

I. Surface Draining, having for its object the removal of the moisture from the surface soil, which has been diffused through it.

II. Deep Draining.—Having for its object the removal of the moisture which pervades the subsoil, and that which is caused by deep-seated springs.

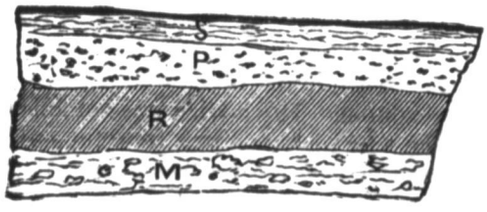
With respect to drainage, soils have been divided into four classes.

1. Porous; as sand, gravel, &c.

2. Retentive or impervious; as clay, marl, dense rocks.
3. Mixed or partly porous; as loam, soft chalk.
4. Surface soils of different ingredients.

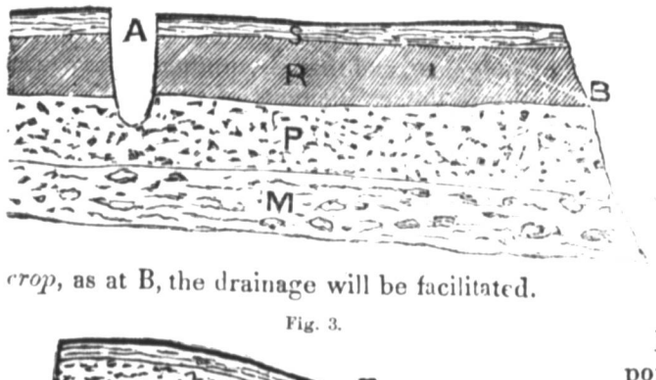
All drainage depends upon the kind of soil on which the operation is to be performed.

Fig 1.



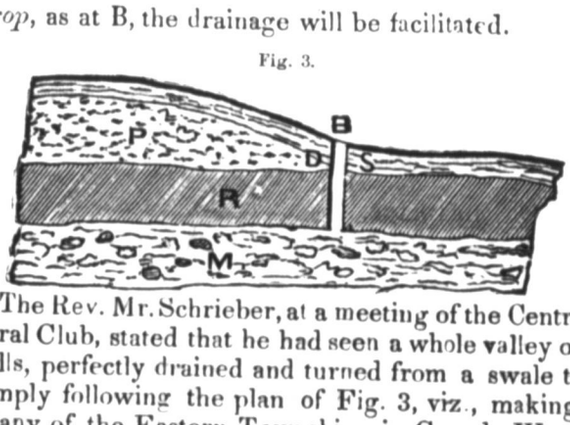
Let the accompanying figure represent a section of the soil to be drained, P being porous, S the surface soil, R retentive, and M mixed. Here, if we should desire to drain the surface only, let the drains be cut through the strata S and P; if, however, the subsoil be so close as to render it desirable, let the drain be made through R, by making a few holes in this below the drains, the land will be much drier.

Fig. 2.



In this section we have the positions of R and P reversed, R lying above P. Here it will be necessary to cut through S, the surface soil, R retentive, and P (if it be shallow), as at A. If there be an *out crop*, as at B, the drainage will be facilitated.

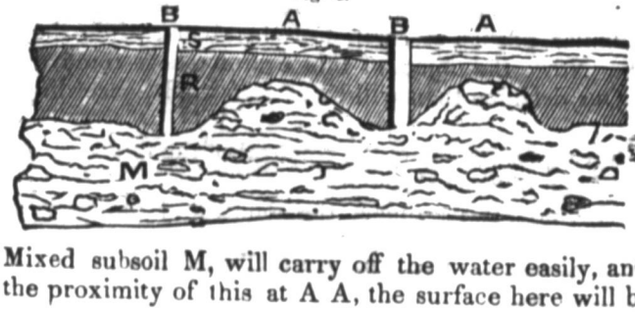
Fig. 3.



Let P be a tongue of porous soil overlying a retentive subsoil, the proper remedy for the swamp or morass (which will certainly be formed at D) will be to cut through R to M, by boring or otherwise.

The Rev. Mr. Schrieber, at a meeting of the Central Agricultural and Horticultural Club, stated that he had seen a whole valley or enclosure within a circle of hills, perfectly drained and turned from a swale to fertile and arable land, by simply following the plan of Fig. 3, viz., making a sort of artesian well.—Many of the Eastern Townships in Canada West, where the limestone predominates, might be easily and cheaply drained in this manner.

Fig. 4.



This figure (4) demonstrates the cause of the uneven state of a piece of country, or even of a field, as to the comparative dryness, and renders the work of remedying it perfectly easy. The Porous or Mixed subsoil M, will carry off the water easily, and consequently owing to the proximity of this at A A, the surface here will be much dryer than at B

B. This drying may be made more equal by connecting B A A B with surface drains, or by boring at the points B B B, through S and R, down to M.

As to the depth of these drains, science and convenience agree that where there is an *outlet* they should not be less than three feet. The object being the removal of the moisture from the soil in such a manner as to render it possible to work the surface soil thoroughly, and to stir up the subsoil occasionally, and yet not to disturb the drains. We should also take into account the power of the frost at small depths. In the construction of drains many opinions exist as to their proper distance from each other; it is unnecessary to mention that soils differ considerably with respect to the distance at which they "draw best." Practice as well as the state of the country financially, would dictate that they should be placed at a considerable distance at first, and then new ones might be inserted, circumstances permitting, and the necessity being established. A wide field is opened for the exercise of judgment and ingenuity so as to make the drainage effectual, and at the same time to use the best materials, and effect this with the least possible cost.

We might refer to the manner of detecting springs before leaving this subject. A gentleman well skilled in the principles of science has given us the following valuable rules for discovering their presence. If the grass assumes a brighter color than in any other part of the field in spring, or the soil when ploughed is darker than the rest of the field, these are surely over a spring. In the summer the gnats hover around and remain at a certain height over these springs. In the evening their presence is also marked by the mist and vapors which rise from them. These remarks apply only when the springs are near the surface, beyond this the only means of ascertaining is by boring. To insure success however, it will be necessary to have considerable knowledge of geology.

We have thus glanced at the professions of geology, have given some illustrations of its general application to the art of culture; from its close connection we might be led to suppose that much more might result from its application than has already; but when we consider that it is a young science, as a whole, and with respect to this in particular, that until very lately scientific men never gave their attention to supplying the wants of agriculture, we cannot but admit that, if more information existed amongst *practical* men respecting it, increased utility would certainly be the result of the application of a science, so intimately related to the art of culture as geology.

CHEMISTRY.

The nutrition, the growth, and the developement of a plant depend upon the assimilation of certain bodies which act by virtue of their mass or substance.—*Liebeg.*

Before entering upon the question of the application of this science to agriculture it seems proper to offer a few remarks as to the history of this subject and its present position. Perhaps no science has been looked upon with so much contempt, and certainly no class of men with so much distrust by agriculturists as a body, as the science of Chemistry and its Professors. They have been considered as the introducers of innovations, as those who profess to teach what they do not understand. Although there may be some ground for supposing that scientific men might advance agriculture in a greater degree by learning the practice of the art, yet, when we consider the treatment which they have received, we cannot but wonder that men have been found willing to prosecute these researches even under the most favorable circumstances. Their theories have been condemned by men under the influence of prejudice, (and it may be remarked, that this habit of forming conclusions without sufficient evidence is

one of the greatest clogs to improvement, for to reject any thing of which *we* are not the originators is certainly an effectual check upon advancement,) men who imagine that they have reached the acme of agricultural knowledge, who boast that they (*gentuses* in the art, for they utterly repudiate the idea that an occupation so extensive and important has any principles by which it is conducted) have learned all they know by their own exertions, and in fact, to use their own words, "never learned nothing from nobody else," a declaration that strongly reminds one of the smartness of the old lady's son, "who made a fiddle all out of his own head, and had stuff enough left to make another." These persons have acquired their knowledge by such independent means that they claim it as their prerogative to dispose of it as they, in the exhuberance of their wisdom, shall see fit; their decision is that when they expire their knowledge *shall* expire with them. I would not depreciate the talent of ordinary practical men, for we have too many examples within the observation of every one where they have and are still succeeding in a very satisfactory manner, but we challenge an instance of this kind in connection with a *genius* such as described above. Does any one suppose that such a being exists; that a man who has with difficulty mastered more than his alphabet, (and these *geniuses* are always of this class,) to have arrived at such a maximum of intelligence from his *own* resources, to have arrived at such conclusions by means of his own power of ratiocination, at conclusions so important and diverse, conclusions, to form which, the wisdom of all that have preceded us has been exercised, assisted too by education and the longest and most persevering study, and impelled by avarice (the love of money) which is said to be one of the greatest incentives to action which pervades the human race. But *they* have not only arrived at these *conclusions* within their short lifetime, but their *results*—results which have required the experience of all past time to establish their truth. All, we think, will admit, after having given the subject a slight consideration, that those who do not *advocate an exchange of thought*, and have succeeded in their operations, must have done this by close observation. They have narrowly watched the labors of their neighbors and have made use of these, either for encouragement or warning. Scientific men have been watched for evil by men who believe it possible for some one to know that of which they are ignorant, and with this view have advocated the support of an agricultural literature, and the maintaining of agricultural associations and other means of improvement. One writer, the author of a work of one thousand pages, a practical farmer, and who rejoices in the title of F.R.S.C., in an edition of his work, published as late as 1852, says that the application of Chemistry to agriculture is at present confined to the dissolving of bones in sulphuric acid, and thinks it impossible that Chemistry can do any thing for agriculture. He asks, "how chemical knowledge can improve agricultural practice"? and then thought "that this remained to be demonstrated." This however seems to have been done, for in an edition of his work, published in 1858, he devotes considerable space to apologising for the untenable ground he had taken in his previous edition. The American editors however, did not coincide with him, and were consequently not compelled to follow him in this respect. We would express a hope that the teachings of science should not be condemned until they are understood, and have had their theories subjected to experiment. Many who condemn science, basing their statements "on experiment" have not taken the trouble to examine these theories carefully. Those who are acquainted with agricultural literature must have noticed the celebrated discussion carried on by Mr. Lawes of England, against the science of Chemistry in general, and Baron Liebeg in particular. Mr. Lawes had for seven years carried on a series of accurate experiments which were instituted for the purpose of overthrowing science, and what was the result? At the

end of that time when it was supposed that Mr. Lawes had effected an anihilation of science, when scientific men after having examined these experiments, were compelled to admit the truth, and Baron Liebeg had not for once denied this, the affair was at length brought to a close in such a manner as to astonish all parties. Baron Liebeg claimed that Mr. Lawes' experiments proved that which they were intended to disprove. To account for this statement he said that Mr. Lawes had instituted his experiments upon a part of a *paragraph*, and had thereby misconstrued the meaning which it was the aim of the writer to establish, giving another instance of the evil effects of prejudice. The object of the practical farmer is to raise the largest and best crops with the least possible expense, and at the same time to do this with the least possible injury to the soil. All must remember the story of our school-boy days respecting the man who had the "goose which laid a golden egg every day," and how from some pressing want or with a view of immediate gain, he killed the goose for one golden egg, and thus stopped the future supply. If we cast our eyes around and observe the farms of our neighbours, and, in completing the circle, do not forget our own, can we not see the application of the story just mentioned? If we cannot at present, we must after being made acquainted with the teachings of science on the subject of the operations of the practical farmer. The va'n-glorious Buffon had inscribed on his tombstone, "A genius equal to the majesty of nature;" but, as an illustration of the complex operations of nature to effect this object, Sir J. E. Smith has happily said, "that a single blade of grass was sufficient to confound his pretensions."—Keeping in view the objects of the farmer it must be obvious that he *should* know the nature of the crops he raises, and the nature of the soil on which they are raised. By the nature we infer their composition, for it has been found by analysis that these consist or are compounded of a variety of ingredients, and that the composition of the former bears considerable relation to that of the latter. He should also know the effect of these plants upon the soil as well as the mode of action and relative value of the different manures he applies.

It is now well known that plants consist of four substances in the "organic part," and nine or ten in the inorganic part. The organic part of a plant is that which burns away in the fire. This forms 90 to 99 parts to 100 of the plant. Science tells us that this organic part consists of four substances (three gases and a solid); she also teaches us whence this (the organic food) is derived. Now, if there be any of these that can be furnished by the aid of man, the knowledge of this substance and the manner by which the plant appropriates it to its support, will, as all must admit, assist him in supplying food of the *right kind*, and applying it in the *form and place* for accomplishing the desired result. Science tells us that one of these substances, viz., nitrogen, is necessary for plants, and after a short time it is exhausted from the soil, and that in order to raise good crops it *must* be restored in some form. Who is the more able to do this *effectually and cheaply? he* who understands the properties of this substance, or *he* who does not know that it even exists? Certainly the former. The former is the scientific man (in this respect), the latter the so-called practical man. The other elements which form the organic food are oxygen, hydrogen and carbon. The farmer applies two of the four when he supplies manure from the farm yard. Everybody must have noticed that with fermenting manures of this kind there is a smell of ammonia or harts-horn, which is composed of ni rogen and hydrogen. There is not space sufficient in this essay to describe experiments illustrating the properties of these bodies, or to name and describe their combinations, with one or two exceptions. Hydrogen and oxygen form water, oxygen and nitrogen form the air, oxygen and

carbon form carbonic acid gas, while hydrogen and nitrogen form the ammonia referred to. With regard to these, Professor Norton says, " that they not only compose by far the largest proportion of the vegetable world but a mixture of two or three of them constitute the air we breathe, the water we drink, and in one shape or another a large part of the earth on which we live. Are not these eminently bodies with which all of every profession ought to be well acquainted ; and most of all the farmer who depends upon them under various forms for all his success, who cannot engage in the most simple operation without being influenced by them in different and most important ways. The man who knows the principal properties and the peculiar energies of the material with which he has to do, provided always he has *practical skill*, is obviously in a much better position than one who knows nothing of them, and scorns the very idea of learning anything from books. The former shapes his course from *certainties*, from *actual reasoning*, based on his own knowledge. The latter does any particular thing simply because he has seen it done before, or perhaps because some other person has recommended it. It has been said the greatest part of the *plant* burns away when placed in the flame. If we place a small portion of soil in the flame, very little, (perhaps five per cent.,) burns away. This is the organic part of the *soil*. From this we should at once say that burning is the test of the different materials composing these, but if we examine the matter more closely, we can easily prove that this distinction exists, and that the materials which compose them bear a certain relation to each other. If we examine a piece of wood or flesh, we see that it exhibits pores, is possessed of organs, and bears unmistakeable evidence of internal structure, the product of life and living organs ; consequently, this is organised. If on the other hand we examine a piece of stone, earth, &c., we shall see that each *part* is independent of the whole mass ; that it is as perfect as the whole mass, these *parts* having merely come together, and are retained in their position by some attractive force. The ash of these plants is found identical with the inorganic part of the soil, and has been found by science to consist of some nine or ten different substances ; these have been taken up by the organs which belong to the plant in which they are found, having been absorbed for some purpose, and not having been formed in the plant, and being easily distinguished from the substances composing the other part, by being less liable to speedy destruction. It having been shown that the composition of the plant is similar to that of the soil, and that plants do not create, but draw these substances from the soil, what must be the only conclusion with regard to the effect of vegetation on the soil ? certainly that the effect of crops is to impoverish the soil on which they are raised. *Science* points out precisely the composition of both plant and soil, and the peculiar kind of exhaustion effected by different plants. Since it has been proved by analysis that the different crops differ in composition, a different exhaustion must result from their growth. Science tells us that all our common plants contain lime, potash, soda, magnesia, sulphuric acid, chlorine, silica, oxide of iron, and some others. It is known that these differ in amount in different plants ; thus wheat requires larger quantities of lime, potash, and phosphoric acid, than grasses of different kinds. The grasses, on the contrary, require much silica, and even this class of plants differ much in their composition. If we burn one thousand pounds of the following kinds of hay, we will get the following kinds of ash, respectively, viz : rye grass, 53 lbs. ; red clover, 74¾ lbs. ; white clover, 89½ lbs. ; and lucerne, 94¾ lbs. Science teaches that lucerne is the most exhausting of the grasses mentioned. Practice confirms this. Many tables might be given to show the effects of this exhaustion, but space will not permit. Boussingault, Johnson, Liebeg, Norton, and many others, teem with such, and before condemning science, these should

be examined. Science not only indicates that different varieties, but that the different parts of a plant exhaust the soil in different proportions. Leaves contain much more inorganic matter than any other part of the plant. Stalks and roots rank next, while the grain is the least exhausting. What a wise arrangement of Providence does science here disclose! Various mineral substances are necessary for the proper nutrition of plants to bring them to maturity; the greater portion of this, however, is distributed through the stalks, leaves, and roots, while the grain, (the only part of the plant that should be entirely removed from the soil,) contains very little of this inorganic matter, so that by returning these stalks and leaves to the soil, its fertility may for a long time be maintained. Perhaps the difference of plants as to the amount of this inorganic matter required by them, and the difference of this exhaustion effected by different parts of plants, cannot be better illustrated than by reference to the tobacco plant.

If one thousand pounds of the leaves be burned, 230 lbs. of solid matter will remain; of the stalks, 100 lbs.; of the *grain or seed*, 40 lbs.; of the roots, 70 lbs. But why have scientific men spoken against this plant with so much energy? Why attribute such exhausting properties to it? The reason has been given, viz: the large amount of solid matter carried off by the leaves, stalks, and seeds, and it must be remembered that *all these are removed from the soil.* The question is, Have the theories of scientific men, with respect to it, proved correct? No one will deny that it is this plant, and the miserable system of husbandry pursued in its cultivation, which has caused those "chocolate colored lands of Virginia, as well as those of her mountain coves and rich lowgrounds," to become so barren and uninviting that they cannot retain the population that has previously cultivated them. For it is well known that there is at the present time an *emigration* of the old inhabitants from this state to new lands, and an *immigration* to this state from the north. Why do these Virginians leave their home, the land of their birth; a land which all that are acquainted with their history know was endeared to them by every tie that can be sanctified by birth, education, and patriotism? The only cause that can be given for the movement is this, they are compelled to do it in order to obtain a livelihood; for their lands, once fertile, have been reduced to the position which scientific men had predicted they would occupy, if their indiscriminate cropping and shallow husbandry were adhered to. The immigration is of a different kind, and is productive of beneficial results, for by the strong arm of free labor, directed by *cultivated* minds, the lands are rapidly being reclaimed. Science points out first the cause of the exhaustion, and the means of preventing it — when neither of these have been taken advantage of, and the lands have been reduced to barrenness, the means of restoring them to fertility. But it may be remarked that this does not apply to the cultivation of wheat, or to our own country. We answer that it has applied to wheat lands, and will apply to Canada, unless the matter be attended to in time; for it is only a matter of time that is required to affect this. In the neighboring State of New York there are counties which formerly produced from forty to fifty bushels per acre; the census tables now show an average of only five bushels per acre. This decrease is being noticed in Canada. The cause of this in the counties referred to, is, that they have neglected the cardinal principle of good husbandry, viz., manuring. At the time the productiveness of that State stood so high, Professor Mapes says the inhabitants were in the habit of making *Bees*,—and for what purpose? To commit the suicidal act of throwing the manure product from these large crops into the Mohawk river. These *Bees* were the seasons of great jollification, yet they have been discontinued, and notwithstanding this, the traveller does not see the straw piled around the barns, year after year, so that the farmers

are compelled "to move their barns for convenience of access." How is this? As the practice of cultivation and the throwing the manures into the rivers continued, the fertility of the soil was decreased, and they now apply this manure to the purpose for which it was designed. This same suicidal custom is still practised on the banks of some Western rivers. They will assuredly find, if this practice be continued, that they have "sown to the winds, and must reap the whirlwind." Mr. Alexander, the late President of the Provincial Agricultural Association, in his annual address to that Association, referred to this matter in a forcible manner.

"Science, ever ready to come to the farmer's aid, suggests systems of cropping and management, by which the fertility of the soil may be produced and maintained, which is indispensable to the successful growth of our staple and other products. We hope to see this suicidal system of indiscriminate and severe grain cropping, so fatal in its results wherever practised, give way to a more enlightened course of husbandry, by which the fertility of our country may be preserved. If we continue to draw so heavily on our capital, we shall have inevitably at some future day to experience all the disadvantages of farming impoverished lands, viz., that while the same expense for cultivation, seed-harvesting, and thrashing, must be incurred, we shall receive but unremunerative returns. The soil is but the treasury of the farmer's wealth; the stores that are found therein may be husbanded with care to administer to the wants of man, with the return of the season, or they may be wasted and dispersed in a short space of time."

Perhaps the cause of this exhaustion is the want of manure to supply the wheat land with. If this be the case, a smaller amount of land should be sown with wheat crops. Let us remember that there exists a close connection between the raising of grain and the rearing of cattle, and that in countries where agriculture is carried to the highest perfection yet attained, this is remembered, and the amount of land sown with wheat is much smaller than with us. In Upper Canada, on 100 acres, about 50 are wheat or flint crops; in England, on 100 acres, about 25 are wheat or flint crops.

This point has long been remembered in the latter country, and hence the old adage, "Up horn, up corn." When we look around upon the vegetable kingdom, and reflect upon the vast number of different forms that represent it, (it has been estimated that there are more than 300,000 of the *Phanerogama*, or flowering plants,) we cannot but be impressed with the grand array of beauty of form, and diversity of arrangement, here exhibited; and this impression should be rendered doubly strong, when we take into consideration the variety of products which the study unfolds.

One bears a flower once a century, another—the Candlebury Myrtle—yields the best of tallow; the cotton shrub and paper mulberry afford materials for clothing; the salt tree supplies the natives of Chili with salt, while the fountain tree gives its cooling draughts to the weary traveller of the Canary Islands;—another class, the beet, sugar cane, and maple, provide sugar; others a variety of medicines; in short, from the smallest root to the stately oak, or gigantic Baobab, this diversity of products exists. It might be supposed that these trees have a different composition. This is true only with respect to the circumstances under which the union of the elements forming them takes place. Some two or three elements unite and form a "substance;" two or three of these uniting form the plant. Chemistry draws the veil which has concealed the structure. Analysis is successful in determining the elements which compose them; but synthesis can give no clue to the manner in which the union of these takes place. All the substances that make up the great bulk of the plant, are starch, woody fibre, and gluten, the study of which forms one of the most inter-

esting parts of analytical Chemistry. They differ so little in their composition, and yet are so different in their properties, that were it not not established beyond doubt, it would be almost impossible to believe it. Besides these three substances, we have others still of the same composition, yet of different properties, as Legumin, Zein, Margarine, &c.; these are, however, in small quantities.

THE ORGANIC MATTER OF THE SOIL.

As has been shown, the greater portion of the soil consists of inorganic matter—although all soils must possess a certain amount of organic before they can be productive. Science tells us that it is necessary to supply the plant to a certain extent. That its tendency is to make light soils more fertile by virtue of its power of consolidating them. That it adds to the heat of the soil by giving it a dark color, which has the property of absorbing a greater portion of the sun's rays. It also tells us that this matter decreases, and if the bare fallow system be practised it decreases more rapidly. By her aid, also, we are furnished with a plan for restoring this to the soil, and as it is much less in amount than the inorganic part, it is therefore more quickly and cheaply done —since it is derived from the air.

(1.) By ploughing in green crops this may be done, since they contain a very large proportion of this matter.

(2.) By growing plants with long roots, which, decomposing, leave considerable of this matter in the soil.

(3.) By exercising care in restoring to the land all the straw, stalks, &c., in the form of manure.

(4.) By laying down to pasture for some time.

By pursuing these methods, the fertility of the soil, in this respect, may be restored, and another of the teachings of science be of service to the farmer; but science teaches that it is much easier and cheaper to keep up the fertility of the soil, than to restore it after it has been exhausted.

ON THE RESTORATION OF THE INORGANIC ELEMENTS TO THE SOIL.

This branch of agriculture is one of the most important that has claimed the attention of scientific men. Some have proposed the term *Stercology*, for this system of forming, economising, and applying manures. It may be thought that this subject is not of sufficient importance to merit such a term. It may be said that the subject is by no means simple, for a perfect knowledge of this requires an acquaintance with Chemistry, Botany, &c., and as to its importance, it is one which has been the subject of much study and experiment, and at present there is no good reason why agriculture should not have a nomenclature as well as any other science.

In considering this subject two axioms *should* be borne in mind, and they *are*, in every good system of culture.

(1.) That to maintain the fertility of the soil it will be necessary to restore an amount at least equal to that which is carried off by the crops which are raised upon it.

2.) That if we desire to increase the fertility of the soil, there must be more matter added to it than has been taken from it.

If these axioms are true, and the farmer acts upon them, where is his profits. Science has shown that refuse, the most worthless for any thing else, and often an incumbrance, possesses the property of restoring those ingredients which went to form the grain, &c.; that manures from the farm-yard restore all ingredients to a greater or less degree, and are consequently used for fertilizing the soil.

Thus we see that the seeming paradox is easily explained: the farmer takes from the soil that which is worth much money, and restores the materials in a shape that is worth very little money. All our manures may be divided into three classes, viz.: Vegetable, Animal, and Mineral. Of these we shall speak: First, respecting the Vegetable. Those belonging to this class are less active than those of the other classes, but are more plentiful, and consequently cheaper, and, as might be expected, are more generally used than any other class. The advantages of these have been partly spoken of under the head of "organic matter." From what has been said, it will be understood that these are in reality both organic and inorganic in their composition. The amount of mineral matter restored to the soil depends on the kind of plant and the part used as a manure. Manures of this kind are the green crops used for ploughing in, straw, stalks of plants, leaves, weeds, scourings of ditches, saw dust, tan bark, &c. These may be applied in four different ways, the effect produced by each being explained by science. (1.) Manures applied by ploughing in green, as clover, buck wheat, green corn, young turnips, &c. This is one of the easiest methods of applying, and the principles of science say the most profitable. All is here retained which was taken from the soil. As to the time when this should be done—the period of flowering is one at which the plant is at the same time the nearest maturity, and capable of easy decomposition; at this time, also, the heat of the sun and the state of the soil, as regards moisture, are favourable to decomposition. Perhaps the question will be best decided by experience and convenience.

(2.) *They may be applied in a dry state.*—As straw, saw dust, leaves, tan bark, &c. Practice confirms what science has given with regard to the merits of manures in a fermented or unfermented state; that while the latter enriches the soil in a greater degree, the former, or fermented manures, act much more energetically after their first application, but lose much during their fermentation. Much discussion has ensued on this point, as well as to the kind of manures, fermented or unfermented, best for turnips, which can be easily answered, if we know the purpose for which they are applied, as to produce a rapid growth of this crop, or whether the soil is to be benefitted to the greatest extent. The substances saw dust and tan bark are long in decomposing, but by calculating properly, the farmer may have much of these common and cheap substances converted into valuable manure; this may be done by pouring over them liquid manure, or mixing them in a compost.

(3.) *By using them partly decomposed.*—In this instance, vegetables having been mixed with the excrements of cattle, or applied in the form of barn-yard manure, science has done much to facilitate the decomposition of these, and has unfolded many useful properties of peat, &c., the fermentation of which valuable fertilizer, by natural means, is an example of this kind of preparation.

(4.) *In a state of decomposition the result of art.*—The great advantage of these kind of manures is their tendency to absorb gaseous matters, which, on being applied to the soil, they give up for the nourishment of plants. Example Charcoal. The property of destroying odours renders it of great utility in making use of animal manures, which might otherwise be excluded on account of their disagreeable odour. Soot is another of this class, and is still more valuable than charcoal as a manure, from its containing more inorganic matter. These manures are drilled in with seeds, having good effect. The economy and most beneficial mode of applying these Vegetable manures cannot be too well understood by the Canadian farmer, for it is to them that Canada must look for her fertilisers, for many years to come.

ANIMAL MANURES.

These comprehend bones, hair, blood, flesh, horns, wool, and the solid and liquid excrements of cattle. Science has effected an analysis of these, so that their composition is well known, and their action upon crops well understood. Their effect is to produce a rapid growth, on the whole they are the most powerful manures that are used, yielding more fertilizing matter, in proportion to their bulk, than those of any other class. The more our knowledge of these is increased, the more we have to regret their limited supply, which will prevent their general introduction. In many countries fish are used for manure, with beneficial results. Our inland position will prevent their general introduction for this purpose in their natural form. Science, however, has achieved another triumph in connection with this matter, which will benefit some of the agricultural population of Canada, at least. The absolute loss of the refuse of the fisheries of the Gulf and River St. Lawrence, as well as of fish that were captured and of no use for curing, has been a cause of regret, which will shortly be discontinued. A gentleman engaged in the fisheries, I believe, has succeeded in preparing this in a concentrated form, which renders it at once free from odour, easy of transportation, and in a state suitable for application. Experiment has proved it to be a most powerful fertilizer. Many of our animal products are of such an economic value as to render their application for manure unprofitable, as for example hair and horns. The flesh of animals is of great value for fertilizing, yet we often see those which die by disease or accident, dragged off to some hollow, and there devoured by birds and dogs, while noxious gases, which should fertilize the soil, are carried up into the atmosphere, where they give evidence of the ignorance, or, to say the least, the slovenliness of their owners. The bones of animals have been found to contain much that is fertilizing, and have been used both in England and this country. They supply Phosphoric acid, lime, and other ingredients, required by the grain crops. Many years ago travellers might have noticed huge piles of bones outside of every glue factory in almost every county in England, the proprietors of which would have been glad to give them for the "drawing;" they were in fact held in about as much estimation as tan bark, after having been used in the tanneries. But a scientific man passing by some piles of them was struck with the waste. He remarked this to the farmer with whom he was spending a few days; this was in the county of Cheshire, well noted for its butter and cheese. He pointed out to him the amount of the constituents which compose the butter and cheese, which might be restored by these bones. The suggestion was acted upon with success; in a few years the available bones of England would not supply the demand; the very field of Waterloo was dug over and over to assist in restoring the fertility of England. The modes of application, as drilling in with seeds, top dressing, &c., need not be described, neither the relative merits of different lengths, as the one inch, 1-2 inch, &c. Suffice it to say, that science has investigated their properties fully, and lays down the principles of their action, and that *practice* in Great Britain, the "Continent," the United States, and in Canada, coincides with these deductions, and gives undeniable testimony of the money value of bones for the purposes mentioned. It would appear that their value is not fully understood by our farmers. Standing on one of our wharves not long ago, I noticed a vessel taking in her cargo for England, a part of which was bones from a glue factory, and this within three miles of a bone mill. It is to be hoped, that with a knowledge of their value, the manufacturers will be sustained.

Guano has been found of great utility in the United States and Great Britian, but its expense precludes its introduction into Canada at present, although extremely valuable as a fertilizer. Should it, however, be of sufficient cheap-

ness to render its use profitable at some future day, the farmer will find that science can give him much information respecting its composition and proper mode of application, as well as the means of detecting the numerous adulterations which invariably attend its importation and sale.

The application and economy of the solid and liquid excrements is too intimately connected with the application of vegetable manures, to require any lengthened description. The liquid manure, however, is almost always in this country a total loss, owing to the *great care in selecting suitable declivities for the barn-yard*; it is extremely valuable as a fertilizer, and in many countries is husbanded with the greatest care;—its economy and application may be referred to under another head.

MINERAL MANURES.

From having occupied so much space with the other and more common varieties, the space alloted to these will be brief. Scientific men have shown (as has been remarked) that plants require certain mineral substances for their healthy growth as well as for building themselves up,—as, for example, the small quantity of glue in a large box is necessary to give it strength. Science has pointed out many of the different products of the mineral kingdom which increase the fertility of the soil in the manner before mentioned, but we fear it will not be until manufacturers have required their use to a considerable extent that the cheapness of many of them will admit of a profitable application in Canada.

We are fortunately supplied by the Onondaga salt group of Western Canada with some of those fertilizers, although their effects and principles of action are not as well understood as they should be. Gypsum, or plaster, is perhaps the most common with Canadian farmers. According to scientific men its value depends upon the amount of lime and sulphuric acid which compose the greater part of it. The specimens in use with us have this value enhanced by the presence of carbonates of lime and magnesia, allumina, &c. Science indicates that this can restore to the soil the ingredients of which it (the plaster) is composed, but nothing more. Some farmers think that in expending a few dollars in plaster the fertility of the soil should be restored, and that by its continued application its fertility should be increased; but they have found that after a few applications the land becomes "plaster sick." Some in the exuberance of their wisdom account for this by asserting that plaster poisons the land, which is a mistake. Science teaches that it is owing to the soil having received enough of these ingredients to satisfy the demands of the crops, and if understood would save the farmer the cost of repeated applications, and would suggest what should be done to increase the fertility. If some other of the constituents of the plants to be raised be applied this will be effected, as, for example, lime, potash, soda or organic matter, which the plaster has not furnished.

Lime.—This substance is the most abundant of mineral manures. Its action is similar to that of Gypsum. It has been thoroughly studied by scientific men, whose theories respecting it have been confirmed by practice. Prof. Johnston gives the following properties of this substance, which every practical man should take into consideration when he applies it as a fertilizer:

(1) That lime has little or no effect upon soils in which organic—*i. e.*, animal and vegetable—matter has no general distribution.

(2) That its apparent effect is inconsiderable during the first year of its application, compared with that which it produces the second and third years.

(3) That its effect is the most sensible when kept near the surface of the soil, and gradually diminishes when it sinks near the subsoil.

(4) And that under the influence of lime the organic matter of the soil disappears more rapidly than it otherwise would do, and as it becomes less in quantity fresh additions of lime produce less effect.

These circumstances have been found to govern its action wherever applied. It is of value not only in supplying the plants with an ingredient which is found in some of them largely, but by combining with the acid matter of the soil sweetens it. It forms by these means soluble compounds, where before, the elements—or at least some of them—were insoluble. It combines with oxides of iron, manganese, and forms beneficial compounds of these, which were before hurtful to the soil; besides this, it decomposes the organic matter of the soil, absorbing nitrogen, which uniting forms a beneficial compound. In a word, science has investigated its properties and dispelled many delusions respecting it, but explains the cause and confirms the truth of the old adage,

Lime and lime without manure
Will make both farm and farmer poor.

Nitrate of Soda.—This substance, as its name implies, is rich in nitrogen, and in accordance with the effect which it is known to produce, is of utility in causing a rapid growth, and hence its value for bringing forward the later portions of a field of grain,—which in these days of machinery must be of utility,—so that it may all be cut at the same time.

Manures in General.—Mixtures of these have been found to be benificial; some have been found difficult to reduce to a state suitable to the support of plants. The means of accomplishing this is by mixing them with some other substance which will ferment easily. The urine of animals possesses not only this property, but that of increasing the fertility of the soil. Peat and the muck of hollows, as well as charcoal, have been found to be of value for absorbing the gases which escape from fermenting manures. Putting all these facts together it seems reasonable that some means might be contrived by which worthless substances may be made manures. Vegetable matter properly fermented, animal matters easily taken care of, and the whole mixture converted into the best manure without the strength being lost. This has been effected by composts. To effect this, however, it is plain that we should know something of chemistry, so that we may not bring substances in contact the union of which will cause the value to be decreased; example, lime and guano, where ammonia is given off.

In concluding the subject of manures we may remark that were we to develop the value of those at present obtainable, by applying the principles of science, we should not want for them. In short, if one half the skill of the Flemings with regard to the manufacture, economy and application of manures were practised, our produce would be doubled, and consequently we should have a great increase in our national wealth.

ROTATION OF CROPS.

Under the head of manures some remarks were offered as to the impropriety of sowing so many flint crops. It was shown that the number of acres of these, as compared with Great Britain, were two to one respectively. It was also shown that those nations who had reached eminence in agriculture engaged, to a great extent, in raising and fattening cattle. To do this it will be neeessary to have a system of rotation of crops.

It has been already stated that some crops exhaust the soil more than others, and that if these crops be continued for some time the return is but trifling. This sterility of the soil does not arise from the want of all the substances necessary to form plants, but from the want of a sufficient quantity of a parti-

ticular ingredient to continue the growth of a particular crop. A soil therefore in this position is not barren, but will produce other crops, requiring larger quantities of the other ingredients. These suggest the necessity of a rotation by which all the ingredients are brought into action, and have time to accumulate again before the rotation is completed. There are different reasons which prevent the use of root crops in this country to as great an extent as in other countries—as the want of artificial manures to raise them, and their insufficiency for maintaining the animal heat should they be raised in sufficient quantities, some of our common grains being of much more use for this purpose. In planning a rotation it should be done so as to keep the land clean, without the necessity of a bare fallow; for unless the fields are stony, and have many a stump, &c. which require removing, bare fallows are both unprofitable with regard to the fertility of the soil and the loss of the land for one year. The following has been practised, and being planned in accordance with the principles of science—as far as the state of the country will admit—is suggested: (1) drill crops of all kinds including Indian corn; (2) spring wheat, barley or oats; (3) clover meadow; (4) pasture; (5) pease or beans: (6) fall wheat. The greatest tendency of this rotation will be to exhaust the potash, phosphoric acid and lime; but being "forewarned" the farmer is "forearmed," and can prevent this result.

CHEMICAL ADVANTAGES OF DRAINING AND SUBSOILING.

It is an admitted fact that water, if it passes over or through the surface of the soil, acts beneficially, but this is not the case if it be allowed to stagnate. Science has shown that plants require air and warmth as well as moisture. Now moisture, if allowed to saturate the soil, prevents the ingress of these, which we see illustrated by the evaporation going on from undrained lands, evaporation always producing cold. If the land be drained this moisture sinks, and is carried off by the drains. If rain falls now it sinks into the subsoil, purifying the surface soil, and giving out heat and ammonia which it has acquired in passing through the air. These effects produce beneficial results. The advantages of draining may be summed up as follows:

(1) Heavy lands may be more easily and cheaply worked if drained.
(2) Lime and manures go further and have more effect.
(3) Larger crops are reaped and of better quality.
(4) Seed time and harvest are earlier and more sure, and naked fallows are rendered less necessary.
(5) A better system of rotation of crops can be introduced; as large crops of wheat, &c., have been raised by its means on land which before produced only poor crops of oats and buckwheat.
(6) The climate in general is made much more healthy, and the attacks of insects on domestic animals are in a great measure prevented.

Subsoiling has been tried to a considerable extent, and has been found not to answer the expectations of many that have practised it. Scientific truths teach us when this should be performed, and easily explain the reason of the failure which may be experienced by all who perform their operations as it were in the dark, or in ignorance of the circumstances on which success must depend. Subsoil and trench ploughing change injurious compounds, as oxide of iron, into beneficial ones by exposing them to the air, but must be done with due regard to drainage.

We have thus completed a slight sketch of the subject of the application of chemistry to agriculture, only with regard to the cause of exhaustion and the means of restoring and maintaining the fertility of soils. The aim has not

been to furnish a directory for the objects mentioned, but to show that there is in performing these operations a connection with chemistry to convince the farmer, if possible, that by understanding both *theory and practice*, he is on the shortest route to a perfect understanding, and therefore the surest and most successful application of the principles of this subject, and consequently will be most likely to obtain abundant reward for his labor.

And here a few remarks may be offered as to what chemistry may do for agriculture. At the time of its introduction many were anticipating that it would supersede the thorough system of husbandry, and that by its application rotation of crops would be unnecessary, no necessity for taking so much care of farm yard manure, that it would be a perfect matter of indifference what they did with it, (perhaps they fancied that they should be compelled to make bees to get rid of it), that the farmer would have only to get a "prescription" for his farm, scatter it over the land, reap his crops, and be contented. I ask was this the aid that scientific men ever proposed for agriculture? I think not. Was it ever an end to be desired? Every one will respond in saying no. The claims of chemists were that there was a relation between the sciences. Their science had for its object the study of the composition and properties of the bodies composing the soil, as well as the composition and properties of the plant, or in other words of its food; of the necessities of every plant, that it might be brought to maturity, and that a knowledge of the former would assist him in supplying the latter easily and cheaply, and would consequently be of a money value to the farmer. How far they were and are correct in their theories we leave practical men to decide. As I understand the history and present position of the subject, chemistry no more claims to revolutionize agriculture by the discontinuance of good mechanical husbandry—farm yard manures and other systems of practice beneficial to the soil—than the steam-plough claims to be able to entirely supersede the use of horse labor.

Analysis of Soils.—With respect to this many suppose that this can be accomplished by any one after a little study. This is a mistake, as erroneous as it is dangerous to the science. A farmer may understand enough of analytical chemistry to give the general characters of the soil, to say whether any given element is present in *large* quantities or not, but that he should give a precise analysis is unreasonable to suppose. The chemist should be able to learn practical agriculture much easier than the farmer practical chemistry, for the latter is the work of a lifetime, or at any rate one that will require more labor, care and attention than many practical men can bestow; for the analysis of soils, plants, manures, &c., are among the most difficult problems of analytical chemistry.

NATURAL HISTORY.

O Lord how manifold are thy works! In wisdom hast thou made them all. The earth is full of thy riches.

"In the limited sense in which this term is often applied, it implies all knowledge respecting the animal and vegetable kingdoms, whether systematical, physiological, descriptive, geographical or economical. Everything relating to the modes of life, conditions of occurrence of organized bodies, the circumstances which influence their development, the climatic limits within which they are circumscribed, the changes through which they pass, the sources of their health and disease, and the influence they severally exert on each other."—PROFESSOR HINCKS.

Let any one carefully consider this the true definition of the science, and pronounce if he can that a knowledge of it is of no utility to the farmer. A prize essayist on the diseases of the wheat plants illustrates the importance in

which *one* of the *many* plants raised by the farmer was held, and the great danger to be apprehended from *one* of the *many* dangers to which *that* plant was subject. He did this by referring to the alarm which arose in England *many* years ago, caused by the report being spread that the *Hessian fly* was about being introduced into that country in some cargoes of wheat which were being imported from America. "The Privy Council sat day after day anxiously debating what measures should be adopted to ward off the danger of a calamity more to be dreaded, as they well knew, than a pestilence or plague. Expresses were sent off in all directions to the officers of the customs respecting the examinations of cargoes. Dispatches were written to the Ambassadors in France, Austria, Russia, Prussia and America to gain information, of the want of which they were now so sensible, and so important was the business deemed that the minutes of the council and the documents collected from all points filled 200 octavo pages." If this one danger of one plant was of such importance, why should not all the diseases of all the plants and animals connected with agriculture be of sufficient importance to render a knowledge of them desirable and beneficial to the agriculturist? Natural history is divided into two great divisions, according to the general system of classification with regard to plants and animals, viz., botany and zoology.

Botany treats of all the plants that grow upon the earth, the circumstances which facilitate or retard their growth, and the various properties of these vegetables. This science professes to explain the nature of plants—whether grasses or grains, whether consisting chiefly of roots or stems, and whether these plants are profitable or unprofitable to the farmer. If so, how important that a knowledge of it should be acquired. It teaches the time when the profitable grains should be sown, and the circumstances with which they should be associated—while it treats of the best means of eradicating those weeds injurious to the growth of Cereals. In treating of the plant we generally commence with the root, because it is at once "the organ of attachment and nutrition." In the study of these there is much to learn, even if we confine our investigation to those connected with Canadian agriculture. Thus we have one class, the "Fusiform," which are subject to "finger and toe," a disease which, according to Prof. Buckman, marks the medium between the wilderness and the well cultivated farm; and which can only be prevented by the soil on which the seeds are sown being of the same or greater fertility than that on which the crop was raised from which the seed was derived. Again, by knowing the peculiar properties of certain plants, we are able to provide circumstances in connection with them, which will materially aid their growth. Thus some of the roots in use with us, are not of so good quality, if a certain variety of manure be placed below them. Some require a compact soil, others one as loose as possible. Practice in Holland with regard to these, seems to be carried on with respect to this property, thus the ground is ploughed deeply, and then trenched deeply with a long narrow spade. The carrot sends its roots deep into the soil when this is in a proper condition. Another root, the potato, is troubled with a mysterious disease, which has never been fully explained; scientific and practical men have endeavored to construct theories in explanation of the cause, but with indifferent success. That this is the fault of science or practice, it is difficult to decide; perhaps more good would result if the practical man would master the principles of Botany, and the Botanist those of practical agriculture; the true cause and its remedy might then be much sooner ascertained. Some varieties of plants can be easily transplanted, others cannot bear this without an application of some kind, either to stimulate their growth or protect the more delicate organs from injury. Some are liable to the attacks of insects. A semi fluid mass of fine earth and water, impregnated with whale oil and soap, is the remedy.

Then we have some roots that multiply in the soil to an injurious extent, and which it is almost impossible to eradicate,—*e. g.*, the so-called "twitch grass" is a fact too well known to require description. Possessed of the greatest tenacity of life, one small joint grows rapidly, and then the seeds diffuse it far and wide, and in fact, to use a common expression, "it runs everything out." Were its properties more generally understood, it would not be allowed to make such progress, in some neighbourhoods, as it now does. Lime has the effect of destroying certain roots, and causing the growth of others which are less difficult to root out. Not only the roots, but the stem is subject to diseases. That a knowledge of the principles on which the development of the stem depends, of the causes which effect its durability, and not only its durability, but the successful development of the grain, as connected with it, would not only be of interest but of a money value to the farmer, we think there can be no doubt, if we can give credence to their many remarks concerning the disease which affect the stem, as the "rust." It must not be supposed that a true knowledge of stems implies an acquaintance with those forms alone which are visible above ground, for there are stems which remain below,—*e. g.*, the onion, where it retains the condition of a bud. We see that stems are in common use for furnishing us with material for manufactures and fuel. This subject should not be left without a remark respecting the sugar maple. All are aware that a liquid is obtained from which sugar is derived by crystalization, though perhaps not so well aware of the cheapest way to obtain the greatest quantity of "sap," and at the same time with the least injury to the tree. It is sufficient to say that, if parties have never learned the *proper practice*, by understanding the principles of this science they may know where to obtain this sap without making those tremendous triangular gashes with the axe, aiming for the centre, as if it were to be found at that point, instead of in the new wood nearest the bark. The most formidable disease of the stems of the grain is *rust*. This has been carefully investigated by scientific men, and no doubt exists as to its nature. Science has shown that it is a minute vegetable growth, which throws that part of it which answers to the roots through the tissue of the stem, and lives upon the nourishment which should support and bring to maturity the growing grain. Mildew is a species of fungus and a parasite. Smut is a species of the same, called *Uredo segetum*. Most probably the potato disease is the result of the attacks of these fungi. It has been found that these fungi require a large quantity of Nitrogen to aid them in their growth. This being absorbed by them from the air, must be in the form of ammonia, which is, therefore, the cause of their injury. It has been proved that the air is particularly rich in ammonia, just at the time of the most foggy weather, viz.: July and August; these seasons are said by practical men to be particularly favorable to rust. Science appears to have arrived at the cause, can a remedy be found? Scientific principles require for this some preparation that will absorb and fix this ammonia, that will cause it to assume another form, by which the action will not be so rapid as to cause the growth of these fungi. These requirements have been met. Finely powdered charcoal has been found to answer the purpose; it is likewise capable of minute division, and consequently of easy application, for when shaken in the air from a bag of loose texture, as muslin, it settles on every stalk in the field. Science indicates that rust is but a state of the development of mildew; both common salt and charcoal are found to fix the ammonia, and either prevent or arrest the ravages of this parasite. Care in selecting varieties of wheat not liable to rust should be exercised when sowing new land, as this is most liable to have crops affected by rust. Lime has been found to prevent rust, and pay for the outlay, at the rate of $20 an acre. Early taking in of crops subject to it should

be attended to; in short, the character of these fungi has been well studied by scientific men, who have exhibited a praiseworthy assiduity in pursuing a task so unrequited. They have not only discovered their cause, but the remedy of the different varieties of rust, mildew, &c., but also of smut. "Dr. Clark's wheat protector, for preventing smut in wheat, and resisting the attacks of the bug, slug, grub, and wire-worm, and at the same time promoting the growth of the plant at germination," has been found to answer the above purposes well, not only in the British Islands, (where it is largely used,) but in Canada. In this neighbourhood (Oshawa,) many farmers have used it with the best of success, and this at a cost of only 12½ cents per acre, giving another example of the *positive* application of science, and its money value to Canadian agriculture. It has been found that not only these diseases, but many others, as *ergot*, *bunt*, &c., are most common on undrained lands, lands distinguished by their vapors, and mist, and consequently rich in ammonia. Science here points out the effect of this operation (drainage). It is practice alone that can execute it, and secure the beneficial effects which have been previously mentioned.

Seeds.—Everyone must have observed the number of these in our common plants, and if they have done this, and considered the means provided by the great Author of Nature for their distribution, they will not be surprised at their abundance. The downy wings of one class, as the thistle, carry them easily to a great distance; some have observed them over the centre of our great lakes —they are carried in the grain, and introduced into new districts. A farmer in this neighbourhood, getting some (*superior*) hay seed from a distance, introduced "twitch grass," which soon spread over many farms in the neighbourhood. In short, they are transported by a variety of means, from which the larger animals, birds, and even children, are not to be excepted. It requires a knowledge of their properties to combat them successfully, and did not so much ignorance prevail respecting them, they would not be allowed to spread so extensively. Talking with a farmer the other day about the thistles "which were going to seed and had been cut down," he said it was a common opinion amongst farmers that the seeds did not grow, and hence it would be of no use to burn them; yet upon asking him some of the most common questions botany could suggest, he thought it impossible that they could be for any other purpose than to produce their "kind abundantly." Let such notions be dispelled, and the people understand the effects of allowing injurious weeds to go to seed, and there will be less difficulty in exterminating them. The people of New Jersey are awake to this principle, and consequently we can account for those laws which impose a fine of 20 cents for each of those "dreaded Canada thistles" which any farmer allows to go to seed; this is just, for no man has a right to raise weeds which, in time, will rob another's soil of the food which should support his grain, any more than he has to raise wolves to rob him of his flocks.

The farmer should know the time to sow seeds in order that they may escape diseases to which they are subject; he should know the amount required per acre best suited to raise the largest crops. It is the opinion of some that as a general thing too little is sown. They show this by good reasoning, and still better by practical experience. We have not time to notice all the facts and experiments in illustration of the application of science to Canadian agriculture, although there is much to interest and benefit all engaged in the latter; the aim has been to furnish an illustration of their connection and application. Before leaving this subject it will be proper to remark the system at present being introduced for the preparation of the seed. The system at present being introduced in France, and which has been found to succeed well, has for its object the preparing of seeds in such a manner that they will

be most favorably situated for germination and for deriving the food necessary to bring them to maturity, by placing it in a suitable form in such close connection that the greatest economy may be practised.

We have many practices at present common with us to effect a certain object, and which depend upon certain principles, *e.g.*, for promoting vegetation soaking seeds in solutions of nitrates of soda, potash and ammonia; preventing smut by "pickling," *i.e.*, by soaking in blue vitriol, urine, &c.; and by Clarke's wheat protector, which has been found to be the cheapest preparation, the easiest of application, and of the greatest utility for this purpose.

Zoology.—This science, so intimately connected with agriculture, professes to explain the habits, history and actions of animals, and their mutual relations to each other. That there are animals beneficial and prejudicial to agriculture is certain; that the useful properties of the one may be the subject of so much study that they may be thoroughly understood is without doubt; and that these being understood may be cultivated to the highest degree much easier if the farmer understands these principles than if he had to depend upon his own experience, seems almost an axiom. Certainly if we are "forewarned we are forearmed"; if we know the history, habits and effects of the weevil, Hessian fly and other insects prejudicial to us, we shall be in a much better position to combat them successfully. It seems strange that nearly all our knowledge of these is due to scientific men. The farmers are and were the most interested in the matter, how is it that they have done so little in this department? They have not the time to make their observations year after year so as to establish the truth of their opinions, and consequently leave it to scientific men, and thus give us another illustration of the application of science to practice.

As has been remarked the habits of insects are understood, and if the knowledge we already possess be applied, all must be compelled to admit its value. Are we to be plundered and not attempt a defence when the means are in our hands. A certain gentleman in this neighborhood has two barrels of these depredators of which he proposes to make oil; he is of the medical profession, and unless this oil be valuable for medicinal purposes it will probably prove a poor speculation. Other countries have abandoned wheat growing from want of knowledge of the means of preventing its destruction. We have many works on entomology, besides prize essays which give valuable information, which we do not apply. The necessary information has been and is being diffused by the *Agriculturist*, which should receive a hearty support.

It is the province of zoology to give the true habits of animals, and dispel many prejudices which exist respecting those which are useful. We often see the farmers either killing, or allowing others to destroy, the swallows and other small birds which surround the homestead. These have always been found to be of service to him by destroying insects, &c. Zoology tells us that all birds are a benefit to us. The "Raptores," or birds of prey, are said to do more good by catching rats, mice and other small animals, than harm by injuring fowls, &c. Others birds, as the "Corvidae," to which class belong crows, blackbirds, &c., are injurious only when the corn is shooting up, (by taking advantage of their natural timidity they may be prevented from doing much injury,) the rest of their time is devoted to our service. From the experience of practical men we are certain that they are our benefactors, and therefore from the rural population at least they should receive protection. The fecundity of swallows and small birds is so great that with little trouble a large colony of them may be collected and made self-sustaining.

Insects are likewise injurious to animals as well as plants. Fortunately these too have been made the subject of scientific research, and the means of destroy-

ing them, or at least preventing their ravages, has been well ascertained. Damp land is peculiarly favorable to them; as has been remarked they are seen hovering over springs, &c. Draining prevents these. Another class has been found to attack the flocks, often causing severe loss; science comes to the aid of practice and gives us a composition for dipping sheep, lambs and other small animals, which claims "to prevent or cure scab, destroy ticks, and prevent the injury from the fly, and improve the general condition of the fleece."

Another class of insects attack animals internally, and are parasitical in their habits; the labors of the zoologist and veterinary surgeon have prescribed the remedy. The external parasites of common animals are easily destroyed. It is to be hoped that this branch of science will be the subject of more investigation and increased utility, and with this view it should be well supported. If we would combat these enemies successfully we must read, must think, must act, must study, must apply the laws of nature with regard to their relation to plants and animals.

ANIMAL PHYSIOLOGY, OR COMPARATIVE ANATOMY.

This science professes to treat of the various diseases of animals, giving their causes and pointing out their remedies. The full consideration of the subject will not be here attempted. The subject is of such great importance that its application to Canadian agriculture must be beneficial to the farmer. From the large amount of money invested in farm animals in this country, it would seem to be almost madness not to have some means by which they should be attended by competent persons during sickness or after having suffered accident.

There appears to be an almost entire want of care as to whether this important science is improved in this country. Men who profess to understand human diseases are examined as to their qualifications, and are not allowed to practise until they pass this examination. Now, although this may not be quite as necessary for those who profess to cure the diseases of domestic animals, yet it would be much more satisfactory to both employer and employee if some kind of an examination was instituted for the purpose. It is a fact to be lamented that of the many persons styling themselves veterinary surgeons in this country, few can describe the principal muscles or bones of the animal they pretend to cure. Should the science be placed upon a proper basis, there is no doubt that it would be profitable to those engaged in it and to the farmer. We have not a single veterinary school in the British Provinces. Is this a proper state of affairs, or one that tends to the improvement of the science, the respectability of those engaged in it, or the benefit of the farmer?

Before leaving the consideration of plants and animals one more science must be referred to,—this professes to apply the principles of chemistry to the phenomena of animal and vegetable life.

CHEMICAL PHYSIOLOGY.

Science tells us that animals require food for four different purposes.

(1) For keeping up the respiration.

(2) For keeping up the animal heat.

(3) To supply the waste of the body,—*eg.* the human body changes every 7 years, that of a calf every 2 years, hence the food is required to supply this gradual change.

(4) In addition to sustaining the respiration, the animal heat, and supplying the waste of the body, all animals under favorable circumstances lay on more or less fat. The question is, can science give any explanation of the manner in which it is carried on? Can she give us any clue as to how these principles may be applied to further the ends mentioned above?

Science has prosecuted her researches in many directions, and this department has not been neglected.

Young animals require to have the natural heat of the body kept up, to have the great waste of their bodies supplied, their respiration sustained, and fat laid on. Practice too often indicates (for *actions* speak) that if a young animal can be kept alive by feeding with straw, as by letting it run to a stack in an open field, that this is economy, that it will be time enough to *feed* when you commence to fatten. But men will differ on this as on other points. Some prefer the teachings of science, which are to the effect that young animals should be supplied with good food, and that suited to the many purposes intended, and that they should have artificial protection from the cold in order that they may not consume so much of their food to sustain the animal heat. Experience proves that the latter raise the largest cattle, that these fatten the easiest, and strange to say make more money than those practical economists first mentioned. Full grown animals require good food, and it may be here remarked that the value of this depends upon the time at which this is cut. As has been remarked under the head of chemistry the stems of grain consist of starch, gluten, woody fibre, and other substances. When the stalk is allowed to stand after it is ripe, the nourishing substances are changed to woody fibre, which is much less beneficial than starch and sugar, consequently science indicates that straw should be cut as soon as possible without injury to the grain. The grain is affected in a like manner. If allowed to stand after ripening, the flour, *i. e.* the starch and sugar, is changed to bran, *i. e.* woody fibre to a certain extent, to which any miller can testify, hence the necessity of cutting these grains as early as possible. Some varieties of straw saved in this way are said by practical men to be of as much value as ordinary hay cut after having been fully ripened. Science explains the cause of this comparative value, and indicates that every means by which the digestiveness of the food may be increased adds to its value—*e. g.*, the use of cutting machines, which render the comparatively worthless kinds of food as valuable as the better varieties. Some advise the soiling of live stock, *i. e.* cutting off grain fodder every day in the neighborhood of the pasture and feeding them there. This is also in accordance with the principles of this subject when applied for certain purposes. As for increasing the milk of cows, science also indicates that full grown animals likewise require much less food if comfortably housed, and that in many instances the value of this food is improved by cooking and often by allowing it to sour afterwards.

From what has been said it appears that science is able to account for all the food which animals consume, to explain to what end they appropriate it, and as might be expected can deduce from these premises the value of manures from animals of different ages and fed with different varieties of food,—*e. g.*, the manure of the young animal is not of so much value as that of the full grown one, of the farrow cow more than of the milch cow, the working animal much less than the fattening one. This science, so important, has been well studied, and if understood must be of advantage to the farmer, since it teaches the nature of the food of animals and the adaptation of this food to certain purposes, as for laying on fat or producing milk rich either in butter or cheese; to enable animals to keep up the animal heat, if exposed to much cold; to enable them to endure much hard labor; in short it teaches the wants of the animal in this respect, and the best means of procuring food to supply these wants. It teaches the value of ferent kinds of manure from different animals, the means of obtaining by the use of certain food the greatest amount of milk rich either in butter or cheese, and the means of taking care of this milk and its products with a view of preventing those chemical changes which take place under all circumstances, unless some means be devised by which the affinities of nature may be counteract-

ed. Finally, it is a subject which should be understood by those engaged in the care of, or interested in, the rearing, improvement and comfort of animals.

We have thus sketched the connection of science with agriculture with reference to the soil generally, and particularly to the demands made upon it by plants and the means of supplying them by manures, the method of economising these manures and their varieties, the different plants which grow on the soil, the diseases to which they are subject, the animals we use for lightening our labors, as well as the merits and demerits of those in any way connected with the subject.

But here the application of science does not end. There are other sciences which are capable of an economical application to our art, which are able to lighten the labor of the husbandman, ministering to his comfort and foretelling the state of the weather, and thus securing his property from the liability of being damaged as much as if he were ignorant of it. A few remarks will be made upon these subjects, following up the order which has been adopted.

METEOROLOGY.

"Coming events cast their shadows before."

This science professes to investigate and explain the various natural phenomena connected with the atmosphere. Men in all ages have been led of necessity to notice the weather, their convenience as well as the safety of their property and themselves demanding it. Thus the huntsman is in danger of losing his way and perishing on the bleak mountain side, or sinking beneath the "shapeless drift." The sailor in order that he may prepare his vessel for the storm; the husbandman, though less incited by personal danger, yet has an interest in observing the weather, so as to calculate respecting the timely removal of grain or the sheltering of animals, As this study of the prognostics of the weather has been long pursued and is pretty well understood, it may be thought unnecessary to pursue it as a science. We may ask who are the best judges of the coming weather throughout the country? The answer generally is some old person. It seems to require a lifetime to acquire a knowledge of this by observation. Science professes to be able by means of instruments to measure the force, temperature and direction of the winds, the weight of the atmosphere, and consequently its capability of containing moisture, the actual amount of moisture in the atmosphere, and the quantity of electric fluid which pervades it, and from these data to draw conclusions as to the future state of the weather for a short time. This knowledge is soon acquired. If a young farmer, ignorant of the practical observation of the weather, had a large amount of grain cut and in the field, and being anxious about the weather of to-morrow, were to understand this science, he could by consulting his instruments, as the barometer, form a correct opinion with regard to it. If he saw the mercury fall he might prepare for a storm, if on the contrary it rises the weather will be fair, and he may allow the grain to be fully dry before bringing it in. It may be said that any one can learn such maxims as will enable him to judge of the weather. Take, for example, a "rainbow at night is the sailor's delight, but a rainbow in the morning is the sailor's warning." This is true, but this is not the case with all, which consequently misleads the novice. A strong proof of the utility of the science is furnished by sailors, who, though constantly accustomed to watch the weather, watch their instruments likewise, and place more reliance on scientific principles than on all the old sayings so familiar with them. Pursued as a study it may be easily acquired, and will prove a valuable aid to agriculture.

HYDROSTATICS AND HYDRAULICS.

There are many situations in this country where water power might be applied to agriculture. Where these occur they should be taken advantage of, and in applying them an opportunity will be afforded for using the principles of these sciences, the first treating of the properties of fluids at rest, the second of fluids in motion, and the best means of conveying them by pipes or otherwise, as well as their effect on machines. By applying these principles we will be able to effect this in the best manner, and with the least cost. A knowledge of the latter will be of service in carrying on draining, since it treats of the pressure of fluids, which often produces results which we would not naturally be led to anticipate. A knowledge of this science applied to farm architecture facilitates the conveying of water to different parts of the farm buildings. If there be no spring of sufficient height from which to draw this water, it may be raised to the required height by a windmill or hydraulic ram at an expense trifling compared with the convenience and benefit to be derived, for the advantages of a plentiful supply of good water for domestic animals cannot be easily estimated.

FARM ARCHITECTURE.

This is a branch that has not yet received that attention which its importance demands. From what has been said in the previous illustrations, it would appear to be intimately connected with other departments of rural economy.

Farm buildings might be planed so as to combine convenience for feeding and watering, as well as furnishing a proper supply of light and heat for the animals, and at the same time to secure them ventilation and room to sleep without standing. They might be so arranged with respect to the farm house that from that point all the yards might be observed. With proper buildings and yards greater economy could be practised with respect to both solid and liquid manures. Finally all establishments of this nature should have a place for everything and everything in its place.

MECHANICS.

"Strange that there should slumber in yon tranquil pond a power so tremendous, and yet so manageable as to be successfully applied to locomotion, commerce, manufactures and other human services."

Treats of motion and the moving powers, their nature, laws and effect in machines. No one can deny that this science is capable of an application to agriculture. Contemplate the many instances where it has and can be applied to assist in a good system of husbandry. This requires that the ground should be well worked. In England, with a population of 234 to the square mile, this cannot be done by human labor as it is in Belgium with her 338 inhabitants for the same space. The people of Great Britain have been compelled to employ the aid of machinery to cultivate their land and to care for its products. If this be necessary with them the idea that Upper Canada, with 5 per square mile, can accomplish this without machinery is hopeless.

Much has been done in this department. Thus the construction of the plough shows the application of these principles to combine lightness, durability and cheapness, for the purpose of cutting and inverting the sod in the best manner, with the least expenditure of strength. So with all the operations necessary to be performed, science having shown the means by which other powers may be substituted to effect these instead of human strength. As an example we may refer to our rollers, mowing machines, horse rakes, cultivators, reaping machines, seed drills, corn shellers, thrashing machines, straw cutters, fanning mills, clod crushers, wood sawers, cob crushers, and many others, which are

impelled by horse or other power, and do much to compensate for the want of manual labor. We have neither the time to expend or money to pay for manual labor when machines can be used instead. Our position demands that what is to be done should be done at once. Our harvesting implements are good examples of the application of this science. Wheat should be cut at the right time, and they enable us to affect this.

Mechanics has changed completely the operations of the manufacturer, has lessened the price of his articles, which caused competition, and competition led to improvement in this department. If practical men understand this science they are most likely to advance its application. They know their own wants and what means are at their disposal to effect the desired object.

This attempt at illustrating the connection and application of science to Canadian agriculture is now completed. Some of the more salient points of the most prominent subjects have been referred to with a view of showing where scientific principles have been applied, and why science may hope to admit of an economical application to the art of culture. But no attempt has been made to give an outline of the general principles of the sciences to which reference has been made. How far this answers the purpose designed we will not venture an opinion, for this subject is widening every day, becomes the more comprehensive as the intellect of man discovers increased utility of those subjects at present known to admit of application, and as other sciences are found capable of rendering assistance. Lord Elgin at the Hamilton exhibition, after noticing the present position of Canada, and referring to the fact that she was but in her infancy as regards time, but an equal of manhood as far as works were concerned, gave this as the reason: "That the appliances of an age rich beyond all preceding ones, particularly in respect to chemistry and mechanics, have been brought to bear under circumstances particularly favorable to the growth of a new country." Having then the history of the past, we cannot but anticipate from the application of the knowledge of the present, so fruitful in desired results, anything but a brilliant future.

PRIZE ESSAY

ON THE MANAGEMENT OF FRUIT TREES, SHEWING THE MOST APPROVED METHODS OF CULTIVATION, AND POINTING OUT SOME OF THE PRINCIPAL CAUSES OF FAILURE EXPERIENCED IN CANADA WEST.

BY J. BEATTIE, NICHOL, COUNTY WELLINGTON.

"Obedient to the breeze and beating ray,
From the deep-loaded bough a mellow shower
Incessant melts away.—*Thomson.*

IMPORTANCE OF THE SUBJECT.

Pomology, or the art of raising and cultivating fruit trees, is, perhaps, the most pleasant of all rural pursuits. Only those who have experienced the sensation can appreciate the pleasure the cultivator derives in plucking the first ripe fruits from trees which he has planted with his own hand,—perhaps raised from seed,—and carefully nursed to a bearing state.

It has been well said that "Fine fruit is the flower of commodities." Downing, the celebrated American Horticulturist and Pomologist, said: "It is the most perfect union of the useful and the beautiful that the earth knows. Trees full of soft foilage; blossoms fresh with spring beauty; and finally, fruit, rich, bloom-dusted, melting and luscious,—such are the treasures of the orchard and the garden, temptingly offered to every landholder in this bright and sunny, though temperate climate."

But Downing was not a resident of Canada, and I am afraid his fine picture will scarcely apply in all its parts to this Province. It is quite true that with proper care we can raise handsome trees, bearing luscious fruits in endless variety; it is also true that we live in a bright and sunny land, but I have some doubts if we are warranted in saying that we live in a "temperate climate." Yet many of our nurserymen still persist in propagating the different varieties of fruit trees recommended by Downing and other American pomologists, without stopping to inquire if they are hardy enough to withstand the winters of Canada, which many of them, I have found out to my cost, are not.

Apart from the pleasure experienced in the cultivation of fruit, it is of the greatest utility. Good ripe fruit is not only a luxury in which we may moderately indulge, but the use of it is actually conducive to health. Fruits have a cooling and gently laxative effect; they are an excellent corrective for certain states of the stomach and bowels, brought on by the wholesale use of butcher-meat in this country; and there have been several instances of violent diseases, and almost hopeless cases of chronic complaints, having yielded to the constant use of fruits.

On this subject a medical correspondent of the London (England) *Times* writes as follows: "Because bowel complaints usually prevail most during the hot season of the year,—the latter end of summer and autumn when fruit is most abundant, and in tropical climates where fruits are met with in the greatest variety,—it is inferred, according to the *post hoc propter hoc* mode of reasoning, that the one is the consequence of the other. It were about as reasonable to attribute the occasional occurrences of sea-scurvy in the navy to the use of lemon juice, lime juice, or potatos. It is well known that, though large quantities of animal oils and fats, wines, spirits, and malt liquors which contain a large amount of carbon, may be consumed with comparative impunity in cold climates and in winter, when the carbonacious matter gets burnt off by the more active exercise and respiration, in hot climates and in summer this element gets retained in the liver, and ultimately gives rise to congestion of that organ and its consequences—diarrhœa, dysentery and bilious disorders. Though in exten-

sive practice for fifteen years, in a district abounding with orchards and gardens, I cannot remember an instance in which I could distinctly trace any very serious disorder to fruit as a cause. I would not be supposed to advocate either immoderate quantities of the most wholesome fruit, or the indiscriminate use of unripe or ill-preserved fruits, but I do contend, as the result of my own experience, that not only is a moderate quantity of well-ripened or well-preserved fruit harmless, but that it is highly conducive to the health of people, and especially of children, and that it tends to prevent bilious diarrhœa and cholera. I am inclined to view the abundant supply of fruit in hot climates, and during the summer and autumn, and the great longing of people, especially of children (in whom the biliary functions are very active) for fruit, to a wise provision of an over-ruling and over-watchful Providence, which generally plants the remedy side by side with the disease, at a time when the biliary system is in most danger of getting disordered."

FAILURES EXPERIENCED BY THE CULTIVATOR OF GRAFTED FRUIT TREES.

There are, perhaps, few men in Canada who own a sufficient quantity of land but have a desire, at some period of their lives, to plant an orchard of fruit trees. The plan in general pursued is to leave the selection of the trees to the nurseryman, or to make a selection of varieties from some catalogue or book of fruits. The inexperienced cultivator, after reading the glowing description of varieties set forth in some of these catalogues, will make a selection, send his order, and in due time the trees will be forwarded, all carefully labelled and ready for planting. By and by the trees are planted in what is no doubt considered the most approved fashion, and the proprietor naturally looks forward to a fine thriving orchard—the trees pendant with fine glowing specimens of fruit, true to name and description. But what is the result? Perhaps at the close of the third year from planting one half the trees or more are gone, and those still struggling for existence are probably tall unsightly looking poles; a small tuft of foilage on the top; the trees all leaning towards the east, and looking like anything but the picture which the proprietor had originally fancied! This is no exaggerated statement of the results experienced in raising orchards in this part of the country. I may safely say that I scarcely know of any complete, well grown, and symmetrical orchards in this locality.

It is surely of paramount importance to the orchardist to inquire into the causes which produce these sad results, and endeavor to avoid them. That they can be avoided, and many of the finer grafted fruits raised in Canada West with almost certain success, is a fact which I have so far proven by experience.

I shall endeavor to review in a brief and practical manner some of the modes generally practised in the propagation and cultivation of fruit trees, and although I am no professional nurseryman, I flatter myself that I have devoted such an amount of time and attention to the theory and practice of the art, as may warrant me in publishing my opinions on the subject. But I wish it to be distinctly understood, that when I condemn any particular mode of practice, I do not allude to any individual nurseryman or establishment,—my remarks are intended for general application.

IMPORTANCE OF PROCURING VARIETIES ADAPTED TO SOIL AND CLIMATE.

So far as my experience goes, I have come to the conclusion that, the chief cause of the failures sustained by the cultivators of orchards in Canada West, is to be found in the fact that, nurserymen persist in propagating and sending out varieties constitutionally unadapted to the sections of the country to which they are sent. It is true that the planter should only order such varieties as are adapted to his own locality; but how many are experienced enough to tell this?

Almost all our nurserymen have copied wholesale the popular varieties of the neighbouring States, and however excellent many of these may be in sections to which they are adapted, I have no hesitation in asserting that more than one half of them are too tender for Canada West.

The Baldwin is one of the very best of apples through an extensive section of country. "It is a native of Massachusetts and is more largely cultivated for the Boston market than any others sort." Downing, in speaking of this fruit in his section of the State of New York, says: "It bears most abundantly with us, and we have had the satisfaction of raising larger, more beautiful, and highly flavoured specimens here than we ever saw in its native region."

Of this popular variety I cannot raise a single tree; it is altogether too tender for this section. Yet it is propagated in the different nurseries in this very neighbourhood. It must be remembered that many tender varieties of trees can be successfully raised to a certain height in a sheltered and crowded nursery, that will, to a certainty, be cut down by the first or second winter after they are removed to an exposed orchard. Again, some varieties are sufficiently hardy to succeed for a few favourable seasons, but when they come through a more than ordinarily severe winter they are either altogether killed, or left in such a shattered condition that they never recover the effects of it.

But before we can hope for any great improvement, much requires to be done. We must, by the aid of Fruit Conventions, or other means, endeavour to select from the standard varieties of the day, such as are fit for general cultivation in this Province. We must also ascertain what varieties are best adapted to certain localities; for there are many that will succeed in some favourable sections, that will to a certainty fail in others. We have many excellent seedling varieties which should not be overlooked; they should be well treated, and if found worthy, propagated, named and introduced into our catalogues. It may be said to be an established fact, that a variety which has been originated in any particular section of the country, will be constitutionally better adapted to that section than any imported variety.

But we should not stop even here. We should endeavour to originate more new varieties suited to our respective localities. By sowing the seeds of those varieties nearest to what we would wish to produce, and when these seedlings produce fruit, sowing the seeds of the best varieties of them, we stand a chance of making some improvement.

Many eminent Pomologists in different parts of the world, have devoted much time and attention to the production of new seedling varieties, and a great many contradictory opinions have been published. And, although I have had little practical experience myself, I am thoroughly convinced of the importance of the subject to us. I shall here give an extract from an address delivered to the Pomological Society at Boston, in 1854, by that eminent Horticulturist, the Hon. Marshall P. Wilder, as the best exposition of this important subject which I can offer:

"The immense loss to American cultivators from the importation of foreign varieties, in many instances not well adapted to the countries from which they came, and often still less adapted to our soil and climate, suggests the importance of raising from seed native sorts, which, in most instances, possess peculiar advantages. It is now generally conceded that the trees and plants of a given country, like its aboriginal inhabitants, will flourish better at home than in most foreign localities.

"We rejoice that public attention has been turned to this subject by some of our horticultural journalists, and that many cultivators and amateurs are engaged in this interesting and promising department. The success which has crowned their exertions affords great encouragement to perseverance. Witness for in-

stance, thirty or more varieties of the Cherry by Dr. Kirtland, of Ohio, which appear adapted to our eastern climate, and some of them of superior excellence. Witness the numerous varieties of the Raspberry by Dr. Brinckle, ex-President of this Society, of which some have endured without covering, the severities of the last winter in the New England States, and which also promise to be valuable contributions to American pomology. In addition to these, how many varieties of the Apple, the Pear, and the Grape have recently been added to the list of American fruits. How many new and excellent varieties of the Strawberry have appeared since the introduction of Mr. Hovey's seedlings.

"These are sure indications of the success which will reward future efforts to obtain valuable and native varieties of fruit, and they point to the fullfilment of the prediction of the celebrated Van Mons, 'that the time will come when our best fruits will be derived from seedlings.' He gives the following sage counsel to his correspondents, to whom he had sent trees: 'Sow your seed and persevere without interruption, and you will obtain even better fruit than mine.'

"Among pioneers in this department, I am happy to notice a gentleman (now residing amongst us) the pupil and friend of Van Mons, one who has adopted our country as his future home, and who has already transplanted to our soil many thousand choice seedlings of the Pear, which have come into his possession from the collections of that gentleman, and the celebrated *Esperen*.

"As to the best methods of producing fine varieties from seed, the opinions of distinguished pomologists are not uniform.

"*Duhamel*, among the French, from causes which seem to us irreconcilable with nature and experience, entertained serious doubts of the practicability of any method for obtaining new and valuable varieties from seed, especially of the Pear, because he had tried various experiments without success for 50 years.

Dr. Van Mons, of Belgium, instead of saving the seeds of the finest varieties selected those of inferior sorts, upon the principle that a kind having arrived at the highest state of perfection must deteriorate, while an inferior one would improve by successive reproductions. He also held that hybridization tended to degeneracy and imperfection. Thus, he assumes the doctrine that a perfect variety necessarily deteriorates, and overlooks the fact observed by other distinguished men, that the improvement or deterioration of which he speaks, may result from natural impregnation by the pollen of other varieties conveyed by the air or insects; and therefore that the seed of a good variety may produce either a better or a worse, and that of a bad either a worse or a better.

"*Mr. Knight's* system of obtaining new and improved varieties, depended entirely on hybridization, or artificial impregnation, so highly esteemed by Dr. Van Mons. This is somewhat difficult to practise on account of natural fertilization by insects and the wind; but it has the merit of depending on a truly philosophical principle, and with very particular attention may yet prove as available for the improvement of our fruits as it has for the production of fine varieties in the vegetable and floral kingdom, or as the corresponding principle has in the crossing of the breeds of domestic animals.

"The results of Mr. Knight's experience disprove the tendency to degeneracy, inasmuch as many of his fruits obtained by hybridization, are among the most durable and hardy varieties, as the *Eyewood* and *Dunmore* Pears; the *Black Eagle* and other Cherries.

"Many cultivators, as Esperen, Bivot, Berchmans, and others, both in this and foreign countries, have sown seeds in variety and have obtained some valuable sorts. But I am confirmed in the opinion, that the best means of producing new and excellent varieties, suited either to general cultivation or to particular localities, is to *plant the most mature and perfect seed of the most hardy, vigorous and valuable roots*; on the general pathological principle that like produces

like, and upon the conviction that immature seed, although the embryo be sufficiently formed to vegetate, yet not having all its elements in perfection, it will not produce a vigorous and healthy offspring. Dr. Lindley, commenting upon this practice justly remarks: 'All experience shows that in every kind of created thing, be it man or beast, or bird, the mysterious principle called life, remains during the whole period of existence what it was at first. If vitality is feeble in the beginning, so it remains. Weak parents produce weak children, and their children's children are weaker still, as imperial dynasties have sadly shown' With him, we believe this theory as applicable to the vegetable as to the animal kingdom. May not a disregard of this doctrine, account for the great number of feeble, sickly, early defoliated trees often found in our grounds by the side of those that are vigorous, healthful and persistent in foliage? Is not the theory we advocate as important in the production of fruit trees, as in the raising of cereal grains? The skilful agriculturist saves the best seed of his various crops, and selects the best animals from his flocks and herds for breeders. Why should not the law of reproduction regulate the practice of the pomologist as well as of the farmer? Has the All-Wise and Infinite enacted several laws when one would subserve the purpose.

"To the doctrine of Van Mons, and other distinguished writers, respecting deterioration by age, and after a variety has reached its perfection, there seems to be some exceptions. From the accounts of oriental travelers, may we not believe that the grapes of Eschol are as perfect now as when the chiefs of Israel planted their rich clusters three thousand years ago? And that the same variety of the Fig, the Olive and the Pomegranate, are as perfect in Syria to-day as in the period of David and Solomon? It is worthy of inquiry whether the native grapes on the banks of our rivers have deteriorated since the day when the red men of the forest refreshed themselves with fruit from those vines; and whether the Orange, the Lemon, the Bananna, and the fruits of southern latitudes, evince any more signs of decay than they did centuries ago? In a word, whether the doctrine of deterioration is as applicable to the native as to the foreign fruit of a country?

"Why may we not expect to obtain natural varieties of the apple and other fruits as durable, and far more valuable, than those which have passed their second centennial, as the *Endicott* and *Stuyvesant* pears? From meteorological or other causes which we do not at present understand, particular varieties may deteriorate in a given locality for a season and afterwards revive; or they may show signs of decay in one locality and flourish well in others not very remote, as the *White Doyenne*, which has been considered for many years by some in this vicinity on the decline, while it is perfect in many places in Maine, New Hampshire, Vermont and other States. Fruit-bearing may exhaust the vital energy of the tree and hasten decay, but still the variety may remain. We have among fruit trees no example of longevity equal to that of the new Taxodium, found in California, supposed to be three thousand years old. Our object is not to controvert the opinions of those who believe in the running out of varieties, whether their duration be limited to one hundred or one thousand years, but to enforce the importance of raising new varieties from seed, especially adapted to our own location."

Although it will be a work of time to ascertain what varieties are best adapted to the different sections of our Province, a great improvement could be made in a short period. Any nurseryman after a few years experience in any section of the country—especially when there are orchards in a bearing state—can make a pretty extensive selection of excellent varieties perfectly adapted to that particular section. I would have each nurseryman adopt to himself something like the following rule: "No trees will be sent out from this nursery, unless

specially ordered, but those which are perfectly adapted to this locality, and of which we can shew specimen trees in a bearing state in our own grounds or that of our neighbors." Of course I only mean this as a general rule. I find no fault with nurserymen propagating all the novelties of the day, and furnishing them to all who wish. But I blame them for sending out tender varieties which are not ordered, and which, they often have a pretty good idea, would not succeed as standards in their own grounds.

NURSERY PRACTICE, STOCKS, MODES OF GRAFTING, &c.

For raising stocks the seeds should be saved of healthy native varieties. It is quite obvious that the seeds of a hardy variety which has been originated in any particular section, will produce healthier stocks than the seeds of a foreign variety. After stocks are one or two years old the almost universal practice with nurserymen here, in grafting apple trees, is to cut the roots of the seedling stocks into pieces three and four inches long, graft a scion on each piece, and plant out. In my opinion this practice cannot be too strongly condemned. No matter how thrifty or hardy our varieties are, if this mode of grafting is practised a large proportion of the trees will turn out sickly, ill-balanced specimens. If we examine the roots of a young seedling, we will see immediately below the collar a close mass of small fibrous roots pushing out in all directions, but the further we trace the larger roots from the collar the more these small fibres will diminish in number. We know by experience that in transplanted trees the small fibres accommodate themselves first to the change of soil and give the tree the first start; it is therefore quite evident that scions grafted on pieces of roots on which these pieces are wanting, cannot succeed so well as those wrought on the collar of the seedling. I have tried both methods and have found a wide difference in the results.

I have already alluded to the importance of cultivating none but hardy varieties, but no matter how hardy the variety may be, the system of culture generally practised in nurseries is sufficient to make any tree tender and ill-adapted for removal. But in justice to the nurserymen it must be admitted, that they are driven to this objectionable mode of culture more by necessity than choice. In ordering trees from the nursery, the almost universal demand is: "Give us tall, straight, smooth-barked trees, none of your short scrubby looking dwarfs." To supply this demand the soil of the nursery must be rich, the rows of trees laid out as close as it is possible to cultivate them, and the trees planted quite close in the row—a practice the very opposite of what *should* be adopted.

It is a law of nature that every plant in the vegetable kingdom grows towards the light, and in a crowded nursery, the light being pretty much excluded everywhere but from above, it is quite obvious that the trees will push upwards and produce few side branches. We will understand this a little better by turning our attention for a moment to nature's nursery. When the forest has been cleared off for some time, and the spot permitted to grow up again naturally with trees, we see that when they are in masses they push up quite rapid with tall, slender, bare trunks, and small tops; but when the same varieties are growing singly they grow more slowly, but have stout, low trunks, with fine spreading tops and roots in proportion. And if we transplant these trees, we find those which were growing singly succeed better, and prove much hardier after removal, than those which were in clusters. The reason of this is quite plain. In the one case the tree has been inured as it were to exposure from the very first, and has adapted itself to the circumstances, while in the other it has been protected and sheltered until the time of removal, and it is no great wonder that it should receive a considerable shock before it accommodates itself to the change.

From this we may learn that in order to produce the hardiest trees of any given variety, we should select for the nursery a good deep friable soil, *not too rich;* we should lay out the rows much wider than the general practice; and we should plant the trees a considerable distance apart in the rows. Instead of drawing them up as fast as possible, we should endeavor to keep them *down.* In the spring of each year, until the trees are fit for removal from the nursery, I would recommend one third to be cut off the previous year's growth. This promotes the growth of side shoots, which aid in the formation of strong, short-jointed, tapering trunks, which I consider essentially necessary to constitute a hardy tree. And I may remark here, that the sooner the almost universal, but most objectionable, notion, of planting none but tall trees in the orchard is done away with the better.

Tall trees are very liable to be uprooted by storms; they are particularly subject, in the course of a few seasons, to be bent towards the east with the westerly storms which prevail in this country, which looks anything but symmetrical; they are more subject to the many diseases to which the trunks of fruit trees are liable; and they never bear as well as low trees, the fruit being always liable to be blown off by the wind. The arguments advanced in favour of high trees are: "That teams can walk under them in cultivating the orchard, and cattle can feed amongst them without 'browzing' the tops." But any one who expects to raise an orchard and still continue to cultivate grain and green crops in it without considerable extra trouble, had better not plant at all, for he will to a certainty be disappointed.

Although trees were propagated and cultivated in the most approved manner in the nursery, the practice sometimes pursued in transplanting and forwarding them is sufficient to *ruin* them. At the busy season of transplanting, nurserymen are often under the necessity of employing inexperienced hands, who tear and mangle the roots of trees in the most careless manner. After being taken up in this fashion they are often tied up in bundles, packed in a waggon amongst a little loose straw, driven for days with many of the roots exposed to a hot sun and drying wind, and after all this treatment often planted in the most careless manner. Is it any wonder that a large proportion of these trees should die? Indeed it has often suprised me that any of them came through at all.

To take up trees well requires considerable care and attention. The roots are as varied in their forms as the tops,—some have a tendency to spread out horizontally, others to run down in a perpendicular direction,—it is, therefore, necessary to proceed with caution. Many insist that it does no harm to curtail the roots of a tree considerably at the time of transplanting, but this is an erroneous idea. When we transplant a yearling tree—which we can accomplish pretty successfully without curtailing either the roots or the branches—we see that it receives very little check in the growth; but the older it is, or the more we interfere with the roots or the top, the longer it will be in recovering after removal. Of course it is impracticable to take up trees three or four years old and transport them any distance with the roots entire, but surely with a little care a great improvement might be made on the general practice. I have actually seen trees six or seven feet high sent out with a few mutilated roots not more than six or seven inches long.

In packing for transportation care should be taken to expose the roots as little as possible to the air. This can be pretty well accomplished by packing the roots in damp moss, filling the interstices between the trees with straw, and sewing a piece of coarse cloth or matting round all; or, what is still better, if the trees are to be sent some distance, procuring broad boxes the proper size, and packing in them as before directed.

I am well aware that nurserymen could not afford to propagate, cultivate, pack and transport trees in the manner I have been recommending at the present nursery prices, but would it not be more satisfactory to all parties if extra pains were taken in producing and sending out trees that would be almost certain to succeed, and charges made accordingly? I am certain it would be much cheaper in the end to the purchaser.

SELECTION OF SOIL FOR THE ORCHARD, AND ITS PREPARATIONS FOR PLANTING.

Light sandy or gravelly soils are unsuitable. It is true that these soils are dry and easily worked, and that the cherry and some other tender varieties of trees will succeed better for a short time than on a heavy loam, but they are invariably short lived. Such soils do not retain sufficient moisture to resist the powerful effects of the sun in the months of July and August. The consequence is the vigor of the trees is checked, they become stunted and scrubby, and peculiarly liable to the attacks of insects and the many diseases to which fruit trees are liable. Such soils should always be rejected if possible.

Stiff clay soils are naturally unfavorable to the growth of trees, especially those newly transplanted. After heavy rains they bake on the surface and exclude both air and moisture, and become so hard that the roots are unable to perforate through them. Still these soils, by expending on them a considerable amount of well-directed labor, can be converted into good fruit soils. When well drained and pulverized to a proper depth, by the application of suitable manures and the mechanical working of the soil, they are well adapted for many varieties of fruit trees. Downing says: "In a moist climate, like that of England, fruit trees on a clayey loam would die of canker, brought on by the excessive quantity of water contained in the soil, but such is not the case under the high and warm temperature of our summers. The finest, largest and most productive plums and pears within our knowledge grow in sites on the North River where the soil is a stiff clayey loam, almost approaching a clay. Those fruits that on light sandy soils are almost worthless from their liability to disease and the attacks of insects, are here surprizingly luxuriant and fruitful."

Wet soils are, of all others, the most objectionable. Barry says: "Wet feet are not more injurious to human health than a wet soil is to fruit trees." A superabundance of moisture fills up the pores of the soil which should be open for the passage of air, without which proper food cannot be prepared to be taken up by the roots of the tree; noxious gases are formed, the tree becomes feeble, the bark mossy, and we soon see all the symptoms of decay. During the past winter and spring I have lost some fine healthy green gage plum trees from excess of moisture in the soil, caused by the outlet of a cellar drain. The same variety of trees, growing in similar soil in the immediate vicinity, but beyond the reach of the water from the drain, are yet quite healthy. It is the height of folly to plant an orchard on wet springy land; the result to a certainty will be the loss of both money and labor. It must be borne in mind that fruit trees will not thrive in all situations where willows will. But if the situation is such that there is sufficient fall of drainage, and the soil otherwise suitable, let it first be thoroughly drained and cultivated before planting, and there is then reasonable grounds to hope for success.

Strong deep loams, or such as are inclined to clay, but have a sufficient quantity of sand in their composition to make them easily worked, are naturally the best of all soils for orchards. Let such a soil be drained if it requires it, and there are few but would be benefitted by draining; let it be deeply and thoroughly cultivated by surface and subsoil ploughing, or trenching if necessary; and if possible, let a root, or other clearing crop, be taken off the land the previous

season. After the land is thus prepared the cultivator may safely proceed to plant, and should he fail he may conclude that the cause of failure is not in the soil of his orchard. It is true that the cherry and the peach will prove hardier on light soils than on heavy loams. It is also true that the apple, the pear, and the plum will be longer in coming to a bearing state on such a soil as I have just described, than on a light soil; because the growth of wood is more vigorous, and fruit buds are longer in being forward: but this delay is amply compensated by the healthy appearance of the trees, the heavy crops they will bear, and the great age to which they will attain.

I might here give an analysis of the inorganic matter contained in the different varieties of fruit trees, and of the component parts of soils best adapted for raising these varieties, but I consider it of little value, generally speaking, to the cultivator. None but a practical chemist, possessed of a good laboratory, can analyse a soil sufficiently correct for any practical purpose. And I consider it to be less necessary in this case, as I am convinced that such a soil as is described above, and which any common farmer will at once understand by the popular name of a "*strong, deep, dry, friable loam*," is particularly well adapted for all the varieties of fruit trees which it will be found expedient to cultivate in Canada West.

PLANTING.

Here is where disputes arise between the farmer and the nurseryman. The farmer says, "Those trees I got from you have turned out very bad; the half of them are dead; you had forced them in your nursery with rank manures; they were not hardy enough to withstand transplanting." The nurseryman very likely replies, "You didn't plant your trees properly, nor did you take sufficient care of them afterwards." Now in nine cases out of ten they are both right to a certain extent; neither of them have managed their part of the business properly. The fact is that the planting of fruit trees is quite a new operation to thousands who engage in it in this country. The majority of the farmers are emigrants from Great Britain and Ireland, where planting is exclusively considered the business of the gardener. There you would hear planters talking of preparing *borders* for fruit trees, which conveys the idea to one's mind of a bed of fine friable soil where the roots of trees could extend in all directions. Here planters will tell you they are going to dig *holes* for their trees, which conveys the idea of planting fence posts. To dig a hole a foot square, twenty inches deep, in a stiff clay soil, which is very often done, and tramp the tree to the bottom, fill in the stiff unbroken clay, and expect such planting to succeed, is surely ridiculous. The consequence is, the hole will fill up with stagnant water, the tenacious nature of the soil will not permit it to escape, and when the extremities of the roots put forth new and tender spongioles in search of food, they are immediately opposed by an impenetrable barrier of hard pan. How could any person expect to succeed with such planting as this? No wonder that nurserymen complain of careless planting.

But if the soil for the orchard has been prepared as previously described, it is a very simple operation to plant the trees, and plant them well too. After the ground is marked out where the trees are to stand, proceed to dig the holes about three feet diameter and twenty inches deep, taking care to lay the surface and friable soil to the one side, and if any hard or unbroken subsoil is in the bottom lay it to the other. Commence and fill in the bottom of the hole with the surface soil, keeping it in the form of a little mound, highest in the centre, until you consider the tree will stand about the same depth as it did in the nursery. Take your knife and trim off all the broken and bruised extremities of the roots, with a sloping cut of the knife outwards on the under side of the

root. Plant the tree on the centre of your mound, carefully spreading out all the roots with the hand. Fill in the remainder of the surface soil, packing it carefully among the roots with the hand. Lastly, fill in the subsoil, if any, or what is better, spread it over the ground, and supply the deficiency with other surface soil. I object to any kind of manure being put in the holes at the time of planting. Let the manure be thoroughly incorporated with the soil the previous season, or applied after rerooting is effected.

Immediately after trees are planted they should be "mulched;" a covering of rank half-decayed manure, three or four inches thick, should be placed in a circle four or five feet diameter around the tree. This keeps the roots in a moist state by preventing evaporation from the soil, and when rain falls it washes down the soluble parts of this mulching to the roots, which is much safer than applying manure in immediate contact with them.

All intelligent cultivators are of opinion that trees should be pruned at the time of planting, but as to what extent there is considerable difference of opinion. Some say that the top of the tree should be at once formed, that the branches should be reduced to four to six, and these cut back to within four or five buds of their base. It is argued that this severe pruning is necessary in order to restore the balance or proportion between the roots and branches, which has been disturbed by the operation of taking up the trees. There is no doubt but this theory is correct to a certain extent; no matter how carefully a tree has been taken up in the nursery, the roots will be less or more bruised and mutilated, and it seems natural enough to infer, that if the roots are much diminished they will become incapable of abstracting sufficient nutriment from the soil for the whole top.

But although this theory seems plausible enough at first sight, vegetable physiology tells us that leaves are necessary to the growth of roots; that there is a reciprocal action going on between them; and that by reckless pruning of the top the first season we run a risk of impairing the vital action of the whole tree.

The following, which I consider the most practical opinion I have read on the subject, is by Mr. P. Barry, formerly editor of the *Horticulturist;* he says: "We have had considerable experience on this very point, and we have come to the conclusion that it is much better to defer the pruning which is to produce the final and permanent form of the tree until the second year, or until the tree shews unmistakable signs of being well rooted, and in a condition to maks vigorous growth. But care must be taken to preserve and encourage as far as possible, young shoot with active buds on the parts where we intend to produce the new head; because old wood in which the buds have become in a measure dormant, does not throw out branches with desirable rapidity and vigour."

In cultivating an orchard, care must be taken not to injure the trees in ploughing amongst them; both the roots and the trunks of trees are often sadly mutilated by carelessness in cultivation. In my own orchard the trees are only from three to four feet high in the stem, a height which effectually precludes the plough from touching them.

But I plough the strips of lands between the rows both ways, as near the trees as I can safely go, leaving a square at each tree which I turn over lightly with the spade, taking care not to injure the roots When this operation is repeated annually and the grass kept out, it is less trouble than one would imagine—an ordinary spadesman will dress a number of trees in a day. It would be preferable to keep an orchard in fallow and green crops for a few years after planting; but as this cannot always be conveniently accomplished, a grain crop may occasionally be taken without injury, if a small circle is kept clear around each tree.

A great deal might be written on the diseases to which fruit trees are liable, the insects which prey upon both tree and fruit, and the remedies and preventives

which are recommended; but it would swell this essay much beyond the limits contemplated. And it is the less necessary, as I am decidedly of opinion that many of the diseases now complained of would nearly disappear if we planted none but sound, hardy and well grown varieties, that have been properly propagated and reared in the nursery. But any who wish to inquire into this subject will find full details in any of the popular works of the day on the cultivation of fruit trees.

I here subjoin a list of Fruit Trees which are considered sufficiently hardy in this locality to be worthy of general cultivation. Several of them I have tested myself.

APPLES.

Summer Varieties.—Red Astracan, Early Harvest, Early Strawberry, Golden Sweeting, Keswick Codlin, William's Favorite.

Autumn Varieties.—Duchess of Oldenberg, Hawthornden, Maiden's Blush, Porter, Pumpkin Sweet, St. Lawrence, Spice Sweet.

Winter Varieties.—Yellow Bellflower, Bourrassa, Fameuse, Hubbardston Nonsuch, Lady Apple, Melon (Norton's), Northern Spy, Pomme Grise, Red Canada, Ribston Pippin, Golden Russett, Seek-no-Further, Talman's Sweeting, Twenty Oz. Pippin, Vandervere, Wagoner.

PEARS.

Summer Varieties.—Dearborn's Seedlings, Rostierer, Tyson.

Autumn Varieties.—Andrews, Brown Beurre, Beurre d'Amalis, Beurre d'Anjou, Bergamotte Cadette, Belle Lucrative, Dix, Dunmore, Forelle (or Trout Pear), Marie Louise, Napoleon, Oswego Beurre, Urbaniste, Van Mons, Leon le Clere.

Winter Varieties.—Beurre d'Arremberg, Beurre Easter Doyenne d'Aiver d'Alençon, (or Noveau), Glout Morceau, Passe Colmar, Vicar of Winkfield.

CHERRIES.

The Herts and Bigarreaus appear to be all too tender for this locality. The Dukes and Morellos are more hardy, but many of them have proved tender with me also. The different varieties are all hardier when wrought on the Mahaleb Stock and cultivated as dwarfs.' In a dry gravelly soil they will also prove a little hardier; but I would not recommend the cultivation of this fruit to any extent here.

PLUMS.

Many of the finer varieties of Plums seems pretty well adapted to this section. It is true that the trees are comparatively short lived; but they arrive at a bearing state so early, and the fruit is so delicious that it is well worth the attention of cultivators to have always a young stock coming forward. Green Gage, Yellow Gage, Lombard, Magnum bonum, and several other varieties have done well; but Bluker's Gage, Coe's Golden Drop, Washington, and some others have proved too tender with me for our winters.

Neither Peaches, Nectarines, Appricots or Quinces will succeed in the open grounds here. Some few peaches have been raised on trees that were in close proximity, or trained to a wall. But unless for the sake of variety or novelty, I consider it useless to attempt to cultivate any of these fruits in this section.

PRIZE ESSAY ON FRUIT CULTURE.

BY R. B. WERDEN, A PRACTICAL CULTIVATOR, PICTON, PRINCE EDWARD CO.

In attempting to write an Essay upon Horticulture, I shall not endeavor to give such a scientific literary address as may be looked for, as I have not had access to such schools as exist at the present day; but have ever practised a life at the plough, in the pursuits of agriculture and horticulture. Therefore, I will attempt to impart the knowledge gained by practical experience in plain language, that can be understood by every farmer, much better than if it had been written in very scientific phraseology. 1st. It is one of the most essential points for every planter of trees to understand their nature and habits, before he can properly cultivate them; for multitudes of different species of plants or trees are spread over the surface of the earth,—not indiscriminately, and presenting the appearance of having been scattered at random; but each and all being especially adapted for their natural abodes, or, in other terms, their natural stations and habitations. The natural station of a plant is determined by the nature of the surface or of the soil in which it is found to thrive. Thus, some species confine themselves entirely to water, these being again subdivided into those of the marsh, the lake, the river, and the ocean. Other species belong to the land, and of these we find some peculiar to valleys, others to plains, and others to mountains; the latter being distinguished by the designation of alpine plants. Some again affect a clayey, some a chalky, and some a sandy soil; whilst others will thrive only in soils impregnated with soda and muriatic salt. Some plants are parasitical, taking root in the stems and branches of other plants. We also find that some plants flourish only when exposed to the action of strong light, whilst others prefer the shade, and others again spring up, even when altogether excluded from light, being formed for tenanting caverns and other dark recesses of the earth.

I mention these things to show that a tree is more at home when planted in a soil suited to its nature; hence, an apple loves best a gravelly loam, with a limestone bottom; a pear, a heavy loam; a plum, a clay; and a cherry, a sandy loam. Therefore, it is necessary that every man that plants a tree should choose or make the soil suitable to it. If the soil does not suit me, I dig a large hole, take my waggon, go and find such soil as I want, fill up the hole, and plant my tree in it. Some may say that this is too much trouble; but it is better to go to this expense, than to have a tree stand half a dozen years, like a bean pole, without any growth to it, and then die at last.

I will state the results of one of my experiments in tree planting. About twelve years ago, a nurseryman from Rochester made a large sale of trees. I purchased seventy-five from him, many others in the neighborhood also purchasing at the same time. I fitted a good piece of ground, set out my trees, and sowed the ground to peas, as many others did. By-and-bye, on came a severe drouth, and my trees began to look pale and sickly. I of course thought it was for want of water. I went and made a hollow around the collar or the root of each tree, then every night I would pour half a pail of water or more around each, leaving it to settle into the ground. The next day the hot sun would bake the ground as hard as a brick; thus, between the peas that covered the principal surface, and the baked ground around each tree, stopping all circulation of nitrogen, the food of the leaves, the death was hastened on, until only about a dozen were left. Wondering why my trees did not live, the next fall I went about to see how my neighbors had succeeded with theirs, from the same lot. I found, in every instance, that all trees set out in wheat, rye, oats, meadow, or,

in fact, almost any sowed fields, proved almost an entire failure; whilst those that were planted amongst corn, potatoes, or any hoed crop, lived and did well. Determined not to be beaten or outdone, the following spring I bought one hundred more trees, studied everything I could get hold of, showing how to plant them. I set them out in well-cultivated ground, dug holes eighteen inches deep, three feet across, filled them up with the top of the ground, planted my trees about one inch deeper than they stood in the nursery; spread the roots all straight, with one layer over the other, filling in the dirt amongst the roots, so that one would not lie on the other, or interfere by crossing each other; then tread the ground down gently. The next important thing is the mulching, which is a very essential point, and should never be neglected; for by this means many trees may be made to live, which otherwise would die. Mulching is done by putting about a wheelbarrow full of coarse manure around the tree; this keeps the roots cool and the ground moist; and if a drouth comes, the trees can be watered by pouring the water on the mulching, washing the manure down amongst the roots; this keeps the ground open and porous, and prevents it from baking. I likewise keep my ground planted in corn, potatoes, or some hoed crop, thereby giving a chance for the nitrogenous gases to escape and feed the leaves of the trees, and thus ensuring success. I plant my trees about twenty-five feet apart, and one in the centre of each square. This is too close to suit most farmers, as they say they cannot plough and sow the land, on account of the trees being in the way, and that there is likewise too much shade, which prevents their crop from growing. But what a false economy to destroy a tree that will produce five dollars' worth of fruit, for the sake of land to produce sixpence worth of grain. Now, this is just what I want: every man to get his orchard and trees in some such shape, that they will protect themselves. This is done by planting them close together, and cultivating the ground for a few years with some hoed crop, and in a few years more you are obliged to exempt the orchard from raising a crop. This is just what the trees require—to be let alone, before the ground is entirely exhausted. The tops soon get large enough to shade the most of the ground, thereby keeping it open and porous, protecting the trunks of the trees, and keeping the heavy winds from breaking them down, while the leaves covering the ground annually places them in the same conditions of growth as the trees in the forest. The best and hardiest of my trees are grown in this way, and with their limbs branched out from the ground,—forming what we call dwarf standards,—they have stood unharmed the past hard winters of 1855, '56, and '57, whilst other trees by their side, with long trimmed up trunks, are blighted and scalded, and the bark peeling from the body of the trees. This condition has been caused by the sudden extremes of heat and cold, in which the sap, having to pass the long distance of a tall trunk, becomes disarranged, and breaks out in the tenderest and most distorted parts.

The best way is to order your trees from the nursery when two years old; set them out in good ground, three or four feet apart; mulch them well; let the limbs grow from the ground; grow them there for two or three years. This forms a new set of fibrous roots, which prevent danger in moving them again. Or, if you will have long stems, you had better get seedling stocks, whip graft four or five feet high, or wherever you want the head of your tree; these make the hardiest bodies, and the least affected of any I have. Every farmer should have a small nursery, and a boy could whip graft them. When the tops are about the size of a pipe-stem, have your scion the same size, slant them off each one alike, tie a woollen yarn to hold them tightly together, then cover them with wax and the work is done. Some of my best and hardiest trees are grown in this way; every farmer can do likewise, thereby saving much expense and teaching their boys how to raise their own trees.

It is said by nurserymen that trees made from pieces of roots grow more clean and straight, and free from spurs and sprouts than others. True, most true, and that alone is enough to condemn them; for the eye of the practised physician sees in the tall, straight, luxuriant, branchless, thornless shoots so made, the same marked indications of premature decay and death that he sees in the tall, slim, fair-favoured, smooth-skinned consumptive boy, or in the pale-faced, girded and corseted maiden. It may be beautiful, but it is the wrong sort of beauty for this rough trying world. At all events, our most intelligent nurserymen are becoming fully awake to the fact that trees so made on this rich soil, whether apple or pear, will not live out half their days; and our farmers will learn it to their sorrow within twenty years, though many of them have found it out already.

Now, I suppose this process of deterioration does and will increase from one generation of trees to another; and if the same practice is continued as long with our apples as it has been with our cherries and pears they will become equally precarious and tender. I advert to this, however, as only the pre-disposing and constitutional course of the disease in the apple, and especially in the pear and cherry, and not as the immediate or proximate cause. Just as tight lacing and hard drinking are great pre-disposing causes of many diseases in the human frame, which would, perhaps, after all, never be developed, unless precipitated by some proximate cause in climate or diet. The proximate cause alone, without the predisposing one, may, and doubtless does in both cases, often produce the disease. But it is only when both are united that its ravages become general and frightful.

Another pre-disposing cause of disease is the absurd modes of pruning, even in the nursery, and ever after. A tree is naturally a tree: it is not a shoot or sprout, a mere riding switch or walking cane. Each branch above has its own root below, and whenever a branch is cut the corresponding root is proportionally paralized, enfeebled or killed. Besides, nature no more designed the trunk of a tree to be exposed to the hot sun than she did the body of a man, and she everywhere guards this important point just in proportion to the real danger. Hence, trees that will form trunks sixty feet long in the shade will not make them ten feet long in the sun. Hence, too, all our forest trees whose branches are quite high in Canada, around the burning prairies of Illinois throw their branches quite down to the ground, so as to screen the trunk entirely from the hot sun. I verily believe many of our fruit cultivators would kill all the forest trees in Canada if they were sent out with the pruning knife and hand saw to cultivate them; for there are few trees of any sort in the country that can endure the scorching rays of our hot August sun thrown directly at full length upon their naked trunks. This marked tendency in all our forest trees to screen their trunks has been observed by every passing traveller. So the young pear or apple tree screens its trunk, or prepares to do so, even in the nursery, but the jack-knife of the nurseryman will not let it. It, however, makes out to hide behind its fellows; and, as slaves in the hold of a prison ship keep each other warm, so they continue to keep each other tolerably cool, until at six feet high and half an inch through they are consigned to the orchard, as branchless as they are worthless. But now comes the tug of war. The hot sun scalds, and the poor tree tries to throw out a protecting branch or shoot, now on this side, and now on that side—but no, that inexorable jack-knife allows of no such liberties. Besides, the farmer's grandson may want to plough there sometimes, and the limb would be in the way, and so off it goes. So for the next five years the ill fated tree stands and scalds in the sun and whips in the wind, with a trunk, or rather a stem, about the size of a man's finger and six or seven feet long, and with a head in size and shape much resembling that of Ichabod Crane, of

Sleepy Hollow notoriety; but no sooner has this head contrived to afford, after all, a tolerable protection to the imploring trunk below, than it finds the fatal pruning saw of the cultivator whisking about its ears; till at last despairing both of shade and of peace in this world, it gives up the ghost and dies. And who blames it?—surely no feeling man can. Every cultivator must have noticed the extreme efforts of all trees, and especially the pear tree, to conform to the general law of our climate, and the habit of all our forest trees, by attempting to throw out side shoots year after year, until the bark becomes so indurate that it becomes impossible, and then it betakes itself to the last resort of throwing a crop up around from the root. Now, my dear friends, this is an intimation to you that a fruit tree does not intend to become a fishing pole nor a mere ornamental shade tree; but it intends to bear you some good fruit, and would do so if you would let it alone; it also intimates in the most modest and respectful manner that, under a hot summer's sun and a colds winter's freezing, its poor body wants some clothing as well as yours.

The necessary effects of this sort of mutilation upon the vital powers and longevity of a tree, are at some points apparent. In the first place it is a constant interference with the natural and healthful functions both of the top and of the root, filling the top and trunk with cavities and patches of dead and putrescent wood externally and internally, and the root with paralyzed and dead or dying roots and rootletts, all inviting and hastening every natural tendency towards disease—probably increasing from generation to generation. What constitutional effect it would have if all the fingers and toes should be cut off from a community of human beings through several generations and the sprouts trimmed if they attempted to grow again, we cannot say; but we can hardly think that it would not, in the end, enfeeble the natural constitution of the whole race, and at last introduce new and unaccountable organic or constitutional diseases. And is there not a strong probability that cultivated trees have been constitutionally as well as individually injured and enfeebled by a similar process. The philosophic world have paid little attention to the laws and conditions of health in trees compared with that bestowed upon animals, and of course but little is as yet certainly known of the former. It has generally been taken for granted that, because a tree could not be killed as easily as a man by external mutilation, that therefore it could scarcely be killed or injured at all. But recent observations tend wholly in one single direction; that is, towards establishing a close and hitherto unsuspected analogy between the functions and powers of life, both in the animal and vegetable world; and sound philosophy should lead us to suspect, rather than otherwise, that such analogies actually exist in multitudes of cases where they have not as yet been demonstrated. Another effect of pruning the trunks of trees severely, is the disturbance of the natural relations of the ascending and decending sap. The ascending sap goes up in the wood, the descending returns by the bark. It is near enough the truth for illustration to say that, the capacity of ascent is most nearly proportioned to the solid contents, while the capacity of descent is nearer to the superficial contents of the trunk or branches in all young trees. Hence the capacity of ascent increases as the square of the surface, or near that ratio, while the capacity of descent increases only as the surface. Hence, where trunks are exposed to the sun, or where plenty of light and air is found for the leaf, nature commences her work of dividing the trunk into branches near the ground, so as to increase the surface for the return sap, while the interior or contents are proportionally diminished, through which the current rises; and the richer the soil the greater the necessity of this increase of surface for the return sap, and hence the constant effort in such soils of trees to throw out branches from the trunk near the ground when young, and if prevented, around

the trunk from the root when old. Some years since I took a pear tree from a nursery six years old, its trunk was already trimmed up five feet; I attempted to make it grow in the form the nurseryman had given it by cutting off all the sprouts which continually were shooting out from the sides of the artificial trunk. The tree refused to grow vigorously upwards under the best care, and finally gave evident symptoms of paralysis in the top by the stunted, short, knotty shoots it would throw out, the most vigorous sort of shoots being from the side of the trunk. I suspected the cause, and allowed the shoots on the trunk to grow on it and on all my other trees which were inclining to the same condition; in less than two years they covered their entire trunks with limbs quite to the ground and then started into a vigorous growth throughout the whole top, which they have continued to this time, and are now loaded with fruit. At the time I began to allow the branches to grow on the above named tree, the trunk just below the upper branches measured nine inches round; all the branches together just measured seventeen inches round. Hence the surface for the return sap was at the crotch of the tree five feet from the ground, suddenly contracted in something near the ratio of seventeen so nine, while the passage of the ascending current could not have been contracted more than in the ratio of four to three, and, considering the diminution of the heart wood, probably was not at that point contracted at all. The necessary mechanical result is plain. The tree in a rich soil poured a full current of sap into the top and leaf, while every year its relative return surface was continually diminishing, and all the return sap, which at the time of measurement flowed over seventeen inches of surface, was at the crotch of the tree suddenly compressed into a surface of nine inches in circumference, and through this compressed surface it was compelled to run full five feet in the hot sun before reaching the root, without being refreshed by the new and fresh sap from a single side shoot. Of course all the vessels in the bark of the trunk were filled constantly with the necessary pressure from above with more sap than they could safely return to the root or deposit in the trunk, and were attempting to relieve themselves by throwing out side shoots; this not being allowed, they were gorged more and more as the leaf and top increased, until either organic ruptures—as in the case of the cherry tree—or the chemical action of the hot sun upon the gorged and impeded sap—as in the case of the pear—completed the catastrophe of obvious disease or death. I have just now measured the pear tree alluded to above, and find that since it has had its own way the relations of the superficies at the crotch, which is now lower down, have changed from the ratio of seventeen to nine to the present ratio of eighteen to twelve, showing the increase between the times of admeasurement to have been three inches on the stem to one inch on the branches above. The trunk of the tree is also now entirely screened from the hot sun by the side branches it has thrown out, and the sap in the stem is frequently refreshed by the return sap from these side branches. There is no appearance of paralysis in the growth of the top, nor of gorged sap in the stem fermenting in the hot sun, and spreading signs of disease on its outer bark, or diffusing them throughout the whole trunk and top of the tree. In a word, the tree has returned, or is at least fast returning, to a vigorous, natural and, therefore, healthful condition. In this country the blotch on the large limbs and trunk of the pear and apple tree in what is called the "blight," is always on the south or west side, or facing the sun at the hour of extreme heat. And wherever I have found it on the north side it was always near the ground, and on further and closer inspection I have found in such cases that the grain of the tree wound as it descended towards the north, and the injury after all was evidently done on the south-west side of the tree, at some distance above the ground, and the scalded and vicious sap there produced settled with the grain of the tree by an

obvious law, round and down to the north west side, where, like other dead matter, it accumulated to poison the bark or to freeze and peal it from the trunk the next winter.

It is obvious that rich soil or high culture with the plough, or with manure or excess of moisture, must materially and necessarily increase these dangers and evils by increasing the plethora and stagnation in the return sap. And if sudden cold is the ultimate cause of the final catastrophe, as some think, it is still obvious how in that case this high culture should hasten the final catastrophe. The case alluded to above, in connection with all other facts, convinces me that our blight and scalds, causing the bark to peel from the tree, are, in fact, produced by the hot sun in the summer, though not generally developed to the eye until severe cold occurs in winter, or perhaps not until the ensuing spring or summer. Meantime I apprehend that it will be found at last that the term "fire blight" or "frozen-sap blight," is not a specific name, but only a general term to signify analogous forms of disease arising from the same predisposing causes, but developed by a variety of proximate causes, like fevers in the human subject; and that, while we may postpone the catastrophe in a single case by attention to soil and culture, we shall never get rid of the constitutional tendency and latent debility resulting from the predisposing causes, until we study the nature of trees more, and apply the knife and hand-saw less; until, in a word, both in grafting and pruning, we learn how to interfere with nature as little as possible. The proximate cause then of blight here, both in the appple and pear, is the falling of the hot sun and extreme frost upon the unprotected trunk and branches of the tree, while the return sap is in an unnatural condition of plethora. It is not unlike in its predisposing or proximate causes to the disease known by many called the sun stroke in the human system. I think the reason of so much pruning being practised in this country is, that so many of our cultivators have come from England, where they have a cloudy and a moist climate; hence it would be necessary there to thin out the top to admit of light and sun in order to ripen the fruit. But not so here, where there is such extreme heat, and sunshine enough to ripen fruit in the thickest shade. Therefore, I only trim enough to keep out all cross limbs and those that might rub against each other.

Much has been said about the time of trimming fruit trees: it appears to be a matter of opinion with many, some say one time and some another; but with my long experience I am satisfied that the best time is the first of March or in June, when the sap flows the least and the wound dries up and heals the quickest. The best way I have found to protect trees with long trimmed up trunks, is to wind them with a straw rope, say two inches thick. This is done by commencing in the crotch of the limbs and winding around until you get to the ground, when the end can be fastened by a stake. In this way I have had one winding last for four years without being removed, and when taken off the rough bark all pealed off, leaving the inner bark smooth and healthy. This is done with a trifling expense; the operator being careful not to wind it too tight, that the tree may have room to grow in case it is not removed for three or four years. I must advise every one to do likewise, and save their trees in a healthy state.

WASHING TREES.

This I find to be very much neglected, but it is one of the most essential operations for preserving trees. I have tried many things, but find nothing so good as ley; this keeps the bark soft and smooth, prevents its cracking, from being hide bound, likewise destroying the bark louse and all insects—for large trees the ley may be strong, then weakened according to the size of the tree.—One of the best fertilizers I ever found for young trees to make them thrifty and

healthy, is soap suds from the weekly wash; let it stand two or three days until it sours, then apply it every three or four weeks, about a pailful at a time, not forgetting to throw it up on the body of the tree, which will help to keep the bark soft and prevent it from cracking.

BEST TREES TO PLANT.

Out of a hundred or more varieties such as are named in the nurseryman's catalogue, which I have tested and tried, the following have proved with me to be the most hardy and profitable: for early apples, the Red Astrachan, Harvest, Red Streak, Sweet Bough and Golden Sweet; for Fall use, the St. Lawrence, Alexander, and Duchess of Oldenburgh; for Winter, the Ribston Pi pin, Golden Russett, Northern Spy, Seek-no-Further, and Bailey's Sweet; these have stood unharmed the past hard winters of 1855, '56 and '57. Of every one hundred trees I would recommend two-thirds to be of these kinds, the remainder can be filled up, for variety, according to taste, or for experiment. I am trying a number of others which I think hardy and very valuable, if they prove so I shall speak of them on some other occasion. As for Dwarf Apple Trees, I feel so well satisfied that they will give good satisfaction, that I recommend every man that has ground only for a garden to fill it up with these trees; they can be planted every eight or ten feet apart, with currants, raspberries and strawberries between them, and my word for it, it will be more profitable than 50 acres to agricultural purposes. Trees can now be seen in my garden not over three or four feet high, loaded with the best of fruit, thus making them both profitable and ornamental.

THE PEAR.

What I have said about the cultivation of the Apple will apply equally to that of the Pear; therefore it will only be necessary to mention a few of the varieties that have proved to be the hardiest and the most profitable: The Flemish Beauty has withstood the past severe winters entirely unharmed; the Bartlett, Oswego Beurre, Seckle, and Vicar of Wakefield have been slightly hurt but have stood the best out of 70 varieties which I have had in cultivation. The Winters of 1855, '56 and '57 badly injured the tops of many of my pear trees, and entirely killed some of them; but what might we expect of pear trees when apple trees, and even forest trees, were killed by the same severe season. Let us have a little patience. I am of opinion that you will not see so great a disaster for the next half century. My trees all came out last Spring without the slightest injury from the Winter. The Dwarf Pear is very desirable, it has succeeded very well with me but is not so profitable as the standards. The best kinds to be worked on quince stocks for dwarfs are the Bond and Jersey, Bartlett, Beurre, Aiel and Easter Beurre.

THE PLUM.

The cultivation of the Plum has become nearly extinct in many places, on account of the two disastrous evils we have to contend with, the Black Knot and the Curculio. Notwithstanding that many have given up in dispair, the course I have pursued has succeeded remarkably well for the last few years. Although that little pest the curculio bade defiance and baffled my skill for several years, destroying large and beautiful crops of plums that were in my garden. I read and searched all of the horticultural works for a remedy, but found all doomed to the same fate; although many premiums were offered and hundreds of dollars were expended for his destruction, yet he laughed at their snares and mocked at their calamities. Many remedies came out, but all to no purpose. I thought of making one more effort before giving up this delicious fruit, therefore I handed him over to the ravages of the hogs, and the experiment proved successful. I went to work and made me a yard adjoining my barn yard and hog pen, I

moyed what trees I could out of my garden and set them out, in all twenty.—When they commenced bearing I opened the fence and let in my hogs, shortly after the trees were out of blossom; throwing some straw over the ground and scattering the feed all over to keep the hogs to work, also admitting the hens, which will pick up every curculio that makes its appearance and the hogs will eat every plum that drops to the ground that has the worm in it, thus giving them no quarter, and thereby ensuring a full crop of plums. These trees at this moment are so loaded with plums that the limbs have to be propped up on every side to keep them from breaking, and are the admiration of every one that visits my grounds, and they have continued to do so for the last four years; enough to convince me of the certainty of the experiment, for the trees in my garden have not half a crop, they being destroyed by the insect, though not more than ten rods from the others. Hence every man that keeps a hog can have his plum trees in a yard adjoining the pen secured from the curculio. For there is not another tree this year within twenty miles of my plum yard in which the crop has not been destroyed by these depredators, thereby showing the plan I took to protect mine to be effectual. The Black Knot is another fatal disease if not checked. It is generally supposed that the knots or swellings are caused by an insect, and that this insect is the curculio has been very frequently imagined. My own experience, however, goes to prove that the idea is far from being a correct one, as there really is no evidence to substantiate it. It appears evident therefore, in fact, I may say conclusive, to my mind, that the excrescence is not caused by the curculio; because, supposing that insect to be prevalent here, it is not at all probable that they would attack the bark in preference to the fruit, as the knots continue making their appearance as long as the sap is in motion. I have until lately been under the impression that it might be caused by some other insect. I therefore watched the trees quite closely but have never discovered any insect feeding upon, or depositing its eggs in the bark of the tree. The fact that the larvae or the eggs of one or two insects are sometimes found in the knots is no evidence of the insect being the cause of the disease, since the larvae or the eggs, as the case may be, are not to be found when the swelling first appears, nor until it has become quite large and pulpy. I have in consequence arrived at the conclusion, that the disease is not attributable to the attacks of an insect. It is no more nor less than an impure state of the sap, caused by the introduction of some improper food of a virulent and contagious nature into the circulation through the agency of the roots or leaves. Or it is an ulcerous habit peculiar to those varieties of the plum with colored fruit, which makes its appearance in the infancy or at an advanced age of the tree, according as it may be affected. In support of these views I shall state the following facts: 1st. Suckers taken from the roots of a badly diseased tree will, without exception, eventually become diseased. On the other hand, seedlings grown from the seeds of a healthy tree will rarely be affected, unless contiguous to trees in an unhealthy state. 2nd. Buds taken from diseased trees and inoculated on healthier stocks have become so much affected as to be cut down entirely the first year after being operated upon; while in other cases where the trees from which the buds for inoculation were taken were in a healthy state, quite the reverse was the result. They remained healthy and sound; this I have tried repeatedly.

Now for the remedy. Give a tree good cultivation in clay or limestone soil, and keep cutting the knots off as fast as they make their appearance, covering the wounds thus made with Mr. Downing's solution of gum salve, at the same time freely watering with copperas dissolved in water. This may be considered rather strong, but the tree will bear it; it is a very powerful disinfecting agent. I have used it with great success on trees which were given up for dead. It possesses some potent vital principle with which I am not sufficiently versed to

be able to explain it, I became acquainted with it some years since in perusing an extract taken from a French Journal. I have since used it on sickly trees, which have proved its extreme efficacy in restoring them to their former health. If every cultivator strictly pursues this course there is no danger of not securing an abundant crop of plums; but through carelessness and neglect the opposite will be the result. The best and most profitable plums out of 50 varieties I have tried are the Princess Gaige, the Yellow Egg, Quane's Purple, Green Gaige, Dennison's Superb, Coe's Golden Drop. These I recommend as having proved to be the most profitable with me.

THE CHERRY.

I shall say but little about the cultivation of the finer sorts of cherries, as I find them too tender, like the peach, for this cold and harsh climate, although I have raised some fine fruit. But generally, by the time they get large enough to bear, the bark begins to crack and peal from the bodies, and continues doing so until the trees are entirely dead. This is the result of a disease the cherry tree is subject to, the cause of which is unnecessary to explain at present, but the best remedy is to wind them with straw as referred to before, especially if they have long trimmed up trunks. But since the dwarf trees have come into notice I have been trying the Dwarf Cherry, allowing the limbs to grow from the ground; this protects their bodies as before mentioned, and keeps the bark from cracking and pealing. But these must be of the Morello kinds, as they are more hardy than the Bigarreau sorts and more desirable for dwarfs, as they are kept easier in the form of a bush, not being such vigorous growers.

PEACHES.

My experience in Peaches has proved almost an entire failure, as the hard winters would cut them off as fast as I could set them out, except a few trees that I have had covered up with boards every winter until the last, they being now too large; every other protection failed. I may get a few peaches from these trees yet, but they are not worth the trouble of cultivating here.

THE GRAPE.

Much has been done and is now doing in the cultivation of the Grape, to get varieties that are profitable and hardy enough to stand our severe climate. The Isabella is the most cultivated but does not more than half the time ripen its fruit satisfactorily. The Sweet Water has proved the best with me; small vines are heavily laden with fruit. Both this and the Isabella must be laid down in Winter and covered over for protection. The Clinton is hardy, needs no protection, bears well and is very desirable for arbours. The Diana Concord not sufficiently tested yet, but highly recommended. There is no danger in trimming the grape too much; every Fall all of the present year's growth should be cut off within two buds of the old stock, as the fruit next year is borne on the present year's growth.

CURRANTS.

As every one knows how to cultivate the currant, I shall only recommend those that have proved the best with me. The Cherry currant, very large red, White Dutch and the White Grape, the latter being very desirable for making wine, and the best in cultivation for that purpose. The currant, like everything else, pays for good cultivation.

THE GOOSEBERRY.

I have about given up this fruit as it always mil-dews with me, although some of my neighbours have succeeded admirably well with it.

THE RASPBERRY.

Very desirable, and should be in every garden. The Red Antwerp, White Antwerp, Falstaff and the Four Seasons or Perpetual, have proved themselves with me to be the best.

THE STRAWBERRY.

Every man that has a garden should have his patch of strawberries. They are the easiest of cultivation of any fruit; they can be planted almost at any time of the year, but in September is preferable, they then will get well established and bear some the next year. Keep your ground clean and moderately rich, plant anew every three years, and they will well repay you with a delicious dish to treat your friends with. The most desirable and hardy kinds that I have tried are the Early Scarlet and the Iowa.

I should like to have dwelt more particularly on the cultivation of the small fruits, but considering that I have already taxed the reader's patience too much, I will draw my remarks to a close by making a few general observations to my brethern by way of encouragement. Who does not like fruit and flowers? They embellish our gardens, they give a more brilliant lustre to our festivals, they are the interpreters of our affections, they are the testimonials of our gratitude, we present them to those to whom we are under obligations, they are necessary to the pomp of our religious ceremonies, and they seem to associate and mingle their perfumes with the purity of our prayers, and the homage which we address to the Almighty. Happy are those who love and cultivate them. The ancients paid particular attention to them; they were in great request at the entertainments of the wealthy, they were scattered before the triumphal chariots of conquerors, they formed distinguished insignia of many divinities, they glitter as gems in the diadems of the seasons, and constitute the mystical language of poetry. We are told that Descartes prosecuted with equal ardour astronomy and the culture of fruits and flowers. The great Conde devoted his leasure hours to that delightful pursuit, and the vase of flowers was daily renewed upon the table of Lord Bacon while composing the volumes of his sublime philosophy. In the cities of Europe flower markets for sale of bouquets and ornamental plants are as common as those of fruits. In this new world these delicate children of the sun have not received that attention which indicates the highest state of civilization; but a taste for horticulture and floriculture is increasing throughout the Province and ornamental plants embellish the country seats of the opulent, and the dwellings of honest industry. The flower garden is one of the best means for keeping your children at home and it invites them to industrious and sober habits. And whilst they are admiring the perfection of the flowers, it will teach them how through nature and by nature to look up to nature's God. Every fruit tree is a preacher to them in the cause of temperance and healthful habits, keeps them from being allured into the snares of idleness and vicious indulgence, tending to make them useful members of society and offering them the delightful hope of each sitting under their own vine and fruit tree and enjoying the fruits of their labour.

ESSAY ON PRACTICAL AGRICULTURE.

SHOWING TO WHAT EXTENT IMPROVED SYSTEMS OF HUSBANDRY MAY BE INTRODUCED INTO THIS PROVINCE, WITH PROFIT AND ADVANTAGE.

BY JOHN HOBSON, A PRACTICAL FARMER, GUELPH.

It will, readily, I think, be conceded that agriculture is the most important of all the sciences, as ministering to the necessities of mankind. How many and important are the interests involved in a good or bad crop of corn in this Province. Those of the grower, perhaps, the least of any, as he is supposed to receive a price in proportion with the produce. Not only are all classes of manufactures affected by it; not only is a whole population, individually as consumers, interested in it, but the monetary affairs of this Province are bound up with it. And in making this assertion, I mean not in any manner to undervalue the great national advantages which must always attend an extended system of commerce, whether it be external or internal. The prosperity of agriculture and commerce depends on the same foundation, and the one cannot reap any advantage from the depression of the other. The agriculturist desires the prosperity of the trader; for from this cause his products become more in demand, and consequently are more valuable in all the great markets of consumption.—But the prosperity of the agriculturist is of equal importance to the manufacturer, and of greater consequence to society in general, in as far as his labor lasts for ages, whilst that of the manufacturer is ephemeral, depending often on the breath of fancy, and possessed of no real solidity. Considering the beneficial effect which an improved system of husbandry must ever have on the affairs of this Province, we ought to use our utmost endeavors so to improve that system as that a larger amount of produce may be raised upon the soil, and at the same time with profit to the farmer. Without any further preliminary remarks I will proceed to the subject under consideration.

ON THE GENERAL MANAGEMENT OF THE FARM.

The importance of an orderly systematic mode of managing every concern is sufficiently apparent; the points which chiefly demand a farmer's attention are the accounts of money, and the regulation of labor.

ON KEEPING ACCOUNTS.

It is a maxim of the Dutch that no one is ever ruined who keeps good accounts. These are not so common among farmers as they ought to be, persons employed in other professions being generally much more attentive and correct in this respect. It rarely happens that books are kept by farmers in a minute and regular manner, and the accounts of those occupying even a large estate, and consequently employing a great capital, are seldom deemed of sufficient importance to merit a share of attention equal to that bestowed by a tradesman on a business of not one-twentieth part of the value. There is certainly some difficulty in keeping accurate accounts respecting the profit and loss of so uncertain and complicated a business as the one carried on by the farmer, which depends so much on the weather, the state of the markets, and other circumstances not under his control. But the great bulk of farming transactions is settled at the moment, that is to say, the article is delivered, and the money instantly paid, so that little more is necessary than to record these properly. In regard to the expenses laid out on the farm, an accurate account of them is perfectly practicable, and ought to be regularly attended to by every prudent and industrious farmer. By examining these, a farmer is enabled to ascertain the value and extent

of the expenses he has incurred in the various operations of agriculture, and to discover what particular measure, or what general system contributes to profit or occasions loss; the principal of economy may thus be introduced into the management of a farm, and les-ening of expense effected. Experience shews that men situated like a great many of the farmers in this country, who are their own masters, and yet have very little capital to manage or to lose, are very apt to contract habits of irregularity and procrastination. Now, nothing can be conceived better adapted to check this disposition than a determination to keep regular accounts. The very consciousness that a man has to make entries in his books of every thing that he does, keeps his attention alive to what he is to do, and the act of making those entries is the best possible training to produce active and pains-taking habits.

REGULATION OF LABOR.

The farmer ought always to bear in mind the importance of order and system; much may be effected by skill and industry, but even these will not always ensure success without judicious arrangement. With it a farm furnishes an uninterrupted succession of useful labor during all seasons of the year, and the most is made that circumstances will admit of, by regularly employing the men and teams at such works as are likely to be most profitable. Under such a system it is hardly to be credited how little time is lost, either of the men or teams, in the course of a whole year.

THE SOIL—THE MODE BY WHICH THE PRODUCTIVE POWERS MAY BE INCREASED AND RENDERED PERMANENT.

Before a soil can properly be denominated fertile, it must be so constituted as to contain a sufficiency of moisture in dry seasons, and nothing more in wet than is necessary to give a sufficient supply to the plants, so as to keep them always in health and vigour. At the same time the texture of the soil must be such as to give an opportunity to the roots of the plants to ramify in every direction in search of nourishment, thereby giving them the means of easily abstracting the elements of vegetable life. A soil of this nature, from its mechanical arrangement, will easily admit of a constant supply of atmospheric air, which is essentially necessary to make and keep it permanently productive, because plants growing in such soil have not only the power of easily abstracting every particle of nourishment which it contains, but such a soil is eminently favorable to the decomposition of the water, the air, and the organic matter which may be in its composition by means of the insensible fermentation it gives rise to, and readily gives up a constant supply of the elements thus involved for the growth of plants. The relative proportions in which the primitive earths require to be constituted so as to obtain the greatest extent of fertility, will, of course, vary according to circumstances. To obtain the necessary proportions of the primitive earths in every case would be a work of great difficulty, but in many instances much capital might be profitably expended by those who have a permanent right over the land, in supplying any deficiency which may be in the composition of the soil, and thereby bringing it to a greater degree of fertility. It may be observed, that the material necessary for this permanent improvement are seldom far away, and it ought never be lost sight of, that these primitive earths, when not amalgamated together in greater or less proportions, are of themselves barren and unproductive, and accordingly that much of the land throughout this country is rendered more or less so in proportion as the constituent parts diverge from the standard of fertility, and as a consequence a greater or less supply of manure is constantly required to supply any deficiency which happens in their composition. There is no doubt therefore, that the productive powers of soil might not only be greatly increased and rendered permanent, but

the expense of cultivation also greatly diminished. Not only so, but the vegetables and plants grown upon soils would be more sound and of superior quality to those not so favorably situated; and their annual production both in quantity and quality would also be rendered more regular and certain.

MANURES.

That mixture of vegetable and animal matter usually termed farm-yard dung, being by far the most important and valuable manure for the farmer, we shall in the first place consider how much the quantity and quality of this necessary material might be increased and improved by the introduction of a more judicious system of management. It may be considered worthy of remark, that a great part of what is usually denominated farm-yard manure, is, under the ordinary system of management, of inferior quality, and that the soil not unfrequently derives but little benefit from the comparatively worthless article so frequently applied to it. Agriculturists ought to use strenuous exertions to adopt such steps as may prove conducive to the improvement of that manure. Such improvement is easily accomplished under judicious management, and more especially so on lands capable of raising turnips. The grand object in view is to improve the quality as well as to increase the quantity of those manures immediately under consideration, and in the first place, it ought to be observed, that one great error in the preparation of farm-yard dung originates from the too common practice of allowing the dung of different descriptions of animals to be kept in separate heaps, where, with the exception of horse dung, it seldom undergoes fermentation, and in applying it to the land in the same unmingled state. The process of fermentation in dung, previous to its being applied to the field, is indispensable, otherwise its fructifying powers are, for the first season at least, rendered comparatively worthless. Stable dung, however, soon sustains damage from an over degree of heat, when allowed to remain in such heaps without any other intermixture, and hence becomes what is provincially called fire-fanged, being thereby deteriorated at least fifty per cent of its intrinsic value. But, with the view of accumulating as great an addition to the dung-hill as possible, horse-dung is found an essential requisite to promote putrefactive decomposition, so that in addition to it, and the dung usually produced in the yards, the rubbish of a stack-yard, potato-stalks, &c., in short all animal and vegetable substances, may be advantageously mixed together. Under a proper course of farm management, it is of much importance to give attention to the descriptions and nature of different manures, that may be effectually mixed together and have an equal degree of fermentation kept up throughout the heaps or piles. It is preposterous to keep dung unapplied for more than one year, for the obvious reason, that its strength is gradually diminished, while its bulk suffers proportionally. In every case manure ought to be turned, which can be done either in the yard or by reserving a small piece of ground adjacent to the home steading as a depot. A dry sheltered spot ought always to be chosen as the site of such depots. The latter mode is the best if teams can be spared at the proper time, for by that means the manure can be carted from different parts of the yard, according to its nature and quality, and can be spread and levelled regularly over the heap; the manure when thus carted may be laid up in allotments to five or six feet in height, and, to avoid compression, it is highly proper to prevent the carts from being driven up on the heaps unless when the materials are rough. Before fermentation has far advanced, it is of much importance to prevent the evaporation of the rich gases, by spreading a quantity of earth or ashes over the top of the heap, and if the sides are made sloping they may also receive a coating, for the purpose of preventing the finer and more subtle of the fertilizing qualities of the manure from escaping; this

will not only add to the quality but also enable it to retain its unctuous and enriching properties. The proper time for turning manure should be duly considered by the farmer, as it depends principally upon the time it is going to be used, and the quality of materials.

LIME, BONES, GUANO.

These manures can seldom be used with advantage in this country, on account of their expense, with the exception of lime, which may in some localities, where it can be procured cheap, and at a short distance from the farm, be used with profit.

DRAINING.

I consider draining one of the most important branches of husbandry; without it manure, seed, and labor are lost. Much has been said and written on this subject since Mr. Smith of Deanston's improvement first attracted attention in Great Britain, but still there is much ignorance prevails amongst farmers, whose interests imperatively demand that they should make themselves acquainted with improvements which promise such important results. The spring and summer of 1857 cannot fail to have taught farmers to their cost, the evil effects of superabundant moisture, as there was a large portion of land, owing to its naturally wet state and the quantity of rain which fell at the time of spring seeding, which could not be sown till very late in the season, and consequently, as might be expected, the crops upon such land were almost a total failure. Although I do not think that draining can be carried on at the present time in Canada to such an extent as it has been done in Great Britain for the last few years, yet at the same time on the great bulk of the farms of this country there are portions which would pay the owner a high rate of interest for money expended in effecting this improvement, and in many cases in a few years, with the extra quantity and superior quality of the crops grown, would more than repay the whole amount of capital expended. I think it is unnecessary and out of place, to enter into any details as to the best system of draining, as there are so many able works written upon it, which it would be well for any person to study before commencing operations of any considerable extent.

ON THE PRINCIPLE OF ROTATIONS.

That a regular system of rotation should be introduced on all farms, is what no intelligent farmer will deny, but at the same time it is impossible to recommend any system of rotation which would answer, equally well, upon all lands, on account of the difference of soils, and situation in reference to markets. For plants which might grow luxuriantly upon some soils, could not be raised without expense and trouble on others of a different nature, and crops grown near a large town may return a large profit, owing to the little expense incurred in sending them to market, and by being able to keep the land in a fertile condition, with manure purchased at a low price, when, if the same system were followed, at a considerable distance from a good market, it would be ruinous. But there are certain rules which may be laid down for the order in which the crops of plants in cultivation in a country should succeed one another on the same ground.

1st. Crops, consisting of plants of the same or similar species, should not follow in succession, but should return at as distant intervals as the case will allow.

2nd. Crops consisting of plants whose mode of growth or cultivation tends to the production of weeds, shall not follow in succession.

3rd. Crops whose culture admits of the destruction of weeds, should be cultivated when we cultivate plants which favor the production of weeds, and

further, crops whose consumption returns to the soil a sufficient quantity of manure, should be cultivated at intervals, sufficient to maintain or increaae the fertility of the farm.

4th. When land is to be laid to grass this should be done when the soil is fertile and clean.

These rules may be applied to the plants which form the subject of common cultivation in the fields. The plants commonly cultivated on a large scale in this country, are the cereal grasses, chiefly for their seeds; certain leguminous plants as the pea; plants cultivated for their fibres, as the flax and hemp; for their leaves, roots, and tubers, as the turnip, the mangold wurzel and potato; and certain leguminous and other plants, for forage and herbage, as clover, timothy grass and tares. The plants of these different classes may be described as follows:

1st. One class of these plants consists of the cereal grasses, chiefly wheat, barley, oats and rye. All these are in an eminent degree exhausters of the farm; they are all suffered to mature their seeds, and are wholly or partially carried away from the farm. Further, from the manner of their growth and mode of cultivation, they all tend to favor the production of weeds. For these reasons, and on the general principle that plants of the same or similar kinds should not follow in succession, the cereal grasses should not succeed one another, but should be preceded or followed by some crop which either exhausts the soil less or admits of a more perfect eradication of weeds.

2nd. The leguminous plants cultivated for their seeds, as the bean and the pea, are all exhausters of the soil; they ripen their seeds, and these seeds are, for the most part, carried off the farm. some have supposed that they are less exhausters of the soil than the cereal grasses, but the essential difference between them when considered with relation to their effect upon the soil, is, that from their growth and the manner of cultivating them, they are greatly less favorable to the production of weeds than the cereal grasses; by their broader system of leaves they tend to stifle the growth of weeds more than the cereal grasses.

3rd. Hemp and flax, which are cultivated chiefly for their fibres, are exhausters of the soil; they are suffered to form and ripen their seeds, and their stems afford no return of manure to the farm.

The next class of plants, from the large returns of manure which the consumption of them affords, may be regarded as enriching or restoring crops.

1st. The turnip, the rape, and other plants, cultivated for their roots and leaves, and consumed upon the farm.

2nd. The potato, the carrot, the mangold wurzel, and other plants cultivated for their tubers and roots, and consumed upon the farm.

3rd. The leguminous plants, the clover, the tare and others when cut green for forage and consumed upon the farm.

Knowing these, the general characters of the cultivated plants, we have in devising a rotation, to cause the restorative and cleaning crops, so to alternate with the exhausting crops, as that the land may be preserved fertile aud clean. Further, when we find that land cannot be sufficiently cleansed by means of cleaning crops, we must make use of the summer fallow, and again when we find that land requires rest, we may lay it down to grass for a longer or shorter time, taking care when this is done that the land shall be in as fertile a state as circumstances will allow and free of weeds.

FALLOWS.

The expediency or inexpediency of pulverizing and cleaning the soil by a bare fallow, is a question that can be determined only by experience, and not by argument. No reasons, however ingenious, for the omission of this practice can bring

conviction to the mind of a farmer, who, in spite of all his exertions finds at the end of six or eight years that his land is full of weeds, sour and comparatively unproductive. Drilled and horse-hoed green crops, though cultivated with advantage on almost every soil, cannot, owing to the shortness of the summer in Canada, be cultivated so extensively as to do instead of a summer fallow, although no farmer will find it to be a loss to cultivate as much ground for turnips as he can do properly without neglecting other operations of his farm, for by that means he can keep his cattle in better condition and make an increased quantity of manure, which, as all farmers know, will insure an increased quantity of produce. The operation of fallowing as frequently practised is a very different and comparatively useless, or at least ineffectual operation, to what it ought to be. Instead of cleaning the land of dirt and weeds, it often leaves it very little better than it was before the operation was commenced. When land is already free from weeds and fallowed for the purpose of giving it rest, I consider it the best mode to plough in green crops, such as clover, buck-wheat or peas, and by that means in a favourable season you can generally insure a good crop of wheat.—When land is full of weeds it ought to be thoroughly worked. If this be done with the plough and harrows it ought to be ploughed at least three times, and oftener if time can be spared. The cultivator or scarifier cannot be too highly recommended as a useful implement for working fallows, and also for land after being ploughed preparatory to sowing.

SUB-SOIL PLOUGHING.

By means of a subsoil plough the subsoil or under crust of the earth is broken and pulverised, say to the depth of from twelve to eighteen inches; the object to be attained is to increase the gradual healthful supply of food and moisture by the earth to the roots of the crop in the degree most grateful to its habits. The chemical effect of pulverizing and breaking up a subsoil is certainly advantageous to the plant in two ways: 1st. It renders the soil penetrable to a much greater depth by the roots, or minute fibres of the plant, and consequently renders more available any decomposing matters or earthly ingredients, which that substratum may contain; and secondly, it renders the soil much more freely accessible by the atmosphere, rendering in consequence a greatly increased supply not only of oxygen gas to the roots of the plants, but also yielding more moisture; which moisture, let it be remembered by the cultivator, is in all weathers as incessantly absorbing by the soil as it is universally contained in the atmosphere, abounding most in the latter in the very periods when it is most needed by the plants, that is in the warmest and driest weather. This property possessed by the soil of absorbing moisture from the atmosphere, and the importance of increasing that power by pulverizing the soil, is not nearly so well understood as is desirable, although the farmer has the means of convincing himself of the fact by the most simple experiments; a free access of air to all soils also adds to their fertility by promoting the decomposition of the excretory matters of plants, which otherwise would remain for a longer period, to the annoyance of plants of the same species; and it is fortunately in our power to prove that a thorough subsoil ploughing is a permanent improvement of the soil, and is productive of continued good results for a series of years after the operation has been performed. Any person may have occasion to notice how slowly ground which has been once disturbed acquires its original degree of solidity, neither are the good effects of this deep soil cultivation merely dependent upon the effects of the manure being more deeply placed or more widely diffused in the soil. The mere loosening and extending the pulverization of any soil is certain to render that soil more productive. Such, I think, are the reasonable advantages derivable from the subsoiling system; benefits which on most soils must be more or less

easily within the reach of the cultivator. It possesses, too, the great advantage of improving the land from its own resources; no expensive artificial fertilizer need be procured; to enable the farmer to render that portion of his land productive which he may have hitherto neglected he has only to avail himself of the advantages which the improved construction of agricultural machinery now offers for his service.

IMPROVEMENT OF BREEDS OF CATTLE.

Though it is extremely desirable to bring the shape of cattle to as much perfection as posible, yet profit and utility ought not to be sacrificed for mere beauty which may please the eye but will not fill the pocket, and which, depending much upon caprice, must be often changing. What particular breed is best adapted for this country is not an easy matter to say, when farmers and breeders who may be considered well qualified to judge differ so widely in their opinions, though I believe at present the preference is decidedly in favour of the improved short horns; and certainly much praise is due to enterprising agriculturists who have within the last few years imported so extensirely from that breed. A few hints upon the best method of improving the breeds of cattle, I think will not be out of place.

Having fixed on the kind of breed which is best suited to the circumstances of the farmer, the practical question to be determined is the manner in which a good stock of the breed is to be obtained, or the old one improved. There are three methods which may be adopted for this purpose.

1. The entire change of the existing stock, and substitution of a different breed, females as well as males.

2. The retaining of the old breed, male and female, and improving them by breeding from the best animals of the same breed.

3. The improving of the breed by crossing with males of a different breed.

As the last method is what is generally adopted in this country, I shall confine my remarks altogether to it. When a cross is made, it should be with a male of superior breed, and in this case the first cross will be almost always a good animal. To secure the full benefits of the cross, however, we should not resort to the males of an inferior stock; because it might be found that, while we had injured the original breed, we had not substituted a better in its stead. The general rule, therefore, should be to cover again the first cross with a superior male of the same breed, and so on, until the good character of that breed become permanent in the progeny. In crossing, the essential characters of form are imprinted on the offspring by the male, and it is surprising in how great a degree this imprinting of better characters takes place when a male of superior breeding is employed. A first cross between a short horned bull, for example, fully bred, and a very ordinary cow, produces often a very fine animal, with an extraordinary aptitude to fatten. Many of the very fat animals that receive premiums at the cattle shows in this country are extreme crosses of this kind.

HOUSING AND FEEDING CATTLE.

There is no branch of husbandry that stands more in need of improvement than this. Not only does the interest of the farmer imperatively demand that his cattle should be better attended to, but humanity calls for it. Go into many farmer's cattle yards in the spring, and you will find ample proof of what I assert; instead of the fine sleek animal which might have been seen in the grass fields a few months before, you will see but a semblance of it merged into a mere mass of skin and bones. It should be particularly remembered by farmers that cleanliness and proper housing are quite as necessary as food that cattle may thrive properly. It is a well known fact, that animals will do better with a smaller amount of food when comfortably housed than when exposed to the

rigor of the weather with the best and greatest amount of fodder that can be given them. It ought to be well known, that when cattle are exposed to the inclemency of the weather, a great portion of what the animal eats goes to sustain the natural temperature of the body, instead, as it otherwise would do, of forming muscle and fat. Hence it is the interest of the farmer to provide clean warm and comfortable buildings for his stock during winter. It is of no use getting improved animals if they are not properly cared for; protection against cold and wet, clean and dry bedding, with regular feeding and watering, are the indispensible conditions of success.

I may remark in conclusion, that I have endeavoured to advocate such an improved system of husbandry as might be introduced with profit and advantage, but at the same time I have not gone into details on some subjects, such as draining and the different sorts of manure, as I consider that to explain them in a proper manner would require greater space than I think it would be right to occupy in an essay of this description.

MEETING OF THE BOARD OF AGRICULTURE.

A meeting of the Board pursuant to call of the President, was held at Kingston, in the City Hall, on Thursday, May 26th, 1859, at three o'clock, p. m.

PRESENT.—E. W. Thomson, President, R. L. Denison, H. Ruttan, Dr. Beatty, Hon. G. Alexander, Wm. Ferguson, J. E. Pell, A. A. Burnham and G. Buckland. Mr. John Wade, Vice-President of the Provincial Association, was also present.

The Board having organized and the minutes of last meeting having been read and approved, it was agreed to adjourn till after a meeting of the Local Committee.

The Board, after an interview with the Local Committee, resumed business at 5 o'clock, the same members being present.

The Secretary read a communication from Hon. Adam Fergusson, stating the improbability of his being able to attend the meeting, and enclosing a communication from Professor Dick, of Edinburgh, N. B., relative to the subject of a veterinary practitioner. The Secretary also read a communication from the Committee of the Board of Arts and Manufactures declining to undertake the management of the Manufacturing and Fine Arts Departments of the Provincial Exhibition on the terms agreed to at the meeting of the Board in March last; and a letter from Mr. Spangenburg, of Kingston, complaining of foreign manufactured articles having taken prizes at the Provincial Exhibitions as home productions.

The Secretary submitted a Report of the Committee appointed at the last meeting to revise the Prize List, which was adopted.

Resolved,—That in consequence of several erroneous entries having heretofore been made, and just complaints founded thereon having been made to this Board, the Secretary be instructed to give greater prominence in the *Agriculturist* and all advertisements that may be issued, to the Regulation No. 7, for the management of the Exhibition.

Resolved,—That as the Board of Arts and Manufactures declines taking charge of the departments of Arts and Manufactures at the ensuing Exhibition, under the conditions proposed at the meeting of this Board in March last, this Board will assume the entire control of the Exhibition, and will avail themselves of the poffered aid of the members of such Board of Arts and Manufactures in carrying out the details of the Exhibition.

After a verbal report of the President as to what had been done in regard to the promotion of the cultivation of Flax in the Province, the Board adjourned at 7 o'clock, to meet at 9 o'clock next morning.

FRIDAY, May 27th, 9 a. m.

The Board met pursuant to adjournment, the same members being present as yesterday.

The minutes of yesterday were read and approved.

Resolved,—That in order to secure the services and attendance of competent and disinterested judges for the next Exhibition, the President, Treasurer and Secretary of the Board of Agriculture, and the President, Vice-President and Secretary of the Board of Arts and Manufactures, be a committee to correspond with such persons as may appear to them suitable for judges, and their decision be final.

Resolved,—That in reference to the recommendation from the Electoral Division Agricultural Societies embodied in Dr. Litchfield's report to the Local Committee, to the effect that members of such societies be allowed the privileges of members of the association, this is so provided by the rules of the association printed with the Prize list; and that with respect to the recommendation that subscribers of five dollars and upwards to the local funds be allowed certain privileges, it cannot be complied with, as the effect would be very materially to diminish the receipts of the association at the gates.

Resolved,—That the Treasurer be authorised to pay the balance of Mr. Hardy's bill, with the understanding that Mr. Hardy use his best endeavors to collect the costs from the plaintiff.

The Board adjourned at 12 o'clock, with the view of meeting the members of the Local Committee on the grounds and to meet again in the evening.

FRIDAY AFTERNOON, 5 o'clock, p. m.

After having met the Local Committee on the Exhibition grounds, with a view of inspecting the state of the buildings, fences, &c., and for consulting on matters pertaining to the necessary accommodations and arrangements required for the next Provincial Show, the Board again met, the same members present.

The President stated to the Board that the Mayor of the City of Toronto, on behalf of the City Council, had in a summary manner taken possession of the offices erected on the grounds reserved by patent to the city for the use of the Provincial Association, expelling the person placed in charge by the association from the said buildings, which were erected solely at the expense of the association; and whereas a suit at law is now pending, instituted by Dunbar, the keeper above referred to, against the policemen who executed the instructions of the Mayor; and whereas it is desirable to avoid litigation, which is calculated to produce evil results to public institutions.

Resolved,—That the President, Secretary and Treasurer be a Committee to prepare a statement of the whole affair, to be transmitted under the seal of this Board to the City Council for their consideration, and in the event of that body refusing redress to seek it through the legal tribunals of the country.

Resolved,—That in order to promote security and economy, members be provided with printed tickets instead of ribbon badges, at the next Provincial show, and that the last named committee, with Mr. Pell, be authorised to carry out this arrangement.

On the representation of Mr. Ferguson, after much deliberation relative to the advantages to be derived from the extension of flax culture, and the information contained in Mr. Dickson's new work, now in course of publication in

England, under the patronage of his Royal Highness Prince Albert and a large number of eminent persons in England and Ireland,

Resolved,—That copies of Mr. Dickson's work to the amount of Ten Pounds sterling, be subscribed for by this Board, and that Mr. Marks, who is now in London, be requested to order the same.

After considering a number of details, chiefly in reference to the arrangements, &c., of the next exhibition, the Board adjourned.

COUNTY AND TOWNSHIP AGRICULTURAL SOCIETIES.

Abstract of Reports received by the Board of Agriculture, in 1859, from County and Township Agricultural Societies, embodying the proceedings of those Societies for the year 1858, under the Act 20 Vic. cap. 32, with the names of the officers of the County Societies for 1859.

ADDINGTON.

County Society.—Seventy-six members; amount of subscriptions received, $76; balance on hand from 1857, $80,43; deposits by Township societies, $221; Government grant, $720; total receipts, 1097,43. Paid Township branches, $652; paid premiums, $255; general expenses of management, $68,45; balance on hand, $121,98.

Officers for 1859.—President, F. Kayler; Vice-Presidents, George Howard and Thomas Price; Secretary and Treasurer, C. V. Price; Post Office address, Newburgh.

TOWNSHIP BRANCHES.

Amherst Island.—Amount received by Treasurer, $118; paid in premiums, $101,80; expenses, $16,50. The Report is incomplete.

Camden.—Seventy-four members; amount of subscriptions, $80; share of public grant, $156; grant from Township Council, $50; balance from 1857, $2,50; total receipts, $288,50; amount paid in premiums, 252,50; incidental expenses, 35,00; balance in hand, $1,00.

Ernestown.—Seventy-seven members; subscriptions, $78; amount paid in premiums, $168,25. The Report is incomplete.

Sheffield.—Amount received from subscribers, $47; share of public grant, $78; total receipts, $125; paid in premiums, $97; expenses of management, $19,42; balance in Treasurer's hands, $8,58.

EAST BRANT.

County or Electoral Division Society.—Organized in January, 1858, under the Act 20 Vic. cap. 32; two hundred and forty-six members; amount of subscriptions, entries, donations, &c., $528,67; Government grant, $720; received from West Brant Society, $265,99; total receipts, $1514,66; amount paid in premiums, $992,25; paid for printing, cattle-pens, and other expenses, $283,80; balance in Treasurer's hands, $238,61.

Officers.—President, Daniel O'Neail; Secretary and Treasurer, Wm. Patton, Paris.

Extract from Report.

"The President and Directors in presenting their First Annual Report, have much pleasure in expressing their satisfaction at the prosperous condition of the Society, now only a year in existence, and the complete success which attended their Exhibition last autumn, in this place.

"The stock, grain, and other articles exhibited on the show day, were of a superior class, and elicited universal admiration from the large concourse of ladies and gentlemen who graced the occasion by their presence.

"The show of horses in the several grades of draught, general purposes, and carriage horses, as well as brood mares and young stock, was excellent.

"The classes of Durhams and Ayrshires,—no Devons being shown—were good, particularly those of Durhams, many of them being of the finest imported stock; Ayrshires very good, but not numerous.

"In the sheep department the competition was very large, especially in Leicesters; those of South Downs were very good; in Cotswolds there were the fewest in number, although a class of sheep which is fast becoming a favorite.

"As fine a display of pigs, of both the large and small breeds, was exhibited, as could possibly be found, though perhaps not the most numerous.

"The show of the different sorts of grain was really good, particularly that of wheat, some of which obtained the first prize at the Provincial Fair, the following week.

"The roots and other vegetable productions were a credit to farmers, horticulturists, and amateurs, taking the dry season into account.

"There were of agricultural implements a goodly display, and quite in keeping with the interest taken by manufacturers in this department.

"The dairy productions were highly creditable to exhibitors.

"In fruits a very choice collection of the various kinds were shown, and the plants and flowers, together with the ladies' contributions to the floral department, rendered the Town Hall, where these articles were exhibited, very attractive, indeed.

"Your directors would also refer to their unanimous adoption of having their Exhibitions open to the whole Province, thereby inviting neighboring, as well as distant, counties to compete, enabling our farmers and others to see the excellence our neighbors have arrived at, and those points in which they excel; to infuse a spirit of fair and generous rivalry, and a greater amount of enterprise amongst ourselves, as well as to render our Exhibitions more attractive.

"Your directors would likewise draw the attention of the Society to this fact, that, in view of Paris being the most central point for holding the Society's Exhibitions, they would strongly recommend, "when in a position to do so," the purchase of a parcel of ground on which to erect Society's buildings, and by this means save annually a sum of about $300 in erecting temporary buildings, which amount has this year been saved to the Society, and awarded in premiums, by obtaining the use of the Town Hall to hold a portion of the articles exhibited."

WEST BRANT.

County Society.—Organised in January, 1858; two hundred and seventy-four members; subscription, $274; government grant, $720; total receipts, $994; amount paid East Riding Society, $266,66; expenses, stationery, postage, &c., $120,00; balance in Treasurer's hands, $607,24.

Officers for 1859.—President, John Tennant; Vice-Presidents, William Thompson and James Maxwell; Secretary and Treasurer, Duncan McKay, Brantford.

Extract from Report.

"Reverting to the present depressed state of the cultivators of the land, it will become the duty of the officers of this Society to investigate into some of the causes of unprofitableness of their avocations. That the agriculture of Canada is not in so progressing and prosperous a state as it might be, is a fact no doubt generally admitted; and this Board hopes to be excused for presuming to suggest what they consider remedial measures. The true spring of agricultural prosperity can only be found in the industrial exertions of its practical members; and to supply this spring with greater power, and to direct aright the energies of those engaged in agricultural pursuits, is an undertaking that deserves the best attention of all who wish well to the prosperity of their country. As our means to accomplish this desirable end, and to improve the sadly neglected state of our agriculture, all possible efforts of self-improvement should be zealously resorted to. There are many good farmers in this neighborhood, well informed if not well educated, whose honorable examples of good husbandry, it is much to be regretted, do not form the rule of practice instead of the exception.

"It is not too much to assert that the exports of agricultural produce of this Province might be easily doubled if a system of improved tillage such as is within the power of all to adopt, were but generally practised. The individual landowners themselves would not only be largely benefitted, but a great national advantage would accrue therefrom. This is, in fact the only high road to national wealth. Another evil to be remedied is, that farmers generally cultivate too much land, that is, more land is ploughed than is well and properly cultivated, hence the low acreable average and miserable crops of grain so generally harvested throughout the country. As an evidence of this fact, the late official returns show the very low average of eight bushels of wheat per acre for Lower Canada, and only twelve for the justly boasted Garden of the Province—Western Canada. This it must be admitted is far below the natural capabilities of the soil. The institution of Agricultural Societies is, therefore, greatly needed to diffuse among us a spirit of greater emulation, to make us more sensible of our want of skill, and more desirous to remedy our own defects by availing ourselves of the experience of others in the path of practical improvement. The majority of farmers require to have placed before their eyes the evidence of what has been done elsewhere by others, and how it has been done, as an encouragement, and as a proof of what may be done by themselves. It is a maxim in every profession, art and science, that the practitioners must be regularly educated for the business; in agriculture this is almost wholly disregarded. In Canada especially, we frequently find many engaged in farming who are ignorant of the first principles of the art. Many are thus employed who were brought up in the old country in totally different avocations. How, it may be asked, can agriculture advance with such practitioners. With a view to remedy this evil your Board begs to offer the following suggestion:—

"The object of this Society is to direct the attention of its members principally to the improvement of the breed of animals, and modernizing agricultural machinery, and your Board would now suggest the establishment of one of those invaluable institutions so much needed, but at present so little known in this colony,—a Farmers' Club,—by which the higher aim of agriculture, the improvement of the soil and its produce, may be carried on simultaneously with the other branches of husbandry. These clubs in England, the first agricultural country in the world, have been a source of the greatest benefit, and have excited in the minds of both farmers and landlords an emulation, the effect of which it would be almost impossible to describe. Their advanced state of cultivation,

and unprecedented prosperity, may be clearly traced to the beneficial result of these institutions.

Without dwelling longer on this subject, your Board will now proceed to explain the nature, object, and utility of a Farmers' Club. The first great desideratum is to get together practical farmers to discuss practical subjects. It is not to be a mere Debating Club, where a disputant, hard pressed, will resort to argument to make the worse appear the better cause; but a congregation of members, met in friendly conclave, to exchange thoughts and feelings. An association of men, in fact, for equal benefits, where all are expected to join in a free, easy, and candid interchange of opinions and ideas, for the general good, and where some, no doubt, would discover that although they might impart largely, they would yet find some information they themselves could receive with advantages. It will be readily seen that by the means of such Clubs much valuable information would be diffused, different modes of cultivation compared, and their results ascertained; improvements suggested and made public; and such an interchange of thoughts, opinions, and observations, as would not fail to exercise a beneficial influence. In addition to the above advantages, the more intelligent and scientific members of the Club might extend the field of enquiry and ascertain the nature and qualities of the soils and subsoils of the district; enquire into the comparative value of different sorts of manures; test by experiments alleged improvements in cultivation, in agricultural implements, or in the management of stock; discover the most valuable varieties in corn, grain, seeds, or roots, and the most advantageous rotations of crops; collect information from all parts of Canada, or the world, respecting the state and progress of agriculture, by correspondence, by the establishment of an agricultural library, and by such other means as may be deemed expedient. In a word, advance the interests of agriculture in every possible way; reducing theory to practice, and throwing the light of knowledge and science over the most useful and important of the arts of life."

BRUCE.

County Society.—Amount of subscription, $106; deposited by township societies, $422; government grant, $720; receipts from sale of seeds, &c., $44,03½; total receipts, $1292,03. Amount paid on account of 1857, $158,27; paid township branches, $851; paid in prizes, $152,10; paid for seeds and expenses, $147,03; balance due Treasurer, $16,37.

Officers for 1859.—President, Wm. Withers; Vice-Presidents, William Miller, and Henry Teskey; Secretary, John Campbell, Kincardine; Treasurer, Malcolm McPherson.

Extract from Directors' Report.

"The Directors of this Society cannot help feeling depressed by the results of the last year's farming operations in this county; but if you look back into history you will find that failure of crops have frequently happened even in the best cultivated and richest soils, but follow history still and you will find years of abundance succeed years of scarcity, therefore our farmers must not lack in their labour nor withhold their hands from sowing; now is the time for them to be stirring and getting every information as to the best time for sowing and the kinds of grain that have been proved to withstand rust and insect; and as the knowledge of these things can so easily be obtained in the present day, those who are ignorant have only themselves to blame.

"We believe a much larger portion of land than heretofore has been sown with Fall Wheat, and we trust that a fine spring will call into active energy the strength and skill of our enterprising yeomanry; and in the present state of

scarcity of money, it will be well to consider the resources we have for exporting cash produce. It is proved beyond doubt, now, that potash can be profitably made from the ashes which go to waste; and if every farmer in this Society would only feed pork so as to export three barrels each, yearly, it would at a moderate price, bring into this neighbourhood $3000 per annum, and in some seasons double that amount; this could easily be accomplished, as no farmer is without sufficient clearing to grow feed for four or five hogs independent of his Fall or Spring Wheat, and if we look to England and Ireland we shall find thousands of the poor cottagers depending on their pork for rent, and any large payment they may have to meet.

"The report from Carrick branch is excellent, and merits the attention of all of us, not that it introduces new maxims, but those that it recommends cannot be too forcibly or too often impressed on the minds of the farmer. We would call your attention to the Fife Wheat, which the Carrick Society so highly recommends as having yielded well, and withstood the rust. You will do well to study the prize essay by Professor Hind, as the Weevil will most assuredly visit us in two or three years. It will, therefore, be better to be prepared for it by sowing at such times as will be most likely to escape its ravages, or perhaps to disappoint it by sowing no wheat that year that its coming is defined to a certainty, which another year's observation will do."

TOWNSHIP BRANCHES.

ARRAN.—Amount of subscriptions, $54,00; share of public grant, $45; sundries, $3,25; total receipts, $102,25. Paid in prizes, $68,25; expenses, $5,62; balance in hand, $28,38.

BRANT.—Amount of subscriptions, $82,32; share of Government grant, $81; total receipts, $163,32. Paid in premiums, $132,75; expenses, $23,07; balance, $7,50.

CULROSS.—Amount of subscriptions, $45; Government grant, $41; total receipts, $86. Paid in prizes, $63,50; expenses, $12,34; balance, $10,16.

PAISLEY.—Subscriptions, $102; public grant, $67,23; balance from previous year, $31,50; total receipts, $200,73. Paid in prizes, $104; expenses, &c., $25; balance in hand, $71,73.

Saugeen, Carrick, and Greenock, which appear to have received portions of the public grant, have forwarded no reports.

CARLETON.

COUNTY SOCIETY.—Amount of subscriptions, $147,00; balance from 1857, 17c.; deposited by Township Societies, $207; Government grant, $900; sundries, $12,10; total receipts, $1266.27. Paid for thirty copies *Agriculturist*, $15,00; expenses of judges viewing crops, $19,00; paid Township branches, $747; premiums, $433; expenses of management, $37,60; balance in hand, $14.67.

Officers for 1859.—President, Robert Hunter, M.D.; Vice Presidents, John Robertson and Wm. T. Aylen; Secretary and Treasurer, J. G. Bell, Ottawa.

Extract from Report.

"Your Directors would remark that at the last Cattle Show, although the day was wet and cold, the general turn-out of stock was better than it has been for some years. Both horses and horned cattle are improved. Sheep, Leicester and South Down, were very good, but not near enough competition. Butter and cheese, with many articles made up by ladies, were very good. Grain in bags made a good show, and was of superior quality. A measured bushel of

Fall Wheat weighed 62 lbs., and the average of the field was 40 bushels per acre; the field was newly drained at 45 feet apart, and was second among field crops; 3 acres of the same field undrained averaged 20 bushels per acre.—The sample of Spring Wheat commonly called Chinese Wheat, which got the 2nd prize, and also 2nd in the field crops, weighed 61½ lbs to the measured bushel, and averaged 35 bushels per acre. Nine acres were sown after roots, without being washed for smut, and the consequence was 10 per cent smut, of the kind called pepper brand or burnt ear. Steeping 20 hours in a solution of blue-stone, and a small handful of common salt to keep the wheat from softening, will prevent all kinds of smut. 1 ounce of blue-stone to the bushel of wheat—it may be dried with lime to make it scatter in sowing. Corn has not been a good crop, the season being cool and wet. Root crops have been an average. Guano has been tried with Swedish Turnips—the produce was 700 bushels roots per acre; they were too late, which was against them;—3 acres got 3 cwt. guano with 7 bushels of ashes mixed, per acre; there were few weeds.—Guano was tried with potatoes mixed in the same way as for turnips, and brought 350 bushels of sound good-sized potatoes. The sets were powdered with plaister as they were cut—none rotten. Thirty cubic yards of rotted yard manure did not bring 200 bushels; some of them were rotten. Half an acre of potatoes was tried with the super-phosphate of lime; they were better than the yard manured, but not so good as the guano manured. Two and a half acres of corn was dressed with the super-phosphate of lime, but was not satisfactory,—I have doubts of its being genuine. Hay is a good crop; some fields were twice cut, some of it not in a good condition. Hay crops were useful.

"General improvements are going on briskly. Some stone houses covered with tin have been built, and many good barns raised. Much land has been drained, and preparations are going on to drain on an extensive scale during the coming season, if men can be got. There is a large addition to the agricultural implements since last report. Your Directors recommend more attention to the proper rotation of crops, never taking two grain crops in succession; and to keeping down weeds, for what will support a good thistle will support six stalks of wheat. Drain your farms three feet deep, and you will find it pay you better than buying new land, or any other way you can invest your money.

"The want of workmen and roads is much against the development of the resources of the County. The man who gets a road made in any direction from Ottawa, will deserve well of his country. The funds should be raised by municipalities, and such a change made in the method of assessment as will make every one pay his fair share, which is far from the case at present."

TOWNSHIP BRANCHES.

NORTH GOWER AND MARLBOROUGH.—Twenty-seven members; subscription, $54; no further report.

HUNTLEY.—Amount of subscription, $91; received from County Society, share of public grant, $237.40; total receipts $328.40. Amount paid in premiums, $308; grant to County Society, $10; paid expenses, $10; balance in hand, 40c.

MARCH.—Amount of subscription, $76; Government grant, $198.26; total receipts, $274.25. Amount paid in premiums, $252; expenses, $16.50; balance in Treasurer's hands, $5.76.

RICHMOND AND GOULBURN.—Amount of subscriptions, $40; balance on hand from 1857, $164.16; Government grant, $104.34; total receipts, $308.50. Amount paid in premiums, $219; grant to County Society, $10; expenses, $31.92; balance in hand, $47.58.

DUNDAS.

COUNTY SOCIETY.—One hundred and fifty-two members; amount of subscription, $166; balance from 1857, $26.47; deposited by Township Societies, $111; admission fees to exhibition, $64.52; Government grant, $720; total receipts $1087.99. Amount paid Township Societies, $411; premiums, $352.33; paid for building on show ground, $114.70; other expenses, $138.29; balance in Treasurer's hands, $71.67.

Officers, 1859.—President, Isaac A. Rose, Morrisburg; Secretary, John S. Ross, Iroquois.

Extract from Report.

The officers and directors of this society, at this their annual meeting, rejoice to be able to report much that is gratifying and encouraging. Last year they were compelled to report that by reason of the formation of two branch societies in the county the amount of funds at their disposal was reduced considerably below the standard of previous years, and that they were only enabled to award premiums to about half the amount of those awarded the previous years. This year however we are happy to be able to state that through the exertions of the society in extending its subscription list, and thereby increasing the amount of Government grant to which it is entitled, our finances are placed in a very favorable position, and that they have to report an increase of about 50 per cent. in the premium list of the society. Regarding the Annual Exhibition last October, the directors have to report that on the whole it was highly satisfactory. In the classes of horned cattle and sheep particularly, there was a marked improvement. It is pleasing to notice that considerable attention is being paid to the introduction of thoroughbred short horn stock into the county, which shows an increased interest in agricultural improvements. The grains, roots, and manufactures, as displayed, were also worthy of a favorable notice. The success of our Exhibition is the more creditable when taken in connection with the fact of a great failure of all grain crops last year, in consequence of the wet season. It may be observed that throughout the county there was a deficiency of at least from one-half to one-third in all descriptions of grain, as also of the potato crop. While the Directors have been able thus far to report much that is favorable, it is to be regretted that a large part in the deficiency of crops has been caused by want of draining, particularly in low lands, where rust has prevailed to such an extent, that loss on that account has been very heavy, particularly in oats. Therefore, as the only remedy for the evil complained of, they would invite special attention to draining as an important branch of improvement in the right direction.

TOWNSHIP BRANCHES.

MOUNTAIN.—The amount received from all sources was $250; the amount paid in premiums $210.62½; and expenses, $38; leaving in the Treasurer's hands, $1.37½.

WINCHESTER.—Sixty-two members; subscription, $66.25; share of Government grant, $117; balance from 1857, $88.16; total receipts, $272.41; paid in prizes, $227.50; expenses, $20.41; balance in hand, $24.50.

EAST DURHAM.

COUNTY SOCIETY.—Organized 1858; fifty-members; amount of subscription, $53; deposited by Township Societies, $217; subscription from Port Hope Mechanics' Institute, $10; Government grant, $720; admission fees at Exhibition, $190.37; donation from Hope Township Society, $250; donation from

Mr. J. S. Smith, $50; total receipts $1490.37. Amount paid Township Societies, $641; expenses, $117; premiums, $623. The statement is incomplete.

Officers, 1859.—President, John Foott, Port Hope; Secretary, H. Crea, Port Hope.

Extract from Report.

Your Directors have much pleasure in stating that the operations of the society during the past year have been very successful. The Township of Hope Branch Society, in a truly liberal spirit, voted the sum of £62 10s. to your directors to assist in forming a fund for premiums for the fall show. This amount, added to what was in the hands of our Treasurer, made nearly seven hundred dollars. A premium list was agreed upon, which, although susceptible of improvement, was on the whole satisfactory. The show of last fall was in every respect the best ever held in the County of Durham. The entries reached nearly one thousand. The display of horses, cattle, sheep and pigs was large and superior, while the Floral and Horticultural Departments were the theme of general praise. The grain exhibited was very fine, particularly the fifteen bushels of wheat beloning to Mr. James Curtis, which took Mr. J. Shuter Smith's prize of $25. The specimens of manufactured articles on exhibition were creditable to the county. The carriages, cabinet-ware, marble-work, and agricultural implements would compare favourably with similar manufactures in any other part of the Province. Your directors feel that Mr. W. F. Russell's cabinet-ware deserves particular mention.

TOWNSHIP BRANCHES.

CAVAN.—Seventy-one members; subscription, $76; balance on hand from 1857, $65.13; share of Government grant, $141.34; total receipts, $282.47; amount paid in premiums, $198.12; expenses, $49.55; balance in Treasurer's hands, $34.80. The Secretary of the County Society, in forwarding the report, writes:—"This township sustains its society well. The farmers pay a good deal of attention to stock raising. The sheep and cattle exhibited at the fall show were very creditable. The agricultural productions of Cavan are generally of excellent quality. The land is well cultivated, and the yield of wheat, oats, peas, barley, &c., is large."

HOPE.—One hundred and forty-three members; subscription, $146; balance from 1857, $19; share of public grant, $290.66; received from sale of seeds, $89.85; total receipts, $545.51; amount contributed to funds of County Society, $250; paid for seeds, $74.20; paid for copies of *Agriculturist*, $67.58; expenses, $21.63; balance in Treasurer's hands, $132.10. The Directors imported a quantity of turnip and carrot seeds from the house of Lawson & Sons of Edinburgh, who took first prizes for their seeds at the London and Paris Exhibitions. The seeds were retailed to members at cost price. The Secretary of the County Society writes:—"This society is in a flourishing condition. It is well managed, its officers being both capable and energetic. The directors, instead of holding a fall show in 1858, voted a handsome sum to the society for the riding—the result of this union of the funds was very satisfactory, as large prizes were offered for competition. The Township of Hope, with the exception of occasional "patches" of woodland, is under a high state of cultivation; and the appearance of the dwelling houses, spacious barns and outbuildings, is a sufficient indication, that the thrift and industry of the farmers of the township have been liberally rewarded I have much pleasure in saying in addition, that the farmers of Hope maintain a "club" for the discussion of questions pertaining to agriculture. They meet once in two weeks. At each meeting an essay is read;

after the reading of the essay, the subject of which it treats is thoroughly discussed. Much benefit has already resulted from the discussions of this club; the young men of the township are beginning to study agricultural chemistry, and to carry it into practice on their farms. There is no question that the progress of agricultural improvements in Hope is encouraging."

MANVERS.—Thirty-eight members; subscription $45; balance from previous year, $14.35; total receipts, $59.35; paid in premiums, $55.30; expenses, 52c.; balance in hand, $3.70. This society having failed to deposit with the County Society, did not receive any portion of the Government grant.

"Manvers is a new township, but has made rapid strides in improvement within the last few years. A large breadth of land is cropped in the fall and spring; and the display of stock at the annual shows is exceedingly creditable. The Port Hope, Beaverton, and Lindsay Railway, gives Manvers a direct and rapid communication with the Port Hope markets; as a consequence the prices of agricultural productions of the township are largely increased, and farming, becoming more remunerative, is better attended to."

WEST DURHAM.

COUNTY SOCIETY.—Organized 1858; eighty-one members; subscription, $81; deposited by Township branches, $272; received from M. Joness, $31.30; Government grant, $720; total receipts, $1104.30. Paid Treasurer, balance due from 1857, $4.64; paid Township Societies, $704; premiums, $315.75; expenses, $38.70; balance in hand, $41.21.

Officers, 1859.—President, Robert Beath, Newcastle; Treasurer, Samuel Wilmot, Newcastle; Secretary, E. A. McNaughton, Newcastle.

TOWNSHIP BRANCHES.

CLARKE.—One hundred and forty-six members; amount of subscription, $146; balance from 1857, $57.30; share of Government grant, $232.25; receipts at show, $4.12; total receipts, $439.72. Paid for *Agriculturist*, $80; premiums, $168.50; various accounts for expenses, &c., $74.15; balance in Treasurer's hands, $117.07.

Extract from Report.

"Your directors congratulate the society upon its prosperous condition. Your directors thought it prudent not to give such an extensive premium list as last year, but still such as would make it sufficiently interesting for competition. This society has been very materially aided by the extension of the Legislative grant to electoral divisions, for which we beg leave to tender our thanks. There has been a falling off of members the last year; this has not been the fault of the directors, but entirely attributable to the financial crisis of the country, but as we have passed that over safely, with but few exceptions, we hope our successors will work vigorously, and endeavour to bring the society to the high position it has always held, and that they will urge the necessity of every farmer becoming a member, and also urge upon them to purchase the agricultural periodical of the country, as much valued information is to be found therein. Your directors trust the means used for the advancement and improvement of agriculture by offering high premiums for fall wheat seed, will be availed of by those who wish to improve their samples, for it is only by very frequent exchange of seeds that we can expect to realize the perfection of this staple article. The samples exhibited this year were very superior—three of the number were taken to the Provincial Exhibition to compete for the Canada Company's prize, and although the samples were far superior to those which took the prize, yet, in consequence

of not weighing as heavy they took nothing, although the judges were satisfied in their own minds that they were by far the best. Your directors would suggest that appearances, as well as weight, should be taken into consideration by the association. The fall show was every thing we could desire, although there were not as many entries as the previous year. The crops of the past year were far below the average. There are several causes for this. On account of the destruction of the crop of 1857, by the midge and hessian fly, many did not sow fall wheat, thinking that by this means they would prevent these insects harbouring in the locality. But while some were cautious in not sowing others were sanguine that the insect would pass theirs' by, but a sad reality has convinced them otherwise. What looked in the spring to be a fair and promising crop, was in the fall not worth reaping, owing to the ravages of these little insects. Again, while our old enemy *rust* did his share in destroying many a fair field, a new enemy in the shape of the grasshopper—(some say locust)—cut off many a field of grain by sucking the substance out of the straw; the head would drop and the grain shrink away. But they were far more destructive on the oats and green crops, which were an entire failure. Consequently many had to kill their cattle or otherwise dispose of them in the fall for lack of this very useful food. But we hope by the blessing of Providence, that these things may be removed in His own good time. Your directors would suggest, as the Farmers' Club is now broken up, (which we are extremely sorry for), that the President or some other member of the society be selected to deliver a lecture upon agriculture; such a thing would be both interesting and beneficial to the society."

DARLINGTON.—One hundred and two members; subscription, $126; share of Government grant, $199.75; receipts at Floral Hall, $57.75; sundries, $7; total receipts, $390.50. Amount paid Treasurer, balance due from previous year, $88.80; paid for copies of *Agriculturist*, $50; prizes, $328.25; expenses, $9; total expenditure, $476.05; balance due Treasurer, $85.55.

ELGIN.

COUNTY SOCIETY.—Sixty-five members; subscription, $65; balance in hand from 1857, $558.43; deposited by Township Societies, $389; Government grant, $896.30; total receipts, $1908.73. Amount paid township branches, $994; premiums, $225.75; expenses, $21.30; balance in Treasurer's hands, $667.68.

Officers, 1859.—President, Daniel Black, St. Thomas; Treasurer, John King, St. Thomas; Secretary, Henry F. Ellis, St. Thomas.

TOWNSHIP BRANCHES.

BAYHAM.—Fifty-nine members; subscription, $71; balance from 1857, $49.01; share of Government grant, $65; total receipts, $185.01. Amount paid in premiums, $107.90; expenses, $16.39; balance in Treasurer's hands, $60.72.

SOUTH DORCHESTER.—Fifty-eight members; subscribing $1 each. No further proceedings reported.

MALAHIDE.—Fifty-one members; subscription, $68; balance in hand from 1857, $226.98; share of public grant, $62; total receipts, $356.98. Paid in premiums, $247.62; paid County Society, to render the President eligible as a director of the County Board, $10; expenses, $45.68; balance in Treasurer's hands, $53.68.

SOUTHWOLD & DUNWICH.—Ninety-three members; subscription, $93; balance on hand from 1857, $128.95; received on account of bulls, $14.50; Go-

vernment grant, $114; total receipts, $350.45. Amount paid for *Agriculturist*, $49; paid in premiums $35.25; paid for keeping bulls, $46.80; general expenses, $20; balance in treasurer's hands, $208.40.

YARMOUTH.—One hundred and nine members; subscription, $109; balance from 1857, $110.27; Government grant, $154; sundries, $1.50; total receipts, $374.77. Amount paid in premiums, $288.07; expenses, $24.58; balance in hand $62.12.

ESSEX.

COUNTY SOCIETY.—One hundred and forty six members; subscriptions paid, $109; balance from 1857, $8.03; deposited by Township Societies, $354; Government grant, $900; receipts at shows, $45.23; received from sale of lumber $68.58; total receipts, $1484.84. Paid Township Societies, $892; premiums, expenses, &c., $578.26; balance in treasurer's hands, $14.58. The Directors report that owing to certain unfavourable circumstances, the funds had fallen unexpectedly short, and they had been obliged to pay only one half of each premium awarded.

Officers, 1859.—President, William Riddsdale Amherstburgh; Treasurer, James Noble, Amherstburgh; Secretary, Alexander Bartlett, Windsor.

Extract from Report

"In regard to the Annual Fair itself, however, we are glad to be able to note a decided improvement in almost every department of Agriculture. The seeds and roots were beyond any former year, and the cattle, horses and sheep were, on the whole, decidedly superior to previous exhibitions; thus showing the increased attention being paid to farming throughout the county generally, and in looking over the reports of Township Societies there appears to be great attention paid to the raising of stock and procuring the best breeds. From the report of the Colchester Society it appears that it has at present something like $1100 worth of imported and improved stock, composed of stallions, bulls and sheep, all purchased from the best breeders in the Province; this must ultimately raise the stock of Colchester immensely in value, and Gosfield and Mersea appear to be pursuing the same course. The Maidstone society spends its funds more in premiums and partly in stock; doubtless they are the best judges themselves of what is the best way of spending the money, but your Board are of opinion that it is not the province of branch societies to fritter away their funds in holding fairs and giving premiums for what must be inferior articles, unless improved by imported stock; let the branch societies spend their funds in improving their stock, and in our opinion they will confer the greater benefit on the community. And it becomes necessary for the farmer to attend more to the raising of stock than heretofore, since his great staple, the wheat crop, has been destroyed by the ravages of the weevil, as his only dependence for a livelihood can be on stock and grains not subject to the destroying insect.

Our faith in the ultimate prosperity of this fine county is based upon the fact that, its soil and climate are particularly favourable to agricultural pursuits, and it only requires sure industry and intelligence to bring it as far forward as other counties in Canada West."

TOWNSHIP SOCIETIES.

GOSFIELD AND MERSEA.—One hundred and four members; amount of subscription, $110; balance from 1857, $32.22; Government grant, $167; received on account of stock sold, $113.35; total receipts, $422.57. Paid for a stallion, $359.70; expenses, $47.80; balance in hand, $15.07.

COLCHESTER.—Eighty-two members; subscription, $82; balance from 1857, $460.24; Government grant, $109; proceeds of a note, $200; received from services and sale of stock, $225.50; total receipts, $1075.74. Amount paid on purchase of horses, $709.47; paid for keeping do., $123.50; paid in purchase of sheep, $102.90; sundry payments on account of stock, expenses, &c., $135.62; balance in hand, $4.25. The directors report that they had succeeded in obtaining very fine animals of the various kinds of stock, and that the purchases had been very satisfactory and advantageous to the society.

MALDEN AND ANDERDON.—Ninety-three members; subscription, $93; balance on hand from 1857, $37.85; Government grant, $141; total, $371.85. Paid County Society, $10; expenses $26; balance on hand, $235.85.

ROCHESTER AND MAIDSTONE.—Seventy-eight members; subscription, $80; Government grant, $122; received on account of stock, $12.25; total, $214.25. Paid for keeping bull and other stock owned by society, and various other expenses, $199.77.

FRONTENAC.

COUNTY SOCIETY.—One hundred and three members; amount of subscription, $152.25; balance from 1857, $25.83; deposited by township branches $241.50; Government grant, $720; receipts at show, $90; received for rent of Crystal Palace grounds and premises, $50; received from city of Kingston Electoral Division Society, contribution to joint exhibition, $400; received for lumber sold $33.20; total receipts, $1712.78. Paid township societies, $613.50; insurance on Crystal Palace, 37.50; planting trees and other work at do., $50.57; paid in premiums, $519.25; preparations for exhibition and various other expenses, $246.62; balance in treasurer's hands, $245.33.

Officers, 1859.—President, Edward Jackson, Kingston; Secretary and Treasurer, Thomas Glassup, Kingston.

TOWNSHIP BRANCHES.

KINGSTON.—Thirty-five members; subscribing $2 each; Government grant $62. No balance sheet of receipts and expenditure given. The society held an exhibition.

PITTSBURG.—Thirty-nine members; subscription, $55.50; balance from 1857, $5; Government grant, $62; total receipts, $122.50. Paid in premiums, $91.45; expenses, $24; balance in hand, $7.05.

PORTLAND.—Twenty-five members; subscription, $42; Government grant, $62; balance from 1857, $18.78; total, $122.78. Paid in premiums, $114.80; expenses, $8.

WOLFE ISLAND.—Amount of subscription, $40; Government grant, $62; total, $102. Paid in premiums and expenses, $100.50; balance in hand, $1.50.

Loughborough and Storrington Township Societies, which each deposited $40, and received $62 of the public grant, have forwarded no reports.

CITY OF KINGSTON.

ELECTORAL DIVISION SOCIETY.—Organized 1858. This society held an exhibition in conjunction with the County of Frontenac Agricultural Society, to which it contributed $400, as above stated. No further report.

Secretary, John Creighton, Kingston.

GLENGARRY.

COUNTY SOCIETY.—One hundred and thirty-six members; subscription, $142; balance from 1857, $63.40; deposited by Township Societies, $188; Government grant, $720; total receipts, $1113.40. Paid Township Societies, $620; paid in premiums, $263; expenses, $73.56; balance in Treasurer's hands, $156.84.

Officers, 1859.—President, D. A. McPherson, Williamstown; Secretary, D. McDonell, Williamstown.

TOWNSHIP SOCIETIES.

CHARLOTTENBURGH AND LANCASTER.—Eighty members; subscriptions paid, $137; balance from 1857, $3.02; Government grant, $269; received in wheat from the President, $76; total receipts, $485.02. Paid in premiums at shows and ploughing match, $338.50; expenses, $35.87; balance in Treasurer's hands, $110.66.

LOCHIEL AND KENYON.—Amount deposited with County Society, $71; Government grant, $163.14. No further report.

SOUTH GRENVILLE.

COUNTY SOCIETY.—Two hundred and seventy-three members; amount of subscriptions, $325; deposited by township branch, $43; Government grant, $720; receipts at fair, $341.40; total, $1429.40. Amount paid Township branch, $158.75; paid for buildings and fences, &c., on show ground, $816.95; premiums, $489.25; forty copies of *Agriculturist*, $20; balance due Treasurer, $55.50. The Directors report stock and other property in possession of the society to the value of $420.

Officers, 1859.—President, Wm. Ellis, Prescott; Secretary, John S. Lynch, Prescott.

Extract from Report.

At the Exhibition, the whole of the different classes of productions, with but few exceptions, were well represented in their different departments; the fine arts, fruit, vegetables and cereals, particularly so. The exhibition would have been larger and fairer had the directors allowed those from neighbouring townships to compete. They feared at the time this could not legally be done; but they now find the practice almost universal, and strongly recommend its adoption in the case of the Society hereafter. The improvement of stock being a matter of much importance to the locality, the directors have acquired from the late County Society two prize bulls, which are now owned by the society for the benefit of its members, and it is to be hoped that other animals may soon be purchased for a similar object. It is a subject of congratulation to know that the Annual Provincial Exhibition is to be held at Kingston for the current year. Every member of this society should not fail to attend if possible. The society have a consignment of bone dust manure for sale to members at cost price, about eighty cents per bushel, in the hands of the Secretary. Its effects on some crops, turnips in particular, are very striking and beneficial. The experience gained during this, the first year of the Society's existence, is of a highly encouraging nature, and augurs well for its future usefulness; but in order to work out and realize the largest amount of good, the cordial and hearty co-operation of all residing within the riding is necessary, and this, it is to be hoped, will be cheerfully accorded hereafter.

TOWNSHIP BRANCHES.

EDWARDSBURGH.—Forty-two members; subscription, $47; Government grant, $115.75; total receipts, $162.75. Paid in prizes, $109.75; expenses, $14.50; balance in hand, $38.50.

GREY.

COUNTY SOCIETY.—Seventy members; subscription, $72; balance from 1857, $89.12; deposited by township branches, $318; Government grant, $720; receipts at show, $18.30; total receipts, $1217.42. Paid township branches, $730; premiums, $278; expenses, $119.91; balance in hand, $89.51.

Officers, 1859.—President, George Snider, Owen Sound; Secretary, Thomas Gordon, Owen Sound.

TOWNSHIP BRANCHES.

BENTINCK AND GLENELG.—Seventy members; subscription, $112; Government grant, $69.50; total, $181.50. Paid Treasurer, balance due him from 1857, $14.25; premiums, $115.75; subscribed to County Society $10; expenses, $42.50; due Treasurer, $1.

DERBY.—Thirty-five members; subscription, $40; Government grant, $58. Paid in prizes, $75; expenses, $11.50; balance in hand, $11.50.

HOLLAND.—Twenty-seven members; subscription, $40; balance from 1857, $4.90; Government grant, $58; total receipts, $102.90. Paid in premiums, $79.28; expenses, $23.62.

MOUNT FOREST.—Forty-four members; subscription, $51.50; balance from 1857, $80.60; Government grant, $60.90; total receipts, $193. Paid in premiums, $128; expenses, $24.82; balance in hand, $40.18.

The Secretary, upon the agricultural returns of 1858, writes as follows:—"Fall wheat may be reckoned a failure from rust. Spring wheat of the Glasgow, or Scotch variety, in this locality has been a light crop of good quality, about half the usual yield. All other kinds have been affected with rust. Peas, a good crop, and excellent in quality. Oats, not quite equal to the product of former years. Barley, little sown. Potatos, a partial failure. Roots generally, not so good as usual. No marked improvement in stock or implements."

SYDENHAM.—Forty-five members; subscription, $45; Legislative grant, $65.25; total receipts, $110.25. Paid in premiums, $64.25; expenses, $44.25; balance in hand, $1.75.

St. Vincent Society deposited $43, and received $62.35 from the public grant. Sullivan Society deposited $40, and received $58. Neither of these societies forwarded reports.

HALDIMAND.

COUNTY SOCIETY.—Sixty-seven members; subscription, $102; Government grant, $900; total receipts, not including deposits of township societies, $1002. Paid township societies, apportionment of public grant, $540; premiums, $340; expenses, $133.50; balance due Treasurer, $11.50.

Officers, 1859.—President, George Docker, Dunnville; Secretary, Jacob Young, York.

TOWNSHIP BRANCHES.

RAINHAM.—Sixty four members; subscription, $64; balance from 1857, $25.72; Government grant, $126.93; total receipts, $216.65. Paid premiums, $151.35; expenses, $26.03; balance in hand, $39.27.

SENECA, ONEIDA AND NORTH CAYUGA.—Fifty members; subscription, $103; Government grant, $193.33; total receipts, $296.33. Paid premiums, $229; expenses, $66; balance in hand, $1.33.

WALPOLE.—Seventy-five members; subscription, $70; balance from 1857, $89.15; Government grant, $151.10; total, $316.25. Paid premiums, $223; incidental expenses, $37; balance in treasurer's hands, $56.25.

HALTON.

COUNTY SOCIETY.—Two hundred and fifty-eight members; subscription, $328; balance from 1857, $321 61; deposited by township societies, $460; Government grant, $900; grant from County Council, $100; receipts at exhibition hall, $100; total, $2109.61. Paid township societies, $997.60; premiums, $528.50; expenses, $147.05; balance in hand, $436.46. The Directors report the Society in a very prosperous condition, notwithstanding the late financial difficulties.

Officers, 1859.—President, H. M. Switzer, Palermo; Secretary and Treasurer, Wm. C. Beaty, Omagh.

TOWNSHIP BRANCHES.

ESQUESING.—Sixty-four members; subscription, $83.50; balance from 1857, $39.15; Government grant, $59.30; total, $180.95. Paid prizes at show and ploughing match, $130; expenses, $38.78; balance in hand, $12.18.

NASSAGAWEYA.—One hundred and ten members; subscription, $112.50; Government grant, $108.81; from other sources, $20.50; total, $241.81.—Paid premiums at fair and ploughing match, $205.75; expenses, $35.68; balance in hand, 38c.

NELSON.—One hundred and forty-six members; subscription, $202; balance from 1857, $16.13; Governmant grant, $210; receipts at show, $11.50; total receipts, $439.63. Paid premiums, $351; expenses, $54.45; balance in Treasurer's hands, $34.18.

TRAFALGAR.—Fifty-seven members; subscription, $154; balance from 1857, $157.45; public grant, 160.29; total, $471.74. Paid in premiums, $268.10; expenses, $42.65; balance in hand, $160.99.

NORTH HASTINGS.

COUNTY SOCIETY—One hundred and three members; subscription, $158; deposited by branch Society, $80; Government grant, $704.30; grant from Municipal Council, $20; total receipts, $962.30. Paid township branch, $240; paid premiums, $246.92; copies of *Agriculturist*, 37.50; seeds, $27; expenses $121.50; balance in hand, $289.38.

Officers.—President, Henry Ostrom, Moira; Secretary, James J. Ryan, Huntingdon.

TOWNSHIP BRANCH.

RAWDON.—Sixty-six members; subscription, $66; balance from 1857, $153.35; share of public grant, $160; received for clover seed, $78.42; total, $457.77. Paid premiums, $298.05; paid for clover seed, $81.83; expenses, $17.76; balance in hand, $60.13.

SOUTH HASTINGS.

COUNTY SOCIETY.—One hundred and thirty-four members; subscriptions paid, $132; balance on hand from 1857, $87.61; received for plaster sold to members, $351.25; clover and timothy seed, $238.36; deposited by Township

Society, $47; received from bank, $600; receipts at show, $39.75; donation from Billa Flint, Esq., $85.66; sundries, $8.00; total, $2310.13. Paid for clover seed, $262.31; paid for plaster, $535; paid bank, $618.21; paid township branch, $141; premiums, $541.52; sundries and expenses, $177.47; balance on hand, $34.62. The financial statement is defective, not stating the amount of Government grant received, or for what purpose several of the payments were made. The President, in a letter accompanying the report, gives a very favorable report of the prospect of the crops for 1859, and believes that the damage from the wheat fly will be less than in former years.

Officers, 1859.—President, Billa Flint, Belleville; Secretary, Samuel D. Farley, Belleville; Treasurer, Phillip F. Canniff, Belleville.

TYENDINAGA BRANCH.—This Society deposited $47, and received $141, but has forwarded no report.

HURON.

COUNTY SOCIETY.—Ninety-seven members; subscription, $103; received as a loan, $192.50; deposited by township branches, $473; Government grant, $720; received for seeds sold, $156.15; grant from Canada Company, $60; total receipts, $1704.65. Paid Treasurer balance due from 1857, $98.30; paid township societies, $884.97; paid for seeds, $105.15; premiums, $353.52; paid money borrowed, $200; expenses, $158.71; total expenditure, $1800.65; balance due Treasurer, $96. The Secretary writes in reference to the distress lately reported to exist amongst the farmers in some portions of the country, owing to the failure of crops:—

"With the exception of the Townships of Howick, Turnberry and Huron, we have not heard of much real distress in connection with agriculture, in this County, although we have reason to believe that numbers of the settlers in the new townships have had to send to the mill, to be made into flour, their seed wheat, which they had held over to sow this spring, so that unless something is done by themselves or others, we may look forward to have very little wheat grown in those townships this year."

Officers, 1859.—President, George Brown, Goderich; Secretary, G. M. Freeman, Goderich; Treasurer, Andrew Donogh, Goderich.

TOWNSHIP BRANCHES.

BAYFIELD.—Forty-two members; subscription, $42; amount awarded in prizes, $26.25; balance on hand, $16.

CLINTON.—Seventy-one members; subscription, $79; Government grant, $40.16; sundries, $13.08; total, $152.24. Paid in prizes, $105.44; expenses, $26.80.

EXETER.—Seventy-two members; subscriptions, $72; share of public grant, $65.77; balance from 1857, $17.99; received from sale of prize wheat, $3.00; total receipts, $158.76. Paid in premiums, $100.50; expenses, $35.17; balance in hand, $23.09.

HARPURHEY.—One hundred and eighteen members; subscription, $120; balance on hand from 1857, $25.42; Government grant, $95.83; sundries, $1.62; total, $242.87. Paid in prizes, $172; expenses, $34.60; balance in Treasurer's hands, $36.27.

HAY.—Fifty-five members; subscription, $107.65; Government grant, $57.39; received for prize wheat sold, $1.79; total $166.58. Paid amount due from previous year, $63.10; premiums at show and ploughing match, $63.50; expenses, $15.82; balance in Treasurer's hands, $24.16.

HOWICK.—Ninety members; subscription, $90; share of Government grant, $19.30; total $160.30. Paid in premiums, $113; expenses, $2.50; balance in Treasurer's hands, $44.80.

STANLEY.—Fifty-eight members; subscriptions, $57; Government grant, $30.37½; total, $87.37. Paid premiums, $53; expenses, $3.50; amount due from previous year, $10.62½; balance in Treasurer's hand, $20.25.

TURNBERRY AND MORRIS.—Forty-four members; subscribing $1 each. No further report.

WAWANOSH.—Forty-four members; subscription, $52.50; Government grant, $40.27; portion of Canada Company's prize wheat sold, $1.87; total receipts, $94.64. Paid premiums, $30; expenses, $16.22; balance $48.42.

KENT.

COUNTY SOCIETY.—Amount of subscription, $174; balance from 1857, $233.88, deposited by township branches, $312; Government grant, $900; sundries, $500; total receipts, $1624.88. Paid township branches, $751.92; premiums at shows and ploughing match, $377.25; buildings and preparations for exhibition and other general expenses, $276.87; balance in Treasurer's hands, $218.84.

Officers, 1859.—President, George Wade Foott, Chatham; Secretary, Richard Monck, Chatham.

Extract from Report.

"The President and Directors regret to be obliged to state that this County has suffered more from the weevil or wheat midge than any other county in the Province, which must operate to a certain extent against the prosperity of this Society.

"This great scourge, combined with a steady wet spring, caused great and unprecedented distress amongst the agricultural population; indeed all classes must be affected by want of success in the farmer. Besides all this, little or no wheat has been sown during the last fall, and as the weevil or midge has extended its blight to barley and oats, we may venture to predict, unless the agriculturists can find some practicable remedy for or can destroy the weevil, or give up altogether the growth of grain, and turn their attention to the dairy and grazing, hard times will not pass away so readily as some imagine.

"The low prices this year in England, is, to us a great source for thankfulness; had prices ranged in that country as they usually do, the price of flour would reach a figure beyond the means of numbers who heretofore had plenty of their own to dispose of.

"During the past year through the liberality of the County Municipal Council your Directors were enabled to put a good and sufficient building on the Fair Ground, at a cost of $650, for the use of the farmers and others attending and exhibiting their stock, grain, roots and manufactures, for which prizes are awarded by the society at the Annual Fair. The increased numbers attending the last Fair over former years we attribute to the convenience afforded by the building, which, with a small additional outlay we hope to make this season, we trust will be found well adapted to the wants and requirements of those attending.

"According to custom, your Directors had their annual ploughing match. It was as satisfactory to see the increased number of competitors, as the evident improvement in the ploughs. The farmers take great interest in those annual trials of skill. Considering the state of the ground, hard and brittle from dry

weather, the ploughing was very well completed, and your directors believe they could not pick out 33 men in their several classes who would have done better. The money paid in prizes was exceedingly well laid out.

At a trial of mowing machines, between one made at Ingersoll, called "Manning's Patent," and one made in Buffalo at the agricultural works, and called "Kirby's Patent;" Kirby's was by all odds the best. It cut clean and was free from clogging, and in draft far easier to the horses. In fact an ordinary pair of horses could work the entire day without being distressed. We have no hesitation in recommending "Kirby's Patent," both for mowing and reaping, beyond any other machine introduced into this county."

TOWNSHIP BRANCHES.

CHATHAM.—Forty-three members; subscription, $44.50; balance from 1857 $10.53; Government grant, $56.40; total, $111.43. Paid premiums, $72.25; expenses, $13; balance in hand, $26.18.

HARWICH.—Ninety-two members; subscription, $92; Government grant, $120.27; received for services of horse, $124.40; sundries, $1.82; total $338.49. Paid balance due from 1857, $6.52; premiums, $55; paid for keeping horse, $164.38; paid for seeds and carriage of do., $50.61; expenses, $34.50; balance in Treasurer's hands, $27.48. The Directors report having exerted themselves to the extent of the means of the Society, to introduce a good breed of horses, and improved agricultural implements into the township. They make the following remarks in reference to the season of 1858:—

Extract from Report.

"Another such season as the last will oblige many of us to quit tillage altogether. First, we had continual heavy rains all through the month of May and the early part of June; next came burning dry weather, which fairly baked the surface of the land. We were then visited by a kind of rust that many of us had never seen before; it destroyed nearly all the oat crop. We are of opinion that there was not as much of that crop harvested as would supply the amount of seed that was sown. Next came that great destroyer the wheat midge; what the rust left it took. The result of these disasters is, that the best of our farmers are obliged to buy their own bread, who, not many years ago used to have hundred of bushels of grain to sell. Indian corn was the only crop which might be considered nearly an average one; it ripened well, although in many places it was not planted until the 20th of June. We are pleased to notice the great desire many of our farmers have to drain their land. It is to be hoped that a drain tile will be soon made at some of our brick-yards that will answer the pressing wants of many of us.

This being the season for the operations of the lumber-man, we regret to see so many of our farmers obliged to sell so much of their valuable timber, as it will be a serious loss hereafter to those wanting to build."

HOWARD AND ORFORD.—Eighty-eight members; subscription, $86; balance from 1857, $54.33; Government grant, $120.26; total, $260.59. Paid in premiums at show and ploughing match, $116.75; copies of *Agriculturist*, $11.65; sundries and expenses, $88.75; balance in hand, $43.44. The Directors report the Society prosperous, and the exhibition to have been highly satisfactory and beneficial.

Extract from Report.

"As the objects of all agricultural shows are not only to create a spirit of competition in the growth of the different products of the farm, but the obtaining and diffusing of the knowledge necessary in producing the same, so as to

yield the greatest amount of profit to the farmer; it appears necessary that some facts should be given at the time of exhibition, which would be a lasting benefit to and open for all. We therefore suggest to future Directors, that they would consider the propriety of doing as many other agricultural societies are doing, that is, to make it (if not compulsory) highly desirable, that everything shown should be accompanied by a brief account of the soil and seed, when plowed, and how manured, yield, &c., &c., which information should form a part of and belong to the society, and which would soon form a fund of valuable information."

RALEIGH.—Thirty-six members; subscription, $50, balance from 1857, $125.80; Government grant, $70.50; total receipts, $246.30. Amount paid on account of bull, $100; expenses, $12; balance on hand, $134.30. The Directors report that the "Fife" variety of spring wheat was the only kind that had done well during the past season, being quite free from rust, and they proposed purchasing a quantity to retail to members for seed.

TILBURY EAST.—Twenty-nine members; subscription, $50; balance from 1857, $107.50; Government grant, $70.50; total receipts, $228. Paid for a young Durham Bull purchased at Provincial Exhibition, $120; prizes at ploughing match, $15; expenses, $33; balance in hand, $60.

LAMBTON.

COUNTY SOCIETY.—One hundred and forty-six members; subscription, $156.13; balance from 1857, $321.58; deposited by township branches, $297; Government grant, $900; received for wheat and other seeds sold, $88.69; total receipts, $1763.40. Paid township branches, $652.60; paid for seeds, $34.94; paid on purchase of land, $244.66; premiums, $227.88; copies of *Canadian Agriculturist*, $74.50; building and preparations for exhibition, and other general expenses, $136.07; balance in Treasurer's hands, $392.75.

Officers, 1859.—President, Peter McGlashan, Corunna; Secretary, E. Watson, Sarnia; Treasurer, A. Young, Sarnia.

Extract from Report.

"The past season, in an agricultural point of view, has certainly been the most unpropitious that we have seen since this part of the country was settled. The drenching rains of May and the first part of June, were followed by scorching heat and withering drought. On account of the prevalence of the midge the preceding year very little fall wheat had been sown, and that little, though in the early part of summer most promising, proved almost a total failure, being again destroyed by the midge. In the preceding year it had been observed, that very early sown spring wheat had been injured by the midge. This prevented most people from sowing early, and the excessive rains prevented them from sowing at the time intended; so that the greater part of spring wheat was either sown when the ground was utterly unfit for the seed, or so late as to afford no rational hope of a good return. When harvest came much of the wheat was not worth cutting. Very rarely did a field of any extent yield an average of ten bushels per acre, more frequently not more than four or five, and in many cases even less. We may here remark that the Fife wheat was the only kind of spring wheat that escaped rust. Very little of any other variety was worth harvesting. Oats, except those early sown, were no better than wheat, in many cases not returning the seed. Peas are from one-half to two-thirds of an ordinary crop. Indian Corn was very good, both as regards quantity and quality, but unfortunately there was but little planted. Potatos were good in quality,

and generally a tolerably fair crop. Other root crops were considerably deficient in most places. The great advantage of drained land was strikingly exhibited during the past summer, and undoubtedly the only medium crops of grain in the county were grown on lands which either naturally or artificially had this advantage.

Having said this much in regard to the season and the crops, your Board would now briefly advert to their operations during the year. Having read and heard much of the excellent properties of "Hungarian grass," an article lately introduced into the United States, your Board, after considerable difficulty, obtained a sufficient quantity of seed to give it a fair trial. The result, we believe, has been very satisfactory, the crop being very heavy, and all kinds of stock eating it with the greatest avidity. Your Board also procured a small quantity of "Alsike Clover," but another season must elapse, before it can be ascertained whether it will be of any advantage. An attempt was also made to procure a small quantity of "Clinton Potatos," but they could not be obtained.

In regard to stock, we have to report that three small premiums were offered for entire horses to travel within the bounds of the Society during the season. In order to improve the breed of cattle a premium of $50 was offered for the best pure bred bull of any of the following breeds viz: *Durham*, *Ayrshire*, and *Galloway*. We are sorry however, to say, that these premiums were not competed for.

The Annual Exhibition was held at the Society's grounds on the 14th of October last. The weather was favorable, and altogether the Exhibition was better than could have been expected under the circumstances. The number of entries was 464, being about 70 fewer than the preceding year. Horses and cattle were fairly represented. Sheep and hogs were excellent. Wheat and oats were very deficient both in quantity and quality. Other grains were better. Fruit was also very deficient in quantity though a few good specimens were exhibited. Dairy produce and maple sugar were well represented. The Hall was enlivened with some beautiful flowers. Also paintings, daguerreotypes, ambrotypes, &c., and a great variety of needle work. Agricultural implements were more numerous than usual, and some of them were very creditable, both as regards form and workmanship.

Your Board cannot conclude without alluding to the great improvement which has recently taken place in our means of communication with other parts of the country. The opening of the Sarnia Branch of the Great Western Railway, commences a new era for this county, affording, as it does at all seasons of the year, a speedy means of conveyance to all the great marts of the east. Let us hope that with the blessing of a bounteous Providence we may soon be enabled to take full advantage of the facilities thus afforded; and that the "hard times" of which all now complain, may soon be remembered only as a thing of the past."

TOWNSHIP BRANCHES.

BOSANQUET.—New society, organized in January, 1859; fifty-one members; subscribing $1 each.

MOORE.—Ninety-five members; subscription, $91.50; Government grant, $108.95; proceeds of sale of stock, $82; seeds, $2; total, $284.45. Paid Treasurer balance due him from 1857, $34.80; paid for seeds, $13.40; premiums, $130.51; agricultural periodicals, $32.33; expenses, $55.08; balance on hand, $18.33. The Directors' report upon the season and the returns of the crops for the past season is similar in tenor to that from the County Society. They, however, report that the exhibition in autumn was well attended, and the display of the various products unexpectedly good. The following is from the report:—

"Fortunately for our farmers the hay crop was abundant, and stock had in-

creased in the ratio to former favorable seasons, thus enabling many to meet the most pressing of the demands upon them. The corn and late planted potato crop also turned out beyond the expectations of the farmer, the remarkably fine "fall" bringing both to maturity. It must be remarked, however, that the potato crop is not a large one, the early planted being destroyed by the wet, and the price of this vegetable will likely rule high in spring, as large quantities will be required for seed, and for such supply we shall have to depend upon the northern parts of Lakes Huron and Michigan, the crop south having failed as with us."

PLYMPTON.—Fifty-four members; subscription, $57; Government grant, $68.25; balance from 1857, 45c.; total, $125.70. Paid premiums, $70.25; expenses, $3.55; balance in Treasurer's hands, $51.90. The directors report a comparative failure of the crops from the same causes stated by the County Society. They report a marked improvement in the live stock displayed at the annual show.

SOMBRA.—Twenty-five members; subscription, $43.72; balance in hand from previous year, $113.93; no share of Government grant; total receipts, $157.65. Paid for a ram and two boars, $60; premiums $15.75; in hands of late Treasurer, $21.28; expenses, 25c; balance remaining in Treasurer's hands, $60.37.

WARWICK.—One hundred and fifty-three members; subscription, entrance fees, &c., $181.63; Government grant, $178.40; total, $360.03. Paid premiums and notes of hand, $342.85; expenses, $6.89; balance in hand, $10.29.

NORTH LANARK.

COUNTY SOCIETY.—Organised in January, 1858, under 20 Vic. cap. 32; one hundred and fifty-two members; subscriptions, $219.50; deposited by township branches, $119; Government grant, $720; total receipts, $1058.50. Paid for agricultural periodicals, $95; paid township societies, $371.90; paid viewers of crops, $13; erecting sheds, &c., on show ground, $12.5; delegates to Provincial Exhibition, $20; expenses of stallion, $67.91; premiums, $127.25; general expenses, $108.51; balance in Treasurer's hands, $129.93.

Officers, 1859.—President, John Menzies, Almonte; Secretary and Treasurer, David Campbell, Almonte.

Extract from Report.

"The crop-viewers make the following observations: 'That it was with pleasure they observed the spirit of emulation existing among the farmers, with regard to the improved mode of cultivation, also the very great improvement of comfortable dwelling houses erected and being erected, other requisite buildings, fencing and laying out of the farm, &c., it was also remarked that the crops in general had a fine appearance, and would be fully an average. The potatoes had a splendid appearance. The crop-viewers cannot refrain from remarking the wide difference that exists between those farmers who unite themselves with agricultural associations, and are in the habit of studying works on agriculture and agricultural periodicals, and those who stand aloof from those things.'

It might also here be stated, that the crops were secured in good condition, with the exception of potatoes. About the end of September and beginning of October, that crop was suddenly affected with blight on the leaves and stalks, speedily reaching the tubers, causing immediate rot, many fields being com-

pletely destroyed, heavy soils suffering most, while those on dry light land partially escaped. It is greatly feared there will be a scarcity of this root in the spring."

TOWNSHIP BRANCHES.

LANARK.—Balance on hand from 1857, $12.86; amount of deposit and Government grant for the year 1857, $109.2½; subscription, 1858, $72; Government grant, 1858, $131.90; received for garden and clover seeds sold to members, $98.30; total receipts, $424.08½. Paid for copies of *Agriculturist*, $20; paid for seeds, $136.66½; prizes, $72.90; paid for a ram, $16.70; expenses of management, $25.57; balance in treasurer's hands, $152.25.

PAKENHAM.—Twenty-six members; subscription, $57; balance from 1857, $10.68; Government grant, $121; total, $188.68. Paid in premiums, $166.41; expenses, $14; balance in hand, $8.27.

NORTH LEEDS AND GRENVILLE.

COUNTY OR ELECTORAL DIVISION SOCIETY.—Organized in 1858; one hundred and eight members; subscription, $139.55; deposited by township societies, $110; Government grant, $626; total receipts, $875.55. Paid township branches, $371.10; copies of *Agriculturist*, $5,00; prizes, $371; expenses, $56.22; balance in hand, $72.23.

Officers, 1859.—President, Gideon Leehy, Frankville; Secretary & Treasurer, William Smith, Frankville.

Extract from Report.

"We have much pleasure in stating that the Society is making steady and onward progress. The annual exhibition at Frankville in the Township of Kitley on the first Wednesday in October last, was well attended by exhibitors, also by a large number of spectators, who were much pleased with the proceedings. The ladies' department was well represented. The show of horses was decidedly a great improvement in that class. Cattle were not so good as expected, especially cows; we think one reason of this is the selling off always of the best ones. Some young bulls and heifers of superior breeds have been introduced and will be a great improvement. There has been more anxiety to obtain good sheep, and some very nice ones have now been purchased and exhibited by members. Hogs are very much improved. The Kitley Branch Society was famed for its good show of hogs, but your last exhibition excels all heretofore known in that township.

The Agricultural and Horticultural Departments were well represented, and as has been said, 'Agriculture, with its twin sister Horticulture, may be considered as the immediate precursors of human civilization, and we find that all nations advance in general and individual prosperity in proportion to their progress in, and to their attachment to agricultural pursuits.'"

TOWNSHIP BRANCHES.

SOUTH GOWER.—New society; forty-nine members; subscription $42. No further report.

OXFORD.—Forty-nine members; subscription, $62; Government grant, $166.40. Paid in premiums, $171; expenses, $25.22; balance in hand, $32.18.

WOLFORD.—Balance from previous year, $53.50; subscription, $41; Government grant, $100.70; total, $195.20. Paid in premiums, $156.75; expenses, $28.20; banance on hand, $10.25.

SOUTH LEEDS.

COUNTY SOCIETY.—Organized, 1848; Fifty-four members; subscription, $62; deposited by township branches, $230; Government grant, $720; contribution from Gananoque Society in aid of Exhibition, $115.12; total $1107.12. Paid for seed wheat from Montreal, $26; paid for *Agriculturist*, $27; delegates to Provincial Exhibition, $24; paid township branches, $662; paid premiums, $319.50; expenses, $48.62.

Officers, 1859. — President, Dr. Richmond, Gananoque; Secretary and Treasurer, Wm. Brough, Gananoque.

Extract from Report.

"With the view of procuring a change of seed, the Society last Spring authorised the President to proceed to Montreal to procure a quantity of "Fife" or "Scotch" wheat, suitable for seed. It was supposed that the change of soil and climate would improve the crop, and this idea was found to be correct.—Even when growing a visible difference could be observed between the fields of wheat raised from the Montreal seed, and the fields where seed of our own growth had been sown; and on threshing the difference was also quite apparent. The wheat raised from the Montreal seed was decidedly plumper and heavier than the other.

In this section the wheat crop as a whole was much lighter than the crop of last year, and the wheat was generally of poorer quality. It was not injured either by insect or rust, but the ears did not *fill up* as they did in 1857. A large breadth of wheat, however, had been sown, and probably in no one year before was so much wheat *sold* by our farmers as in last year.

The crop of oats, barley and other coarse grains, was also very light, and the potato crop was nearly an entire failure.

The Society's first Exhibition was held on the 12th of October, 1858, and was very successful. Great interest was excited in the surrounding country, and the attendance was very large. The farmers generally, and not the members alone, seemed to take a deep interest in the proceedings. For most of the prizes there were numerous competitors, and so great was the merit of all the articles and animals entered in some classes, that the judges had much difficulty in giving their awards.

During the past year the Society have taken 54 copies—being one copy for each member—of the *Canadian Agriculturist* and *Journal & Transactions* of the Board of Agriculture, published by the Provincial Board of Agriculture, and have derived no little advantage from the valuable information communicated by that excellent publication."

TOWNSHIP BRANCHES.

GANANOQUE.—Fifty members; subscription, $100; Government grant, $187.85; total, $287.85. Paid prizes at ploughing match, $46; paid for keeping of bull and boar owned by the Society, $30; grant to County Society in aid of joint exhibition, $95.12; balance in treasurer's hands, $116.73. The County Society's Exhibition being held in Gananoque, the Township Society did not hold one of their own, but merged their funds for the purpose with those of the County Society. Their ploughing match was very successful. The Society reports owning a valuable Ayrshire bull, a Berkshire boar and several Leicester rams.

BASTARD AND CROSBY.—This society deposited $180, and received $244.15 of the government grant, but have forwarded no report.

LENOX.

COUNTY SOCIETY.—One hundred and eleven members; subscriptions, $111.50; balance from 1857, $10.16; deposited by township societies $217; Government grant, $720; total receipts, $1058.66. Paid township branches, $434; paid premiums, $491; expenses, &c., $95.72; balance in treasurer's hands, $37.93½.

Officers, 1859.—President, Edwin Mallory, Parma; Secretary and Treasurer, Charles James, Napanee.

TOWNSHIP BRANCHES.

NORTH FREDERICKSBURGH.—Sixty six members; subscription, $66; Government grant, $66; total, $132. Paid premiums, $102; expenses, $20.65; balance in hand, $1 35.

SOUTH FREDERICKSBURGH.—Sixty seven members; subscription, $80; balance from 1857, $26.03; Government grant, $76; total $182.03. Paid in premiums, $127.37; agricultural periodical, $20; expenses, $35.10; balance due treasurer, 44c.

RICHMOND.—Fifty-two members; subscription, $75; balance from 1857, $3; Government grant, $75; total, $153. Paid premiums, $135.37; expenses, $13.70; balance in hand, $3.93.

LINCOLN.

COUNTY SOCIETY.—Three hundred and forty-six members; subscriptions, $346; deposited by township societies, $475; government grant, $900; grant from town of St. Catharines, $40; receipts at hall door during show, $39.25; total, $1800.25. Paid township branches, $1004.94; paid in premiums at Spring and Fall Fairs, $500.50; expenses, $106.43; balance in hands of treasurer, $188.38.

Officers, 1849.—President, J. W. O. Clark, Jordan; Secretary, Thomas L. Helliwell, St. Catharines; Treasurer, James Laurie, St. Catharines.

TOWNSHIP BRANCHES.

CLINTON.—Ninety-five members; subscription, $102; Government grant, $113; total receipts, $215. Paid in premiums, $170.50; expenses, $25.54; balance in hand, $18 96.

GAINSBRO'.—Fifty members; subscription, $50; Government grant, $48.87; total, $98.87½. Paid in premiums, $71.12; expenses, $13.06; balance in hand, $14.69.

GRANTHAM.—Two hundred members; subscription, $247.50; balance from 1857, $114.71; Government grant, $238.73; receipts at fair, $22; total, $622.94. Paid in premiums, $471.75; expenses, $58.72; balance in treasurer's hands, $92.47.

GRIMSBY.—Forty-four members; subscription, $58; grant, $56.84; balance from 1857, $6; total $120.84. Paid premiums, $108.62; expenses, $11.22.

LOUTH.—Fifty-six members; subscription, $84; balance from 1857, $4.41; Government grant, $81.81; total, $170.22. Paid in premiums, $145; expenses, $22.65; balance, $2.57.

NIAGARA.

ELECTORAL DIVISION SOCIETY.—Embracing the town and township of Niagara; established in 1858; eighty-one members; amount of subscription,

$153. Owing to a lengthened correspondence with the Government department in regard to the interpretation of the part of the act relating to the Electoral Division Societies of the class to which Niagara belongs, the paying of the public grant to this society was deferred till early in the year 1859, after the annual meeting, and consequently the sum does not appear in the report.

Officers, 1859.—President, E. C. Campbell, Niagara; Secretary & Treasurer, F. M. Whitelaw, Niagara.

Extract from Report.

"No show was held during the past year, in consequence of the non-payment of the Government grant, which still remains unpaid, but they hope that the sum will soon be realized. They regret the difficulty which deprived this section of the Province of the annual exhibition and competition in their own town and township, inasmuch as the agriculturists, horticulturists and mechanics thereof, it may be recollected, proved the warmth of their zeal in the respective interests by their numerous entries and prizes at the Provincial Exhibition.

This section may be viewed as representing a large strip of the garden of Upper Canada, and the omission alluded to caused some murmuring.

They beg further to report that an enterprising agriculturist, R. N. Ball, Esq., is about to introduce the growing of hemp as an experiment, and as a substitute (at present at least) for the wheat crop, which has for a few years suffered from the insect.

They beg further to report, that the Secretary of the Provincial Association caused to be delivered to the President of this Society, about eight bushels of seed potatoes, comprising nearly twelve varieties, to be distributed and cultivated in this section—many of them seedlings, and some varieties heretofore introduced and proved. These may be had at anytime in the Spring, by those intending to test the qualities by planting.

The Directors regret to add, that the inhabitants of the township have not manifested a liberality corresponding with that of the town, although a large portion of agricultural prizes must necessarily be awarded to the former.

The sum subscribed in the Township amounts to about ten dollars, while that of the town and vicinity amounts to over one hundred and twenty-five dollars. If a change be not made in this respect, the inhabitants must blame themselves if, in their annual shows hereafter, they are necessarily met with a return co-extensive with their own liberality. But from the assurances made by one of the Directors present, of fair promises on the part of agriculturists in the township as soon as the society appears in earnest in their operations, the Directors doubt not that their next report will be more satisfactory.

MIDDLESEX.

County Society.—Two hundred and thirty-three members; subscription, $270; balance from previous year, $224.92; deposited and subscribed by township branches, $780; received for rent of property, $100; Government grant, $900; total, $2301.87; Paid premiums at Spring fair, $129; premiums for sheep shearing, $10; paid township branches, $1320.92; paid premiums at Fall fair, $439; expenses of delegates and judges to Provincial Exhibition, $40; expenses and sundries, $166.45; balance in treasurer's hands, $196.49. Electoral Division Societies were organised in January, 1859, for the East and West Ridings.

East Riding, Officers, 1859.—President, J. B. Askin, London; Secretary, John Peters, London; Treasurer, John Stiles, London.

West Riding, Officers, 1859.—President, Thomas Moyle, Strathroy; Secretary and Treasurer, James Keefer, Strathroy.

Extract from Report.

"We are happy to congratulate the society on both the exhibitions; not only in the number but the excellence of the animals, seeds and articles exhibited over all previous years. We are glad to remark in one or two of the township societies' reports much more full of details than they have been in the habit of giving, not only of their exhibitions but of the crops, and the general state of agriculture in their neighborhood. We would here suggest the propriety of the various townships sending on their reports earlier; it is true that there is only one week allowed by the present act between the day of elections of officers for the township and county societies, but in most instances the report of the township societies might be made up immediately after their Fall exhibition. We would suggest an alteration in the act, changing the time of the annual meetings of the township and county societies so as to give a good space between hand.

At present the County Society derives but small assistance from the townships, London and Metcalfe being the only two who are represented at the board by a subscription of ten dollars.

Since the last annual meeting no change has taken place in the claim made upon us by the county of Elgin, and all landed property in the city of London being still so depreciated as to be nearly unsaleable, it is not the interest of any party to force a sale until the times mend.

An effort has to be made to secure the Provincial Exhibition at this place in 1860—for the coming year it will be held in Kingston. The residents of Hamilton are exerting themselves to have it next, and already their subscriptions are large.

Of course it is a very desirable object to this society and our farmers to secure the Provincial Exhibition to this locality every third year, but it is an object just as desirable to all other classes of the community, and we may fairly call upon the City and County Councils as well as our merchants and all persons who desire our prosperity and progress to assist in a liberal manner the exertions we as a body are ready to undertake.

A Committee has been appointed with power to add to their number, for the purpose of taking proper steps in this matter, and we feel assured that you will all strive to the utmost to aid them."

TOWNSHIP BRANCHES.

ADELAIDE.—Fifty-four members; subscription $53; balance from 1857, $1.10; Government grant, $32.50; total, $86.60. Paid prizes at show and ploughing match, $52; paid for keeping live stock lately owned by society, $18; expenses, $7.55; balance, $9.05. The Directors report that they had sold all the live stock formerly owned by the society, and they were of opinion that the most advantageous application of the funds was in giving premiums for ploughing, live stock and agricultural and mechanical productions.

DORCHESTER.—Seventy-three members; subscription, $102.50; balance from 1857, $28.62; grant, $62.92; total, $184.04. Paid in prizes, $132.50; expenses, $44.68; balance, $6.86.

LOBO.—Ninety-nine members; subscription, $100; balance from 1857, $3.46; public grant, $68.45; total, $176.91. Paid for a bull, $100; sundry payments—service not stated—$71.80; balance in hand, $5.11.

LONDON.—One hundred and three members; amount subscribed, $134.75; balance from 1857, $54.27; grant, $91.79; total, $280. Paid in premiums, $216.50; expenses, $41.50; balance $22.

Extract from Report.

"We congratulate you upon the energy and enterprise of our farmers and breeders. London Township possesses many fine herds of improved breeds of cattle, sheep and swine, which we flatter ourselves would compete favourably with any in the Province. Reaping, mowing and other labor-saving machines are used on many farms in the township.

We have great pleasure in reporting the crops generally pretty good, although wheat is beneath the average crop, owing to the heavy rains in the last of May and the first of June, and to the ravages of the weevil and midge, and the effect of rust; the last has been the most detrimental to the wheat crop in this township. We feel confident that it might be much mitigated, as the wheat most injured has been the late or winter killed Fall wheat and the late sown Spring wheat. We would therefore urge upon the farmers the increasing necessity of a higher cultivation, and an increasing attention to the draining of their lands generally thereby securing an earlier harvest.

We consider our barley crops an average, and the grain a better article than last year. This crop is coming more into note, and there is a considerable breadth now sown in this township.

The oat crop is below an average, owing to drought and rust.

The peas sown upon high lands were generally pretty good, but those sown upon low lands were below an average. We are happy to state that the ravages of the bug have almost disappeared in this section of the country.

Rye, Indian corn, flax and buck-wheat are very little grown in this township.

The hay crop was above an average and of an excellent quality.

The Sweed turnip crop was about an average, although it suffered considerably from the fly. We are happy to observe such a breadth of land sown with that valuable crop. A few years ago it was a rare thing to see a farmer with half an acre, now we see many farmers with from three to ten acres.

Carrots and mangold-wurzel, are not very much sown, although our soil is well adapted to the growth of them.

That valuable crop, the potato, is below an average, owing we believe to the heavy rains and cold weather in the Spring—in quality they are excellent. We would further report that many of the farmers have turned their attention to the dairy to a considerable extent, to the making of butter in particular, and some few to the making of cheese, and we hope that many more will follow their example, as we believe our lands as well adapted to dairy purposes as any in the Province.

METCALFE.—Ninety-two members; subscription, $108.25; grant, $69.73; balance from 1857, $83.25; received from the sale of live stock, $123.40; total, $384.63. Paid for animals and keeping the same, and other expenses, $357.32; balance, $27.31.

MOSA.—Sixty-seven members; subscription, $67; balance from 1857, $33.19; grant, $34.57; total, $134.76. Paid in premiums, $78.50; copies of *Agriculturist*, $18.50; expenses, $30.19; balance, $3.43.

WEST NISSOURI.—Amount of subscription, $180; Government grant, $90.72; received on account of animals, $49.48; total, $320.20. Paid in prizes $102; other payments, $186.25. The Directors report the Society in possession of three good Devon bull, and several sheep and pigss, which animals are distributed through the township for the improvement of the live stock. They also report.

"The root crop is much neglected in our township. Turnip fields are few and too far between; mangold wurzel is little known, and only two entries of it

were made at the fall show. Spring wheat, barley, Indian corn, oats and peas are all productive crops in Nissouri West. Fall wheat not growing so well."

WESTMINSTER.—Eighty-six members; subscription, $94; balance from 1857, $17.08; grant $56.70; total, $167.78. Paid in premiums, $138; expenses, $28.50; balance, $1.28.

WILLIAMS.—Amount of subscriptions, $49.40; balance from 1857, $16.18; grant, $32.84; total, $98.42. Paid in premiums, $60.20; expenses, $24.35; balance, $13.87.

EAST NORTHUMBERLAND.—One hundred and ten members; subscription, $110; deposited by township societies, $255; government grant; $720; total, $1085. Paid township societies, $787; premiums, $280.25; expenses, $39.17; balance, $78.58.

Officers, 1859.—President, Robert Garbutt, Brighton; Secretary, A. J. Wright, Brighton; Treasurer, John Eyre, Brighton.

Extract from Report.

"The exhibition was held in Brighton, on the 15th October. Your Directors would beg leave to make a few remaks upon it. To take the whole display of stock, grains, &c., individually, would perhaps be unnecessary, but they feel pleasure in bringing a few of what they deem worthy of notice under your consideration. Of the class of horses, they can with satisfaction say that, the number was not only large but specimens good, and some were deserving of notice not only here but in more extensive exhibitions. Cattle, we can safely assert, were not only good but numerous in all departments. In sheep, your Committee feel especial gratification in stating as our opinion that the display was superior. If the class of Swine was not so numerously represented, still they were in many instances good.

Poultry, although not so generally esteemed as they deserve for their real worth, were both numerously and well represented, and we should desire rather an increased than diminished exhibition for the future.

When the season and depredations of insects are taken into consideration, your Directors feel more than common gratification in stating, that the display of grain was superior. Spring wheat shown by Mr. J. H. Proctor, would have stood well in the best of seasons, and particularly in this.

Roots were unusually good, the number of entries large, and would have shown to advantage anywhere.

In the Horticultural department, although good for the season, your Committee can only attribute the deficiency in excellence from former seasons, to the universal causes of blight and insects.

The Home Manufactures were not only good in quality but to the satisfaction of your Committee, and worthily represented, showing a proof of interest in the ladies for the production of not only the farmer's comfort but good to all.

In the Implement department your Committee would beg leave to mention a pair of Horse-hoes belonging to Mr. Black, and, as they understand, of his manufacture, and could wish to see a like interest shown by more of your members. Although there were many articles exhibited under that class, your Committee do not consider any others worthy of particular notice."

TOWNSHIP BRANCHES.

BRIGHTON.—Sixty-eight members; subscriptions, $68; balance from 1857, $101.22; grant, $115.22; received for seeds sold, $90; total, $374.44. Paid for seeds, $90; premiums, $113.10; expenses, $22.50; balance, $148.84.

CRAMAHE.—Forty-seven members; subscriptions, $48.50; balance from 1857, $29.28; grant, $71.16; total, $148.94. Paid in premiums, $107.50; expenses, &c., $34.60; balance, $6.84. The directors report that considerable depression had been caused amongst the farmers by unfavorable seasons and the depredations of destructive insects.

MURRAY.—Forty-five members; subscriptions, $45; grant, $76.27; total, $121.27. Paid in premiums, $90.57; expenses, $9.50; balance, $21.20. The Directors report that the liberal introduction of well bred stock, and of pure and good varieties of seeds, together with other improvements, principally in consequence of the efforts of the Society, is fast placing the township in a prominent and highly creditable position as regards its agriculture.

PERCY.—Fifty members; subscriptions, $54; Government grant, $88.02; total, $142.02. Paid in premiums, $101.12; expenses, $13.08; balance, $27.82.

SEYMOUR.—Forty-seven members; subscriptions, $53; balance from 1857, $7.50; grant, $81.34; total, $141.84. Paid in premiums, $86; copies of *Agriculturist*, $24; expenses, $16; balance in hand, $15.84.

WEST NORTHUMBERLAND.

COUNTY SOCIETY.—One hundred and thirty-five members; subscriptions paid, $129; deposited by township societies, $181; Government grant, $720; total receipts, $1030. Paid township branches, $612.99; paid in premiums, $317.55; copies of *Agriculturist*, $62.50; expenses, $76.75; balance due Treasurer, $39.79.

Officers, 1859.—President, Asa A. Burnham, Cobourg; Secretary, Charles Bourn, Cobourg.

Extract from Report.

"The crops generally have proved short, and the ravages of the grasshopper have, in several places, entirely destroyed the root crop. With regard to the stock in the county, your directors think that it is generally improving, and that the superior animals do not now remain in the hands of a few persons only."

TOWNSHIP BRANCHES.

HALDIMAND.—Amount of subscriptions, $80; public grant, $190.94; total $270.94. Paid in premiums, $111.90; expenses, and balance due Treasurer from 1857, $26.02; balance in Treasurer's hands, $133.02. The directors report the failure of the root crop from the ravages of the grasshopper.

HAMILTON.—One hundred and fourteen members; subscription, $123; Government grant, $241.06; balance from 1857, $56.67; total $420.68. Paid in premiums, $318.25; expenses, $44.10; balance in Treasurer's hands, $58.33.

Extract from Report.

"The directors, with the view of improving the breed of horses in the township, offered a premium of eighty dollars for a stallion to travel in the township during the season; this offer brought out a fine display of horses, from which the Judges selected for the prize the horse Tippo Goodenough, the property of C. Powers, of Darlington. The annual show, in October, was by far the largest and most successful the Society has ever had. The show of horses, cattle, and sheep being a marked improvement both in numbers and quality over former shows, while the show of grain, roots, &c., was much better than could have been expected, considering this unfavorable season. We regret to have to report that the past season has been a very unprosperous one for the farmer—the wet, back-

ward weather in the spring prevented many crops from being sown in due season or in proper condition. The fall wheat was severely damaged by rust and the wheat fly, while spring wheat yields much less to the acre than usual. Oats were injured by an unusual blight and proved a very light crop, and the various root crops which are now largely grown in the township were seriously damaged, and in many cases totally destroyed by grasshoppers, which likewise proved very destructive to clover seed and pastures."

NORFOLK.

COUNTY SOCIETY.—One hundred and fifty-two members; amount of subscriptions, $215; balance from 1857, $136.38; deposited by township branches, $292; admission fees at exhibition, $123.36; rent of booths at do $15; legislative grant, $900; grant from county, $50; total receipts, $1730.74. Paid Windham branch, Government grant for 1857, $111; paid township branches subscription and public grant for 1858, $584; paid in premiums at ploughing match and exhibition, $630.65; expenses, &c., $159.25; balance in Treasurer's hands, $246.84.

Officers, 1859.—President, Oliver Blake, Esq., Waterford; Secretary, D. W. Freeman, Esq., Simcoe; Treasurer, Henry Groff, Esq., Simcoe.

TOWNSHIP BRANCHES.

CHARLOTTEVILLE.—Seventy-eight members; subscriptions, $78; balance from 1857, $347.33; note, $25; Government grant, $62; total receipts, $522.33. Paid premiums at ploughing match and show, $105; expenses, $16.67; balance in hand, $400.66.

Extract from Report.

"Your officers and directors, in connection with officers and directors of the Woodhouse Society, decided upon having a union ploughing match, to take place on the 24th day of April; and also a union show, to take place on the 12th October. Although the day for the latter was very unfavorable, still the result was very creditable, there being a much larger quantity exhibited than on any previous year, especially in grain and vegetables; a very marked improvement was observed in sheep, and some improvement noticed amongst the hogs. We think more attention to the improvement of our stock of horses is much needed, as the Woodhouse Society took away all the best prizes in them.

"The financial affairs of your Society are in a state now that will enable you to purchase some improved stock, which, we think, would be a great advantage to the Society."

TOWNSEND.—Eighty members; subscriptions, $80; balance from 1857, $4.37; grant, $80; received on account of bull sold, $40; total, $204.37.—Paid in premiums, $143.65; expenses and sundries, $40.25; balance in hand, $20.47. The directors report a satisfactory progress in the improvement of stock, farm implements and field cultivation.

WALSINGHAM.—Seventy-three members; subscriptions, $73; grant, $70; balance from 1857, 75 cents; total, $143.75. Paid for stock, $[illegible]00; premiums, $36.75; expenses, $4.45; balance, $2.55.

WOODHOUSE.—Eighty members; subscriptions, $80; Government grant, $80; balance from 1857, $213.68; total, $373.68. Paid in prizes at union ploughing match and show, $107; paid for a bull, $35; expenses, $1.50; balance in Treasurer's hands, $230.18.

NORTH ONTARIO.

COUNTY SOCIETY.—One hundred and eight members; subscriptions, $112; deposited by township societies, $224; Government grant, $720; fees, &c., at

exhibition and ploughing match, $82.62; total receipts, $1138.62. Paid township societies, $656; paid premiums at ploughing match and fair, $344.50; expenses, $66.50; balance in Treasurer's hands, $71.62.

Officers, 1859.—President, T. C. Foreman, Reach; Secretary, Charles Payne, Reach; Treasurer, William Boynton, Reach.

TOWNSHIP BRANCHES.

BROCK.—Forty-one members; subscriptions, $41; balance from 1857, $9.40; grant, $79.07; total, $129.47. Paid in prizes, $96; expenses, $7.66; balance, $25.84.

REACH.—One hundred and twenty-one members; subscriptions, $144; balance from 1857, $45.57; Government grant, $233.36; total receipts, $422.93. Paid in prizes at fairs and ploughing match, $267; expenses, $52.10; balance in hand, $103.83. The directors report a satisfactory attendance at the several exhibitions, seed fair, ploughing match, &c., and an evident improvement in the various products and trials of skill in competition.

THORAH AND MARA.—A new society, organised in January, 1859.

SCUGOG.—Also a new society, established 1859.

UXBRIDGE.—Sixty-two members; subscriptions, $60; grant, $119.57; total, $184.57. Paid in prizes, $122; expenses, $7.10; balance, $55.47.

SOUTH ONTARIO

COUNTY SOCIETY.—One hundred and thirty-five members; subscriptions, $139; balance from 1857, $209.03; deposited by townships, $408; Government grant, $720; admission fees, &c., at show, $132.15; donations, plough and harrow, $30; total, $1638.18. Paid townships, $840; premiums at show and ploughing match, $498.50; expenses of management and sundries, $176.84; balance in hand, $123.34.

Officers, 1859.—President, Ebenezer Birrell, Greenwood; Secretary and Treasurer, John Shier, Whitby.

Extract from Report.

"The sixth annual exhibition of the Society was held at Whitby on Wednesday, the 22d of September, 1858, at which 739 entries were made, being an increase of 142 or about 24 per cent on the previous year, and premiums to the amount of $407.50, and 65 diplomas were awarded. This exhibition fully sustained the character of the society for progress and improvement. The ploughing match was held in Whitby on the 3d of November, when, although the day was most unpropitious, 23 ploughs were entered. The sum of $91, including a plough ($20) and a pair of harrows, ($20) was awarded in premiums. The harrows being presented as a donation to the society for this purpose by Messrs. Johnston & Allen, Implement makers; and the plow was sold to the society at half-price, ($10) by the makers, Messrs. Rice & Clayton, being a donation of $10 on their part.

"It is with regret that we notice that within the last two years, the midge or wheat-fly has made its appearance within our borders. In 1857 it appeared in some fields on the lake shore, and in 1858 advanced some miles inland. As a preventive against the midge or fly, as well as a caution against a failure of the wheat crop, we would recommend that more attention be given to draining, a more extensive culture of root crops, a proper rotation of crops adapted to the nature of the soil, carefully avoiding consecutive grain crops, especially of wheat, on the same land, and more attention to dairy husbandry.

"It is with pleasure that we notice the steady progress making in this county, as well as in the Province generally, in the manufacture of improved agricultural implements, among the manufacturers of which, in this county may be named, the Oshawa Manufacturing Company, Messrs. Johnston & Allen, Messrs. Rice and Clayton, and M. W. Brown, Whitby, while several of our country blacksmiths are now manufacturing, in our midst, iron ploughs in no respect inferior to the best imported Scotch plough.

"The Woollen manufactories of Messrs. Mathewson, Ratcliff & Co., and Hall & Cowles, East Whitby, we believe will compare favorably with any similar establishments in the Province; while in the manufacture of Cabinet-ware, the Messrs. Fuller & Co., of Oshawa have been very successful competitors at the Provincial Exhibition for several years past."

TOWNSHIP BRANCHES.

PICKERING.—One hundred and eighty members; subscriptions, $204; balance on hand from 1857, $149.39; share of public grant, $200.13; receipts at Floral Hall, $82.79; total, $636.31. Paid in prizes at spring and fall shows and ploughing match, $355.50; expenses, $58.75; balance in Treasurer's hands, $222.03.

Extract from Report.

"In concluding this our report, for the year 1858, we remark that more attention is now being paid to the subject of rotation of crops than could be done at an earlier period of our history. Many of our farmers are fencing their lands in a much more permanent and handsome manner than has hitherto been the case, and in doing this they are arranging their fields in that order and number which will suit that system of cropping which they intend to follow.

"The cultivation of turnips is still increasing, affording the agriculturist the power not only of keeping his improved breeds of stock in a superior and more healthy state, but producing by means of their consumption, a large supply of excellent manure to maintain and increase the fertility of the soil. We are happy also, to be able to state, that the most important and radical improvement of draining is beginning to be generally appreciated and partially practised amongst us.

"The following resolution was appointed to be recorded:—

"*Resolved*—This Society taking into its consideration the fact that the Messrs. Miller of this township, for a long series of years, have devoted much time and capital to the importation of farming stock of all kinds, and that by this means they have in an eminent degree promoted the success of this society and the great improvement in the breed of our live stock, both within and without the membership of our society, and that these gentlemen in all respects have conducted their business in a most exemplary and praiseworthy manner, this society, under these circumstances, feel much gratification in supporting and carrying this resolution of hearty thanks to these gentlemen as an expression of its hearty appreciation of their enterprise and exertions."

WHITBY.—One hundred and five members; subscriptions, $121; balance from 1857, $138.43; Government grant, $112.22; total, $371.65. Paid in premiums at shows, $206.50; expenses, $31.37; balance in hands of Treasurer, $133.78.

EAST WHITBY.—One hundred and thirteen members; subscriptions and donations, $151.65; public grant, $119.65; total, $270.65. Paid in premiums at shows, $188.65; expenses, $27.95; balance, $54.05.

NORTH OXFORD.

COUNTY SOCIETY—One hundred and twenty-two members; subscriptions, $122; received from Treasurer of late County of Oxford Society, $450; deposited by township branches, $404.36; legislative grant, $720; received for services of horse, $145; total receipts, $1841.36. Paid on purchase of a horse, $400; paid township branches, $836.36; premiums, $260.50; expenses and sundries, $193.13; balance in Treasurer's hands, $151.37.

Officers, 1859.—President, Hon. George Alexander, Woodstock; Vice-Presidents, John Barwick, and John L. Wilson, Woodstock; Secretary and Treasurer, William Grey, Woodstock.

TOWNSHIP BRANCHES.

BLENHEIM.—Two hundred and five members; amount of subscriptions, $218; balance from 1857, $200.20; Government grant, $163.30; admission to Hall, &c., $42; total, $623.50. Paid in prizes, $285; expenses, $49.66; balance in hand, $288.84.

Extract from Report.

"The Board would recommend in the prize list, greater inducements for the cultivation of roots for stock, as without such requisite it would be folly to attempt to excel in raising and supporting the best breeds of horned cattle, sheep and swine. Still it is gratifying to witness the great improvement that has already been made in this branch of our economy.

"The Seed Fair, now well established, promises to be of great service, and judging from the interest taken at the last show, we would recommend more liberality in the amounts for prizes; also that the samples continue to be not less than twenty bushels, as it has already been proved that this is no mere show of fine wheat but actually a market for seed wheat, and where farmers can obtain the very best clean seed that can be found in the township, as well as a change from different soils, which is also a matter of the first importance to the careful farmer.

"We are proud to acknowledge the rapid progress of our township within the last few years. Besides the important mills and factories of many kinds, our beautiful rich rolling lands, intelligent farmers, good roads, improved breeds of horses, cattle, sheep, &c., attest our many advantages. No doubt much is due to railroad facilities; we having two important railroads running in a nearly parallel direction from east to west, the whole length of the township, and five railway stations. The Grand Trunk Line also runs within a convenient distance along the north end of the township. Perhaps no other township in the Province offers greater inducements for either agricultural, manufacturing, or commercial enterprise."

EAST NISSOURI.—Forty-three members; amount of subscriptions, $73; balance from 1857, $31.71; public grant, $75.92; total, $180.63. Paid in premiums at show and ploughing match, $132.50; paid for *Agriculturist*, $11.50; expenses, $8.10; balance, $28.53.

EAST ZORRA.—Fifty-seven members; amount of subscriptions, $66; balance from 1857, $11.98; Government grant, $70.57; total, $148.55. Paid in premiums, $81.50; paid on a promissory note, $20; 25 copies of *Agriculturist*, $12.50; expenses, $29.30; balance, $5.25.

WEST ZORRA.—One hundred and one members; amount of subscriptions and entrance fees, $145.25; balance from 1857, $53.51; share of public grant, $120.17; total, $318.93. Paid in premiums at show and ploughing match, $218.50; expenses and sundries, $31.90; balance, $68.53.

SOUTH OXFORD.

COUNTY SOCIETY.—One hundred and forty-seven members; subscriptions, $149; deposited by township societies, $221; received from Treasurer of late County of Oxford Society, $450; legislative grant, $720; total receipts, $1540. Paid township societies, $643; paid in premiums, $437.50; pens, hurdles, &c., for show ground, $93; other incidental expenses, $98.70; balance in Treasurer's hands, $267.80.

Officers, 1859.—President, William S. Light, Woodstock; Secretary and Treasurer, James Scarff, Woodstock.

Extract from Report.

"The funds of this Society for the past year were large, owing to the receipt of a considerable sum from the County of Oxford Agricultural Society; and the Directors were thus enabled to offer a large list of premiums, which, they are happy to say, induced in most of the classes a great deal of competition.—With regard to the exhibition, the Directors were gratified to observe, that it was most eminently successful. The animals shown were such as proved that the farmers of this riding are paying much attention to the improvement of their stock, and especially was this evident with regard to the horned cattle, the number of these being large and the quality superior. In horses the show was remarkably large and good. Although the number of sheep shown was not very great, yet they were of fine quality. The swine exhibited were excellent. The implements, though few in number, were constructed with the latest improvements, and were of superior manufacture. In the ladies' department, as well as that of the fine arts, the show was very fine. With respect to grain, although the wheat crop was greatly injured by the combined influence of the midge and blight, (the worst results being produced by the latter) yet many very fine samples were shown. The other grains exhibited, with the exception of the oats, were of excellent quality, though the crops were much below the average. The show of butter was both large and good. Throughout the other departments the show was very fine. The Directors would urge upon the farmers of the riding the necessity of still further attention to the breeding of improved stock, as well as to the dairying; so that in the event of other failures in the grain crops, the country may not be so heavily oppressed by financial difficulties."

TOWNSHIP BRANCHES.

DEREHAM.—Amount of subscriptions, $75.50; share of public grant, $135.12. Paid in prizes, $122.25; balance in hand, $91.38. Report not complete. The Directors report the efforts of the Society attended with highly satisfactory results, and the different kinds of live stock and other products of the farm well represented at the exhibitions. They urge upon the society the importance of land drainage and a thorough system of cultivation, with greater attention to the improvement of the different breeds of sheep, and maintaining larger flocks of them upon the farm.

NORWICH.—Ninety-four members; subscriptions, $112.50; balance from 1357, $5.34; share of public grant, $169.93; total, $287.77. Paid premiums, $169.25; copies of *Agriculturist*, $5.50; expenses, $33.41; balance in Treasurer's hands, $79.60.

EAST OXFORD.—Fifty members; subscriptions, $62; balance from 1857, $62.01; grant, $126,95; total, $250.96. Paid for copies of *Agriculturist*, $10; prizes, $108.50; expenses, $30; balance in Treasurer's hands, $102.46.

PEEL.

COUNTY SOCIETY.—One hundred and forty-six members; subscriptions paid, $223.75; deposited by township branches, $578; received from Mechanics' Institute and township branches as subscriptions, to entitle their Presidents to sit at Board of Directors, $60; grant from Brampton Municipality, $40; legislative grant, $900; admission fees, &c., at show, $64.99; total, $1866.74.—Amount paid Treasurer, balance due him from 1857, $30.27; paid branch societies, $1118; premiums, $411; paid for *Agriculturist*, $25; general expenses, including printing, advertising, use of tent, musical bands, &c., $226.12; balance in hands of Treasurer, $56.35.

Officers, 1859.—President, James Paterson, Streetsville; Vice-Presidents, Robert Smith, Brampton, and John Snell, Edmonton; Secretary and Treasurer, John Lynch, Brampton.

TOWNSHIP BRANCHES.

ALBION.—Ninety-nine members; subscriptions, $108; balance from 1857, $4.77; share of public grant, $79.68; total, $192.45. Paid in premiums at ploughing match and shows, $166.50; expenses, $19.59; balance on hand, $6.36.

CALEDON.—Fifty members; subscriptions, $82; balance from 1857, $21.25; share of grant, $64.75; fees, &c., $5.25; total, $173.25. Paid in premiums, $127.25; expenses, $21.31; balance, $24.69.

CHINGUACOUSY.—Sixty-two members; subscriptions, $82.45; grant, $29.23; total, $111.68. Paid amounts due from 1857, $31.60; paid in premiums, $88.75; expenses, $13.25; balance due Treasurer, $21.92.

TORONTO TOWNSHIP.—One hundred and seventy members; amount of subscriptions and entrance fees, $226; Government grant, $176.85; balance from 1857, $14; total, $416.85. Paid premiums at spring and fall shows, $269.50; expenses, $74.22; balance in hand, $73.12½. The Secretary reports the show of live stock in autumn as "particularly good, and testifying to the increasing attention of the farmers of the township, to those most necessary branches of good husbandry, breeding and feeding."

GORE OF TORONTO.—One hundred and twenty-nine members; subscriptions, $175; balance from 1857, $27.43; grant, $149.48; total, $351.91. Paid in premiums, $252; subscription to County Society, $10; incidental expenses, $40.17; balance in hand, $49.74.

PERTH.

COUNTY SOCIETY.—One hundred and fourteen members; amount of subscriptions, $177.50; grant from county, $240; deposited by Township Societies, $327; received on account of a bull sold, $127.20; Government grant, $900; received for premium wheat sold, $17.12; donation from Canada Company, $40; total, $1828.82. Paid balance due from last account, $3; paid township branches, apportionment of county grant, $144; paid do. subscription and apportionment of Government grant, $842; paid for copies of *Agriculturist*, $50; paid in premiums, $442; expenses, $245.45; balance in Treasurer's hands, $102.37.

Officers, 1859.—President, Wm. Smith, Stratford; Secretary and Treasurer, Stewart Campbell, Stratford.

TOWNSHIP SOCIETIES.

BLANSHARD.—One hundred and twenty-two members; subscriptions, $138; balance from 1857, $62.65; share of grant from County Council, $60; share of

legislative grant, $195.25; received for services of bull, $35; sundries, $18.25; total, $509.15. Paid in premiums, $324.91; expenses and sundries, $161.31; balance in hand, $22.93.

FULLARTON, LOGAN AND HIBBERT.—Eighty-one members; amount of subscriptions, $183; apportionment of county grant, $68.57; Government grant, $241.25; total, $492.82. Paid Treasurer balance due from 1857, $56.33; paid for *Agriculturist*, $40; premiums, $269.60; expenses, &c., $141.93; balance due Treasurer, $15.03.

WALLACE AND ELMA.—Thirty-four members; subscriptions, $42; balance from 1857, $30; share of public grant, $66.48; share of county grant, $15; total, $153.48. Paid in premiums and expenses, $88.77; balance in hand, $64.72.

PETERBOROUGH.

COUNTY SOCIETY.—One hundred and two members; subscriptions, $105; balance from 1857, $32.39; deposited by township societies, $398; admission fees at show, $12.37; Government grant, $720; received for seeds sold, $158.28; total, $1426.03. Paid for *Agriculturist*, $25; paid for clover seed, $79.17; paid township branches, $828.85; paid in premiums, $352; expenses, $49.97; balance in hand, $97.06.

Officers, 1859.—President, John Walton, Peterboro'; Secretary and Treasurer, J. W. Gilmour, Peterboro'.

Extract from Report, adopted at Annual Meeting, January, 1859.

"It may not be the part of your Board to discuss upon the gloom that now pervades the community, for who need be reminded of the present financial distress, yet they cannot refrain from expressing their regret that the commercial embarrassment felt throughout the Province upon their taking office, still exists; and among the agriculturists, is felt more severely than even last year. The hopes then entertained of an average harvest, (which would in a great measure mitigate the ills felt,) gave some encouragement; but these hopes are crushed. Another harvest past, and the yield much less than that of 1847, has left its effects, the consequences of which are easier told than averted.

Fall wheat has been much injured. In some cases barely justifying the labor of harvesting and threshing, in other cases half the usual amount, and in few instances has the yield exceeded or even amounted to 20 bushels an acre.

The same may be said of Spring wheat, and even to a greater extent has the cereal failed. As in former years the early sown Fall wheat generally succeeded best.

In the year 1857 the midge was the principal cause of the failure of the wheat crop. This insect appears to have caused comparatively little injury the past season. Rust has been at work; but even were this the only disease that affected the wheat, a much greater yield would have been secured. Though from either of the above causes the yield of wheat would have been much lessened, yet what seemed to be the most serious enemy was a sort of blight of a very unusual character, blasting whole fields at one swoop. In examining ears affected by this blight there will be found in the same ear good sound pickles and chaff enclosing the barely formed grain, showing the peculiarity of this disease in selecting as it were so nicely the subjects of its attacks without any apparent cause; hence the common remark that the wheat, although so small in quantity, is fair in quality; the imperfectly formed, blighted grain, being blown out in the cleaning.

Many conjectures have been formed as to the cause of this blight, but no satisfactory explanation has yet been given. There is room for theorizing and speculating on the subject, and every means should be used to discover, if possible, the cause of this and every phenomenon that has a bearing upon agriculture, as thereby some means may be discovered that would lessen the ills of such visitations. From the observations of the past it is found that wheat sown early is less subject to attacks from its various enemies, and better able to withstand these when made. Good farmers taking advantage of past experience have this season made most determined efforts to get their wheat sown early, and your Board venture to say that never was there in this county such a breadth of wheat sown in the early part of September as this year. The grass-hopper considerably injured the early-sown wheat, yet it is hoped that success will follow the effort made by farmers, prompted by observation and experience.

Peas are a fair average crop, and in general a good sample.

Oats are a very light crop, owing in a great measure to the depredations of the grasshoppers. About the latter part of harvest these creatures made their appearance in myriads, eating almost everything before them, and oats were destroyed by them to such an extent as in some cases to render the crop next to valueless. Even what the grasshopper left is very light, the grain not being properly filled, and in but few instances have oats yielded an average crop.

Hay is not heavy, but the harvest being very favourable it was well secured, and if the quantity does not equal that of former years, it will be made up to a great extent by a superior quality. The after math was scant from the ravages of the grasshoppers, and for the same cause the pastures were very bare, consequently the produce of the dairy after harvest has been very deficient, farmers requiring in some parts to commence feeding their cows in the beginning of October, such was the scarcity of grass. Cattle in general have suffered much from this cause, and were not in such good condition as is desired at the commencement of a long and dreary Canadian winter.

Potatoes have been excellent, and yielding bountifully and of superior quality. The culture of this root has been attended with unusual success this season.—May it be the beginning of a series.

Turnips have been this year a failure. The fly in the beginning of the season was very resolute in its work, injuring the plant in its early growth, and so imparing it that often twice and even three times had fields to be ploughed up and sown over again. The plant was thus weakened and retarded in its first stages of growth. Towards the end of the season the grasshoppers commenced their work upon the leaves of the turnip, devouring the tender and fleshy part of these organs. They at length became such adepts at the work of destruction that not satisfied with the leaves they next attacked the neck of the plant, which they seldom left until it was entirely eaten through, thus separating the neck from the tuber. The plant thus deprived of its principal and almost sole means of collecting nutriment was stopped in its growth; and the root stripped and unmatured was of no value. Although some places have altogether, and others but partially escaped the ravages of these intruders, yet the deficiency of this vegetable is general and its want much felt, as farmers in this vicinity have of late depended much upon turnips for the proper wintering of their cattle having recently cultivated pretty generally and rather largely this highly esteemed root.

The events of the past two years may lead to serious inquiry and reflection. The failure of the farmer's staple crop, and that upon which he almost altogether depends, has plunged him into great difficulties. From these circumstances the wisdom of continuing thus to depend upon wheat for his returns naturally forces itself upon his consideration. It is an established fact that when the midge

has made its appearance in any locality, it generally continues to hold possession, doing more or less injury until it is starved out by discontinuing the raising of wheat and thus depriving it of its natural food. This fact alone would lead to a doubt as to the prudence of continuing the growth of wheat to such an extent as formerly. When added to this there are many other difficulties attending the culture of this cereal, it becomes a matter of careful enquiry whether the farmer might not more profitably pay greater attention to the cultivation of the other products of the farm, neglecting wheat culture to such an extent as circumstances might dictate. A few years ago when scarcely anything could command money but wheat and perchance pork, this matter would be surrounded with difficulties; but things are now changed, there is a cash market almost at our doors for all kinds of produce.

Your Board would also call your attention to the fact that the Province is dependent to a very large extent upon foreign exports to supply it with the general products of the farm, and that it will require a large increase in the growth of these articles before the supply will equal the demand. A reference to the imports from the United States for 1857 will show this :—

Animals	$570,035
Butter	39,897
Cheese	152,269
Eggs	18,658
Firewood	64,218
Lard	58,739
Meat	903,264
Poultry	8,045
Tallow	277,569
Vegetables	65,908
Seeds	123,412

The above figures are very suggestive, but your Board would say nothing more than simply recommend them to your consideration.

Another matter naturally suggests itself from this subject, and to which simple allusion may be made, namely, the importance of all Canadians, and especially the farmer, encouraging any branch of industry and home manufacture that can be profitably engaged in, as thereby a greater demand for all products will be created, and he need raise only such articles as are best adapted to his locality. This would be a direct advantage to him, and indirectly he would participate in the general prosperity of the Province, which would arise from an increase in profitable manufacture.

The annual Spring Show of horses was held in the mouth of April, at which there were sixteen entries. The animals exhibited were by no means of a superior class. In this county, there is great need for improvement in this class of stock.

The usual Fall Show was held in October. Your Board, in order if possible, to create and promote a greater and more extended interest in the Society, enlarged the premium list, by increasing the premiums offered for farm produce, vegetables, farming implements, domestic manufactures, and adding a department altogether new, viz., ladies' work and fine arts.

The day of the exhibition was exceedingly unfavorable, the morning being very wet, yet the show was good, the animals shown were on the whole excellent. Although the introduction of many manufactured articles into the list of premiums, had not engaged the public attention, until it was too late to make up such articles in time for the Exhibition, yet even this department was not a failure. It proved that our mechanics, ladies and others, are quite competent by

their united efforts, to make a very creditable show. Your Board scarcely anticipated much more for the first season, than simply to direct the public mind to this new feature in their operations, and induce timely preparations in future. Your board would highly recommend a continuance of this enlarged premium list, as they feel assured it will add much to the interest and success of your Society.

TOWNSHIP BRANCHES.

ASPHODEL, BELMONT, AND DUMMER.—Amount of subscriptions deposited with County Society, $63; share of Government grant received, $68.17. Awarded in premiums, $91.25; due by the society on account of seeds purchased previous year, $112; due members for prizes, $40. The report is very imperfect.

DUMMER AND DOURO.—One hundred and thirty-six members; subscriptions, $155; share of grant, $167.85; received for clover seed sold to members, $39.40; total, $362.25. Paid Treasurer, balance due from 1857, $5.85; prizes, $103.25; paid loan, $80; expenses, $38.16; balance in hand, $134.99. The Directors report that a ploughing match had been held in the township for the first time, in October, 1858, and had excited a large amount of interest in the improvement of that very important farming operation.

OTONABEE.—Sixty members; subscriptions, $65.37; received for clover, turnip, and other seeds sold, $92.93; Government grant, $64.93; admission fees, $10.85; total, $234.08. Paid Treasurer, balance from previous account, $144.14; copies of *Agriculturist*, $10; paid for seeds imported from England, $42.30; premiums, $47.25; expenses, $46.55; balance due Treasurer, $56.16.

Extract from Report.

"Notwithstanding that the failure of the wheat crop, and consequent scarcity of money has retarded improvement, yet a considerable amount has been done in the way of fencing, draining, removing stones, roots, &c., and although but few buildings have been erected, some of them are of a better kind than any before existing in the township. A clover-cleaning machine has been introduced, the first in the township, and some other agricultural machines, but not to so great an extent as in some former years. The society imported turnip and other seeds from England, but owing to the heavy spring rains and subsequent dry weather, together with the ravages of the grasshoppers, root crops did not succeed well. A remarkable feature in the failure of the wheat crop the past season is, that while the quantity is less than one-third of an average, the sample brought to market is almost equal to other years. The society held its show at Allandale, on November 13th, which, notwithstanding the weather was most unfavorable, was a decided success. The Directors strongly recommend the continuance of the annual show, as a means of stimulating farmers to improvement."

SMITH, HARVEY AND ENNISMORE,—One hundred and twenty members; subscriptions, $120; balance from 1857, $74.39; Government grant, $129.92; total, $324.31. Paid on clover seed, $110; plaster, $90; premiums, $54.50; expenses, $64; balance in Treasurer's hands, $5.81

PRESCOTT.

COUNTY SOCIETY.—Sixty-three members; subscriptions, $60; deposited by township branches, $215; Legislative grant, $720; total, $995. Paid township branches, $647; premiums, $299; expenses, &c., $39.40; balance in Treasurer's hands, $9.60.

Officers, 1859.—President, Charles Hersey, L'Orignal; Secretary, S. M. Cushman, L'Orignal; Treasurer, Chauncey Johnson, Jr., L'Orignal.

TOWNSHIP BRANCHES.

CALEDONIA.—Amount of subscriptions, $40; Government grant, $104; total, $144. Paid in premiums, $129.50; expenses, $12; balance in hand, $2.50.

EAST AND WEST HAWKESBURY.—Thirty-seven members; subscriptions, $139; share of grant, $216; total, $355. Paid members' subscriptions to county society, $33; paid premiums, $271; paid expenses of judges of field crops, $24; other expenses, $14.10; balance in hands of Treasurer, $12.90.

LONGUEUIL.—Amount of subscriptions, $53.75; share of grant, $108. No further report of proceedings.

PRINCE EDWARD.

COUNTY SOCIETY.—Sixty-six members; subscription, $66; balance from 1857, $10.62; deposited by township societies, $339; Government grant, $900; receipts at show and use of hall, $30; total, $1345.62. Paid township branches, $877.27; premiums, $337.75; paid for hall, $106.30; paid for *Agriculturist*, $35; expenses, $47.17; balance due Treasurer, $57.87.

Officers, 1859.—President, Lewis B. Stinson, Bloomfield; Secretary and Treasurer, J. P. Roblin, Picton.

TOWNSHIP BRANCHES.

AMELIASBURGH.—Sixty members; subscriptions, $60; balance from 1857, $29.54; share of grant, $95.30; total, $184.84. Amount paid in premiums, $167.44; expenses, $9.30; balance in hand, $8.10.

ATHOL.—Thirty-one members; subscriptions, $55; balance from 1857, $3.45; grant, $87.36; total, $145.81. Paid in premiums, $124.87; expenses, $15.11; balance in hand, $5.83.

HALLOWELL.—Fifty-two members; subscriptions, $52; balance from 1857, $10.50; grant, $79.03. Paid premiums, $122.85; expenses, $134.85; balance in Treasurer's hands, $6.68.

HILLIER.—Seventy members; amount of subscriptions and share of grant, $186.10. Paid in premiums, $151.77; expenses, $12.05; balance, $22.08.

MARYSBURGH.—Amount of subscriptions, $40; balance from 1857, $8.42; share of grant, $63.55; total, $111.97. Paid for clover seed, $100; expenses, $11.97.

SOPHIASBURGH.—Sixty-two members; subscriptions, $65; balance from 1857, $24.60; grant, $96.92; total, $186.52. Paid in premiums, $139.55; expenses, $12.25; balance in hand, $34.72.

RENFREW.

COUNTY SOCIETY.—Ninety-three members; subscription, $105; balance from 1857, $14.03; deposited by township branches, $166.25; Government grant, $720; total, $1005.28. Paid township branches, $380; paid premiums on field crops, $180; premiums at exhibition, $267.75; expenses of judges of crops, $102; other expenses, $132.92; *Agriculturist*, $6.00; balance due Treasurer, $63.40.

Officers, 1859.—President, John McNab, Renfrew; Secretary and Treasurer, George Ross, Renfrew.

Extract from Report.

"The Directors of the County Agricultural Society for the County of Renfrew, in submitting their report are gratified in being able to state that the prospects

of agriculturists in this county are extremely favourable as compared with those of the more westerly parts of Upper Canada. There having been no failures in the crops during past years, many of the old settlers are now becoming comparatively wealthy, and in a position to test the capacity of the soil, by improved cultivation and the introduction of superior implements, and the result has been most satisfactory. Still the Directors have to report that the stock, while excellent as native stock, is not of such a superior character as it is desirable it should be, and this is owing to the want of improved breeds. The same may be said in regard to seeds. But the Directors already observe symptoms of improvement in this respect in many quarters, and they regret that they are not able, from want of funds, to assist in the importation of superior seed and stock. The breed of horses in this county, however, the Directors believe to be equal to that of any county in Canada.

A bountiful harvest crowned the labours of the agriculturist, last year, exceeding that of many former years, notwithstanding the heavy rains of the spring and the long drought of the summer. No appearance of weevil or fly was observed, but in several localities rust made its appearance. The general average of the crops is as follows :—

Fall Wheat—A fair average crop.
Spring Wheat—Fully over an average crop.
Oats—Nearly an average crop.
Peas—Fully a half more than an average crop.
Corn—A good average crop.
Potatoes—Fully a half more than an average crop.
Barley—An inferior crop.
Hay—A light crop.

The judges were much gratified at the several improvements in the culture, fencing and buildings of the various homesteads.

The last exhibition was held on the 6th of October, in the Village of Renfrew, and was more interesting than any former one, while the symptoms of improvement in the young stock, were most encouraging. The weather was pleasant, the assemblage of people large, and the exhibition of stock extensive. In several of the other departments, however, the number of entries were not so numerous as last year; this was occasioned by a new rule of the society, permitting members to make only one entry in such classes.

TOWNSHIP BRANCHES.

Bromley and Ross.—Society organized in August, 1857; in 1858, forty-two members; subscriptions 1857 and '58, $90; share of public grant for 1858, $58; total receipts, $148. Paid in premiums, $62.15; expenses, $21.87; balance in Treasurer's hands, $63.97. The Directors report very satisfactory progress.

McNab.—Fifty-three members; subscriptions, $87.25; balance from 1857, $57.81; share of public grant, $87.25; total, $232.31. Amount paid in premiums, $114.50; paid for copies of *Agriculturist*, $27; expenses, $56.93; balance, $33.88. The Directors report a great improvement in the position of the Society since the previous report, and much greater interest taken in its proceedings, and in the progress of agricultural improvement.

Westmeath.—Forty-eight members; subscriptions, $83; share of grant, $60; total, $143. Paid in premiums, $111.50; expenses, $30.75; balance, $0.75.

RUSSELL.

County Society.—The Townships of Gloucester and Osgoode having been attached to the County of Russell proper, for the purposes of representation in

Parliament, by the Act 16 Vic., cap. 152, they were in consequence also attached to it for the purposes of Agricultural Societies, by the Act 20 Vic., cap. 32, and the society was re-organized in January, 1858. Fifty-two members; subscriptions, $52; subscriptions of four township societies at $10 each, $40; deposited by township societies, $395; legislative grant, $720; total, $1207.—Paid township branches, $418.78; premiums, $630; expenses, $102.50; balance in hand, $55.72.

Extract from Report.

"The Directors, in reference to the report of the Inspectors of crops, regret to observe that the Fall wheat has not generally turned out well, having in some instances suffered by the Fly, and in others being partially winter-killed; on the whole, the crop in this particular, is considerably under an average. The Spring wheat has turned out better, but is also, in quantity, under an average crop. The oats will also in most cases be under an average yield, and not well filled out, while Indian corn is very inferior. The potatoes all over have been a very light crop, although good in a few localities, the quantity also is no doubt considerably diminished, owing to the tendency to rot where stable manure is applied; all other vegetables where care has been taken in the cultivation have made a good return.

"The Directors would still urge on the Society the adoption of a better system of rotation of crops, regarding which there is sufficient information furnished in the agricultural publications; they must however, keep in mind that the rotation must vary according to the quality of the soil, and that no system will succeed well where the land is low and not sufficiently drained. Although there is not any manufacture of tiles in the county, yet stone is generally in abundance, and where this is not the case, cedar or hemlock can be had, which, when properly laid, will answer nearly if not quite as well, as either stone or tile; the chief difference in the mode consisting in forming the ditches wider in the bottom when laid with timber. A quantity of brush should always be used in covering the timber before filling up with earth."

TOWNSHIP BRANCHES.

CUMBERLAND AND CLARENCE.—Amount of subscription, $196. These townships appear to have claimed no portion of the public grant for the year 1858, but to have merged their funds with those of the County Society. There is no report from them.

GLOUCESTER.—Sixty-eight members; subscriptions paid, $161.50; share of public grant, $133.17; total receipts, $294.67. Paid balance due Treasurer from 1857, $3.81; subscribed to County Society, $10; paid premiums, $183.61; copies of *Agriculturist*, $11; expenses, $54.35; balance in Treasurer's hands, $31.90.

OSGOODE.—Thirty members; subscriptions, $90; Government grant, $86.62; total, $156.62. Paid subscription to County Society, $10; prizes, $124.67; expenses, $40.30; balance, $1.65.

NORTH SIMCOE.

COUNTY SOCIETY.—Amount of subscriptions, $82; received from bank, $80; deposited by townships, $346.50; legislative grant, $720; rent of show ground, $11; total, $1239.50. Paid balance due Treasurer from 1857, $71.27; paid bank, $80; paid township branches, $776.49; paid premiums, $172.80; incidental expenses, $82.52; balance in Treasurer's hands, $56.92.

Officers, 1859.—President, Walter Raikes, Barrie; Secretary, Joseph Thomas, Barrie; Treasurer, Dr. Archibald Pass, Barrie.

Extract from Report.

"Your Committee, in referring to the Agricultural Act, 20 Vic., chap. 32, clause 63, find that it provides for the apportionment of property, whether real or personal, between Electoral Divisions which originally belonged to the County Society; and that the said property shall be equitably divided by arbitrators chosen by each Electoral Division. Your Committee also beg to report that at the time the Act above referred to was passed, the County of Simcoe Agricultural Society was personally indebted, and at the same time was in possession of real property, being the ground whereon the annual shows are held, and that no steps have been taken up to the present time in order to the final settlement of the same by the Directors of the County Societies in each of the Electoral Divisions. Your Committee therefore would recommend that proper measures should be taken forthwith in order to the final settlement of the matter, it being the only way whereby the agreeable working of the society can be secured for the time to come.

"Your Committee consider that the Show held last Fall in our county town, was, on the whole, satisfactory. The horned cattle, with the exception of aged bulls, were unusually good; and there were also sheep and pigs of a superior kind, although the specimens of the latter were not so numerous as on some former occasions. The number of colts and fillies, and indeed of young stock generally, was much in excess of former years, and some of the animals exhibited in these classes, especially the yearling heifers and heifer-calves, were of superior quality. It must be borne in mind that the Directors kept strictly to the rule of giving prizes only to breeding animals, by which some classes were excluded which were formerly exhibited. Your Committee are glad to learn that some valuable additions have been recently made to the thorough-bred stock in this part of the county. But while we thus express our pleasure that valuable stock is brought amongst us, we respectfully beg to offer it as our opinion that very much depends on the treatment all kinds of stock receive the first and second years. Although the breed purchased be ever so pure, or the outlay ever so great, without proper feeding and care, very little after progress will be perceptible; hence the necessity of good feeding. Your Committee are aware that some are of opinion that native stock is best for these northern latitudes, and perhaps not without some truth, because they will bear a larger amount of starvation; but of this we are assured, that after the little native animals have existed for four or five years, they very rarely equal in weight a well-bred, and well-fed beast of little over half the age. With reference to the show of grain, your committee are of opinion that, considering the partial failure of crops last season, the samples exhibited were highly creditable to the farmers, and we trust the excellent grain that has been produced at the last few shows, will encourage them to still greater care and energy in their operations. With regard to the dairy productions, your committee feel convinced they need not eulogize, for all parties who visited that department of the exhibition must feel satisfied that the wives and daughters of our farmers have paid every attention to their branch of the business, and have well fulfilled their part.

"Your Committee would not omit to mention an important change which has taken place in our Riding, (we refer to Penetanguishene,) a place which was not long since the residence of our soldiers and navy; now the barracks will be converted into a Reformatory Institution, and the ground whereon our youth formerly met for drill, and to thus learn the art of war, will now be appropriated to learning the science of agriculture. While your committee lament the causes which will bring together so many of our unfortunate youth, we rejoice that there is a probability of their receiving a training whereby they may be reformed and become useful members of society."

TOWNSHIP BRANCHES.

NOTTAWASAGA.—Sixty members; subscriptions, $93.25; balance from 1857, $47; legislative grant, $54.20; total, $194.45. Paid in premiums, $104; expenses, $56.36; balance, $34.09.

Extract from Report.

The Directors are much pleased to learn that the most extensive agriculturist in the township, J. D. Stephens, Esq., has lately purchased a thorough-bred Durham bull, also four pure Cotswold ewes and a fine specimen of a Leicester ram, perhaps the most magnificent animal ever brought into the county of Simcoe, so that a decided improvement may be expected in the appearance of the young stock.

In regard to the crops the Directors would say that the wheat has turned out generally fair in quality, although about one third to one fourth deficient in yield in comparison with former years, and that the ravages of the fly have not been at all felt. The Spring wheat of the club description was considerably damaged with rust where late sown, but where early sown or where the Scotch Glasgow wheat was adopted, a fair crop was the result. The potato crop was considerably affected by disease, causing a deficiency of from 25 to 30 per cent, still, however, many parts of the township entirely escaped. Many supposed this to be caused by the difference in the soil and the soundness of the seed planted.

ORILLIA.—Thirty-one members; subscriptions, $97; balance from 1857, $110.02; share of public grant, $94.31; sundries, $3; total receipts, $284.32. Amount paid for keeping a bull owned by society, $61; paid for seed, grain and carriage of do., $78; copies of *Agriculturist*, $12; premiums, $69.50; general expenses, $33.70; balance in Treasurer's hands, $30.12. The Directors report that they had for two years devoted the funds of the Society exclusively to the purchase of fresh seeds, and of improved stock for breeding purposes. In 1858, they had resumed the system of offering prizes for competition, partly for the purpose of testing what improvements had been made. They found the progress on the whole satisfactory; in sheep and pigs especially there was a decided improvement. They still, however, recommend appropriating a portion of the funds for the purchase of clover seed, which can be procured from the large houses in Toronto, and retailed to members at a much lower rate than it can be obtained at the small country stores.

ORO.—Forty-six members; subscriptions, $128; special entry fees, &c., $16.81; share of public grant, $155.30; total receipts, $300.11. Paid balance due Treasurer from 1857, $6.82; premiums, $138.50; clover seed, carriage, &c., $59.48; copies of *Agriculturist*, $21; incidental expenses, $28.96; balance in Treasurer's hands, $45.35.

Extract from Report.

The Directors report with much pleasure that some of our enterprising members made purchases of valuable male stock at the Provincial Exhibition and elsewhere, from the increase of which we hope to be able to report a marked improvement in the stock department, at our future annual shows.

The last year's grain being now generally threshed out, we are enabled to report with tolerable certainty of the quantity and quality of the yield, and we believe we are correct when we state that the wheat crop generally is below the average in our township, but the samples shown both of Fall and Spring wheat were very creditable to the exhibitors. It is true Fall wheat is not considered a staple crop with us, for various reasons, not that the midge is very destructive,

for many engaged in agricultural pursuits here in the north, have never seen the little insects which have caused so much destruction in the southern and western parts of the Province, but we have snow, frost and rust here, which oft-times very materially injure the Fall wheat, and thus make it an uncertain crop, whereby many are discouraged and have ceased to cultivate it to any extent. And the reason why it is not cultivated by others is, it requires two years to produce one crop. The argument of this class is, will not the land produce a crop of roots, say Swedish turnips the first year, instead of a naked fallow, and followed by Spring wheat the second year. Farmers following this system are aware that Spring wheat is not as valuable as Fall wheat, nevertheless they believe the deficiency is more than counterbalanced by the roots in provender for the stock on the farm, and should the question arise which system returns most to the land, they believe that no argument will be required to produce a verdict in favour of the root crop and Spring wheat. Peas may be said to be an abundant crop this year, and the quantity shown was beyond anything we have before witnessed, and the samples were generally good. But not so oats, very few samples were shown, and scarcely any equal to former years. Root crops were generally both abundant and good.

VESPRA.—Twenty-seven members; subscriptions, $101.50; grant, $126.19; total, $227.69. Paid in Premiums, $80.67; paid for clover seed, $38.05; copies of *Agriculturist*, $12.50; paid accounts due from 1857; and incidental expenses, $50.46; balance in treasurer's hands, $46.01.

The Directors say:—"There has been during the winter, and there still continues to be a good demand for farm produce, and at fair remunerative prices. The establishment of the Barrie market will prove a boon to the farmer of this locality, for by means of our railroad produce merchants from Toronto are enabled to attend it, and purchase for cash our surplus produce at prices only a trifle below the Toronto markets. Through these influences an impetus will be given to the farmer to use every exertion to improve his farm, and increase the quantity of its productions."

SOUTH SIMCOE.

COUNTY SOCIETY.—Amount of subscriptions, $192; deposited by township branches, $304; legislative grant $720; entry fees, &c., $44.48; donation, $10; total receipts, $1270.48. Paid township branches, $723.24; premiums, $409.27; copies of *Agriculturist*, $6; expenses and sundries, $131.97; balance in Treasurer's hands, $114.51.

Officers, 1859.—President, G. D. Morton, M. D., Bradford; Secretary, David Thompson, Bradford; Treasurer, Arthur McMaster, Bradford.

Extract from Report.

"The Directors are happy to state that increased interest and attention are manifested by the inhabitants of this district on the subject of Agricultural improvement, and more particularly in the improvement in the breeding and raising of all kinds of stock. But it is to be deplored that the rust during the past year has committed such depredations on the wheat crop, 'more particularly as this may be called a wheat growing district.' Upon the lowest calculation three-fourths of the Fall wheat has suffered very materially from this cause, and in some instances the Spring wheat, particularly that known as club wheat, whereas Fife or Glasgow Spring wheat has altogether escaped the malady as far as we have been able to learn.

In order to encourage the growth of green crops, the society offered three prizes of $20, $10 and $5 for the best acre of Swedish Turnips, to be judged on the ground, knowing that to bring the different kinds of stock to any thing like

perfection, particularly in this country where we have such long winters, they require some such food to keep them in that health and condition which is necessary to maintain their growth. The competition for these prizes, and pains taken with the crops, was very creditable, and it is only to be deplored that the havoc made by the insect known as the black fly on this crop, is the cause of so many failures. It may be said that this is the greatest barrier to the growth of this valuable crop in this country, and it is to be hoped that some efficient means will be devised or found out for their destruction.

The Society's First Annual Show was held in Bradford, on 6th October, and was decidedly superior to anything of the kind ever held in the South Riding of Simcoe before. The inhabitants generally seemed to take a very lively interest in it, and the competition for prizes was very spirited; perhaps no very distinguishing praise can be awarded any of the departments, 'except that of sheep, which was really of a superior description and deserving of high commendation,' yet the exhibitions in all classes were good and much beyond mediocrity.

The Directors did not think it expedient to hold a ploughing match last season, but Thomas Driffill, Esq., very handsomely presented an iron plough to the society, which they offered as a prize for the best ploughman in the electoral division, and it was competed for on the 29th October, the same day and place as the West Gwillimbury Branch Agricultural Society's ploughing match.

TOWNSHIP BRANCHES.

Essa.—Fifty-seven members; subscriptions paid, $54; balance on hand from 1857, $81.25; proportion of public grant, $93.44; total, $228.69. Paid in premiums, $159; expenses, $36.40; balance, $33.29. The judges report a creditable display at the autumn exhibition.

West Gwillimbury.—One hundred and twenty-four members; subscriptions paid, $145.46; share of public grant, $166.44; balance from 1857, 93cts; total, $312.83. Paid in prizes, $240; subscription to County Society, $10; expenses, $30.47; balance in Treasurer's hands, $32.36.

Innisfil.—Fifty-nine members; subscriptions, $61; balance from 1857, $56.20; Government grant, $83.20; total, $200.40. Amount paid in premiums, $129; expenses, $12.72; balance in hand, $58.68.

Tecumseth.—Fifty-seven members; subscriptions, $59; Government grant, $86.14; receipts at show, $15.50; total, $160.64. Paid in premiums, $120; expenses, $25.90; balance in Treasurer's hands, $14.74. The Directors report a marked improvement in the live stock of the township, particularly in the breed of horses, in consequence of the competition created by the annual exhibitions of the Society.

STORMONT.

County Society.—Amount of subscriptions, $37; deposited by township branches, $227; Government grant, $720; total receipts, $984. Paid township branches, $659; paid in premiums, $209.33; expenses, $86.50; balance in hand, $29.17.

Officers, 1859.—President, David Tate, Cornwall; Secretary, John S. McDougall, Cornwall; Treasurer, Martin McMartin, Cornwall.

TOWNSHIP BRANCHES.

Cornwall.—Amount of subscriptions, $74; balance from 1857, $202.60; share of public grant, $133.22; total, $409.82. Paid premiums on field crops, $133.50; expenses, $16.50; balance carried to account of 1859, $259.82.

Finch.—Forty-one members; subscriptions, $60; share of Government grant, $106.55; total, $166.55. Paid in premiums, $144.50; expenses, $17.70; balance in Treasurer's hands, $4.35.

OSNABRUCK.—Amount of subscriptions, $101; balance from 1857, $5.22; share of public grant, $192.21; total, $298.43. Amount paid in premiums on green crops, live stock, domestic products, &c, $263; expenses, $27; balance in Treasurer's hands, $8.43.

VICTORIA.

COUNTY SOCIETY.—Sixty-three members; subscriptions, $64; balance in hand from 1857, $591.91; deposited by township branches, $281; received for seed sold, $42.25; Government grant, $720; total, $1698.16. Paid township branches, $728; paid for clover seed, $59.68; premiums and expenses, $163.75; sundries, $7.50; balance carried to account of 1859, $739.23.

Officers, 1859.—President, John Gibb, Ops; Secretary, A. A. McLauchlin, Oakwood; Treasurer, J. H. Hopkins, Lindsay.

TOWNSHIP BRANCHES.

The township branch societies in this county are, Fenelon: which appears by the report of the county society to have deposited $46, and received $10 from the county society; Ops deposited $110, and received $410, including apportionment of grant; Mariposa, which deposited $125, and received $268; and Emily, which received $40. No reports came to hand from the township societies, and that from the county society is imperfect.

NORTH WATERLOO.

COUNTY SOCIETY.—One hundred and thirty-four members; amount of subscriptions, $151; deposited by township branches, $182; Government grant, $720; receipts at show, $22.30; total, $1075.30. Paid township branches, $502; premiums at show and ploughing match, $387; expenses, $113.46; balance in hands of Treasurer, $72.84.

Officers, 1859.—President, William Hastings, Cross Hill; Secretary and Treasurer, D. S. Shoemaker, Berlin.

TOWNSHIP BRANCHES.

WELLESLEY—Sixty-nine members; subscriptions, $92; balance from 1857, $6.13; share of grant, $160; total, $258.13. Paid in prizes, $214; expenses, $44.13.

WOOLWICH.—Eighty-seven members; subscriptions, $96; share of grant, $160; total, $256. Paid premiums at show and ploughing match, $179; paid balance due Treasurer from 1857, $4,05; incidental expenses, $78.98; balance due Treasurer, $6.03.

SOUTH WATERLOO.

COUNTY SOCIETY.—Four hundred and thirty-six members; amount of subscriptions, $498.25; received from North Dumfries Society, $7.75; Government grant, $720; admission fees at Show, $87.75; total $1313.75. Paid in premiums, $707; paid Horticultural Society, $20; expenses, $348.43; balance in Treasurer's hands, $238.32. There are no township societies reported from this Electoral Division. They appear to have been discontinued or merged in the County Society.

Officers, 1859.—President, Wm. Osborne, Galt; Secretary and Treasurer, Wm. A. Shearson, Galt.

WELLAND.

COUNTY SOCIETY,—Eighty-six members; amount of subscriptions, $120.50; balance from 1857, $117.21; deposited by township branches, $452; Government grant, $900; total, $1589.71. Paid township branches, $992; paid in premiums, $299.75; expenses, $93.29; balance in hand, $204.67.

Officers, 1859.—President, John Wilmot, Welland P. O.; Secretary, Alex. Reid, Crowland; Treasurer, John Rannie, Allanburgh.

Extract from Report.

"The Directors would remark that there was evidently a great improvement manifested at the annual show of this society, there being a large assemblage of the farmers of the county, and also a much larger display of animals and articles exhibited than heretofore. Yet your directors regret to state, that there were a great many premiums uncompeted for, and this holds good particularly in regard to animals of various breeds, there being none either of the Ayrshire or Devon breeds shown. There were however some good animals in the other classes exhibited—the sheep department was good, and made a creditable display. There was a deficiency in the fruit and grain departments, which, no doubt, was mainly attributable to the peculiarities of the season, for there was a partial failure over the entire county in the crops of all kinds of grain and fruit, both in regard to quantity and quality.

We were particularly pleased to observe a drill plough, manufactured by Geo. McKenzie, exhibited, it being the first ever shown in the county; it must prove a useful implement to persons engaged in the culture of roots. The root department of the show was very good.

The ladies' department was well represented, for which they are entitled to special thanks, both in regard to the number of articles presented, and their excellency of manufacture."

TOWNSHIP BRANCHES.

BERTIE.—Forty-six members; subscriptions, $46; Government grant, $53.76; total, $99.76. Paid in premiums, $82.37; expenses, $9.25; balance in hand, $8.13. The directors report that they had a large attendance at the annual show, and the whole display of stock and articles very satisfactory.

CROWLAND.—Thirty-nine members; amount of subscriptions, $40; balance from 1857, $17.34; Government grant, $47.80; total, $105.14. Paid in premiums, $96.75; expenses, $8.50.

HUMBERSTONE.—Thirty-six members; subscriptions, $61; balance from 1857, $13.88; share of grant, $72.89; total, $147.77. Amount paid for Fife spring wheat for seed with expenses, $42.80; premiums, $82.88; incidental expenses, $22.09.

PELHAM.—Sixty-four members; subscriptions, $70; grant, $76.48; total received, $146.48. Paid in premiums, $121.25; expenses, $19.69; balance, $5.54.

STAMFORD.—Seventy-five members; amount of subscriptions, $77; balance from 1857, $32.87; share of public grant, $124.28; total receipts, $234.15. Paid in premiums, $142.96; sundries, $4.90; balance in Treasurer's hands, $86.29.

THOROLD.—Amount of subscriptions, $58; balance in hand from 1857, $64.32; share of grant, $69.31; receipts at show, $12; total, $203.63. Paid in premiums, $153.74; expenses, $24.10; balance in hand, $25.79.

WAINFLEET.—Thirty-seven members; subscriptions, $40; balance on hand from 1857, $17.51; share of grant, $47.80; total receipts, $105.31. Paid in premiums, $88.50; expenses, $23.72; balance due Treasurer, $6.91.

WILLOUGHBY.—Thirty-four members; amount of subscriptions, $40; Government grant, $47.68; total, $87.68. Paid in premiums, $68.50; expenses, $6,83; balance, $12.35.

NORTH WELLINGTON.

COUNTY SOCIETY.—One hundred and sixty-five members; amount of subscriptions, $185; proceeds of prize grain sold, $17.25; deposited by township societies, $252; Government grant, $720; receipts at show, $3.59; total, $1177.84. Paid township branches, $683.07; paid in premiums at show and ploughing match, $297; expenses, &c., $114.50; balance in Treasurer's hands, $83.27.

Officers, 1859.—President, Adam L. Argo, Fergus; Secretary and Treasurer, John Beattie, Nichol.

Extract from Report.

"The Directors are convinced that the establishment of Electoral Division Societies, has, in this locality at least, proved a great improvement on the former system. Out of 386 entries made at the Fall Show held in Fergus, there would perhaps, not have been more than 40 or 50 had the same exhibitors been forced to travel to the county town as formerly.

Although the number of entries and the quality of the stock and produce, &c., were all that could have been expected, it is useless to conceal the fact, that the public in general do not manifest that interest in county exhibitions which might naturally be expected. Indeed it is well known, that apart from the exhibitors themselves, there are often more visitors at township than county shows. This is, no doubt, attributable to the former being held previous to the latter, and sometimes as was the case with us last season, the county exhibition held in the same village in which a township one was held only a few days before.

Different modes have been suggested for improving the efficiency and popularity of county exhibitions. The Directors, however, in the meantime, would simply call the attention of the members to these defects in the working of the society, leaving it for their successors in office to provide a remedy."

TOWNSHIP BRANCHES.

MARYBOROUGH.—Fifty-six members; subscriptions, $62; share of public grant, $94; total, $156. Paid premiums, $116.75; expenses, $18.38; balance, $30.87.

NICHOL.—One hundred members; amount of subscriptions, $105.50; Government grant, $152.57; total, $259.07. Paid subscription to county society, $10; paid premiums, $192.50; expenses and sundries, $57.11; balance due Treasurer, 54 cents.

PEEL.—Amount of subscriptions, $80; balance from 1857, $30; Government grant, $116; total, $226. Paid prizes at shows and ploughing match, $142.75; expenses, $22.63; balance, $60.62.

PILKINGTON.—One hundred members; subscriptions, $114.50; balance from 1857, 11 cents; share of grant, $68.50; total, $183.11. Paid in premiums, $133; expenses, $69.11; balance due Treasurer, $19.

SOUTH WELLINGTON.

COUNTY SOCIETY.—Two hundred and twenty-six members; subscriptions, $286; balance from 1857, $89.68; deposited by township branches, $653; Government grant, $720; total, $1748.68. Paid township branches, $1080.65; premiums, $450; expenses, $184.48; balance, $33.55.

Officers, 1859—President, F. W. Stone, Guelph; Secretary and Treasurer, James Wright, Guelph.

Extract from Report.

"It is very gratifying to the Directors to be able to demonstrate the steady progress and increasing interest evinced in the success of the society. They

are however, fully aware that our exhibitions and prize lists do not favorably compare with some of the neighboring counties, where the several township societies place the whole of their funds at the disposal of the county society.—Nevertheless they trust it will be satisfactory to the members to know that although the society sustained the loss of many valuable members by the county having been divided into electoral divisions, that the subscription list of the past year has exceeded that of any former one.

The Directors tender their thanks for the liberal amount of funds placed at their disposal, especially as that amount was raised under most unfavorable circumstances, arising from the very serious deficiency in the wheat crop of the past year, which must have suffered to a greater extent in some localities than in others, for our seed fair held in August last presented a very pleasing appearance, and exceeded our most sanguine expectations, being by far the largest exhibition of the kind we ever had. Yet in estimating the probable entire yield, we do not think it will exceed one half of an average crop, and while it may be considered as individual loss, must also be looked upon as a public calamity.

The stock of this county, probably, is now so extensively known, as to need no comment. Suffice it to say, that it continues to elicit the most favourable remarks, from gentlemen and breeders from various parts of the Province; and from the position the stock occupied at the late exhibition at Toronto, it gave incontestable evidence of its superiority, from the fact, that in almost every class in which the cattle were exhibited, first prizes were awarded them, as also to the sheep, some of which, fed by our worthy President, F. W. Stone, Esq., were exhibited by our butchers at their Christmas show, weighing from 195 lbs. to 218 lbs. the carcase.

Our root crop generally may be considered of excellent quality, but the potatoes below an average yield."

TOWNSHIP BRANCHES.

ERAMOSA.—One hundred and sixteen members; amount of subscriptions, $220; share of grant, $101.56; total, $321.56. Paid in premiums, $268; expenses and sundries, $18; balance in hand, $35.56. The Directors report that although the comparative failure of the wheat crop had affected the annual exhibition in that particular department, yet the exhibition on the whole was a very good one, and the competition spirited. They also report the ploughing match well attended and evincing considerable improvement in that important art.

ERIN.—Amount of subscriptions, $163; balance from 1857, $11.64; share of public grant $84.80; total, $259.44. Paid in premiums, $198.75; expenses, $28.62; balance in Treasurer's hands, $32.07.

GUELPH.—Two hundred and thirty-seven members; amount of subscriptions, including donation of $20 from the Canada Company, $280; Government grant, $146; total, $426. Paid balance due Treasurer from 1857, $672; paid premiums at shows and ploughing match, $373; expenses, $67.48; balance due Treasurer, $21.20.

Extract from Report.

"The almost total failure of the wheat crop in this section of the country has affected not only the agriculturist, but every class in the community. But as the farmers of this township have for a number of years devoted considerable attention to the raising and feeding of stock, the Directors confidently believe that the Township of Guelph will suffer as little from the failure of the wheat crop as any municipality in the Province. The Annual Show, held on the 7th day of October last, was very successful, and in every way creditable to the society.

The quality of the animals in every class exhibited sustained the character this township has heretofore held for superior stock, and showed that improvement is still making advances in that department of agriculture.

PUSLINCH.—One hundred and fifty-one members; amount of subscriptions, $172.50; balance from 1857, $22.24; share of public grant, $90; total, $284.74. Paid in premiums at show and ploughing match, $199; expenses, $44.53; balance in Treasurer's hands, $41.21. The Directors report the display at the annual exhibition, as well as the work at the ploughing match, highly satisfactory and creditable to the competitors.

NORTH WENTWORTH.

COUNTY SOCIETY.—One hundred and eight members; amount of subscriptions, $108; deposited by township branches, $383; public grant, $720; grant from County Council, $50; total, $1261. Amount paid township branches, $815; paid to Treasurer of joint board of North and South Wentworth, $433.35; expenses, $12.65. This society united its funds for the purpose of the exhibition of 1858, with those of the societies for South Wentworth and the City of Hamilton.

Officers, 1859.—President, Thomas Stock, Waterdown; Secretary and Treasurer, H. R. O'Reilly.

TOWNSHIP BRANCHES.

BEVERLEY.—One hundred and fourteen members; amount of subscriptions, $119.50; share of public grant, $90.32; total, 209,82. Paid balance due from 1857, $9.47; premiums, $150.12; expenses, 58.78. Balance due Treasurer, $8.55.

EAST FLAMBORO.'—One hundred and six members; subscriptions, $187; balance from 1857, $11; grant from Township Council, $30; share of Government grant, $196; total, $424. Paid in prizes, $583; expenses, $39; balance in hand, $2.00

WEST FLAMBORO.—Amount of subscriptions, $135; share of grant, $120.68; total, $255. Paid in premiums, $229.50; expenses, $31.98; balance due Treasurer, $5.80.

SOUTH WENTWORTH.

COUNTY SOCIETY.—This Society as above stated, united with the North Wentworth and the City of Hamilton Society, for the purpose of holding an autumn exhibition in 1858; number of members, two hundred and eighteen; amount of subscriptions, $246; deposited by township branches, $320; Government grant, $720; received from North Riding Society for the joint exhibition, $325.35; grant from County Council, $50; received for admission and entry fees at exhibition, $319; total receipts, $1980.35. Paid balance due Treasurer from 1857, $68.75; paid township societies, $752; paid premiums at united exhibition, $898.75; expenses, $181.88; balance in hands of Treasurer, $78.97.

Officers, 1859.—Levi Lewis, Ontario, P. O.; Secretary and Treasurer, William A. Cooley, Ancaster.

TOWNSHIP BRANCHES.

ANCASTER.—Ninety members; subscriptions, $102.50; share of public grant, $162: grant from township council, $40; entry fees, $7; total receipts, $311.50. Paid balance due Treasurer from 1857, $8.91, paid prizes at exhibition, $218.25; expenses, $58.06; balance in Treasurer's hands, $26.28.

BARTON, BINBROOK, GLANFORD AND SALTFLEET.—United Townships Society; one hundred and three members; amount of subscriptions, $124.50; balance from 1857, $50.61; amount of grants from the municipal councils of each of the townships, $90; apportionment of public grant, $270; total receipts, $535.11. Paid in premiums, $319; expenses, $13.15; balance in Treasurer's hands, $202.96.

CITY OF HAMILTON.

ELECTORAL DIVISION SOCIETY.—Organized 1858; one hundred and eighty-seven members; amount of subscriptions, $189.75; grant from Hamilton City Council, $300; Government grant, $360; total receipts, $849.75. This Society united with the societies of North and South Wentworth, for the purpose of holding a joint exhibition in the City of Hamilton in October, 1858, and the city society appears to have borne the principal burden and expense of the preparations and general details of management, having paid for stationery, printing, labor, carting, fencing, preparing buildings, rent of grounds and buildings, bands, remuneration to officers, entertainment and accommodation of judges, a few premiums, &c., the sum of $833 12; leaving a balance in the Treasurer's hands of $16.63. The statements of the respective societies as to the amounts contributed by each to the general expenditure do not exactly correspond, owing apparently to each charging some of the items to different accounts. The united exhibition was held on the 14th and 15th days of October, and was highly successful in every respect. The officers of the City of Hamilton Society for 1859 are—

President, Captain W. H. Nicolls, Hamilton; Vice-President, H. J. Lawry, and James Leslie, Hamilton; Secretary & Treasurer, James S. Wetenhall, Hamilton.

NORTH YORK.

COUNTY SOCIETY.—One hundred and twenty-two members; subscription, $146; deposited by township branches, $304.29; Government grant, $720; total receipts, $1170.29. Paid township branches, $618.95; paid in premiums and expenses, $604.84; balance due Treasurer, $53.50.

Officers, 1859.—President, John D. Phillips, Aurora; Vice-Presidents, Dr. E. Morton, Queensville; George Playter, Pine Orchard; Secretary, William Trent, Newmarket; Treasurer, D. Sutherland, Newmarket.

Extract from Report.

The President, according to a resolution passed by the Board of Directors, gave notice of an exhibition of grain, which was held at Newmarket, on the 25th August last. Your directors are fully impressed with the desirableness of this exhibition, affording as it does to the farmer an opportunity of effecting an exchange of seed previous to the period of the Fall sowing. The Fall Show, your Directors are of opinion, was fully equal in appearance to any of those held before in this section of the county; in some of the classes, particularly sheep, we think it superior; in roots also, and in mechanical art particularly so. Your Directors consider it as part of their duty to report upon the state of the crops during the past season. The Fall wheat is, they consider, the main stay of the farmer of this section of the county, and they regret to say, that in consequence of the open Winter and wet Spring this portion of the crop has been below the average. The Spring wheat has not been a failure; wherever the Fife or Scotch wheat has been sown the crop has been good. This wheat has not been affected by the rust, which has this season affected both Fall and Spring wheat of other varieties. The oat crop has generally turned out well, so have peas, barley tolerable well; potatoes and the turnip crop have turned out well. Your

Directors have further to say that the insect which has proved so destructive to the wheat in the various sections of country, does not as yet appear to have visited to any extent this part of the county of York.

TOWNSHIP BRANCHES.

EAST GWILLIMBURY.—One hundred and twenty-five members; amount of subscription, $128; balance from 1857, $36.60; Government grant, $117; sundries, $7.37½; total, $288.97. Paid premiums at show and ploughing match, $217; expenses, $24.97; balance, $47. The Directors report very satisfactory progress and that the Fall show exhibited a marked improvement in the various products offered.

KING.—One hundred and seventy-seven members; subscription, $197; balance from 1857, $53.18; Government grant, $186; total, $436.18. Paid in premiums, $248; paid for copies *Agriculturist*, $68.40; expenses, $20; balance, $99.78.

Extract from Report.

The Directors are enabled to say that the township is steadily progressing in regard to the excellence and superior quality of stock, implements and grain, as exhibited at our last Fall Fair; no less than 385 entries having been made and 131 prizes awarded. We cannot say that the root crop exhibited any thing worthy of notice, the dry season no doubt being the principal cause. There has also been a great falling of in the average yield of nearly all kinds of grain, the wet Spring, dry Summer and rust have all contributed more or less to cause a deficiency; the average no doubt being less than 15 bushels per acre. The root crops are beginning to engage considerable attention, but have not yet become general for the feeding of stock. Artificial drainage is going on to a considerable extent, the importance of which cannot be overlooked.

WHITCHURCH.—This Society having agreed to merge their funds for the year with the electoral division society, make no lengthened report. Amount of subscription, $104. Paid premiums due from 1857, $35.45; expenses $5; paid county society, $81.45; balance in hand, $22.55.

EAST YORK.

COUNTY SOCIETY.—One hundred and fourteen members; amount of subscription, $158; deposited by township societies, $202; Government grant, $720; received from Markham Township Society for Fall Fair, $300; receipts at Fair, $40; total, $1420. Paid township branches, $634; premiums, $573; expenses $45.20; balance in hand, $167.80. The society held their Autumn show in conjunction with the Township of Markham Society. The amount offered in prizes was $900; there were about 500 entries, and $573 was awarded.

Officers, 1859.—President, George Miller, Markham; Vice-Presidents, John Malcolm, Agincourt; Thomas A. Milne, Markham; Secretary & Treasurer, Archibald Barker, Markham.

Extract from Report.

The fair was most successful, more particularly was the display of stock not only larger but in quality superior, as a whole, to that exhibited on any previous occasion in the township, either at township or county fairs. In agricultural products the quality was very superior, and surpassing any previous exhibition in the county. The exhibition of fruit was also excellent, particularly some specimens of grapes, which were very fine. In manufactured articles the display was limited but of superior quality; a reaping machine shown by Darling & Aitcheson, of Thornhill, which obtained the first prize, was highly recommended by the judges, as also the mowing machines exhibited by the same firm and by Patterson & Bros., of Richmond Hill.

TOWNSHIP BRANCHES.

MARKHAM.—One hundred and eighteen members; amount of subscription, $163; balance from 1857, $82.52; special subscriptions and entries for ploughing match, $127; an iron plough, presented by Mr. Palmer, Black Horse Inn, Toronto, to be competed for at ploughing match, value, $40; Government grant, $290.85; total, $703.48. Amonnt paid in prizes due from 1857, $46 50; paid in prizes at ploughing match, including plough, $140; paid to county society, contribution for joint Fall show, $300; expenses, $6.62; balance in treasurer's hands, $210.36.

SCARBORO'.—One hundred and eight members; subscription, $139; balance from 1857, $23; share of public grant, $141.12; total, $303.12. Amount paid in premiums at ploughing match, $42; premiums at Fall show, $205.50; expenses $23.50; balance in hand, $32.12. The Directors say that they had a very fine display of stock, grain, &c., at the Fall show.

WEST YORK.

COUNTY SOCIETY.—One hundred and sixteen members; subscriptions, $113; deposited by township branches, $430; Government grant, $720; total receipts, $1263. Paid township branches $862; appropriated to pay debt of late County Society, $40; expenses, $24.83; paid to Agricultural Association in aid of Provincial Exhibtion of 1858, $336.16. This society voted all their surplus funds for the year 1858, in aid of the Provincial Exhibition, and consequently held no show of their own for that year.

Officers.—President, Edward Musson, Etobicoke; Vice-Presidents, J. P. Bull, Yorkville, and H. J. Boulton, Thistleton; Secretary and Treasurer, H. C. Thomson, Toronto.

Extract from Report.

"In regard to the profits of the farming interest during the past year, we have not sufficient information to be able to offer a very precise report. Though spring crops generally have been good, wheat has been considerably injured, in some portions of the riding, by the wheat fly and the rust. Farmers who have heretofore been in the habit of thrashing 20 to 25 bushels per acre, have some of them not obtained from the produce of their fields the past season more than 15, others 10, others 5 bushels per acre. Still, although it is certain that the entire crop for the riding is considerably below an average, we are yet aware that many excellent fields have been harvested.

"The agricultural population has felt more or less the monetary depression which has lately fallen so severely upon the commercial classes. Although wages for hired labor have been lower, and the farmer's annual expenses consequently lessened, engagements made two or three years ago under too flattering prospects of prosperity have entailed straitened resources upon many.—Abundant crops, with high prices, for several years, at the same juncture of time that we had the expenditure of a large amount of money in the country in railroad operations, and agriculturists, consequently, as well as others, were tempted to indulge in speculations, in many instances visionary, and beyond their assured means, have been followed by two years of indifferent crops, with lowered prices, and the discontinuance of the expenditure of foreign capital. The hired laborer who was tempted to sink his little accumulations in the renting of a farm, and buying stock upon credit at extravagant prices,—the tenant farmer who was tempted to convert his lease into a freehold and burden himself with heavy payments for a series of years,—the proprietor who was tempted to add by purchase to the acres he already possessed, and mortgage his homestead in

security, have each in many instances been obliged to fall back from the position they had been too ready to assume, happy if they could escape from their involvements without a serious diminution of their original means, while the seller of land has been equally embarrassed by being disappointed in the receipt of his instalments.

"We do not mean to imply that such a position of affairs is universal, but merely that it is common. Nor do we in the least doubt that with two or three years of good crops, and with prudence and economy, the country will fully recover from its temporary depression, all the wiser for the lesson it has had."

TOWNSHIP BRANCHES.

ETOBICOKE.—Two hundred and eighty-five members, amount of subscriptions, $323.50; balance from 1857, $80.79½; grant from township council, $60; entrance fees at Fairs and ploughing match, $122; share of Government grant, $351.62½; total receipts, $937.92. Paid premiums at Spring Fair, $79; do. Fall Fair, $384; do. at ploughing match, $116; expenses, $137.83; balance in Treasurer's hands, $221.09.

YORK TOWNSHIP.—One hundred and seventy-four members; amount of subscriptions, $203; Government grant, $80.37½. Amount paid for premiums due from 1857, $71; expenses, $14.30; paid to Provincial Agricultural Association in aid of Provincial Exhibition of 1858, $197.50. This society having contributed its funds for 1858, in aid of the Provincial Exhibition, held no show of its own for that year.

CITY OF TORONTO.

ELECTORAL DIVISION SOCIETY.—Organized 1858; two hundred and thirty-four members; amount of subscriptions, $235; Government grant, $187.20; total receipts, $422.20. Amount appropriated to meet liabilities of late County of York Society, $40; expenses, $37.86; amount not paid over by one of the Directors, $15; amount contributed to Provincial Agricultural Association in aid of Provincial Exhibition of 1858, $329.34.

Officers.—President, Hon. G. W. Allan, Toronto, Vice-Presidents, E. W. Thomson and William McDougall, M. P. P., Toronto; Secretary and Treasurer, J. E. Pell, Toronto.

Extract from Report.

"This society having held no show of its own for the year past, but granted its funds in aid of the Provincial Exhibition, that may be considered to a certain extent as having been the exhibition of this society, the members of it being prominent amongst exhibitors and recipients of prizes. We beg, therefore, to offer a few remarks upon the Provincial Exhibition, in so far as this society may be considered to have been connected with it, or in so far as it may be considered to have stood in the stead of an exhibition, which would otherwise have been held by this society.

As was to be expected from the location of the Provincial Exhibition, and the large population of Toronto, the residents of this city participated spiritedly in the competition. The following statement shows the amount of prizes taken by residents within the limits of this society, as compared with the amounts taken by those from other quarters. In live stock and field produce of course the amount is small, as compared with the more rural districts.

[*Here follows the statement, and the Report proceeds.*]

In round numbers Toronto received about $2,000 out of about $9,000 awarded in prizes.

Farm stock and field products are not expected to come so much under the notice of this society, as that of those of the more professedly agricultural districts, still we may report that the display of these products brought into the exhibition was large and the quality good. Although there are three or four farms of considerable extent within the boundaries of this division, and a few acres of winter wheat were sown, there were none harvested of any consequence, the combined effects of the wheat fly and the rust being so disastrous that scarcely a bushel of grain could be obtained from threshing the produce of an acre of land. The exhibition itself, however, furnished but little evidence of this fact, although we are aware the crop has suffered more or less throughout the country, the display from other quarters being large and the sample good. Field roots were also plenty, and good specimens of their kind at the show. The past has not been a very favourable season for horticultural products. Although the season opened early, Spring progressed but slowly, and continued cold and wet weather retarded vegetation so much, that the Horticultural Society of this city could not hold their first exhibition of flowers, early fruits and vegetables, till more than a week after the average time. The result of the whole season was, that although garden vegetables were of tolerable quantity and quality, fruit was almost an entire failure. Many persons who have heretofore had an abundance of excellent fruits of the various kinds, could with difficulty cull specimens sufficient to make a middling display at the Provincial Show. We do not attribute this, however, entirely to the peculiarities of the season, but partly also to the general decay of fruit trees from some unexplained cause. The scarcity with individuals, however, did not prevent the display at the exhibition, on the whole, from being highly creditable. In the arts and manufactures, notwithstanding the serious depression these interests are at the present time exposed to, the display was very creditable; and although we cannot boast of any very material new invention or great improvement, in any particular branches of industry, still we can safely say that the workmanship displayed in machinery, household furniture, castings, carving and gilding, gas fittings, and a variety of other productions, show that our manufactures are well worthy of all the encouragement that can be given them by societies such as our own, or of a kindred character, or the community at large. In paintings, drawings, and other branches of the fine arts, Toronto contributed a fair proportion. The display in the building was large, and although there were many specimens of a very mediocre character, there were many others of undoubted excellence, and this department of the exhibition was interesting and instructive. But it is much to be regretted that in a city like Toronto, so much apathy exists on the part of a large portion of the leading and wealthy inhabitants, in giving their countenance and encouragement to the cultivation of a taste for the fine arts among the youthful part of the population. A strange contrast exists in this respect between Toronto and many English town and cities. Lastly, the ladies of Toronto were not backward in contributing their quota of elegant and attractive productions in their department, one which, perhaps, as much as any other, tends to popularize and render interesting annual exhibitions of this character. The musical performance which took place at intervals in the Crystal Palace during the exhibition, were an agreeable and attractive addition to it, which should have a tendency to elevate and refine the tastes of the multitude. The large number of professional and amateur ladies and gentlemen of Toronto and other places, who devoted their time and labour to the giving of those entertainments to the crowds of visitors at the exhibition, with so little prospect of profitable remuneration to themselves, are entitled to our thanks. As, under the existing Act of Parliament relating to Agricultural Societies, the amount of public grant which the several Electoral Division Societies of the County of York are entitled

in the aggregate to receive, provided their own subscriptions are sufficient, is no less a sum than £700, and which, with the subscriptions of the societies, might probably amount to at least £1,200 or £1,500 yearly, and as we have now a large and commodious building for exhibition purposes, erected by the liberal contributions of the city of Toronto and the United Counties of York and Peel, and of the Agricultural Societies, aided by the Association, the question may with propriety be mooted, whether it would not be expedient for all the societies in the county to combine their means occasionally, on such years as the Provincial Exhibition is not held here, and hold one large Exhibition on the Provincial grounds and in the Crystal Palace, rather than numerous small ones in their various localities. At such an exhibition £800 or £1,000 might easily be offered in premiums, and by being kept open for two or three days it would offer many advantages to exhibitors and visitors. Should the County of Peel be disposed to join in such an arrangement, the amount of premiums might be increased by several hundred pounds, and of course the contributions would be proportionally more numerous. We submit that the adoption of such a plan, at least occasionally, might be made advantageous and interesting.

MEETINGS OF THE BOARD OF AGRICULTURE.

The Board met at Kingston, in the City Hall, on Friday, August 19, 1859, at 3 o'clock, p. m.

Present: E. W. Thomson, Chairman, R. L. Denison, Hon. G. Alexander, H. Ruttan, Asa A. Burnham, William Ferguson, President Provincial Agricultural Association; Dr. Beatty, President of the Board of Arts and Manufactures, and Professor Buckland.

The minutes of last meeting were read and confirmed.

The Secretary read a communication from William Hutton, Esq., of the Bureau of Agriculture, stating that His Excellency in Council had been pleased to accede to the application of the Board, for the use of some of the Government Buildings about to be vacated, and had granted the free use of the house formerly occupied by the Board for an office, &c., with the stables, coach-houses, &c., belonging to Government House, for the purposes of a veterinary school, and the treatment of diseased animals.

The Secretary submitted to the Board the correspondence which he had received from the Presidents of two rival societies in the County of Russell, as to the validity of their respective claims to be the legal County Society.—After an investigation of the correspondence it was

Resolved,—That with a view to the settlement of the dispute now existing between the two societies, each claiming to be the Electoral Division Society of the County of Russell, a committee of the members of this Board, consisting of the President, Treasurer, and Secretary, be formed to investigate the matter in dispute, and, if necessary, to obtain legal advice, and finally to decide the case, provided the disputants signify their willingness to abide by such decision.

The question as to the propriety of having the names of exhibitors on the entry tickets, was taken up and discussed, and it was

Resolved,—That for the present year the names of the owners and manufacturers of stock and articles shall not be inserted on the entry or exhibition cards, and that all such names painted or cast in the articles, shall, as far as practicable, be covered over till after the judges have made ther decisions.

The Chairman read a letter from Professor Buckland, resigning his office as Secretary of the Board, of which the following is a copy:

"BOARD OF AGRICULTURE,

Toronto, August 16, 1859.

"DEAR SIR,—

In consequence of my recent appointment as Dean of Residence in University College, I find that it will be necessary for me to resign the Secretaryship of this Board.

I shall always look back with peculiar pleasure as one of the happiest, and I trust, not the least useful period of my life, to the harmonious connection which has now for several years subsisted between us, and to the great progress which our general agriculture as well as the Provincial Association, have made during that period. If I have been the means of contributing, however, humbly, towards the realization of these important results, the reflection, with the remembrance of the courtesy and confidence which I have uniformly received in the discharge of my duties, both from the Board and the public, will prove a source of pleasure and satisfaction to me as long as I live.

In penning these few lines I have the happiness to know that my connection with the Board will not be dissevered, and I hope that for the future I shall have more time and opportunity for contributing to the pages of our Journal and Transactions, and of making agricultural tours, during the summer months, to different parts of the country.

I likewise feel less reluctance in taking this present step, from the conviction that the Recording Secretary, with whom I have been for some years most agreeably associated, is fully competent to discharge the whole of the duty.

Requesting that you will oblige me by submitting this communication to the Board at its next meeting.

I remain, Dear Sir,
Your faithful and obedient Servant,

GEORGE BUCKLAND.

E. W. THOMSON, ESQ.,
President Board of Agriculture, U. C."

Resolved,—With reference to the letter of resignation of Prof. Buckland, our Secretary, on the occasion of his appointment as Dean in Residence, in University College, we cannot allow him to depart without entering on the Record of our Proceedings the high sense which this Board entertains of the value of his services.

That in accepting of Mr. Buckland's resignation as Secretary, we do so with regret, individually as well as collectively, and trust that in his future and highly honorable position in our Provincial University, his services may still be available to the agricultural interests of Canada.

Resolved, further,—That the President and Treasurer of this Board, with Dr. Beatty, be a committee to procure a suitable testimonial for the occasion.

Resolved,—That in consequence of the resignation of our highly esteemed and efficient Secretary, Profestor Buckland, Mr. Hugh C. Thomson, the Recording Secretary, be promoted to the Secretaryship of this Board, and that the salary be at the rate of £300 currency per annum.

The Board adjourned at 7 o'clock, p. m., to meet the Local Committee next day at 10 a. m.

I am to request that you will accept and convey to the Association, His Excellency's sincere thanks for the expression of their sympathy with him and Lady Head in their affliction.

I have the honor to be,
Sir,
Your obedient Servant,
R. T. PENNEFATHER,
Secretary.

J. P. LITCHFIELD, Esq, M. D.,
Corresponding Secretary Local Committee
Agricultural Association, C.W."

WEDNESDAY, September 28th, 1859.

The Board met in the Treasurer's office, at 9 a. m.

Present: Messrs. E. W. Thomson, President, Hon. G. Alexander, H. Ruttan, A. A. Burnham, R. L. Denison, Wm. Ferguson, Professor Buckland, Dr. Beatty.

Resolved, That the soldiers in garrison be admitted to the exhibition on Thursday, in companies, and also the volunteer cavalry force, in their uniform, and that a copy of this resolution be transmitted to Colonel Bourchier, commandant of the garrison, and Major Flanagan, commanding the mounted volunteer force.

Ordered, That the Board purchase 100 tickets for the dinner to take place on Thursday, in the Mechanics' Hall, that Dr. Barker be furnished with forty for the use of the press, each member of the Board with five, and that the President of the Board and the President of the Association distribute the remainder.

Ordered, That the bands playing upon the grounds, be each paid twenty-five dollars for their services.

After some other business the Board adjourned to 3 o'clock, p. m.

SAME DAY, 3 o'clock.

The same members present.

An application was received from the Rev. Vicar-General McDonell, of Kingston, for the admission this day of the students of Regiopolis College to the exhibition free of charge. A motion that the application be granted was negatived.

Mr. Ruttan moved, seconded by Mr. Ferguson, That all pupils under sixteen years of age now attending school be admitted to the exhibition free. Lost.

A delegation from the county of Russell, consisting of Mr. Kennedy, President, Mr. Morgan, Secretary, and Mr. Tobin, officers of one of the organizations assuming to be the County of Russell Society, appeared before the Board, and presented a memorial setting forth a statement of the proceedings which had taken place at the annual meeting, held by their county society in January, 1859 and subsequently, and praying for the action of the Board in the premises.

Mr. Petrie, president of the other organization assuming to be the society for the same electoral division, was also present, and made his statement of the case. The Board agreed to give an opinion at an adjourned meeting to-morrow (Thursday) morning, at 9 o'clock.

The Board then adjourned.

THURSDAY, September 29th, 1859.

The Board met at 9, a. m.

Present: Messrs. E. W. Thomson, President, Hon. G. Alexander, A. A. Burnham, H. Ruttan, R. L. Denison, Dr. Beatty, J. E. Pell.

Minutes read.

Resolved, That the Committee formerly appointed to settle the matter of the County of Russell Agricultural Society, be requested to urge on the Minister of Agriculture to grant if possible the money for the present year to the Society that organized in that county in January last, although that society did not comply with the law in sending up a report for the past year.

After some routine business the Board adjourned to 9 a. m., to-morrow.

FRIDAY, September 30th.

The Board met in the same place at 9 a. m.

Present: Messrs. E. W. Thomson, President, H. Ruttan, R. L. Denison, A. A. Burnham, W. Ferguson, Dr. Beatty, J. E. Pell.

The Secretary submitted the following communication from G. P. Ridout, Esq., who has for many years given his valuable services gratuitously as auditor of the accounts of the Association.

"TORONTO, September 23rd, 1859.

DEAR SIR,—I was yesterday favored with yours of the 16th instant., enclosing a medal, and acquainting me that I had been elected a life member of the Agricultural Association of Upper Canada.

Be good enough on my behalf to communicate to the gentlemen connected with the Association, my warmest thanks for the gratifying compliment they have paid me; and I wish them and yourself to feel assured, that any services it may have been in my power to render to the cause you and they are associated together for enhancing, have been performed under a sense of the duty that, in my opinion, I, in common with all others in the colony, owe to the important interests of agriculture,—an interest to promote which, or in any way to serve, will at all times afford me the most unfeigned satisfaction.

I have the honor to be,
Dear Sir,
Your most obedient servant,
G. P. RIDOUT.

George Buckland, Esq.,
(late) Secretary, Board of Agriculture, Upper Canada."

Some cases of contested prizes were then taken up and decided upon.

Ordered,—That the President of the Board, with Messrs. Ruttan and Burnham, be a Committee to revise the prize list in the Agricultural department, and Messrs. Beatty, Pell, and Edwards, in the Arts department.

The Board then adjourned to the annual meeting of the Directors of the Association, at 10 a. m., in the Mechanics' Hall.

THE BANQUET.

The following report of a public banquet which took place on the exhibition ground on Thursday afternoon, the 29th, is abridged from one of the Toronto daily papers:—

The upper story of the Mechanics' Hall was tastefully fitted up for the public dinner which came off this afternoon. The guests were not very nume-

SATURDAY, August 20.

The Board, pursuant to adjournment, met the Local Committee in the Court House, this morning at 10 o'clock. The same members present as yesterday.

After going over the minutes and proceedings of the Local Committee, and consulting on a number of matters relating to the approaching exhibition, they proceeded to the Show ground, to inspect the buildings and arrangements, which they found very satisfactory.

Having diposed of a number of questions and details in reference to the Show, the Board separated at 3 o'clock.

KINGSTON, Monday, September 26, 1859.

On this day, being the day preceding the opening of the Exhibition, the Board assembled at 4 p. m., in the upper room of the Mechanics' Hall, on the show ground, to be present at a meeting of the Local Committee, the following members of the Board being present, viz: Messrs. E. W. Thomson, President, R. L. Denison, Asa A. Burnham, William Ferguson, Professor Buckland, Dr. Beatty, J. E. Pell.

The Local Committee having stated that they were now prepared to hand over the grounds and buildings to the Board, and having discussed some points of the programme of proceedings for the week, allusion being made to the improbability of the attendance of His Excellency the Governor General, on account of the melancholy death of his son, the previous day, by drowning, the Committee separated.

SAME DAY, 5 P. M.—The Board then met in the Treasurer's Office, the same members present as above named.

The minutes of previous meeting were read and approved.

Professor Buckland submitted the following communication from Mr. Hugh C. Thomson:—

"BOARD OF AGRICULTURE OFFICE,

TORONTO, 26th August, 1859.

SIR,—I have the honor to acknowledge the receipt of your letter of the 25th instant, with a copy of a resoultion of the Board of Agriculture, appointing me Secretary of the Board, in consequence of your own resignation. I beg leave to tender my thanks to the Board for the distinction conferred upon me, and to say, that while I regret that other engagements prevent you continuing to fill the position which you have so long occupied with honor to yourself and advantage to the Association, I accept the appointment, and shall make it my study to discharge the duties connected with it to the best of my ability.

I have the honor to be,
Sir,
Your obedient Servant
HUGH C. THOMSON.

To Prof. BUCKLAND."

Mr. Buckland reported the action of the Special Committee appointed at the last meeting to investigate the dispute existing between two organizations, each assuming to be the County of Russell Agricultural Society, stating that they had recommended the two societies to meet, and if possible adjust their dispute between themselves. He also read two letters which he had received, one from Mr. Kennedy, and one from Mr. Petrie, the respective Presidents of the rival

societies, stating that the two contending parties had met, agreeably to the suggestion of the committee, but that they had unfortunately been unable to adjust their differences.

The Secretary then read a communication from Mr. Marks, tendering his resignation as a member of the Board in consequence of failure of sight, and requesting that the same might be submitted at the annual meeting of the Association.

The Secretary submitted the following resolution which had been handed to him as adopted at the meeting of the Local Committee at 4 p. m.:

Moved by Sheriff Corbett, seconded by Mr. Warner,

That it be recommended to the Board that twenty quarter dollar tickets be issued to each member of the Local Committee for the admission of members of their families, and also that members of the Local Committee be permitted to enter the exhibition grounds in their carriages free.

It was then resolved that the request of the Local Committee be acceded to.

Resolved,—That the President, Vice-President, and Secretary of the Board of Arts, the President of the Kingston Mechanics' Institute, and the President of the Kingston Horticultural Society, be appointed a committee to superintend the arrangements of the Arts and Manufactures, and Horticultural departments.

Some further details relating to management of the exhibition were then discussed and arranged, and the Board adjourned to 9 a. m., Tuesday, 27th.

TUESDAY, September 27th, 1859.

The Board met at 9 a. m., in the Treasurer's office.

Present: Messrs. E. W. Thomson, President, Hon. George Alexander, A. A. Burnham, R. L. Denison, William Ferguson, Professor Buckland, Dr. Beatty.

Minutes of yesterday read and confirmed.

The following persons were then appointed as superintendents, of the several departments:—Horses, Henry Wilmot; Horned Cattle, John Wilmot; Sheep and Pigs, Peter Graham; Agricultural Implements, Frederick Kayler; Grain and Roots, Edward Jackson.

After some further routine business the Board adjourned.

At noon this day, the Board again met in the Mechanics' Hall, for the purpose of organizing the Committees of Judges for the various classes, and filling any vacancies that might have occurred, and having completed the arrangements, they then adjourned to the next day.

An Address of Condolence was then voted to their Excellencies Sir Edmund and Lady Head by the members of the Association and of the Local Committee, on the sad casuality which had occurred in the drowning of their son, Mr. John Head, and which prevented His Excellency from attending the Exhibition. The following reply was subsequently received from the Governor General's Private Secretary:—

"SPENCER WOOD, QUEBEC,
October 1st, 1859

SIR,—I am directed by His Excellency the Governor General, to acknowledge the receipt of the Address of Condolence forwarded by you on behalf of the Agricultural Association of Canada West, on the 27th of September.

Mr. Ferguson thanked the gentlemen of the Local Committee for their munificent gift, but disclaimed having done anything to deserve it, more than his duty. He originated the idea of permanent buildings it was true, but he had done nothing beyond what any one would be willing to do in his situation.—He was taken by surprise and could say little more, but thanked them again for their splendid present.

Several other toasts were proposed and duly responded to, and the company broke up shortly after six o'clock.

THE ANNUAL MEETING.

The Annual General Meeting of the Directors of the Association took place at 10 a. m., on Friday, September 30, in the Mechanics' Hall, on the show ground.

William Ferguson, Esq., President, in the chair.

Messrs. Hugh C. Thomson, Secretary of the Board of Agriculture, and Wm. Edwards, Secretary of the Board of Arts and Manufactures, joint Secretaries.

Members of the Board of Agriculture present:—

Messrs. E. W. Thomson, H. Ruttan, A. A. Burnham, R. L. Denison.

Delegates from County and Electoral Division Agricultural Societies, and from Horticultural Societies:—

Addington—Samuel Lake, Frederick Kayler,
Brant East—Henry Morven, George Stanton,
Paris Horticultural Society—Charles Arnold, William Gillespie,
Brant West—Daniel Perley,
Brockville—Henry Freeland,
Durham East—John Foott, Samuel Dickenson,
Durham West—Matthew Joness, E. A. McNaughton,
Elgin—Daniel Black, John King,
Essex—William Riddsdale,
Frontenac—Edward Jackson, Dr. Barker,
Glengary—Daniel Campbell,
Halton—Adam Sproatt, Austin Wilmot,
Hamilton—Captain Nicolls, H. J. Lawry,
" Horticultural Society, Isaac Buchanan, Arthur Harvey,
Hastings South—James J. Farley,
Huron—Horace Horton, John Adams,
Kent—R. J. Earl, Duncan McVicar,
Kingston—Sheriff Corbett, Dr. Litchfield,
Lanark North—John Menzies, William Wallace,
Lennox—E. Mallory, D. McPherson,
Leeds and Grenville North—Gideon Leehy,
Leeds South—Dr. Richmond, Alex. Cowan,
Lincoln—E. C. Rykert, J. W. Lewis,
London Horticultural Society—W. L. Lawrason, James Glen,
Middlesex East—Col. Askin, William Balkwill,
Middlesex West—Richard Saul, James Keefer,
Niagara—E. C. Campbell,
" Horticultural Society, Robert Warren, H. J. Brown,
Northumberland East—Robert Garbutt,
Northumberland West—P. R. Wright, J. G. Rogers,
Ontario South—James Pyle, George Robinson,
Ottawa Horticultural Society—Archibald Petrie,

Oxford North—John Barwick,
Peel—James Paterson, Robert Smith,
Perth—W. F. McCulloch, Robert Moderwell,
Toronto—Hon. G. W. Allan, A. Shaw,
" Horticultural Society—J. D. Humphreys, George Leslie,
Waterloo North—Robert Douglass,
Waterloo South—William Osborne,
Welland—John Ker,
Wellington South—Arthur Hogge, F. W. Stone,
Wentworth North—Isaac H. Anderson, John Weir,
Wentworth South—Levi Lewis, William Freeman,
York West—E. Musson, H. J. Boulton.

Members of the Executive Committee of the Board of Arts and Manufactures:—

Dr. Beatty, President, J. E. Pell, Vice-President, Dr. Craigie, Thomas Sheldrick, William Hay.

Members of the Board of Arts and Manufactures, delegates from Mechanics' Institutes, and Boards of Trade:—

Paris—John Lawrence, Charles Whitlaw, James Dickey.
Galt—Robert Thompson, H. H. Date,
Hamilton—Charles Freeland, F. J. Rastrick, J. P. McCuaig, Dr. Hurlburt, T. C. Keefer, C. W. Meakin, Thomas Hilton, J. E. Tomes, J. Hoodless, J. W. Roseburgh.
"Board of Trade—Adam Brown,
Dundas (town) —— McKechnie,
Toronto—H. Piper,
London—William Bowman,
Oakville—G. K. Chisholm,
Kingston—Thomas Drummond,

Moved by Dr. Barker, seconded by Mr. Bowman, That the members of the Board of Arts and Manufactures, with the exception of the committee, be not allowed to sit and vote at the meeting of the Directors of this Association.

Moved in amendment by Dr. Richmond, seconded by Mr. Cowan, That where a doubt exists as to the proper interpretation of the Act, the sense of the meeting be taken as to the construction to be adopted on the present occasion.

Moved also in amendment by Mr. Whitlaw, seconded by Mr. Adam Brown, That the members of the Board of Arts and Manufactures be allowed to vote, provision being made in the Act for their doing so.

A question as to the resolution being in order having been raised, and the President ruling it to be in order, it was

Moved by Mr. Ruttan, seconded by ———
That the ruling of the President, that the motion is in order be rescinded.

Moved in amendment by Col. Thomson, seconded by Judge Campbell,

Resolved,—That the several motions now in the hands of the President, be not put to the meeting, but that the lists of Delegates now in the hands of the Secretaries be taken as the list of Delegates to this meeting.—*Carried.*

The Secretary then submitted the following communication from Mr. Marks:

KINGSTON, 26th September, 1859.

SIR,—I request you will please inform the President and the members of the Board of Agriculture, that owing to dim sight I do not feel equal fully to perform the duties of member of the Board of Agriculture, and therefore am reluctantly constrained to resign the office.

rous, not more than 200 being present. William Ferguson, Esq., the President of the Upper Canada Agricultural Association, presided on the occasion, Sheriff Corbett doing the duties of the vice-chair. The chairman was supported on the right by Sir Allan N. MacNab, Bart., and on his left by E. W. Thomson, Esq., First President of the Agricultural Association. Among the other gentlemen present, we observed the Rev. Dr. Ryerson, Hon. George W. Allan, M.L.C.; Hon. Mr. Alexander, M.L.C., Woodstock; Hon. Alex. Campbell, M.L.C., for Cataraqui; Judge Campbell, Niagara; Judge Terrill, from New York State; Dr. Beatty of Cobourg; Isaac Buchanan, M.P.P.; Mr. Gibbs, late Tutor of the Prince of Wales; Angus Morrison, Esq., M.P.P.; John Cameron, Esq., M.P.P., &c.

After full justice had been done to the viands, the Chairman proposed the health of the Queen, which was drank with all the honors.

The CHAIRMAN then proposed "the Prince Consort and the Royal Family," which was drank with all the honors.

In proposing the health of His Exellency the Governor General, the President said he was sure it would be drank with that cordiality and enthusiasm with which it had always been received. The representative of royalty in this country was a gentleman whom we all admired and respected. Had it not been for the melancholy occurrence that had happened a few days ago, whereby he had been bereft of an only son, they might have had the pleasure of seeing him here on this occasion.

The CHAIRMAN next proposed the health of the President of the United States, which was responded to by Judge Terrill, of New York State.

The Army and Navy was then proposed, and Colonel Bourchier, on behalf the army, replied. Mr. O. S. Gildersleeve, replying for the navy.

SIR A. MCNAB rose to propose the next toast, which was "Prosperity to the Agricultural Societies of Canada West." He was sure this toast would be well received. The prosperity of this Association was an object dear to the heart of every Canadian. He liked Agricultural Associations, because every year at the annual exhibitions he could see what progress had been made in comparison with the exhibitions of former years. He liked these exhibitions because he had an opportunity of seeing old friends, and would go any day 100 miles to see so many as he had met since he had came to Kingston. He hoped he would meet them all in Hamilton next year, and he would make them sure of a hearty welcome—a Highland welcolme.

Col. E. W. THOMSON returned thanks. He was peculiarly pivileged in doing so, as he was the first President of the Upper Canada Agricultural Association, and had watched with great interest and growing pleasure every successive exhibition. This was the fourteenth yearly show since the commencement of the Association, and those that saw the first exhibition and the one to-day, must be struck with the wonderful progression since that time. He held in his hand the statistics of the fourteen yearly exhibitions, and they showed that the entries at the first exhibition only numbered 1,180, and £275 for prizes; while this year the entries were 5,000, and last year at Toronto the entries were 5,570. A marked change had also taken place in regard to the quality of the stock, and those yearly exhibitions had, no doubt, been the means of encouraging breeders to import superior animals. Greater facilities were now afforded to importers, and great as the advance had been within the last few years, he had no doubt those that lived would witness a still more rapid advancement in the future. He thanked them for the honor done the Association, and before sitting down he would propose "Prosperity to the Sister Society of Lower Canada."

The SECRETARY of the Lower Canada Agricultural Society, J. Perrault, Esq., rose to return thanks. He thanked them for the manner in which they had drank to the prosperity of the society of which he was Secretary. He was much pleased with the exhibition here, and especially with some classes of the stock. The people of Lower Canada were behind them in their agriculture and stock raising; but they must recollect that the farmers of Upper Canada had many advantages over their neighbors. They had the example and lessons of emigrants coming every year from a country where agriculture had attained its highest perfection. And the presence of these new comers served to keep the people of Canada alive to all improvements. He thought Lower Canada would yet be able to compete successfully with the Upper Province, and he expected great things from the dissemination of agricultural knowledge through the operations of the newly started Agricultural College. He was proud to say they had some enterprising farmers in Lower Canada, and he hoped soon to see many more.

He was followed by Mr. Penner, a late resident of Lower Canada, who expressed similar sentiments to those of the previous speaker.

The Hon. Mr. ALLEXANDER proposed "Our Guests," coupled with the name of Mr. Gibbs.

Mr. GIBBS replied, and expressed his gratification at being present at this fair. It was supposed by some that from his late connection with the Prince of Wales, he had been sent out as his forerunner to this Province. He wished to state that this was not the case. He was to him as a private individual, and he thought he could not spend his time to more advantage than by judging with his own eyes of the progress that had taken place here, and to gain knowledge of the state of agriculture and domestic manufactures in this province. He had passed through some parts of the country which he was told a few years ago was a complete wilderness; and he would almost compare those localities to some of the finest districts in England. The fairs of the old country were often characterized by scenes of drunkenness and every species of immorality. Here he was surprised at the difference. He saw here order, regularity and decorum, certainly a great improvement upon the notions and proceedings at home.

Hon. ALEX. CAMPBELL next proposed "The Press," and spoke of the duties and responsibilities devolving on its members. The agricultural community had to thank the press for their efforts in behalf of agriculture, and the interest they took in the prosperity of the farmers. The press here was a powerful institution, and in activity and spirit was on a par with the press at home, while it out-distanced altogether that of the continent of Europe. In the old country, not many years ago, he happened to be in Hull, a large manufacturing city of Yorkshire, and he found they had not a single daily in the place, while in Kingston, a much smaller place, they had three daily papers.

Dr. Barker, of the Kingston *Whig*, on behalf of the members of the Press, returned thanks.

Colonel Cameron craved the attention of the company for a few minutes while he performed a duty which he was sure would give pleasure to every gentleman present. They all knew how much the success of this exhibition was owing to the exertions of their worthy President, and they could not but admire the judgment and discretion displayed in every thing connected with its arrangements. In directing the movements of the local committee he had rendered great service, and as a slight acknowledgment for these services, and as a token of their esteem for him, he was deputed to present to Mr. Ferguson a service of plate from the members of the Local Committee.

In discontinuing a seat at the Board, it is due to the members of the Agricultural Association that this communication should be made known to them at the Annual Meeting on Friday next, in acknowledgement of their continued confidence in electing me to a seat at the Board from its first formation, and also that the County Societies may know of my resignation in time before the next annual county meeting, to consider a proper person to fill the vacancy.

I have the honor to be,
Sir,
Your obedient Servant,
JOHN BENNETT MARKS.

H. C. THOMSON, Esq.,
Secretary Board of Agriculture.

Resolved,—That this Association has heard with very great regret that the cause assigned by Mr. Marks has induced him to tender his resignation as a member of the Board of Agriculture, and they take this opportunity of expressing the high sense they entertain of Mr. Marks's services in the cause of agricultural advancement, and most deeply sympathise with him in the deprivation that he has suffered in the partial loss of his sight.

Moved by Dr. Barker, seconded by Mr. Daniel Campbell,—That John Wade, Esq., of Port Hope, be appointed President of this Association for the ensuing year.—Carried.

Moved by Colonel Askin, seconded by Sheriff Corbett,—That John Barwick, Esq., of Woodstock, be the First Vice President of this Association for the ensuing year.—Carried.

Moved by Capt. Nicolls, seconded by Mr. George Stanton,—That Frederick W. Stone, Esq., of Guelph, be the Second Vice-President of this Association.

Moved by Mr. Ruttan, seconded by Dr. Beatty,—That Asa A. Burnham, Esq., be elected Second Vice-President of this Association for 1860.

Moved by Mr. E. C. Campbell, seconded by Dr. Barker,—That the Hon. George William Allan be elected Second Vice-President of this Association for the ensuing year.

It was then decided that the resolutions should be put from the chair in the same order in which they had been proposed, and that moved by Captain Nicolls having been accordingly put to the meeting, was carried, and Mr. Stone was declared duly elected Second Vice-President.

Moved by Mr. Daniel Campbell, seconded by Dr. Barker,—That Richard L. Denison, Esq., be the Treasurer of this Association for the ensuing year.—Carried.

Moved by Colonel Askin, seconded by Doctor Barker,—That the next exhibition of the Provincial Agricultural Association be held in the City of London.

Moved by Mr. E. C. Campbell, seconded by Mr. Ruttan,—That the next exhibition of this Association be holden in the City of Hamilton, being for the year 1860.

It was then moved and carried that the Mayor of London should be allowed to submit the proposition from that city. The Mayor then stated that London was prepared to guarantee sufficient and suitable buildings for the exhibition, and submitted the following document, under the seal of the Corporation :—

CITY CLERK'S OFFICE,
LONDON, C. W., 27th September, 1859.

Copy of a Resolution passed at a meeting of this Corporation held on the 22nd instant.

Moved by Alderman Mitchell, seconded by Councillor Gillean,

That His Worship the Mayor, Aldermen Flock, Buckley, Moffatt, Mc Kenzie,

and Councillor Norris, be delegated on behalf of the Corporation to attend before the Board of the Agricultural Association at Kingston, with full power to guarantee on behalf of this Corporation, that the necessary and suitable buildings will be provided for holding the exhibition of the Provincial Fair in this City in 1860, and that the City Seal be attached to a copy of this Resolution, and furnished to said delegates.

Certified a true copy.

ALEX. S. ABBOTT,
City Clerk.

Moved by Mr. J. E. Pell, seconded by Mr. A. Shaw,—That the next exhibition of the Association be held in the City of Toronto.

The Mayor of Hamilton was then permitted to speak on behalf of the claims of that city, and submitted the following document, also under the seal of the Corporation :—

CITY HALL, 19th September, 1859.

The Special Committee on the Crystal Palace, in submitting its second report has much pleasure in testifying to the general expression of deep interest in this enterprise, not only in the city, but also on the part of many of the neighboring townships and counties. Effectual means are now being taken to obtain the requisite subscriptions for shares in the Joint Stock Company, and these have been so far successful as to leave no doubt that the whole will speedily be taken up.

With ordinary liberality, therefore, on the part of this Corporation, the erection of the Chrystal Palace may be considered as no longer doubtful.

Your Committee now recommend that with a view to securing the Provincial Exhibition in this City, next year, and of meeting any difficulty in its accomplishment, this Council do apppoint His Worsnip the Mayor, along with five members of the Council, as a deputation to the Annual Meeting of the Provincial Agricultural Association, to be held at Kingston next week, and that said deputation be authorised to pledge this Council that a building in every way worthy of this City and section of the country, will be provided for the Exhibition of 1860.

HUGH COCHRANE,
Chairman.

Moved by Councillor T. Walker, seconded by Alderman Devaney,

"*Resolved*,—That a deputation of this Council be now appointed to proceed in conjunction with the Mayor, to Kingston, during the holding of the Annual Exhibition of the Provincial Agricultural Association, for the purpose of taking on behalf of this City, such action with the Board of Delegates, as will secure to it the Exhibition of 1860;" and

"That the members now constituting the Special Committee on the Crystal Palace be so appointed, viz :—Aldermen Cochrane, Roach, Browne, Mitchell and Patterson."—Carried.

I, Thomas Beasley, Clerk of the Municipal Council of the City of Hamilton, do hereby certify that the above is a true copy of a report and resolution adopted by the said Council, on the 19th day of September, A. D., 1859. Witness my hand and the Corporate Seal of said City, this 24th day of September, A. D., 1859.

THOMAS BEASLEY, City Clerk.

The resolution in favor of holding the next exhibition at Toronto, was then put from the chair and lost.

The resolution in favor of holding the exhibition in Hamilton was then carried.

Moved by Mr. Ruttan, seconded by Colonel Thomson—

Whereas a bill was introduced into the Legislature during the last session, having for its object the fixing the holding of the annual exhibitions of this association at Kingston, Toronto and London, respectively, for nine years,—

Resolved,—That the Directors of this Association disapprove of the said bill, and now take this occasion to declare their decided opinion that any measure calculated to take out of their hands the appointment from year to year, as has hitherto been the custom, of the place at which this Association shall meet, is impolitic and inexpedient. Carried.

Moved by Captain Nicolls, seconded by Dr. Craigie,—That the following persons do compose the Local Committee for the exhibition of 1860, viz :—Sir Allan N. McNab, Isaac Buchanan, M. P. P., Sheriff Thomas, The Mayor of Hamilton, Henry McKinstrie, Aldermen Roach, Cochrane, Brown, Patterson, Mitchell, Dr. Roseburgh, Captain Nicolls, Dr. Hurlburt, Adam Brown, The Mayor of Dundas. Carried.

Moved by Mr. H. J. Boulton, seconded by —— ——, That a committee be named by this Association to take into consideration the advantages of an Act being passed by the Provincial Legislature for the encouragement and aiding of Land Drainage, and to present a petition to Parliament on the subject; and that Mr. Isaac Buchanan, Col. Thomson, the President and Vice-Presidents of this Association, and the mover, be such committee. Carried.

Moved by Mr. Barwick, seconded by Mr. Buchanan,—That the name of Wm. Ferguson, Esq., be forwarded by the Secretary of this Association to the County Agricultural Societies, as that of a suitable person to be nominated to fill the vacancy in the Board of Agriculture, caused by the resignation of Colonel Marks. Carried.

Resolved,—That the thanks of this Association are due and are hereby given to the Local Committee, the Mayor and Corporation of the City of Kingston, the Council of the United Counties, the Officers of the Association, the Judges of the various Classes, and especially to the Ladies of Kingston, for their valuable contributions and services in aid of the Exhibition.

Resolved,—That the thanks of this Asscociation be given to the Canada Company for their continued liberality in giving annually the handsome sum of $100 as a prize for wheat, and of $40 as prizes for Hemp and Flax.

Moved by Dr. Craigie, seconded by Dr. Beatty,—That in future all judges appointed for the exhibitions of this Association be paid their railroad and steamboat fare incurred in discharging their duties. Carried.

Moved by Mr. George K. Chisholm, seconded by Captain Nicolls,—That a detailed statement of the receipts and expenditure of this Association for the past and present year up to the 20th September, be printed and circulated under the Direction of the Board, and that the same be published annually in future. Carried.

The meeting then adjourned.

ANNUAL ADDRESS.

DELIVERED BY THE PRESIDENT OF THE AGRICULTURAL ASSOCIATION, WILLIAM FERGUSON, ESQ., AT KINGSTON, SEPT., 30, 1859.

Gentlemen of the Provincial Association,—At this the 14th Annual Provincial Agricultural Exhibition of Upper Canada it is pleasing to reflect that while displaying the progress made in the peaceful arts, consequent on our safety from foreign foes or domestic broils, our present happy security does not depend on extensive standing armies, fed and maintained by the industry of our people, but on the prestige and prowess of that noble country of which we are proud to form an integral part, and the desire of whose sovereign has ever been to maintain with her own our honor and our rights.

Through the wise course of non-interference adopted by Her Majesty's advisers, our beloved sovereign and her subjects have been happily exempted from the disasters resulting from the late fearful conflict between European despots, and terminating as it has done with such an amount of human misery, suffering and desolation, to a people whose sunny clime has been the admiration of the world, and whose fields, once so fair, have been desolated by the fearful scourge incidental to a state of warfare.

Duly appreciating the blessings of peace and the commercial advantages which the colonists of this part of Her Majesty's vast dominions enjoy from their connection with Great Britain, they should exert their best efforts to secure all the benefits resulting from this happy position by developing the resources of the country, and by the proper appreciation of the extended information which science and the experience of the past place within their reach.

To secure the many blessings which the munificent Creator intended for mankind in the varied productions of the world, they have been permitted by degrees, assisted with the aid of chemistry, to contemplate Nature's great laboratory of wonders through the light thrown on that science by the profound researches of Liebeg, Johnston, and many others, and are made acquainted in the plainest manner with the constituents of the earth in its varied form, whether of "soil, plant, or animal, and their mutual dependencies upon each other" so beautifully and learnedly again illustrated by Professor Lawson, of Queen's College, at his lecture on Tuesday last.

With a thorough knowledge of the constituents of his soil, by the aid of chemistry, the skilful husbandman is enabled not only to ascertain in what component his land may be deficient for the production of desired crops, but also the most suitable fertilizers required to supply such deficiency, as well as to select such soils as are best adapted for the production of certain crops under varied circumstances, either by adopting a rotation system or otherwise.

Nor are the advantages of a correct knowledge of chemistry necessarily confined to the agriculturist alone. In the arts and manufactures it lends its valuable aid, and in many of the operations of the manufacturer, as well as the artist, whose opportunities of acquiring scientific information may have been limited, through long experience and extended practice a practical knowledge of it is imperceptibly forced on their attention and understanding, and hence they become convinced of its value and importance. It may not be convenient for every farmer to acquire a thorough knowledge of this science; but now that the chief educational department of the Province offers such facilities, through standard works on the subject, with the assistance of appropriate apparatus, it becomes the duty of the trustees controlling the management of the schools of the country, to place within the reach of the rising youth of the land the facilities thus offered, and with the

aid of adequate teachers enable them to obtain a practical knowledge of this interesting and valuable science.

As the prosperity of the Province, at least for a considerable time to come, must mainly depend upon the success of our agricultural resources, we should avail ourselves of every opportunity of advancing those interests, whether they present themselves in the shape of a new and improved system of management in farm culture, labor saving implements or otherwise. It is idle to deplore the loss which the country sustains in unfavorable years of diminished grain and other crops, while in the mean time no preparations or attempts are being made to avert the fatal effects of future recurrences, either by arming ourselves with a knowledge of cause and effect, and means of prevention, or by substituting other and better modes of culture, calculated to cause mother earth, in accordance with the Divine fiat, to bring forth in abundance, if not of wheat at least of other crops equally profitable to the grower.

True it is, Canada is occasionally visited with uncongenial seasons, unfavorable to almost every species of culture or crop, which no human effort or foresight can either control or avert; and such, to a certain extent, was the unpropitious season of the past year, 1858; but should not the experience of the past teach us not to depend on perpetual cropping with wheat, which has resulted in so much distress to some sections of the country. It is not now absolutely necessary to a profitable system of cultivation that every farmer should produce a certain quantity of breadstuffs for exportation, wherewith to ensure his annual cash returns. Other products have been equally remunerative, when the wheat crop ceased to be profitable, either through the effects of weevil, rust or other causes; and the foreign market for beef, pork, butter and cheese, as well as for peas and other coarse grains, has presented a demand far beyond any amount we have been able to supply, and at prices at least equally remunerating as that of wheat to the producers.

To ensure success in the dairy branch of husbandry, as well as in the rearing of live stock, a proper selection of the most profitable domestic animals should claim the thoughtful consideration of the agriculturist, as much of the success attending his efforts must depend on the skill and care bestowed upon them. It is fallacious to entertain the idea that inferior or common breeds will thrive upon poorer pasture or less costly food; or that they will yield as profitable returns for their rearing and keeping, or that, if beasts of draught, they will perform the labor of well bred and well fed animals. Every person having opportunities of making comparisons between pure and ordinary breeds of domestic animals, when side by side, with equal feeding, must be convinced of the advantages resulting from improved breeds of every description of stock. But no amount of food, however rich or excellent it may be, will cause an animal to thrive that is exposed to the rigors of a cold Canadian winter, deprived of the necessary and proper shelter or housing required to protect it.

The very excellent display of superior animals, at the present exhibition, affords satisfactory proof that this department is increasing in interest, and presents an improvement creditable to the country; and it is highly praisworthy to those gentleman through whose skill and enterprise these many excellent specimens of valuable domestic animals have been imported, or bred during the present and past years, and by which our stock has been materially improved and the country greatly benefitted. Among the latest importations at the present exhibition, may be noticed a variety of animals introduced by Mr. Nimmo, of Camden East, County of Addington, consisting of Galloway cattle, Leicester sheep, a Clydesdale brood mare, and some specimens of trained sheep-dogs.

Next in importance to a thorough knowledge of the capabilities of the soil —the proper manner of cultivating it, and the most profitable domestic animals to be reared, correct information is necessary with reference to the most suitable labor saving implements required to carry on the business of the farm. The cost of manual labor in Canada, even when it can be obtained in the hurried seasons of farm work, is such a draw back on the farmers' resources that it becomes absolutely necessary to adopt the most efficient labor-saving implements for the various operations of the farm, and generally to substitute horse power whenever it can be introduced.

The great advantage of labor-saving implements has been considered of so much importance, when farming is extensively carried on, that no hesitation is made at even superseding horse power by steam power in many of the farming operations in England, and the steam plough has there become no longer a matter of wonder. Although the period may be remote when its introduction in Canada, may be deemed necessary, yet there is very little doubt of its being generally adopted at no distant day by the enterprising farmers of the western prairies. Already have the members of one Agricultural Society forseen its beneficial results, and by the liberal offer of one thousand dollars premium induced the inventive genius of one of their people to construct a steam plough, which, for its efficiency and excellence, has been pronounced, after a practical trial, to be all that the most sanguine could desire as a perfect agricultural machine.

While desirous of giving to the genius of every country its full share of praise for useful inventions, we must not omit noticing that Western Canada has also produced its steam plough; and that its interprising inventor, Mr. Romain, in full confidence of its capabilities, entered into competition in July last, with those of English invention and manufacture at the Royal Agricultural Society at Warwick, England, when its efficiency was acknowledged, notwithstanding that an accident occurred which prevented its performing the allotted portion of work.

With an agriculture thus revolutionized, as it were, by steam, it cannot be expected that the Canadian agriculturist, who, from the uneven surface conformation of many parts of the country, will be obliged to continue the present expensive hand and horse power system of farming, of old and perhaps worn out land, can keep pace or compete in the markets of the world with the produce of those extensive western plateaus which can with such advantage be ploughed, reaped, and threshed so economically by steam. As well might we expect the stage coach of by-gone days to travel with the speed of the present railway locomotive.

While we offer our most grateful acknowledgements to the Lord of the harvest for the bountiful crop vouchsafed throughout the land during the present season, so materially tending to resuscitate the lessened prosperity of the Province, it is worthy of consideration to ascertain, if possible, the chief cause of the late depression, with a view of preventing its future recurrence. Many opinions from the press and otherwise on the same subject have been already enunciated, parties in many instances taking opposite views; but the prevalent one has been that our extravagancies and desire for finery in various forms, and for costly articles of foreign manufacture, have induced a much larger importation of those articles than what our diminished exports would warrant. Should this opinion be correct, and there is doubtless good reason for believing it to be partly true, it is time to diminish the importation of those articles that can be manufactured with advantage at home; particularly now that the fostering care of the Government has, by a recent enactment, shielded the home manufacturer by a large protective duty, which will eventually enable him to undersell the foreign-made article.

But it is to be feared that there have been other causes to which the increased depression of the country may be fairly attributed. There are to be found in every country (and Canada is not an exception) many persons to whom labor is repugnant, and who, stimulated by airy dreams of amassing wealth without labor, embark, as they have been doing, in wild speculations on the incidental chances which a European war might offer in the rise of the principal staple in which they have risked their cash, as well as their credit, to the utmost extent, afterwards adroitly managing through false rumours, and otherwise to place a fictitious and extravagant value on that indispensible necessary of life, regardless of the embarrassment occasioned to the poor consumer in procuring sufficient for his present wants. In the mean time the fair value in cash, which would have been readily given for the staple thus locked up, remains in the pocket of the foreign purchaser, thereby lessening the circulating medium here, while the evil occasioned to the poor by such seasons of depression and exorbitant prices, is often ignorantly charged to the producer instead of the speculator. Many instances are on record where fabulous prices have been obtained, where no dearth or scarcity existed, by the avaricious speculator closing his granaries until extravagant profits were secured, or threatened bankruptcy compelled him to sell to meet his own monetary engagements, bringing, in too many instances, ruin on himself and others who might be depending on or connected with him in business transactions.

Although many cases have occurred where ruin has followed in the wake of reckless speculation, yet an occasional fortune has been secured, as it were, by a single turn of the wheel. But a question of grave importance naturally arises, whether society is also an equal gainer by the sudden advancement of an individual. Experience has shown, that wealth acquired without labor or industry, too often leads to habits of extravagance and pride on the part of its possessor or inheritor, incompatible with the habits of the rural population of Canada, who are destined for a long time to come, to depend for success and prosperity on their agricultural and industrial resources. We find too, that the force of such examples of extravagance and pride produces baneful effects on society, by leading some to view industry as undignified, and honest labour as degrading, as well as by forcing many to become mere useless drones or office seekers, who, if properly trained, might have been, by well directed labor, skill or industry, useful members of the community, and have contributed largely to the country's wealth and their own individual advancement, thereby leaving less occasion for the journalists of the day to attribute, as some have done, the country's disasters and depression of past years, to a desire on the part of our people for finery, extravagance and ease.

The properly constituted monetary institutions of a country exercise a powerful influence in promoting its prosperity; and in this respect Canada has just cause of congratulation in her establishments of this kind. It is to be feared, however, that the banking facilities and monetary accommodation so liberally afforded have been too often employed in the system of forestalling referred to, without a corresponding public benefit. Better would it be for the country, as well as for the class of persons thus engaged (who in many instances possess no mean share of intelligence, as well as resources) to direct those talents and resources to some other channel by which they might equally improve their own condition, and benefit their fellow men.

The field for profitable enterprize, as now opened by the recent Parliamentary protective enactment, is immense, and already have our infant manufactures that were previously drooping, as if under the effects of an uncongenial atmosphere, experienced its resuscitating influence. It is not only gratifying, but also creditable to the country, to witness the efforts being made by our manufacturers, par-

ticularly where water power is available, in securing those advantages which this protective influence affords them; whilst it warms into vigorous action the various branches in which they are engaged.

While the advantages, for at least some time to come, of manufacturing on an extensive scale, may in some instances appear doubtful, rivalled as we are by the cheap labour products of other countries, and our efforts checked by the difficulty of procuring capital; yet it is our best interest, as well as our duty, to do all in our power to encourage those infant manufactures that have already started into life, and begin to exhibit unmistakeable signs of prosperity; overcoming the apathy of those of our law makers, who should have protected, long ere this, the interests of home industry.

Many systems have been suggested for increasing the capital necessary for developing the agricultural resources of a new country, and fostering its manufacturing interests; the most reliable of which is, that we should export more than we import, thereby preserving the balance of trade in our favour, and by manufacturing, where practicable, for the supply of our wants, such articles as can be produced at home with profit and advantage, create a home market, and promote those reciprocal interests between all classes of the community, beneficial alike to the farmer, the merchant, the manufacturer, and the artisan; by which means we might reserve from the surplus products exported, a portion of their proceeds for liquidating the country's liabilities, and for making further progress.

In England, where money is often obtainable at three or four per cent, the manufacturer is satisfied with a profit on his wares equal to the rate of interest charged by our banks on short loans, and from his facilities of superior machinery and cheap labour, has hitherto been enabled, even with these small profits, to undersell the Canadian manufacturer, who has to pay a high rate of interest when compelled to borrow.

To encourage the influx of capital into the country, the usury law has been repealed, but without accomplishing the anticipated purpose of making money obtainable on easier terms. Not that less capital has flowed into the country, but following the example of a certain class of foreign speculators, many of our people have been induced to enter into land speculations, the purchasing of which required the borrowing of large sums of money at usurious rates, and the property so acquired, too frequently afterwards sold in times of depression for half its original cost, to meet the payment of the money so borrowed, thereby shutting up the capital thus employed from the legitimate course of sound and honest commerce.

The foreign capitalist, who is induced to invest here by hopes of obtaining an unusually high rate of interest for his money, instead of entering into some profitable business that would eventually benefit the country and himself, and give impetus to some of the commercial or manufacturing departments in which he might employ his capital, finds it an easy matter to lend his money on good security, at an exorbitant rate of interest, without ever venturing upon any of the legitimate risks of trade, caring but little whether he gets back his money from the borrower direct, or through the hands of the Sheriff. As the evil resulting from over-speculation naturally cures itself, and the money value of all descriptions of property is regulated by the demand, so will it be found that this reckless spirit of speculation will have to cease, and make way for the legitimate courses of trade, which money, as a circulating medium, was intended to subserve.

As the future wealth and prosperity of the country must, to a great extent, depend upon the industry of an increasing population, new tracts of the Public Lands are wisely being surveyed and opened up to the immigrant and industrious settler, and suitable free grants offered for actual settlement; at the same time

large sums of money are being expended on the new roads leading thereto, to make those lands still more attractive.

While those new tracts are being brought into cultivation, the virgin soil, for a succession of years, yields super-abundant crops in return for the labour bestowed upon them, and enables the hardy son of the forest to obtain in exchange for his surplus produce, all the indispensable manufactures he may require, and makes it the interest of the older community, on the ground of mutual advantage to supply those wants as fast as they arise. As therefore each fresh demand for our manufactured articles is created, it should be properly and promptly supplied by our own exertions, not only in the branches which are the produce of the primitive saw or grist mill, situated on the forest stream, but also to the more costly articles of a more refined and advanced civilization, consequent on the improvement of the country.

Some may imagine that the field for future enterprize in the various agricultural and mechanical pursuits, like some of the professional or mercantile, are either over-crowded or of limited scope. This cannot be the case while so much territory remains unexplored. The increasing wants of the country are boundless, and the imports of every variety of foreign manufactured goods, as shown by the Customs' returns, but which it would be our interest to produce at home, are almost of incredible magnitude. Nor can it be denied that our scope for future profitable manufacturing operations is immense, our mineral resources unlimited, our forests unbounded, and that the expanse for future developement terminates but in the impenetrable distance.

The benefits derived by Atlantic steam navigation, already established with Europe, place Canada in a position in which her increasing interests will hereafter be more fully subserved, and her extensive resources developed; and by the settlement of the British Colonies lying between Lake Superior and Vancouver's Island, with a hardy race of British subjects, direct communication will be established from the Pacific to the Atlantic Ocean; giving to Canada not only a large share of the carrying trade and commerce of this vast territory, but also opening up a highway by which direct intercourse will be had with the East Indies and China. Already has the iron band of the Grand Trunk Railroad been stretched from the shores of the Atlantic, to almost the western extremity of the Province; and the extension of a line to the Pacific, will doubtless speedily be accomplished, requiring but a favorable consideration of the home authorities and British capitalists for its completion.

It is to be regretted that the relation to England of Canada as a colony, has, until recently, either not been thoroughly understood by those at the head of Colonial affairs, whose duty it was to be well informed on the subject, or her position improperly placed by ignorant or interested parties. But the importance of Canada as a colony, as well as the loyalty of her people in having raised for the service of Her Majesty the 100th Regiment of Canadian Rifles, is now favorably acknowledged by the British Press. The London *Atlas*, in noticing the subject, remarks: "that on no other colonial interest is there displayed, in the British Legislature, such apathy and ignorance as there is on Canadian affairs," and also acknowledges that "the Colonies have been, and are still, the arteries which collect and purvey the life-blood which animates the whole frame of her gigantic commerce," and that "the noble loyalty of the 100th Regiment of Canadian Rifles, has warmed to a momentary enthusiasm the grateful heart of mother England."

When I had the pleasure of addressing you on a similar occasion this time last year at Toronto, I endeavored to draw the attention of the farmers to the advantages resulting from the cultivation and management of flax. Since that period the Board of Agriculture, with the view of testing the benefits

that might be derived from its culture, procured a sufficient supply of seed to admit of a portion being placed at the disposal of all such county agricultural societies as were disposed to avail themselves of it for trial. It is to be regretted, however, that the lateness of the season at which the seed arrived prevented many persons disposed to test its adaptability to the soil of Western Canada from giving it a trial. The seed on hand will, however, retain sufficient vitality for next year's sowing, when it is expected that many will enter upon its cultivation. Where it has been sown upon a small scale in this vicinity, although at too late a period to ensure success, and under other unfavorable circumstances, the yield has been satisfactory.

In order more fully to secure all the advantages of the flax crop it would be necessary to procure suitable machinery for rough dressing to fit it for exportation, as well as that necessary for extracting the oil. With this object in view, communication has been opened with J. H. Dickson, Esq., London, England, a gentleman engaged for over thirty years in the flax business, under whose directions the most improved machines for preparing flax and East India fibres have been constructed, and for which patents have been secured by him. This gentleman has now in course of publication a work on the "cultivation and preparation of flax and Indian fibres," which will be a valuable acquisition to our agricultural knowledge, and cannot fail to produce beneficial and lasting results when practically carried into effect. This book, besides giving all the necessary information for the production of flax, from the preparation of the ground on which it is to be grown until it is fitted for the loom, also gives many instances of the result or produce of flax-growing in England and Ireland, two of which I shall quote to show the profit of flax culture over any other cultivated crop. At page 43, we read that "on the farm of His Royal Highness the Prince Consort, 4½ acres were sown with flax, which produced 252 stones of clean flax, fit for spinning, and 76½ bushels of seed, which, if sold at current prices, would realize for flax at nine shillings per stone, and for seed at eight shillings per bushel, the handsome sum of £145 16s, or equal to £32 8s the acre. At the same page of his work, we find the following: "Extraordinary produce—Mr. J. Corry, of Mullanburry, Dromore, Ireland, sowed last season, (1857) fifteen pecks of Riga flax seed in one acre and a half a rood of his farm, the produce when scutched at the Fintona flax-mills, amounting to 128 stones payable; for this he received nine shillings per stone in the Omagh market, thus realising a sum of £54," equal to £48 per acre. The Board of Agriculture has ordered a copy of the book referred to for each county in Upper Canada with a view to disseminating its valuable contents among our farmers.

It is confidently hoped that this Annual Exhibition of the Industry of Western Canada, now near its closing, has been productive of some good to the farmers, their families, and others who have visited it, and that the pains taken and expenses incurred by the people of this city and neighborhood to furnish the most ample accommodation, and to render it both attractive and instructive, will have their beneficial results, and be an incentive to greater exertions at all our future exhibitions.

The chief aim of the Agricultural Association is to encourage a right spirit of emulation among the industrial classes, with a view to their permanent benefit, and to bring to public notice all the improvements which our enlightened times have produced, whether in improved stock, agricultural and horticultural products, arts and manufactures, works of art, or new and useful inventions, and to mark their approval by suitable rewards, in the granting of diplomas and premiums, and thus to afford encouragement to still greater efforts.

In some one or other of these subjects almost every person visiting the exhi-

bition will take more or less interest; and it is hoped that its general attractions will have created a spirit of thoughtfulness and enquiry, especially in the youths who attend it, many of whom will become the farmers, mechanics, and manufacturers of the country in due course of time. It is not enough to take a mere hurried glance with the passing throng at the varied objects of interests to be seen in order to insure correct knowledge in any particular department of the exhibition. Care should be taken by proper enquiry and minute inspection, to gain correct information as to the particular merits of each object of interest, and with the assistance of perhaps the exhibitors themselves, as well as others properly qualified to judge, by means of interchange of sentiments and opinions acquire such correct knowledge of the subject examined as to render its investigation both profitable and instructive.

It is with profound diffidence, and a knowledge of my own inability to discharge the responsible duties of President, or to add anything new to the general stock of useful information or practical knowledge, that I have now ventured to address you, as is the custom for the President to do at the annual exhibition; but I am fully aware that the farmers, manufacturers, and others, chiefly interested in the success of the Agricultural Association, do not always expect that the person whom they honor by placing in the exalted position of President, should be either possessed of the exterior blandishments often found in a public lecturer, or be qualified through a perfect knowledge of the multitudinous theories of the day, to deliver an address distinguished for depth of research or scientific knowledge. The honor of President, instead of being conferred (as doubtless some supposed it should be) upon the book-learned and scientific, is occasionally conferred, through the kindly regards of the farmers, mechanics, manufacturers and others representing the Association, on some members of the industrial classes, or, as in my own case, for some real or supposed services in a cause in which we are all more or less deeply interested, and which these exhibitions are intended to develope.

MEETING OF THE BOARD OF AGRICULTURE.

KINGSTON, September 30th, 4.30 p. m.

The Board met in the Treasurer's office.

Present: Messrs. E.W. Thomson, President; Asa A. Burnham, H. Ruttan, R. L. Denison, Dr. Beatty, J. E. Pell.

The question of adjusting the amounts to be paid for extra prizes being discussed, it was,

Resolved,—That in consideration of the smallness of the receipts at this exhibition the revising committees be instructed to fix the amounts of the extra prizes to be paid at a very low rate, in porportion to the nature of articles.

Ordered, That the Secretary write to the Secretary of the Local Committee, requesting that that committee will meet the Board at 9 o'clock a. m., to-morrow, for the purpose of giving a statement of the local receipts and expenditure, and of considering the finances connected with the late exhibition.

The Board than adjourned.

SATURDAY, October 1st, 1859.

The Board met at 9 o'clock, a. m.

The same members present as yesterday, and Mr. Ferguson.

After attending to various matters of detail connected with the late show, the Board adjourned till further notice.

THE EXHIBITION.

The Fourteenth Annual Provincial Exhibition of the Agricultural Association of Upper Canada was held at the City of Kingston, on the 27th, 28th, 29th and 30th of September, 1859. The list of prizes offered was substantially the same as the previous year, the amount being about $11,000. There were a few changes in details, amongst the most important being the omission of prizes for bulls five years old and upwards, making those of four years old and upwards the highest class; sub-dividing the classes of pigs from "large" and "small" breeds into classes under the names of each distinct breed, as Yorkshire, Berkshire, &c., and introducing some new prizes for implements, and in the mechanical and arts classes. The preparations made at Kingston by the Local Committee for the reception of the animals and other products were of the most extensive and substantial character; in regard to horses, cattle and sheep, especially, much more so than at any former meeting of the Association. In addition to improving and repairing the "Crystal Palace," erected for the exhibition of 1856, the committee erected a large and commodious building, of permanent and well finished construction, as a "Mechanics' Hall," and for the display of grain, dairy products &c., with the upper story well lighted and arranged for holding public meetings; a very substantial and well framed double roofed shed for the cattle, with stalls each side and floored passage through the centre; and upwards of a hundred lock-up boxes for the horses, with abundance of pens for the sheep, pigs, &c. To meet these expenses the local municipalities and societies contributed the sum of about $6,000. The number of articles and animals entered for exhibition was a few hundreds less than the previous year, but the display was altogether one of a most satisfactory character as an exposition of the products and industry of the province, particularly in regard to the live stock and the agricultural products. The

weather was throughout favorable, and, although the number of visitors was not so large as on some former occasions, and the money receipts were much less than for many years previously, the exhibition of 1859 may be considered in other respects to have been amongst the most successful ever held by the association. The following is a brief notice of the display in the different classes:—

Blood Horses.—Nine entries. The animals in this class are never numerous, there not having been over twenty at any exhibition since 1853. There was nothing in the class deserving special remark.

Agricultural Horses.—Two hundred and thirty-five entries, being a few more than in 1858. The show in this class was large, but there were no animals of unusual merit. Many of those to which prizes were awarded had taken prizes at previous exhibitions.

Heavy Draught Horses.—Thirty-four entries. Less numerous than at the two preceding shows. There were, however, a few new importations.

Durham Cattle.—Sixty-eight entries. The smallest number for six years. The animals in this class were, however, nearly all very superior. The chief exhibitors were Mr. Stone, of Guelph; Mr. Snell, of Chinguacousy; Messrs. Miller, of Markham; Mr. Roddick, of Port Hope; Mr. Thompson, of Whitby, &c. The exhibiters of newly imported animals were Messrs. George Miller, Markham; Neil McGillivray, Glengarry; C. A. Cuthbert, Berthier en haut, C. E.

Devons.—Sixty-two entries; the smallest number since 1856. Messrs. Lock, of St. Thomas; Courtice, of Darlington; Choat, of Port Hope; Tye, of Wilmot; Coates, of Oakville; Peters of London, were the principal exhibiters; Mr. Lock, as on former occasions, having the largest lot. Nearly all the animals in this class were of first quality, which would show creditably at an exhibition in any country, and in their fine appearance attested the thorough fitness of the breed for the climate and other circumstances of the Province.

Herefords.—Seven entries, all exhibited by Mr. Skene, of Amherst Island. The number of entries in this class has never yet exceeded eight; showing that the breed does not gain much ground in popular favor in this country.

Galloways.—Twenty-nine entries; the smallest number since 1856, when it was the same. It is certain, however, that these cattle are steadily gaining ground, particularly in the neighborhoods of Cobourg, Toronto and Hamilton. The chief exhibiters were Messrs. Fleming and McNeil, of Vaughan; Wm. Roddick, of Cobourg; John Roddick, of Brantford: Joseph Jardine, of Saltfleet, and Jas. Nimmo, of Camden East. The animals of this class were almost all of very fine quality. Mr. Nimmo had five head lately imported from Scotland, and which promised well.

Ayrshires.—Sixty-two entries. This class was more numerous than at any previous exhibition, and certainly exceeded also in quality any show of that breed that we have ever had before in Upper Canada. Mr. James Logan, of Montreal, was the chief exhibiter, and his stock, most of which has been recently imported, was of the very finest description, and bore unmistakeable marks of high breeding. He exhibited eleven head, all of the best. If any fault was to be found with his cattle it was that they had been too well cared for, and appeared as meant for show rather than use. In this respect they were somewhat of a contrast to the stock of Mr. Wright of Cobourg, which though in general as good had not the same holiday look. Mr. Wright's cattle were six in number, and are probably the best of their kind in Upper Canada. Mr. Dawes, of Lachine, had also a

fine bull, and Mr. Brown, of Cobourg, had a very fine animal of the same kind. Mr. Nimmo, of Clarke's Mills, showed an imported bull. Mr. R. L. Denison, Toronto, exhibited an aged bull, a very fine animal. Among the other exhibiters were Mr. Morton, of Brockville; Dr. Richmond, of Gananoque; Mr. Ryland, of Picton; Mr. Cuthbert, of Berthier-en-haut, C. E.; Mr. Bowes, of Pittsburgh; Mr. Hitchins, of Amherst Island, &c. The animals of this class made a very imposing display, and their graceful appearance attracted a great deal of attention.

Grade Cattle.—Thirty eight entries. Being a smaller number than at any show since 1852. The animals of this class were, of course, only cows and heifers, and there were none claiming any very special remark. They were principally grades of the Durham breed.

Fat and Working Cattle.—Twenty one entries. Being less than any year since 1853. There was not a fat ox or steer exhibited, and only two fat cows or heifers. The remaining entries were working oxen, of which there were about 30 yokes, few of them, however, possessing any special merit.

Leicester Sheep.—Ninety Entries. The smallest number since 1852. If the number, however, was not so large as on former occasions, the quality of those exhibited was of the highest order of excellence. Amongst the principal exhibiters were, as usual, the well known breeders, Messrs. Snell, of Chinguacousy; Miller, of Markham and Pickering; Stone, of Guelph; Guy, of Whitby; Walker, of London; Jeffrey, of Vaughan, &c. Mr. Snell had two lately imported rams.

Costwolds.—Twenty-nine entries. Being equal to the number in 1856, and less than any other year since 1854. The same remark as to excellence of quality will apply to this class, and in fact to the sheep generally, as to Leicesters. The largest exhibitors of Costwolds were Messrs. Stone, of Guelph, and Snell, of Chinguacousy. There were no new importations in this class.

Cheviots.—Twelve Entries. This class has never had over eighteen entries, which was in 1856; and the breed does not appear, notwithstanding its many good qualities, to be gaining ground. Mr. Dickson, of Clarke, who formerly exhibited in this class, did not show this year, leaving the field entirely to Mr. Roddick, of Hamilton Township.

Long Wooled Sheep—not pure Leicesters, Costwolds, or Cheviots.—Fifty-five entries. Being a few less than last year, or the year preceding, when the class was first established. Messrs Snell, of Chinguacousy; Miller, of Markham; Smith, of Toronto Township; Jeffrey, of Vaughan, were the largest exhibiters. Mr. Snell had several newly imported animals, some of which obtained first prizes. The sheep in this class were chiefly crosses of the Leicester and Costwolds, with a few Lincolns.

Southdowns.—Fifty-three entries. Being the largest number of this breed ever shown, except in 1857 and 1855. Mr. Spencer, of Whitby; Mr. Nimmo, of Camden East; Mr. Miller, of Grantham; Mr. Davy, of Ernestown; Mr. Jones, of Stamford; and Mr. Coates, of Oakville, were amongst the chief exhibiters. Messrs. Spencer and Nimmo both exhibited specimens imported from Britain since the preceding exhibition. Besides the exhibiters named were a good many others exhibiting smaller lots, showing that this breed is gradually becoming more extended.

Merinos and Saxons.—Seventeen entries. Being the smallest number since 1851, except in 1854, when it was the same as this year. Mr. Rymal, of Barton, and Mr. Miller, of Grantham, were the only exhibiters. Mr. Choat, of

Port Hope, formerly one of the chief competitors in this class, not showing this year.

LARGE BREED PIGS. The large breed pigs were this year, for the first time, divided into three classes. The Yorkshire, in which there were eleven entries; large Berkshire, two entries; and Other Large Breeds, nine entries; altogether twenty-two, being the smallest number since 1851, except in 1856. Messrs. Jordison, of Thurlow; Coates, of Oakville; Sisley, of Scarboro'; Robinson, of Kingston, were among the chief exhibiters in these classes.

SMALL BREED PIGS. The small breeds were divided into the Suffolk, in which there were twenty-three entries; Imported Berkshire, twelve; and Other Small Breeds, thirty entries; being altogether sixty-five, a larger number than on any former occasion, except in 1856 and 1858. The display of pigs, on the whole, especially in the small breeds, was excellent. The Essex pigs shown by Mr. Boulton, of Etobicoke; Mr. Durand and Mr. Briggs, of Kingston, could hardly be surpassed anywhere. Amongst the other chief exhibiters in these classes, were Messrs. McGlashan, of Pelham; Thomson, of York Township; Logan and Price, of Montreal; Davy, of Ernestown; McCammon, of Kingston; Foott, of Port Hope; Sadleir, of Kingston; Carveth, of Port Hope; Cuthbert, of Pittsburgh; &c. The neighborhood of Kingston is noted for its fine breeds of pigs. The statistics of the exhibitions exhibit the feature, that while the number of large breed pigs has been gradually decreasing, the number of the small breeds has been as gradually increasing, a circumstance which would seem to show the increase in popularity of the smaller breeds.

POULTRY.—One hundred and seventy-nine entries. Being less than any year since 1855, and more than that or any preceding year. The display of Poultry was very good, but not calling for special remark. Poultry fancying is not quite so much in fashion as a few years ago.

FOREIGN STOCK.—Twenty-two Entries. Being the largest number since 1850, when there were fifty. During the intervening years, foreign stock was almost entirely unrepresented. The chief exhibiters on this occasion were Messrs. Brodie and Converse, of Jefferson County, N. Y.; Mr. Gifford, of Genesee County; and Mr. Cook, of Jefferson County, N. Y.

GRAIN, SEEDS, &C.—Six hundred and nine entries; being a larger number than at any preceding show. The display in this class was excellent and imposing in every respect. The grain of the different kinds was exceedingly fine in quality, probably it could not have been surpassed at a similar exhibition anywhere; and there were no less than thirty-six samples of fall wheat, nine of these being of twenty-five bushels each; eighty-eight of spring wheat; sixty-eight of barley; thirty-six of rye; sixty-nine of oats; seventy-eight of peas; forty-one of timothy seed; forty-eight of Indian corn; with large lots of other sorts, entered. The bulk of the grain came from the Counties adjacent to Kingston, say Frontenac, Lennox, Addington, Hastings, Prince Edward, Leeds, Grenville, and Lanark, showing very satisfactorily the suitableness of the soil in those Counties for such productions. The more remote Counties also contributed very superior samples, but, as a matter of course, less in quantity.

ROOTS, &C.—Three hundred and sixty-eight entries. In this class, also, the display was much larger than on any former occasion. The specimens, especially of Turnips and Mangels, were remarkably good, probably finer than at any previous exhibition in the Province. Amongst the articles attracting particular attention in this class were the specimens of flax, competing for the Canada Company's Prize, particularly the lots exhibited by Messrs. Perine, Brothers, of

Woolwich, Waterloo County, who grow successfully several hundred acres annually, and prepare it for the foreign market. The gradually increasing attention given to the cultivation of roots and other field crops, and the growing interest taken in competitive exhibitions, are illustrated by the increase of entries at the Provincial Exhibition of Agricultural productions, consisting of grain, roots, and other field crops, from one hundred and thirty-nine in 1850, to nine hundred and seventy-seven in 1859.

FRUIT.—Two hundred and fifty-two entries. The number in this class was somewhat less than at either of the three immediately preceding shows. The slight falling off may be partly accounted for by the unusually early severe frost which took place in the latter part of September, and injured many tender fruits and vegetables in the vicinity of Kingston, so that the horticulturists of that neighborhood were prevented exhibiting many of their intended contributions to these classes. Besides, the season had been generally unfavorable to the growth of fruit throughout the Province. Still, the display in this department was very creditable, the majority of the specimens coming from Kingston and parts adjacent, Niagara, Toronto, Brockville, Hamilton and Montreal.

GARDEN VEGETABLES.—Three hundred and ninety-four entries. This is a larger number than any year except 1858. The display, although as well as fruit, somewhat curtailed by the early frost, was exceedingly good, showing satisfactorily the increasing attention paid to the production of garden stuff.

PLANTS AND FLOWERS.—One hundred and thirty-two entries. Being a larger number than on any former occasion in this class. This department was interesting and attractive. Judge Campbell, of Niagara; Mr. Leslie, Toronto; Mr. Faris, of Sorel, C.E.; Dr. Hirschfelder, of Toronto; Mr. Briggs, of Kingston; Mr. Lunn, of Montreal; Mr. Grey, of Toronto; Mr. Stenhouse, of Brockville; Mr. Curry, of Brockville; Mr. Baxter, of Kingston, being amongst the exhibiters deserving particular mention. The number of entries in all the horticultural classes has increased from one hundred and eighty-five in 1851, to seven hundred and sixty-nine in 1859.

DAIRY PRODUCTS, HONEY, &c.,—One hundred and fifty-six entries. The display of these products was more extensive than at any previous show, and the quality of nearly all the samples not to be surpassed; the country in the neighborhood, which contributed the bulk of the display, being noted for the excellence of its dairy produce, particularly butter.

AGRICULTURAL IMPLEMENTS.—Two hundred and eight entries. Not quite so many as the two preceding years, but more than other previous year. The manufacture of implements within the country has gradually increased, and, generally speaking, the specimens shown exhibit an improvement in model and workmanship. Reaping machines, mowing machines, cultivators, &c., as well as many of the smaller tools and implements, such as spades, shovels, &c., are much more extensively manufactured than a few years ago.

FOREIGN IMPLEMENTS. In this class there were only two entries, and those not strictly of implements, one being a steam engine. The number has gradually decreased from one hundred and twenty-two in 1850, and upwards of seventy on several other years, when our display of implements was almost dependent upon the foreign exhibiter for any degree of respectability, to be, as at present, practically nothing. The extension of the manufacture of implements within the country, and the decreased market, comparatively, for those manufactured in the adjoining States, has no doubt contributed in a considerable degree to this result; and probably the prizes awarded at our exhibitions for foreign manufactured implements have hardly been sufficient to induce the United States manufacturer to compete.

Without pursuing these comparisons any further in detail, it will be sufficient to state that the display in the other classes, viz :—Cabinet-ware, carriages, the fine arts, ladies' work, manufactures of leather, machinery and manufactures in metals, woollen and flax goods, &c. &c., was nearly equal, in the aggregate, to the exhibition at Toronto the preceding year, and superior to any other former exhibition. The following notices of the implements, machinery, manufactures, &c., are selected from the newspaper press. The extracts are from successive letters, omitting from each, as far as possible, the mention of such articles as are noticed by the others-

From the Toronto "Globe."

The furniture from the Penitentiary factory is very good. The chief article was a sideboard of oak, made for James Morton, of Kingston, beautifully carved, and moreover very handsome and symmetrical in design. A common bedstead, with an improvement invented by Mr. Stephens of Owen Sound, excited some attention. One of the bars round which the cord passes, can be turned with a small iron bar, and tightens the cord as it moves. It is kept in its place by a ratchet.

Mr. Wm. Knowles exhibited a mantel-piece of marble taken out of a small island in the Madawaska river, within the village of Arnprior. It is black and grey in colour, and so curiously striped as to make it quite unique. For monuments and mantel-pieces in plain rooms it is well adapted. It is easily got out, the bed having been washed on the surface by the river. The marble is very hard; Sir Wm. Logan gives it as his opinion that it is the most durable yet discovered in America. The grain of the sample exhibited is coarse, but the quality improves the deeper you go. Mr. Knowles has been only two months quarrying, but hopes to make a good business of it.

Mr. Staunton, corner of King and Yonge streets, Toronto, makes an excellen exhibition of room paper. He is an excellent workman, who was well established in business in England, but emigrated to Canada for the benefit of his family. He commenced manufacturing in a small way, in Toronto, three years ago, doing a retail business in connection with it. He has now established a factory, from which he can turn out 1,000 pieces a day, and is prepared to supply dealers. His paper is furnished by Taylor, Brothers, who have taken pains to make a good article. Mr. Staunton's patterns and colours are tasteful, and he is constantly adding new styles to his stock. We notice, with pleasure, the growth of this branch of manufacture.

Some fair specimens of woollen goods are shown, but a new regulation this year of not allowing the exhibiters to put cards on their goods, prevents us giving names.

A blind boy named Andrew Moses, who resides in Oak Street, Toronto, shows some beautiful cane and reed baskets, chairs, &c. The colours are well arranged, and the workmanship excellent. He deserves encouragement in his efforts to support himself.

John Condell, of Kemptville, shows an artificial leg and arm, which seem almost perfect in their mechanism. The movements of the natural limbs are copied exactly. The fingers and thumb grasp an article, and raise it as high as the head by the action of the stump alone.

Mr. Nasmith has his usual exhibition of fine biscuits, and Mr. Hessin, Toronto, a good show of confectionery.

Mr. Edward McGivern, of Hamilton, has an unusually fine show of saddlery hardware of his own manufacture.

The Mechanics' Hall is a very rough frame, in which are displayed some specimens of manufactures that ought to have been exhibited in the main

building. Kingston shows well in iron manufactures. The establishments of James Morton, T. Drummond, and Chewett & Company send specimens of different kinds of work. Briggs, of Gananoque, shows excellent nails, and Jones & Co., of the same place, forks and spades. The most interesting product in this Hall, however, is a quantity of flax, shown by Perine Brothers, of Conestoga. It is of remarkably good quality, and the firm had great success in growing it. They had 400 acres this season, and have never lost a field since they began to grow it, five or six years ago. Any land suitable for other spring crops will grow flax. Messrs. Perine have a scutching mill at Doon as well as at Conestoga. They find their market in the United States, there being no mill in Canada which manufactures linen goods. This want will surely be supplied soon. If we can manufacture cotton, the raw material for which we do not grow, linens will surely follow if the flax is supplied.

Mr. Rice Lewis showed a great deal of enterprise in sending down a large number of Taylor's safes and iron bedsteads. They make an excellent display.

The implement-men never have had at any show a corner for their articles, and they are no better off on this occasion. It is too bad that well-got-up machines should be left exposed to the weather, and amidst the competition between cities to get the show, it is to be hoped that better accommodation for the implements willbe provided. Messrs. Patterson, of Belleville, carry off the bell for finish and taste. Their combined reaper and mower is a model of beauty, and as they are very skilful mechanics, we presume that it is equally good for work. It has a cast-steel cutter, which is a recent improvement. They have sold no less than 210 of these machines during the year. They also exhibit a threshing machine, fanning mill and separatar, all of beautiful workmanship. Also a farm mill, which appears worthy of notice. They warrant it to grind six bushels of wheat per hour, with horse power, and the cost is only $80. The machinery is some-thing like that of a pepper-mill. It is the intention of this firm to open an agri-cultural warehouse in Toronto, where, we hope, they will also manufacture be fore long. At the centre of business in Upper Canada, an establishment of that kind is imperatively required, and whoever starts it will be amply remunerated.

There are on the ground three portable steam engines, an indication of progress in this department. One is by Mr. James Morton, of Kingston, another by Beckett & Co., of Hamilton, the third is not marked. The ploughs are very numerous and good. The English Howard plough exhibited by Mr. Rice Lewis attracts much attention, and all our own makers are well represented. There are several self-raking reapers on the ground, showing some skill in arrangement, but none which can yet be considered perfect. The Johnston and the Helm reapers are among those exhibited.

Messrs. Lake, of Newburgh and Napanee, have a very brilliant show of carriages. They deserve great credit for their enterpsise and liberality. Mr. McCabe, of Hamilton, showed a very handy inside jaunting car for one horse, well worthy of notice. Mr. Owen, of Toronto, has some of his substantial carriages on hand as usual. Mr. Perry, of Montreal, has two splendidly decorated engines on the ground, and Mr. Marks, of Toronto, one of equally good workmanship, though plainer.

We were somewhat interested in a hand-loom invented and patented by Mr. George A. Sargent, of Bloomfield, County of Prince Edward. It is worked without a treddle by a pull forward with the arm, and there is a shuttle movement which dispenses altogether with the necessity of throwing by hand. It is a great improvement on the ordinary domestic loom, the position of the weaver being with this machine a very easy and healthy one, while the old was the reverse. It can be made for $50, and is easily repaired and kept in order.

Mr. Peter R. Lamb, of Toronto, exhibited a great many useful articles worthy of notice. Every one knows the value of bone dust, as manure for root crops, and it is satisfactory to observe that ample provision has been made for the wants of farmers in that respect. Mr. Lamb has the dust, and also what is called half-inch stuff. He obtains all the bones he uses in Toronto, and yet in that limited field collects more than suffices for the wants of the Canadian farmer. He shipped this year about 200 tons to England. Though the export adds something to the wealth of the Province, the use here in the form of dust would benefit us much more. Canada is very far from the point of being able to dispense with any of the natural manures. When our farmers come to use roots more as a change for wheat, and to feed their stock, Mr. Lamb's bone-dust will come more into play. Mr. Lamb also manufactures glue, gelatine, neats' foot oil and blacking. Perhaps some of our lady readers do not know that the delicate jelly which they receive from the confectioner for evening parties, is made of the same material as the dark sticky glue which they may have chanced to see in a carpenter's pot. There is a constant demand for Canadian glue, which is quite equal to any of its foreign rivals. The neats' foot oil is the best lubricator for the machine now used.

Mr. John Gartshore, the celebrated iron manufacturer of Dundas, exhibits a locomotive cylinder worthy of notice, since it has been made, with others, for the Great Western Railway, to replace the cylinders of some of their English engines which have been found too soft. The iron is partly American, partly scrap, partly Scotch pig, and partly Canadian, from Marmora, and is as hard as care can make it. We were glad to notice also an improved water wheel, which we understand has been tried by Mr. Rowland, at his mill on the Humber, with success. As the streams diminish with the clearing up of the country, improved driving wheels will become absolutely necessary for turning the smallest machinery. No improvement of the steam-engine has hitherto supplied so cheap a motive power as water, when to be had in adequate quantities.

A very remarkable change has of late years come over the exhibition of implements. Formerly at least one-half of the articles upon the ground were American. Rapelje & Co., of Rochester, used to exhibit whole rows of cultivators, ploughs, straw cutters, and other instruments. We did not see on this occasion a single article of American manufacture, and yet the show was by no means deficient either in quantity or quality. A new implement is exhibited this year. It is called a *Chop Grinder*—a singularly infelicitous name. It is intended to accomplish somewhat the same end as is set forth in the advertisement in the English papers, headed, "Do you bruise your oats?" Instead of bruising it cuts the grain in pieces. Mr. Mowry, of Peterborough, exhibts one of them. Messrs G. & J. Brown, of Belleville, another; and the flour mill of Messrs. Patterson, of Belleville, to which we referred yesterday, may be used for the same purpose, by a slight alteration in the machinery. Crushing grain, and more particularly Indian Corn, is undoubtedly of great service in assisting digestion, and effects an important saving in the food of all descriptions of animals. Messrs. Patterson's mill was invented by a Mr McDonald of Belleville, and being fit for all descriptions of grinding, from the finest flour to the roughest cutting for animals, is peculiarly well suited for general use.

Mr. Gartshore exhibits one of his smut machines, with all the latest improvments; Messrs. Haggart Bros. were on hand as usual, with one of their fine threshing machines and separators. Mr. Massey, of Newcastle, had also a similar machine. The latter claims an improvement this year for separating and cleaning the grain for market. An unusual quantity of rollers were upon the ground, showing that this machine is coming into general use with the farming community. Horse rakes were also very plentiful; Mr. Wilson's, from the neigh-

borhood of Hamilton, had the advantage, according to the general report, in simplicity of construction as well as speed, certainty, and ease of working. The number of good ploughs and cultivators was remarkable. The old-fashioned machines appear to have gone entirely out of use, and have been replaced by the most efficient implements human ingenuity and skill can devise. Messrs. Carpenter, Ware & Co., of Hamilton, had their usual fine display of scales. They manufacture six descriptions and twenty different sizes. They have added steel caps to the scales, which have a movable platform, thus providing an effectual preventive against wearing. Their scales for weighing flour by the barrel are remarkably convenient—a real boon to millers. Their other firm of Gurney & Carpenter exhibit a new stove, which they have patented on account of its many excellencies. They also have boxes for waggon-wheels. The competition in cloths lay between Messrs. Fraser & Co., and Disher & Co., of St. Catharines.—Mr. James Rosamond, of Almonte, showed some excellent fulled cloths.

From the Toronto Leader.

Mr. Steward, saddler, of Toronto, makes a fine display of saddles and trunks, of all sorts, and Mr. Buchan, of Newcastle, a nice set of harness and a very pretty robe and bridle. There are some good looking pianos and a nicely carved sideboard of black walnut, exhibited by Mr. O. Sinclair, of Kingston. In boots and shoes, Mr. Samuel Sims, of Toronto, shows several kinds. Savage & Lyman, of Montreal, exhibits some splendid specimens of silversmith ware, manufactured in that city. A very pretty map of the Kingston Post Office and mail rooms, designed by Mr. Matthew Sweetman. Post-office Inspector, is shown, and evinces a good deal of ability and ingenuity on the part of Mr. Sweetman.

The display in the ladies' department is superb. The fair exhibiters were as busy as bees throughout the morning, and the result was a fine exhibition of their handiwork. Passing on there are several articles of clothing, among which is a fur robe made by Mr. Groh, of Kingston, out of 2,150 pieces of different furs. It is a magnificent article.

In the Fine Arts Department there is not very much to mention. Many of the paintings have already been exhibited several times, and are as familiar to those who attend these exhibitions as household words. There, are, however, some few new ones, which are deserving of notice. Mr. R. J. Griffith, of Toronto, shows some landscapes and animals in water colours, a crayon drawing (a lion), and animals in oil. They are all nicely executed. Mr. Griffith also exhibits two banners of beautiful workmanship. Messrs. Carson Bros, of Toronto, make a rich show of colored photographs; nothing at all equal to them are on exhibition. Mr. Hind's views of the Red River Territory, and some paintings by Mr. Hopner Meyer are also on exhibition. Messrs. Fuller and Benoke, and Mr. A. M. Barr, of Toronto, show some fine lithographing and engraving. The educational department is worthy of special mention on this occasion, as nearly all the articles shown in the collection have been manufactured in Toronto. The globes have been made by Messrs. Jacques & Hay, the brass work manufactured by Mr. Potter, and the lithographing by Maclear & Co. The largest size globe is thirty inches, and the smallest three inches in diameter. The maps are the most complete yet published; those of China and Japan having marked on them the late treaty made by Lord Elgin, and the times at which the various ports became open to commerce. Some such peculiarities are shown on all the maps. Mr. Potter also exhibits a fine collection of philosophical instruments.

In bookbinding and ruling the only specimens I saw were those exhibited by Messrs. Brown Bros., of Toronto. All the samples are excellent, especially

some new embossed cases for large works, which have been manufactured but very lately by this firm in Canada. Lyman Bros. show a nice collection of chemicals, essences, oils, &c. Nasmith is here with his biscuits, which, as usual, makes one feel a little hungry on seeing them, and Mr. Hessin, of Toronto, makes a fine display of confectioneries. John Burns, of Yorkville, shows a collection of pottery, and Mr. Peter R. Lamb some blacking and glue. Henry Robinson, of Kingston, and others, exhibits some nice specimens of fulled cloth. There is some flaxen hemp cordage—a splendid article—manufactured I could not find out where. Mr. J. B. Smith, of Hamilton, but who carries on business at Ancaster, shows a large quantity of woollen drawers, stockings, &c., all of which speak well for the success of home manufactures. Meik & Co., of Toronto, showed several bottles of their excellent pale ale.

It is much to be regretted that the rule adopted last year of trying the reaping machines has not been followed this year. In the absence of an actual trial of their merit, no intelligent decision can be come to by the judges. The owner of each machine declaims loudly upon its superiority; and there is no means of eliciting truth out of this confusion of claims. The implements must be judged either from appearances or by the most imperfect accounts of what they have severally done. The advantage of awarding prizes upon such a principle, may well be questioned. There is no approach to a certainty that the best working machines will get the prizes; and it is quite within the range of possibility that the contrary may occur. In that case, positive injustice would be done. This plan of awarding prizes blindfold must be abandoned; and it is not to the credit of the Association that a practice long since condemned by the common sense of Europe, should be persisted in here. Last year a step in advance was made; and it is more painful to witness the retrogression observable on the present occasion. This principle applies to every kind of machines exhibited. It should be made a rule absolute and inflexible that no prizes should be awarded to machines that had not proved their superiority in a competitive trial. The absence of this rule is observable in the amount of extra gilt and polish everywhere to be seen. And it could not be otherwise, where machines are judged by appearances, the makers will strive to outdo one another in that particular. In some cases, the exhibiters themselves had remedied the defects of the arrangements, and put their machines in motion. This was the case with the washing-machines; and it would enable the judges to give an intelligent and just decision.

In the Mechanical Hall, several articles from the Kingston Locomotive Works, such as a drilling machine, a connecting rod beautifully finished up and fitted with brasses, a good sized bell, small cast-iron locomotive wheels, and several smaller articles of finished work were those which first attracted attention. Mr. Rice Lewis, of Toronto, is here, as he is everywhere, and exhibits a few of Taylor's fire-proof safes, a spring bottomed mattrass, iron bedsteads and other articles. A. S. Whiting & Co., of Oshawa, show a nice glass case of two and three-pronged manure forks, hoes of all descriptions and several other things of a similar nature; all of which are nicely got up. Messrs. D. F. Jones & Co., of Gananoque, compete in this line. In cut nails of all sorts, Messrs. I. Briggs & Co., of Gananoque, exhibit largely. A very fine display of axles of all sorts and sizes, beautifully finished, is made by A. Chewett & Co., of the "Victoria Iron Works," Kingston. In the collection are also specimens of malleable iron, bent and twisted into various shapes. T. Drummond & Co., of Kingston, show some fine cradles, scythes, snaiths, forks, &c. In stoves there is a fair display, Mr. Rodden, of Montreal, and Mr. McGee, of Toronto, being pre-eminent.—Some articles of copper furniture which set off Mr. Rodden's stoves, and which are manufactured by Mr. Prowse, of Montreal, are splendid specimens of copper work. A very ingenious cheese curder is shown by the inventor, Mr. John

Rook, of Newburgh. Some spring wheels by Mr. N. Gough, of Gananoque, are also on exhibition. In Plumber's work the only thing to be seen in the hall is a bath with necessary fixings, and wash hand-basin. William Hodson, of Toronto, makes a fine display of door-sashes, window-frames and blinds, &c. Some magnificent iron ore from the mine of George Chaffey & Bros., of the township of Crosby, County Leeds, is on exhibition. On analization it is found to be composed of 4.60 Protoxide of iron, 82.30 Peroxide of iron, 11.00 Silica, 0.30 Sulphur and 1.80 Water and loss. In this hall there is also some leather of various kinds exhibited by Minnes & Bros., Kingston. A collection of 51 pieces of Canadian wood, attracts a good deal of notice.

Outside the building there is a pretty fine display of agricultural implements of all sorts. Besides these there are two engines and boilers attached, from the Locomotive Works, Kingston, one of which is horizontal, the other slightly inclined from the horizontal. J. W. Forsyth, shows an engine of the oscillating kind, and F. G. Beckett & Co., of Hamilton, a portable engine and boiler. They are all set in motion, and are used in working threshing or fanning machines or some other practical purposes. On the grounds there are also some nice boats, one of which is made with paddle-wheels, by Mr. F. R. Corner, of Kingston, and worked by hand. It is a very nice affair.

Yesterday I mentioned that Brown Bros. were the only parties that had specimens of binding on exhibition, since then other entries in the same department have been made, and there appears to be a pretty brisk competition.

Several more carriages have been brought in, and there is now a finer display in this department than has been at any previous exhibition of the Association. The greatest number exhibited by any one person is what is shown by Mr. S. Lake of Newburgh, C.W. In all he shows about twenty carriages of various sorts, all of which are beautifully finished. Some cutters shown by the same exhibiter are also pretty specimens of workmanship, one especially with an elegant cover, which is lowered and raised by means of a lever at the hind part of the cutter. The carving and painting on all these articles are very creditable. Mr. S. P. Lake of Napanee is also an exhibiter in this department, but not to the same extent as his namesake. There are a few carriages shown by Mr. J. Linter of Kingston, and a nice double-seated buggy by Mr. Treffle St. Charles of Montreal. Under the same roof there a few fine engines, several washing and a few winnowing machines. One of the fire-engines is a large one made by Mr. Perry of Montreal, called the "Cataract." It is highly finished in every respect. Further I can say nothing about it, as there has been no practical test made of the merits of the various mechanisms. Mr. Marks, of Toronto, also shows his "machine," which has already been exhibited several times, and which for its size is on excellent piece of workmanship.

Of the various washing machines on exhibition, one shown by Mr. Hiram E. Lawrence, of West Shefford, C. E., seems to be the best adopted for its purpose. It is simply a circular barrel with raised longitudinal slips of wood on it, which when set in motion by means of a crank rubs the cloth against a series of rollers underneath it, forming a segment of a circle. The rollers increase in size the further they are from the centre.

There are some few things more on exhibition which deserve notice. The enterprising "Thorley" has erected a tent for his own special use and is attracting notice. Mr. D. Crawford, of Toronto, shows some corn starch and chicory, and McNaughton Bros., of Newcastle, some flour and potato starch. Mr. M. Staunton, of Toronto, makes a fine display of room-paper of his own manufacture, for which he has obtained a first class prize. Three fine banners are exhibited by Thomas Robinson of this city. There is some good toilet soap of Hearl's (Canadian) manufacture, shown by G. S. Hobart, of Kingston; also a fine collection of paints, oils, chemicals, &c.

From the Toronto Colonist.

The specimens of pottery, from Burns' manufactory, Yorkville, are well worth inspection. A number of filters, chimney tops and jars are exhibited, and the ornamental work is very much admired. Close to these are samples of confectionery by Hessin, Toronto, and Mr. Nasmith occupies a space with samples of his fine biscuits. Several varieties of biscuit are also shown from Kingston, and a few kinds of fancy biscuits from Montreal. Dumble, of Kingston, exhibits several varieties of ornamental confectionery, which are much admired for their finish. The same individual has a can of preserves. A large space is taken up with woollen and other manufactured goods in this department. There is more variety in this class than at any of the former exhibitions, and the quality of the goods is generally excellent. We miss the world-renowned blankets from Dundas; but that district is well represented by a fine lot of yarns and knitted factory goods from Ancaster mills. There are several varieties of cloths from the St. Catharines mills, such as grey cloths, tweeds and satinets, and some of the finer cloths are of superior quality and finish. Captain Meik of the Weston brewery, has a lot of pale ale and porter. A miscellaneous assortment of articles occupies a corner of this department, from Montreal. There are samples of pot and pearl barley, oatmeal, starch and composition candles. Along the centre of the court is displayed an endless variety of harness and saddlery goods. Specimens of cabinet work, in walnut bureaus, pianos, melodeons, &c. Parson Bros. of Toronto, have samples of their coal oil lamps, and Lyman Bros., also show samples of linseed and rape oils, and the native shrubs from which some of the medicines were extracted. Savage & Lyman, of Montreal, have a large case of finely finished silver ware and plated work, and close to it is a superbly mounted safe, from Kershaw, Montreal, fashioned somewhat like a bureau and painted in wainscott. The imitation of wood is so perfect, and the moulding so well executed, that the observer, unless told, would imagine it was made of wood. Olmstead & Jones, of Syracuse, N. Y., exhibit a fine selection of plated harness and silver and other mountings for harness. Condell, of Kemptville, C. W., explains to the listeners the mechanism of an artificial leg and arm which appear to do wonders in the way of walking and in the power which is given to the hand in grasping any article even as small as a pin.

Turning into the next court, we find a case of perfumery from Lyman & Bros, also a choice assortment of medicines. Mr. Fleming has a space here for his various kinds of seeds and roots, and beyond, Mr. Stanton, of Toronto, displays several rolls of wall papers of delicate patterns beautifully finished, and manufactured by himself.

Charles Boeckh, of Toronto, shows a variety of brushes, and succeeding them a large space is taken up with well finished models of vessels in every peculiarity of rig. The articles from the Educational Department comprise a selection of globes of various sizes, ranging from 3 to 30 inches in diameter, maps mounted and on framed rollers; a beautiful air pump made by Potter of Toronto; an electrical machine by the same maker. Potter also exhibits a very useful instrument for city surveyors, and the finish and style of these instruments is in every respect equal to those of English make. The globes are made in Toronto by Jacques & Hay, and the maps are also designed and finished in Toronto. They also exhibit a revised map of Modern Italy, which shows very distinctly the features of that country. Lovell & Co., Montreal, exhibit specimens of printing, book binding, &c., and Donnelly of Hamilton has some neatly executed specimens of printing on cards, posters and bookwork. A little case of beautifully executed cards from the *Pantagraph* office, Bloomington, Ill., is exhibited, and Fuller & Benecke have some well executed litographs.

In fancy work there was a large and fine collection. The wax-work was particularly admired. One specimen—a beautifully inlaid wax table—attracted the attention of the ladies. It was executed by a young lady of Kingston. Some fancy hair-work fashioned in flowers was very pretty. There were several good samples of raised worsted work, and the netting in lace and muslin was in general well executed. Of plain and fancy quilts there was, as usual, an endless variety, and hanging, as they did, from the roof of the building, had a fine appearance. Mrs. Dumble, of Kingston, showed some specimens of native straw, grown in Kingston and manufactured by her into hats and bonnets. The straw has a clear fibre, and at a distance looks like the best English Dunstable. The few samples of knitting shown are good. The Indians have a large variety of nicknacks—beadwork in moccasins and pouches. There were also several large rolls of rag-carpeting of substantial material and well put together. There were only a few specimens of tailoring by Mr. McKay of Kingston ; and Mr. Groh of the same place, exhibited a fine collection of furs dressed and made into caps, &c. A seamless seal-skin cap claims particular notice from its finish and appearance. The same exhibiter also shows a selection of hats and caps. There are only two specimens of dentistry, one by French of Toronto, and the other by Bazin of Montreal. A space in this court is devoted to some fine cases of stuffed birds and insects, by Passmore of Toronto, and Horsey of Kingston. J. Mills, of Flamboro' West, has on view a few of his newly patented roofing tiles. They are plain and fancy colored, and seem well adapted for roofing, being as durable as slates and as imperious to rain, while they are manufactured at two-thirds of the cost. J. Broome, of Milton, C. W., exhibits a set of metal pipes for an organ, also wooden pipes for the same instrument. This gentleman is the owner of the organ which is placed in the orchestra.

Among the manufactures more immediately connected with agriculture, is a patent cheese curder, made by Rooke, of Newburgh, C.W. It is a large square boiler made of double tin, with a furnace below. Jones of Gananoque, has, as usual, a fine assortment of spades, shovels, socket forks, and other articles necessary in the farm yard. The Oshawa Company also exhibit a case of similar articles, and Drummond, of Kingston, occupies a large space with a variety of pieces in the same class. Chown & Hamilton, of Kingston, exhibit a variety of cooking and warming stoves, some manufactured by themselves, and some from McGee's foundry, Toronto, for which they are agents. Kershaw, of Montreal, exhibits a large and finely finished banker's safe, and a few locks of peculiar construction, which would puzzle the far-famed Hobb to open. Morton, of Kingston, occupies a large space with a variety of iron works in castings for locomotive wheels, a complete set of taps and dies, and a patent pump. There are several good specimens of iron from the Canada ore. A. C. Chewett, of the Victoria Iron Works, exhibits specimens of steel from the native ore, and a few iron axles from the same material. A. Dyer, of Pickering, shows an ingenious mill-stone-dresser, which performs the work in less time than by hand and with less trouble. Mahaffy, of Brampton, exhibits a variety of horse-shoes, and a few excellent axes, one sent from Newburg. Dame, of Belleville, is the only exhibiter of pails, and there are a few patent churns, some of them constructed on what might be called the self-acting principle. A considerable space is taken up with leather. There are samples of dressed calf, Spanish sole-leather, and some rolls of strong and well-dressed belting. Perry, the fire-engine maker, from Montreal, exhibits several yards of hose-pipe. Minnes, of Kingston, is the principal exhibitor of leather, and Ford, of the Cataraqui Tannery, has some excellent sole-leather. Hodson, of Toronto, has the only machine-made panel doors, sashes and window-blinds. A case of files from the Dundas Foundry is the only article of the kind we could see. A hammered anchor from Kingston is a neat piece of

work, and some bush hammers for stone-cutters, from the same place, are much admired for their superior finish and fine timber. A company from Ogdensburgh have brought over some organ melodians lately patented, and the tone of the instruments and general finish is good. Several additions have been made to the Saddlery department, and some leather trunks have been added to the articles in this class. Carpenter and Ware, of Hamilton, compete with the Syracuse firm in plated work for harness; and a lot of small and platform scales are just unpacking. A couple of balls of flax rope are worthy of notice. They are equal to any made in England. We were unable to find the name of the manufacturer: but they are made somewhere in this locality. We omitted the name of Hopner Meyer, as an exhibiter of Photographs, in our letter yesterday. Mr. Brown, of the *Globe*, has sent specimens of printing.

The show of agricultural implements is neither very large nor very good, but there are one or two fresh things which ought to be made public. One of these is an improvement in the combined mower and reaper, invented by Johnston & Bros., of the Meadowvale Iron Works. It consists of a very simple contrivance by which the draft is brought to bear from the centre of the machine instead of from one side, as heretofore, entirely removing the side draft so often complained of in these machines. The gearing is also made more simple, and the draft altogether much lightened. The weight is also so well balanced that the pole does not distress the horses in the least. This machine appears to come as near perfection as possible, and the one exhibited yesterday, was, I am informed, purchased by an English gentleman, who is going to take it home with him. Messrs. Patterson, of Belleville, as usual, show some very nice machines of this class.

We also noticed on another machine made by Mr. Davidson, at the Kingston foundry, a contrivance invented by Mr. Irving, a farmer at Wolfe Island, for the purpose of removing the grain as cut from the machine, and laying it down in the proper size for sheaves, thus entirely doing away with the necessity of having a man to rake it off by hand. This contrivance is still in a rough state. but appears to work with tolerable success.

There is also a new fanning mill, patented by D. E. Norton, of Toronto, which is a vast improvement upon any machine now in use. By an arrangement of the screws, not only is every bit of chess and cockle removed, but any two sorts of grain of different size will be delivered separately, each perfectly free from any impurity. It is perfectly successful with regard to chess, which is a great point gained; and the manner in which peas and wheat, or peas and oats or barley, are separated is excellent. It is certainly the best thing of the kind that has ever been brought into use in this country.

The ploughs are generally of the usual class—the successful competitor in this article being Mr. Mahaffey, of Brampton, whose wooden plough is very highly spoken of by the judges. The ploughs were all tested by their draft in the field. There were on exhibiton a large number of cultivators, harrows, ploughs, mowing and reaping machines, churns, cheese presses, &c.; but there does not appear to be anything original besides what I have mentioned.

The carriages shown contain a large number of very highly finished and a few useful specimens, but they are chiefly of the buggy species, and many of these are so guadily decorated that no one would ever dream of driving them anywhere except on a drawing-room floor. Mr. Lake, of Newburgh, is the chief exhibiter of these pretty toys. Among other eccentric specimens of taste, I noticed a cutter, having on the front of it a picture of a semi-nude female, languidly reclining in an impossible position in a delightfully cool bath. Fancy such a design for a winter vehicle! McCabe & Co., of Hamilton, have a couple of well made concerns, one a very neat specimen of an Irish jaunting-car, and the other a sulky, which merits approval, if such a term can be applied to a

vehicle of such a questionable character. The same firm have also some beautiful specimens of carriage and wagon wheels. R. Owen, of Toronto, has some carriages, which, though made plainer than many others exhibited, look as if intended for some useful purpose, and in point of finish are all that could be desired. Among them, a four wheeled dog cart, a most useful and elegant article.

LIST OF PRIZES.

Awarded at the Fourteenth Annual Exhibition of the Provincial Agricultural Association of Upper Canada, held at Kingston, September 27, 28, 29, and 30, 1859.

HORSES.

CLASS I.—BLOOD HORSES.—(9 entries,)

Judges—George Roach, Hamilton; Daniel Perley, Brantford; J. W. Lewis, Grimsby; Samuel Dickinson, Port Hope; John Peters, London.

Best thorough-bred stallion, Wm. Bennett, Montreal, 40 dol; 2nd do G. J. Grange, Guelph, 25 dol: 3rd do Chas. Rowe, Augusta, 12 dol.

Best thorough-bred 3 years old stallion, George Cooper, York Township, 22 dol; 2nd do Edward Howard, Fredericksburg, 14 dol.

No other entries in this class worthy of premium.

CLASS II.—AGRICULTURAL HORSES.—(235 Entries.)

Judges.—John P. Wheler, Scarboro'; John Menzies, Almonte; George Robson, Whitby; Job Aylsworth, Newburgh.

Best stallion for agricultural purposes, James Bell, Weston, 40 dol; 2nd do Thomas Davis, Etobicoke, 25 dol; 3rd do William McNair, Markham, 12 dol.

Best roadster or carriage stallion, John Sanderson, Markham, 40 dol; 2nd do S. S. Cornell, Kitley, 25 dol; 3rd do Nicholas Grimshaw, Hamilton Township, 12 dol.

Best 3 years old stallion, J. VanSlyck, Ernestown, 22 dol; 2nd do Simon Shunk, Vaughan, 14 dol; 3rd do J. Janes, Richmond, 7 dol.

Best 2 years old stallion, John Hartley, Nelson, 14 dol; 2nd do Edwin Shibley, Portland, 10 dol; 3rd do Hugh Rankin, Kingston Township, 5 dol.

Best 3 years old filly, Alfred Jeffrey, Vaughan, 18 dol; 2nd do Milo Parkes, N. Fredericksburg, 11 dol; 3rd do George Lake, Camden, 7 dol.

Best two years old filly, S. H. Miller, Ernestown, 14 dol; 2nd do Conrad Sills, Fredericksburg, 9 dol; 3rd do R. Spooner, Kingston Township, 4 dol.

Best yearling filly, Thomas McMurtry, Hamilton Township, 8 dol.

Best brood mare and foal, or evidence that the foal has been lost, John Moore, Etobicoke, 22 dol; 2nd do James Logan, Montreal, 14 dol; 3rd do Nicholas Grimshaw, Hamilton Township, 6 dol.

Best roadster or carriage brood mare and foal, &c., Joseph D. Purdy, Ernestown, 22 dol; 2nd do S. H. Miller, do 14 dol; 3rd do Conrad Sills, do 6 dol.

Best span matched carriage horses, J. H. Perry, Whitby, 20 dol; 2nd do Miles Shorey, N. Fredericksburg, 15 dol; 3rd do D. Purdy, Belleville, 10 dol.

Best saddle horse, Samuel H. Purdy, Ernestown, 10 dol; 2nd do John Stacey, Brockville, 8 dol: 3rd do John Milton, Pittsburgh, 6 dol.

Best single carriage horse in harness, T. H. B. Purdy, Kingston, 10 dol; 2nd do S. D. Purdy, Ernestown, 8 dol; 3rd do D. H. Case, Belleville, 6 dol.

CLASS III.—HEAVY DRAUGHT HORSES,—(34 Entries.)

Judges.—John W. Lewis, Grimsby; George Roach, Hamilton; Daniel Perley, Brantford; Samuel Dickinson, Port Hope.

Best heavy draught stallion, D. Rowntree, York Township, "Cumberland," 40 dol; 2nd do R. Armstrong, Markham, "Merry Farmer," 25 dol; 3rd do John Sanderson, Markham, 12 dol.

Best 3 years old stallion, W. Crawford, Scarboro', 22 dol; 2nd do John Miller, Pickering, 14 dol.

Best 2 years old stallion, Joseph Thompson, Pickering, 14 dol; 2nd do Thos. Smith, Toronto Township, 10 dol.

Best 3 years old filly, J. Logan, Montreal, 18 dol; 2nd do McNaughton & Bros. Newcastle, 11 dol.

Best two years old filly, Thomas Smith, Toronto Township, 14 dol.

Best brood mare and foal, or evidence that the foal has been lost, J. Crawford, Scarboro', 22 dol; 2nd do, J. Lawrie, do, 14 dol.

Best span of draught horses, J. Logan, Montreal, 20 dol; 2nd do. McNaughton Bros. Newcastle, 15 dol; 3d do, A. McGuin, Kingston Township, 10 dol.

REMARK BY JUDGES.—The Judges in awarding the prizes would remark that the show of horses under the several classes has been very inferior: many have been ruled out as unworthy; neither have the entries been so numerous as was to be expected at a Provincial Show. The judges also regret being compelled to state that no attention was paid to them or exertions used by any member of the Local Committee to have the horses brought into the ring for examination. To facilitate the awarding the prizes one of the judges was obliged to act as Marshal in place of one of the members of the Local Committee.

CATTLE.

CLASS IV.—DURHAMS.—(68 Entries.)

JUDGES.—George Walker, London: A. Sproatt, Esquesing; John Boyes, Kingston; W. A. Cooley, Ancaster; M. Joness, Bowmanville; S. D. Farley, Belleville.

Best bull 4 years old and upwards, Arthur Hogge, Guelph, "John O'Gaunt 2d" $36; 2nd do Samuel Peters, London, "London Lad" $24; 3rd do. George Robson, London, "Shenandoah" $16; 4th do Thomas Smith, Mimico, "Young Victor" $8.

Best 3 years old bull, John Snell, Chinguacousy, "Prince of the West," $32; 2nd do. John Thompson, Whitby, "Bridegroom," $20; 3rd do. Peter Moffat, Peterboro', "Young Hudsworth," $12.

Best 2 years old bull, F. W. Stone, Guelph, "Third Grand Duke," $24; 2nd do. Wm. Armstrong, Markham, "Tweedside," $16; 3rd do. C. A. Cuthbert, Berthier, *en haute*, C. E. "Myrmidon," $9; 4th do. George Roddick, Port Hope, $5.

Best 1 year old bull, J. P. Wheler, Scarboro, "President," $20; 2nd do. George Robson, London, "Sir C. Knightley," $12; 3rd do. George Miller, Markham, "Prince of Wales," $8; 4th do. John Snell, Chinguacousy, $4.

Best bull calf, (under 1 year,) John Walton, Peterborough, $10; 2nd do. John Snell, Chinguacousy, "Cobden," $10; 3rd do. George Miller, Markham, "Magnet," $6; 4th do. John Snell, Chinguacousy, "Jack Frost," $3.

Best Cow, F. W. Stone, Guelph, "Desdemona," $20; 2nd do. N. J. McGillivray, Williamstown, $12; 3rd do. John Snell, Chinguacousy, "Sonsie," $8; 4th do. N. J. McGillivray, Williamstown, $4.

Best 3 years old cow, F. W. Stone, Guelph, "Sansparcil, 2nd," $16; 2nd do. do., do. "Marchioness of Glo'ster," $10.

Best 2 years old heifer, John Thompson, Whitby, "Lady of Athelstane," $12; 2nd do. do. do., "Nerissa 11th," $8.

Best 1 year old heifer, George Miller, Markham, "Queen of the May," $10; 2nd do. John Walton, Peterboro,' $6; 3rd do. F. W. Stone, Guelph, "Victoria," $4; 4th do. John Bellwood, Jun., Clarke, $2.

Best heifer calf, (under one year) F. W. Stone, Guelph, $6; 2nd do. George Roddick, Port Hope, $4.

REMARK.—The Judges of this Class have to remark that the competition in the different sections was small, but the cattle exhibited were of superior quality.

CLASS V.—DEVONS.—(62 Entries.)

Judges—John Ker, Drummondville; Charles Partridge, Barrie; Robert Douglass, Waterloo.

Best bull, 4 years old and upwards, Nathan Choate, Hope, $36; 2nd do. John Davy, Clarke, $24; 3rd do. Christopher Courtice, Darlington, $16; 4th do. W. H. Lock, Yarmouth, $8.

Best 3 years old bull, W. H. Lock, Yarmouth, $32; 2nd do., Daniel Tye, Wilmot, $20; 3rd do. do. do., $12.

Best 2 years old bull, Thomas Allin, Oshawa, $24; 2nd do Richard Coates, Oakville, $16; 3rd do Daniel Tye, Wilmot, $9; 4th do do do, $5.

Best 1 year old bull, W. H. Lock, Yarmouth, $20; 2nd do C. Courtice, Darlington, $12; 3rd do D. Tye, Wilmot, $8; 4th do Samuel Peters, London, $4.

Best bull calf (under 1 year) W. H. Lock, Yarmouth, $16; 2nd do John Moore, Etobicoke, $10; 3rd do. W. H. Lock, Yarmouth, $6; 4th do C. Courtice, Darlington, $3.

Best cow, W. H. Lock, Yarmouth, $20; 2nd do do do, $12; 3rd do do do, $8; 4th do C. Courtice, Darlington, $4.

Best 3 years old cow, W. H. Lock, Yarmouth, $16; 2nd do do do $10; 3rd do Samuel Peters, London, $6; 4th do W. H. Lock, Yarmouth, $4.

Best 2 years old heifer, W. H. Lock, Yarmouth, $12; 2nd do do do $8; 3rd do do do $5.

Best 1 year old heifer, W. H. Lock, Yarmouth, $10; 2nd do do do $6; 3rd do R. Coates, Oakville, $4; 4th do do $2.

Best heifer calf (under one year) W. H. Lock, Yarmouth, $6; 2nd do do do $4; 3rd do do do $2.

CLASS VI.—HEREFORDS.—(7 Entries.)

Judges—The same as for Devons.

Best bull 3 years old and upwards, Charles Skene, Amherst Island, 3rd prize 12 dol.

Best bull calf (under one year) Charles Skene, Amherst Island, 16 dol.

Best cow, Charles Skene, Amherst Island, 20 dol; 2nd do do 12 dol; 3rd do do 8 dol.

Best one year old heifer, Charles Skene, Amherst Island, 2d prize, 6 dol.

Best heifer calf (under one year) Charles Skene, Amherst Island, 2d prize, 4 dol.

CLASS VII.—AYRSHIRES.—(62 Entries,)

Judges:—Philip Luke, Huntingdon; James Hart, North Lanark; H. D. Jessup, Prescott; David Tait, Cornwall.

Best bull 4 years old and upwards, James Nimmo, Camden East, 36 dol; 2d do R. L. Denison, Toronto, 24 dol; 3d do George Morton, Brockville, 16 dol; 4th do Thomas Richmond, Leeds, 8 dol.

Best 3 years old bull, Herman Ryland, Picton, 32 dol; 2d do John Hitchins, Amherst Island, 20 dol; 3rd do Thomas Dawes & Son, Lachine, 12 dol.

Best 2 years old bull, James Logan, Cote St. Louis, C. E. 24 dol; 2nd do C. A. Cuthbert, Berthier *en haut*, C. E., 16 dol; 3rd do Herman Ryland, 9 dol; 4th do John Boyes, Pittsburgh, 5 dol.

Best 1 year old bull, John Boyes, Pittsburgh, 20 dol; 2nd do R. L. Denison, Toronto, 12 dol.

Best bull calf, (under 1 year) Daniel Collins, Augusta,—(subject to proof of purity of blood,) 16 dol; 2d do P. Rose Wright, Cobourg, 18 dol; 3rd do James Logan, Cote St. Louis, C. E. 6 dol; 4th do George Morton, Brockville, 3 dol.

Best cow James Logan, Cote St. Louis C. E. 20 dol; 2d do do 12 dol; 3rd do John Boyes, Pittsburgh, 8 dol; 4th do do 4 dol.

Best 3 years old cow, John Hitchins, Amherst Island, 16 dol; 2nd do John Boyes, Pittsburgh, 10 dol.

Best 2 years old heifer, James Logan, Cote St. Louis, C. E., 12 dol; 2nd do do 8 dol; 3rd do P. R. Wright, Cobourg, 5 dol; 4th do John Hitchins, Amherst Island, 3 dol;

Best 1 year old heifer, James Logan, Cote St. Louis, C. E. 10 dol; 2nd do do 6 dol; 3rd do do 4 dol; 4th do P. R. Wright, Cobourg, 2 dol.

Best heifer calf (under one year), James Logan, Cote St. Louis, C. E., 6 dol; 2nd do do do 4 dol; 3rd do George Morton, Brockville, 2 dol; 4th do John Hitchins, Amherst Island, 1 dol.

REMARK.—The Judges think it proper to remark that in their opinion there is a number of this class of animals presented for competition which are not pure blood.

CLASS VIII—GALLOWAY CATTLE.—(29 Entries.)

Judges:—John Ker, Drummondsville; Robert Douglass, Waterloo; Charles Partridge, Barrie; James Hart, North Lanark; Philip Luke, Huntingdon; H. D. Jessup, Prescott; David Tait, Cornwall.

Best bull, 4 years old and upwards. John Fleming, Vaughan, 36 dol; 2nd do Authur McNeil, Vaughan, 24 dol; 3rd do James Carruthers, Haldimand, 16 dol; 4th do Wm. Roddick, Hamilton Township, 8 dol.

Best 3 years old bull, John McClain, Essa, 32 dol; 2nd do E. W. Thomson, York Township, 20 dol; 3rd do J. Riddick, Brantford, 12 dol.

Best 2 years old bull, John Roddick, Port Hope, 24 dol; 2nd do Joseph Jardine, Saltfleet, 16 dol.

Best 1 year old bull, James Nimmo, Camden East, imported from Scotland since last show, 60 dol; 2nd do John Moore, Etobicoke, 12 dol.

Best bull calf (under one year), William Roddick, Hamilton Township, 16 dol; 2nd do Joseph Jardine, Saltfleet, 10 dol.

Best cow, John Moore, Etobicoke, 20 dol; 2nd do Jos. Jardine, Saltfleet, 12 dol; 3rd do James Nimmo, Camden East, 8 dol; 4th do Joseph Jardine, Saltfleet, 4 dol.

Best 3 years old cow, John Miller, Pickering, 16 dol; 2nd do William Roddick, Hamilton Township, 10 dol; 3rd do James Nimmo, Camden East, 6 dol.

Best 2 years old heifer, William Roddick, Hamilton Township, 12 dol.

Best 1 year old heifer, James Nimmo, Camden East, imported from Scotland since last show $20; 2nd do Joseph Jardine, Saltfleet, 6 dol.

Best heifer calf (under one year,) James Nimmo, Camden East, 6 dol.

CLASS IX.—GRADE CATTLE.—(38 Entries.)

Judges.—Captain Nicolls, Hamilton; J. Paterson, Streetsville; and P. R. Palmer, Thurlow.

Best cow, G. W. Miller, Grantham, 20 dol; 2nd do H. Summerfelt, Markham, 12 dol; 3rd do W. Elliott, Kingston, 8 dol; 4th do Henry Ryland, Picton, 5 dol.

Best 4 years old grade cow, Wm. Nicholl, Kingston, 20 dol; 2nd do James Nimmo, Camden East, 12 dol.

Best 2 years old heifer, Reuben Spooner, Kingston, 12 dol; 2nd do William Miller, do 8 dol.

Best 1 year old heifer, Robert Garbutt, Brighton, 10 dol; 2nd do Robert Garbutt, Brighton, 6 dol; 3rd do Colin McIntyre, Kingston, 4 dol; 4th do James Durand, do 2 dol.

Best heifer calf (under one year,) Wm. Elliott, Kingston, 6 dol; 2nd do John Flanagan, do 4 dol; 3rd do Archibald Urquhart, do 2 dol; 4th do Reuben Spooner, do, 1 dol.

EXTRA ENTRIES.—Twin heifer calves, Reuben Spooner, Kingston, 1 dol.

CLASS X.—FAT AND WORKING CATTLE, ANY BREED.—(21 Entries.)

Judges.—H. J. Lawry, Hamilton; T. Demmery, Toronto; G. Andrews, Kingston; and John Geale, Kingston.

Best fat cow or heifer, Robert Garbutt, Brighton, 30 dol; 2nd do H. Huffman, Bath, 20 dol.

Best yoke of working oxen, E. Jackson, Kingston, 20 dol; 2nd do Alfred Ayerst, do 12 dol; 3rd do Hugh Rankin, do 8, dol.

Best yoke of 2 years old steers, James Gibson, Kingston, 16 dol.

Best team of oxen, not less than 10 yoke from one township, the property of any number of persons, Hugh Rankin, Kingston, 40 dol.

SHEEP.

CLASS XI.—LEICESTERS.—(90 Entries.)

Judges.—John Foott, Port Hope; C. Forster, Smiths' Falls; W. Gibbard, Napanee.

Best ram, two shears and over, George Miller, Markham, 16 dol; 2nd do. T. Guy, Oshawa, 10 dol; 3rd do J. Snell, Chinguacousy, 4 dol.

Best shearling ram, J. Snell, Chinguacousy, imported from England since last show, 48 dol; 2nd T. Guy, Oshawa, 10 dol: 3rd do J. Snell, Chinguacousy, 4 dol.

Best ram lamb, J. Miller, Pickering, 8 dol; 2nd do Thomas Smith, Toronto Township, 4 dol; 3rd do A. Jeffrey, Vaughan, 2 dol.

Best 2 ewes, 2 shears and over, J. Snell, Chinguacousy, 16 dol; 2nd do do 12 dol; 3rd do George Miller, Markham, 6 dol.

Best 2 shearling ewes, George Miller, Markham, 12 dol; 2nd do J. Snell, Chinguacousy, 8 dol; 3rd do do 4 dol.

Best 2 ewe lambs, J. Snell, Chinguacousy, 6 dol; 2nd do do 4 dol; 3rd do George Miller, Markham, 2 dol.

CLASS XII.—COTSWOLDS.—(29 Entries.)

Judges.—A. Wilmott, Milton; Robert Beath, Whitby; Robert Beith, Darlington.

Best ram, two shears and over, John Snell, Chinguacousy, 16 dol; 2nd do F. W. Stone, Guelph, 10 dol; 3rd do John Snell. Chinguacousy, 4 dol.

Best shearling ram, John Snell, Chinguacousy, 16 dol; 2nd do F. W. Stone Guelph, 10 dol; 3rd do do 4 dol.

Best ram lamb, F. W. Stone, Guelph, 8 dol; 2nd do J. Snell, Chinguacousy, 4 dol; 3rd do F. W. Stone, Guelph, 2 dol.

Best 2 ewes, two shears and over, F. W. Stone, Guelph, $16; 2nd do do do, $12; 3rd do John Snell, Chinguacousy, $6.

Best 2 shearling ewes, F. W. Stone, Guelph, $12; 2nd do John Snell, Chinguacousy, $8; 3rd do do $4.

Best 2 ewe lambs, F. W. Stone, Guelph, $6; 2nd do do do $4; 3rd do John Snell, Chinguacousy, $2.

CLASS XIII.—CHEVIOTS.—(12 Entries.)

Judges—James Patterson, Streetsville; Robert Kirkwood, Hamilton; William Beattie, London.

Best ram, two shears and over, Wm. Roddick, Hamilton tp., $16; 2nd do do do $10

Best shearling ram, Wm. Roddick, Hamilton tp., $16; 2nd do do do $10.

Best ram lamb, Wm. Roddick, Hamilton tp., $8.

Best two ewes, two shears and over, Wm. Roddick, Hamilton tp., $16; 2nd do do do $12.

Best two shearling ewes, Wm. Roddick, Hamilton tp., $12; 2nd do do do $8.

Best two ewe lambs, Wm. Roddick, Hamilton tp., $6; 2nd do do do $4.

EXTRA.—James Nimmo, Camden East, six young Colley, or shepherd dogs, prize of $2.

CLASS XIV.—LONG WOOLED SHEEP, NOT PURE LEICESTERS, COTSWOLDS, OR CHEVIOTS.—(55 Entries.)

Judges—Robert Beath, Whitby; Austin Wilmot, Milton; Robert Beith, Darlington.

Best ram, two shears and over, Thomas Smith, Toronto tp., $16; 2nd do J. Snell, Chinguacousy, $10; 3rd do George Miller, Markham, $4,

Best shearling ram, John Snell, Chinguacousy, imported from England, 1859, $48; 2nd do do do $10; 3rd do P. R. Wright, Cobourg, $4.

Best ram lamb, John Snell, Chinguacousy, $8; 2nd do Alfred Jeffrey, Vaughan, $4; 3rd do Thomas Smith, Toronto tp., $2.

Best two ewes, two shears and over, George Miller, Markham, $16; 2nd do, John Snell, Chinguacousy, $12; 3rd do do do $6.

Best two shearling ewes, John Snell, Chinguacousy, imported from England, 1859, 24 dol; 3rd do George Hunter, Storrington, 4 dol.

Best two ewe lambs, John Snell, Chinguacousy, 6 dol; 2nd do Alfred Jeffrey, Vaughan, 4 dol; 3rd do George Miller, Markham, 2 dol.

CLASS XV.—SOUTHDOWNS.—(53 Entries.)

Judges—James Paterson, Streetsville; Robert Kirkwood, Hamilton; William Beattie, London.

Best ram, two shears and over, John Spencer, Whitby, 16 dol; 2nd do do 10 dol; 3rd do do 4 dol.

Best Shearling ram, John Spencer, Whitby, imported from England, 1859, 48 dol; 2nd do do, 10 dol; 3rd do P. R. Davy, Bath, 4 dol.

Best ram lamb, George W. Miller, Grantham, 8 dol; 2nd do John Spencer, Whitby, 4 dol; 3rd do George W. Miller, Grantham, 2 dol.

Best two ewes, two shears and over, John Spencer, Whitby, 16 dol; 2nd do do, 12 dol; 3rd do P. R. Davy, Bath, 6 dol.

Best two shearling ewes, John Spencer, Whitby, 12 dol; 2nd do do 8 dol; 3rd do P. R. Davy, Bath, 4 dol.

Best two ewe lambs, John Spencer, Whitby, 6 dol; 2nd do do, 4 dol; 3rd do P. R. Davy, Bath, 2 dol.

CLASS XVI.—MERINOS AND SAXONS.—(17 Entries.)

Judges—The same as for Southdowns.

Best ram, two shears and over, Jacob Rymal, Barton, 16 dol; 2nd do G. W. Miller, Grantham, 10 dol; 3rd do Jacob Rymal, Barton, 4 dol.

Best shearling ram, G. W. Miller, Grantham, 16 dol; 2nd do J. Rymal, Barton, 10 dol; 3rd do do, 4 dol.

Best ram lamb, J. Rymal, Barton, 8 dol; 2nd do do, 4 dol.

Best two ewes, two shears and over, J. Rymal, Barton, 16 dol; 2nd do do 12 dol.

Best two shearling ewes, J. Rymal, Barton, 12 dol; 2nd do do, 8 dol.

Best two ewe lambs, J. Rymal, Barton, 6 dol; 2nd do do. 4 dol.

CLASS XVII.—FAT SHEEP.—(9 ENTRIES.)

Judges—H. J. Lawry, Hamilton; John Geale, Kingston; Thos. Demmery, Toronto; George Andrews, Kingston.

Best two fat wethers, Wm. Elliott, Kingston, 12 dol; 2nd do do, 8 dol; 3rd do. Charles Scott, Whitby, 4 dol.

Best two fat ewes, Wm. Elliott, Kingston, 12 dol; 2nd do do, 8 dol; 3rd do John Snell, Chinguacousy, 4 dol.

EXTRA ENTRIES.—D. G. Forbes, Whitby, pair of sheep of Poland breed, prize of 2 dol.

PIGS—LARGE BREEDS.

CLASS XVIII.—YORKSHIRES.—(11 Entries.)

Judges—John Fletcher, Hastings; Wm. Humphries, Warkworth; John Patterson, Hamilton.

Best Boar, 1 year and over, R. Coates, Oakville, 15 dol; 2nd do, Joshua Sisley, Scarboro', 10 dol; 3rd do, C. A. Jordison, Thurlow, 6 dol.

Best Breeding Sow, 1 year and over, C. A. Jordison, Thurlow, 10 dol; 2nd do do do, 7 dol.

Best Boar, under 1 year, C. A. Jordison, Thurlow, 10 dol; 2nd do do do, 6 dol; 3rd do do do, 4 dol.

CLASS XIX.—LARGE BERKSHIRES.—(2 Entries.)

Judges—D. B. Solmes, Pr. Edward; John Gordanier, Lenox; Mattaniah Kerr, Hastings.

Best Boar, under 1 year, H. Robinson, Kingston, 2nd prize, 6 dol.

Best Sow, under 1 year old, H. Robinson, Kingston, 5 dol.

CLASS XX—ALL OTHER LARGE BREEDS.—(9 Entries.)

Judges—The same as for Class XIX.

Best Boar, 1 year and over, John Morrow, Prescott, 15 dol.

Best Breeding Sow, 1 year and over, John Geale, Kingston, 10 dol.

Best Boar, under 1 year, James Durand, Kingston, 2nd prize, 6 dol.

Best Sow, under 1 year old, John Morrow, Prescott, 5 dol.

PIGS—SMALL BREEDS.

CLASS XXI.—SUFFOLKS.—(23 Entries.)

Judges—Thos. Musson, Weston; John Fletcher, Hastings; Wm. Humphries, Warkworth; John Patterson, Hamilton.

Best Boar, 1 year and over, John Price, Montreal, 15 dol; 2nd do, Robert Warren, Niagara, 10 dol; 3d do, John Rogers, Pittsburgh, 6 dol.

Best Breeding Sow, 1 year and over, John Price, Montreal, 10 dol; 2nd do, E. W. Thomson, York Township, 7 dol; 3rd do, Peter R. Davy, Bath, 4 dol.

Best Boar, under 1 year, E. W. Thomson, York Township, 10 dol; 2nd do, James McCammon, Kingston, 6 dol.

Best Sow, under 1 year old, James McCammon, Kingston, 5 dol; 2nd do, Peter R. Davy, Bath, 4 dol.

CLASS XXII.—IMPROVED BERKSHIRES.—(12 Entries.)

Judges—The same as for Class XIX.

Best Boar, 1 year and over, John Foott, Port Hope, 15 dol.

Best Breeding Sow, 1 year and over, McNaughton & Bros, Newcastle, 10 dol; 2nd do, E. W. Thomson, York Township, 4 dol.

Best Boar, under 1 year, John Foott, Port Hope, 10 dol; 2nd do, James Durand, Kingston, 6 dol; 3rd do, E. W. Thomson, York Township, 4 dol.

Best Sow, under 1 year old, John Foott, Port Hope, 5 dol; 3rd do, E. W. Thomson, York Township, 3 dol.

CLASS XXIII.—ALL OTHER SMALL BREEDS.—(30 Entries.)

Judges—The same as for Class XXI.

Best boar, 1 year and over, Thomas Briggs, Jun., Kingston, imported from United States since last show, 30 dol; 2nd do H. J. Boulton, Etobicoke, 10 dol; 3rd do James Durand, Kingston, 6 dol.

Best breeding sow, 1 year and over, H. Sadleir, Kingston, 10 dol; 2nd do do do, 7 dol; 3rd do John Carveth, Port Hope, 4 dol.

Best boar, under 1 year, Henry Sadleir, Kingston, 10 dol; 2nd James Durand, Kingston, 6 dol; 3rd do John Carveth, Port Hope 4 dol.

Best sow, under 1 year old, James Durand, Kingston, 5 dol; 2nd do W. H. Cuthbert, Pittsburgh, 4 dol; 3rd do do do, 3 dol.

CLASS XXIV.—POULTRY, &c.—(179 Entries.)

Judges—H. J. Brown, Niagara; F. Scott, Scarboro; J. Lamb, London.

Best pair of white dorkings, Samuel Peters, London, 4 dol; 2nd do do, 2 dol.

Best pair of spangled do, Samuel Peters, London, 4 dol; 2nd do do, James Logan, Cote St. Louis, C.E., 2 dol.

Best pair of black Polands, John Price, Montreal, 4 dols; 2nd do, William O'Reilly, Kingston, 2 dol.

Best pair of white Polands, J. R. Hatton, Kingston, 4 dol; 2d do, William O'Reilly, Kingston, 2 dol.

Best pair of golden Polands, Thomas Guy, Oshawa, 4 dol; 3rd do, J. Price, Montreal, 2 dol.

Best pair of silver Polands, J. Price, Montreal, 4 dol; 2nd do, Henry Grouard, Hamilton, 2 dol.

Best pair of game fowls, Sam Peters, London, 4 dol; 2nd do, Joseph McConnell, Kingston, 2 dol.

Best pair of Cohin China, Shanghai, Canton, or Bramah Pootra fowls, Sam. Peters, London, 4 dol; 2nd do, James McCammon, Kingston, 2 dol.

Best pair of black Spanish fowls, James Logan, Cote St. Louis, C.E., 4 dol; 2nd do, D. G. Forbes, Whitby, 2 dol.

Best pair of feather-legged bantams, Samuel Peters, London, 2 dol; 2nd do, Thomas Porter, Kingston, 1 dol.

Best pair of smooth-legged bantams, John Price, Montreal, 2 dol; 2nd do, Samuel Peters, London, 1 dol.

Best pair of turkeys (white or colored,) E. Jackson, Kingston, 4 dol; 2nd do D. G. Forbes, Whitby, 2 dol.

Best pair of wild turkeys, George Miller, Markham, 4 dol; 2nd do Samuel Peters, London, 2 dol.

Best pair of large geese, James Gibson, Kingston, 4 dol; 2nd do George Miller, Markham, 2 dol.

Best pair of common ducks, Samuel Peters, London, 4 dol; 2nd do George Miller, Markham, 2 dol.

Best pair of Aylesbury ducks, Samuel Peters, London, 4 dol; 2nd do do do 2 dol.

Best pair of Poland ducks, D. G. Forbes, Whitby, 4 dol.

Best pair of Rouen ducks, Samuel Peters, London, 4 dol; 2nd do do do 2 dol.

Best pair of Guinea fowls, Edward Jackson, Kingston, 4 dol.

Best pair of pea fowls, J. P. Litchfield, Kingston, 4 dol; 2nd do Hiram Leonard, Kingston, 2 dol.

Best collection of pigeons, John Price, Montreal, 4 dol; 2nd do G. M. Patrick, Kingston, 2 dol.

Best lot of poultry, in one pen, and owned by the exhibiter, Samuel Peters, London, 6 dol.

Best collection of poultry in various classes, Samuel Peters, London, 8 dol.

Best pair of rabbits, H. M. Rogers, Kingston, 2 dol.

Best lot of rabbits, H. M. Rogers, Kingston, 4 dol.

EXTRA PRIZES.—Pair of game fow'ls, chickens, W. Allan, Kingston, 1 dol; pair of wild geese, D. G. Forbes, Whitby, 2 dol; pair of geese between wild and tame, do do, 1 dol; do a pair of silkey fowls, 1 dol.

XXV.—FOREIGN STOCK.—(22 Entries.)

Judges—E. W. Thomson, Toronto; Hon. George Alexander, Woodstock; Matthew Davidson, Quebec.

Best Durham bull, Brodie & Converse, Jefferson County, N. Y., diploma and 10 dol; 2nd do John Gifford, Genesee County, N. Y., 10 dol.

Best Ayrshire bull, Brodie & Converse, diploma and 10 dol.

Best Ayrshire cow, Brodie & Converse, N. Y., diploma and 6 dol.

Best Devon Bull, E. G. Cook, Jefferson Co., N.Y., diploma and 10 dol; 2nd do do do, 10 dol.

Best Devon Cow, E. G. Cook, Jefferson, Co., N. Y., diploma and 6 dol.

Best Leicester ram, Brodie & Converse, N. Y., diploma and 6 dol; 2nd do do do, 4 dol.

Best 3 Leicester ewes, Brodie & Converse, N. Y., diploma and 6 dol.

Best Southdown ram, E. G. Cook, Jefferson Co., N. Y., diploma and 6 dol; 2nd do do do, 6 dol.

Best 2 Southdown ewes, do do, 6 dol.

Best 2 Merino or Saxon ewes, do do, 6 dol; 2nd do do do, 6 dol.

Extra entries—Driving horses, A. C. Bristol, Ogdensburg, N. Y., 10 dol.

AGRICULTURAL PRODUCTIONS.

CLASS XXVI.—GRAINS, SEEDS, &c.—(609 entries.)

Judges—E. A. McNaughton, Newcastle; Gideon Leehy, Frankville; William Penhall, Greenbank; Andrew Wilson, Maitland; Robert Smith, Brampton; Thos. D. Farley, Belleville; Lewis Davis, Peterboro.

The Canada Company's prize of $100 for the best 25 bushels of Fall Wheat, Thomas Vicars, Clarke, $100; 2nd do by the Association, T. McEvers, Hamilton Township, $40; 3rd do, I. H. Anderson, West Flamboro, $20.

Best two bushels of Winter Wheat, D. Campbell, Glengarry, $10; 2nd do. do do, $8; 3rd do I. H. Anderson, West Flamboro, $6; 4th do, T. Vicars, Clarke, $4.

Best two bushels Spring wheat, Chris. Anderson, Haldimand tp., $10; 2nd do, T. McEvers, Hamilton tp., $8; 3rd do, Allon Wilmot, Newcastle, $6; 4th do Wm. McGee, Lanark, $4.

Best two bushels barley, (two rowed) J. Logan, Montreal, 6 dol; 2nd do T. Allen, Whitby, 4 dol; 3rd do, N. A. Briscoe, Ernestown, 2 dol; 4th do, J. O'Sullivan, Lonsdale, Vol. Trans.

Best two bushels of barley, (six rowed) S. S. Wallbridge, Belleville, 6 dol; 2nd do, I. H. Anderson, West Flamboro, 4 dol; 3rd do D. Campbell, Glengarry, 2 dol; 4th do, J. D. Purdy, Ernestown, Trans.

Best two bushels rye, N. A. Briscoe, Ernestown, 6 dol; 2nd do, P. Huyck, Fredericksburg, 4 dol, 3rd do, P. R. Palmer, Thurlow, 2 dol; 4th do do do, Trans.

Best two bushels of oats, (white) Robert Brown, Cobourg, 6 dol; 2nd do W. Riddell, Cobourg, 4 dol; 3rd do J. Roddick, Brantford, 2 dol; 4th do, J. Pile, Whitby, Trans.

Best two bushels of oats (black) Henry Knight, Kingston tp., 6 dol; 2nd do John Asselstine, Ernestown, 5 dol; 3rd do P. Hinman, 3 dol; 4th do W. Lawrence, Loughborough, Trans.

Best two bushels of field peas, M. Kerr, Hungerford, 6 dol; 2nd do H. Platt, Hallowell, 5 dol; 3rd do C. Grass, Kingston, 3 dol; 4th do, James Pile, Whitby, 2 dol.

Best two bushels of marrow fat peas, A. Shaw, Toronto, 6 dol; 2nd do, D. Rowntree, York, 4 dol; 3rd do, D. Jones, Sidney, 3 dol; 4th do R. Brown, Cobourg, 2 dol.

Best two bushels tares, J. Davidson, Kingston, 6 dol; 2nd do W. Riddell, Cobourg, 5 dol.

Best bushel of white field beans, P. Brewer, Kingston, 6 dol; 2nd do J. Rowland, Ramsay, 4 dol; 3rd do H. J. Brown, Niagara, 3 dol; 4th do E. Vandawaters, Sidney, Trans.

Best two bushels Indian Corn, in ear, H. Platt, Hallowell, 6 dol; 2nd do, P. Hinman, Haldimand tp., 5 dol; 3rd do W. Latimer, Storrington, 3 dol.

Best two bushels Indian corn [yellow] R. Warren, Niagara, 6 dol; 2nd do, H. J. Brown, Niagara, 5 dol; 3rd do H. Platt, Hallowell, 3 dol.

Best bushel of timothy seed, D. Purdy, Belleville, 8 dols; 2nd do, W. M'Gee, Lanark, 6 dols; 3rd do, J. Jones, Sidney, 4 dols.

Best bushel clover seed, J. Hopkins, Kingston Township, 8 dols; 2nd do W. Riddell, Cobourg, 6 dols; 3rd do, G. B. Sills, Fredericksburgh, 4 dols.

Best bushel hemp seed, J. B. Aylsworth, Newburgh, 6 dols.

Best bushel flax seed, W. Gibbard, Richmond, 6 dols; 2nd do, Geo. Miller, Markham, 4 dols; 3rd do, R. L. Denison, Toronto, 2 dols.

Best Swedish turnip seed, from transplanted bulbs, not less than 20 lbs, W. McGee, Lanark, 6 dols; 2nd do, Geo. Baker, Newcastle, 4 dols.

" Best 14 lbs. field carrot seed, D. G. Fraser, Richmond, 6 dols; 2nd do, R. Dinwoodie, Seymour, 4 dols; 3rd do, R. C. Gill, Colborne, 2 dols.

Best 12 lbs yellow mangel wurzel seed, D. G. Fraser, Richmond, 6 dols; 2nd do R. C. Gill, Colborne, 4 dols.

Best bale of hops, not less than 112 lbs, H. Davis, Brantford, 20 dols; 2nd do E. Fell, Prescott, 12 dols; 3rd do H. Davis, Brantford, 8 dols.

Best bushel horse beans, J. Logan, Montreal, 6 dols; 2nd do, R. Jack, Chateauguay, 3 dols.

Best bushel buckwheat, I. H. Anderson, W. Flamboro, 4 dols; 2nd do, C. Lee, Kingston Tp, 2 dols.

EXTRA ENTRIES.—2 bushels of field black-eyed peas, R. C. Grass, Sidney, 1 dol; 1 do Chinese Millet, I. H. Anderson, West Flamboro, 1 dol; 1 do White Flour Corn, H. J. Brown, Niagara, Township, 1 dol; 14 lbs. Parsnip seed, W. A. Leckie, Kingston, 2 dols; sample Fall barley, C. Chapman, Ottawa, 4 dols; 14 lbs. Onion Seeds, Wm. McGee, Lanark, 1 dol; Garden Seeds, J. Bower, Ramsey, 2 dols; New variety of peas, H. Platt, Napanee, 1 dol; Sample of Flax in raw state, R. L. Denison, Toronto, commended.

CLASS XXVII.—ROOTS AND OTHER FIELD CROPS—(368 entries.)

Judges—W. Jacques, Toronto; J. Leslie, Hamilton; H. Ostrom, North Hastings.

Best bushel pink-eyed potatoes, J. Sisley Scarboro,' 3 dols; 2nd do J. R. Hodgson, Storrington, 2 dols; 3rd do C. Skene, Amherst Island, 1 dol.

Best bushel cup potatoes, J. R. Hodgson, Storrington, 3 dols; 2nd do R. Spooner, Kingston, 2 dols; 3rd do, J. Glassford, do Trans.

Best bushel goldfinders, W. Riddell, Cobourg, 3 dols; 2nd do, C. Skene, Amherst Island, 2 dols; 3rd do, H. J. Brown, Niagara, 1 dol.

Best bushel white potatoes, J. Glassford, Kingston, 3 dols; 2nd do J. Logan, Montreal, 2 dols; 3rd do W. Burgess, Toronto, Trans.

Best bushel red do, J. B. Aylsworth, Newburgh, 3 dols; 2nd do, W. Wilson, Kingston, 2 dols; 3rd do W. Howard, Amherst Island, Trans.

Best bushel blue do, M. D. Canfield, Morven, 3 dols; 2nd do, A. Ayerst, Kingston, 2 dols; 3rd do, H. J. Brown, Niagara, Trans.

Best bushel of any other sort, D. G. Fraser, Richmond, 3 dols; 2nd do, C. W. Miller, Switzerville, 2 dols; 3rd do, W. O'Reilly, Kingston, 1 dol.

Best bushel Swede turnips, Geo. Elliott, Clarke, 8 dols; 2nd do, D. Hooper, Newburgh, 2 dols; 3rd do McNaughton Bros., Newcastle, 1 dol.

Best bushel white globe turnips, J. Steel, Ramsay, 3 dol; 2d do D. Campbell, Glengarry, 2 dol.

Best 20 roots red carrots, W. Burgess, Toronto, 3 dol; 2nd do J. Logan, Montreal, 2 dol; 3rd do D. Robertson, Ottawa, 1 dol.

Best 20 roots white or Belgian carrots, J. Sisley, Scarboro,' 3 dol; 2d do R. Dinwoodie, Seymour, 2 dol; 3d do J. Underwood, Cobourg, 1 dol.

Best 12 roots mangel wurtzel [long red], D Campbell, Glengarry, 3 dol; 2d do J. Logan, Montreal, 2 dol; 3d do Murdock Bros., Bowmanville, 1 dol.

Best 12 roots yellow globe mangel wurzel, W. Burgess, Toronto, 3 dol; 2d do J. Logan, Montreal, 2 dol; 3d do J. Sisley, Scarboro', 1 dol.

Best 12 roots long yellow mangel wurzel, W. Burgess, Toronto, 3 dol; 2d do Murdock Bros., Bowmanville, 2 dol; 3rd do A. Shaw, Toronto, Trans.

Best 12 roots of khol rabi, R. C. Gill, Colborne, 2 dol; 2d do J. Sisley, Scarboro', 1 dol.

Best 12 roots of sugar beet, W. Burgess, Toronto, 3 dol; 2nd do J. Logan, Montreal, 2 dol; 3d do D. Campbell, Glengarry, Trans.

Bess 20 roots of parsnips, W. A. Leckie, Kingston, 3 dol; 2d do W. Wilson, Kingston, 2 dol; 3d do J. Lucas, Camden, Trans.

Best 20 roots of chicory, D. Crawford & Co., Toronto, 3 dol; 2d do R. C. Gill, Colborne, 2 dol; 3d do W. A. Leckie, Kingston, 1 dol.

Best two large squashes for cattle, W. Burgess, Toronto, 3 dol; 2d do P. Huyck, Fredericksburg, 2 dol; 3d do W. H. Cuthbert, Pittsburg, Trans.

Best two mammoth field pumpkins, C. Skene, Amherst Island, 3 dol.

Best four common yellow field pumpkins, H. Platt, Hallowell, 3 dol; 2d do J. B. Aylsworth, Newburgh, 2 dol; 3d do J. Glassford, Kingston township, 1 dol.

Best 20 lbs of tobacco leaf, growth of Canada West, H. Girouard, Hamilton, 4 dol; 2d do R. C. Gill, Colborne, 2 dol.

Best broom corn brush, 28 lbs, W. Harker, Kingston, 4 dol; 2d do John Harker, Kingston, 3 do; 3d do R. C. Gill, Colborne, 2 dol.

The Canada Company's Prize for Flax.

Best 112 lbs, of flax, D. Campbell, Glengarry, 24 dol; 2d do by the Association, Perine Bros., Conestoga, 16 dol; 3d do by the Association, Perine Bros. Conestoga, 8 dol.

EXTRAS.—Hungarian grass, B. C. Davy, Napanee, 1 dol.

Flax tow, Perine Bros., Conestoga, 1 dol.

HORTICULTURAL PRODUCTS.

CLASS XXVIII.—FRUIT.—(252 Entries).

Judges—Edwin Taylor, Toronto; Rob't Warren, Niagara; Jas. E Sabine, Hamilton; Professor Williamson, Kingston.

Best 20 varieties of apples, named, (six of each), J. E. Beamen, Newcastle $5; 2d do, E. C. Campbell, Niagara, $4; 3d do, H. J. Brown, do, $3.

Best 12 table apples, named, (Fall sort), E. C. Campbell, Niagara, $3; 2d do do, J. D. Humphreys, Toronto, $2; 3d do, W. Wilson, Kingston, $1.

Best 12 table apples, named, (Winter sort), T. Briggs, Kingston, $3; 2d do, Thos. Wilson, Kingston, $2; 3d do, E. C. Campbell, Niagara $1.

Best 12 baking apples, named, J. E. Beaman, Newcastle, 3 dol; 2nd do E. C. Campbell, Niagara, 2 dol; 3d do do 1 dol.

Best 20 varieties of pears, named, [three of each], E. C. Campbell, Niagara, 5 dol; 2d do G. Leslie, Toronto, 4 dol; 3d do H. Girouard, Hamilton, 3 dol.

Best 12 table pears, named, [Fall sort], E. C. Campbell, Niagara, 3 dol; 2d do do 2 dol; 3d do do 1 dol.

Best 12 table pears, named, [Winter sort], H. J. Brown, Niagara, 3 dol; 2d do E. C. Campbell, do, 2 dol; 3d do do 1 dol.

Best 12 plums, named, (Dessert), E. C. Campbell, Niagara, 3 dol; 2d do do 2 dol.

Best 12 baking plums, named, E. C. Campbell, Niagara, 3 dol; 2d do do 2 dol.

Best quart of damsons [English], G. W. Miller, Grantham, 3 dol; 2d do E. C. Campbell, Niagara, 2 dol.

Best 12 peaches, grown in open air, named, E. C. Campbell, Niagara, 3 dol; 2d do do 2 dol; 3d do do 1 dol.

Best 10 varieties of peaches, grown in open air, (3 of each), E. C. Campbell, Niagara, 4 dol.

Best 12 quinces, H. J. Brown, Niagara, 2 dol; 2d do do 1 dol 50c.

Best 3 clusters of grapes hot house, W. Lunn, Montreal, 4 dol.

Best 3 clusters black Hamburgh, hot-house, W. Lunn, Montreal, 4 dol.

Best 4 clusters black grapes, grown in open air, R. Drummond, Kingston, 2 dol; 2d do H. J. Brown, Niagara, 1 dol 50; 3d do H. Girouard, Hamilton, 1 dol.

Best 4 clusters white grapes, grown in open air, W. Lunn, Montraal, 2 dol; 2d do J. D. Humphreys, Toronto, 1 dol 50; 3d do. E. C. Campbell, Niagara, 1 dol.

Best and heaviest 2 bunches of grapes, open air, J. D. Humphreys, Toronto, second prize, 2 dol.

Best collection of grapes, grown in open air, 2 clusters of each sort, E. C. Campbell, Niagara, 4 dol; 2d do W. Lunn, Montreal, 3 dol.

Best water melon, G. M. Patrick, Kingston, 2 dol; 2d do M. Parkes, N. Fredericksburgh, 1 dol 50; 3d do M. Kerr, Hungerford, Trans.

Best musk melon of any sort, E. C. Campbell, Niagara, 2 dol; 2d do C. Williamson, Kingston, 1 dol 50; 3d do H. L. Perrin, Toronto, 1 dol.

Best 6 citrons for preserving, H. Girouard, Hamilton, 2 dol; 2d do H. J. Brown, Niagara, 1 dol 50; 3d do W. Burgess, Toronto, Trans.

Best display of fruit, the growth of exhibiter, distinct from other entries, not more than three specimens of each sort, G. Leslie, Toronto, 10 dol.

Extra Prizes.—Peck crab apples, J. P. Litchfield, Kingston, 1 dol; Siberian do, M. Wellborn, Kingston, 1 dol; seedling rhubarb, D. Robertson, Ottawa, 50cts; red currants, James Wardsworth, Kingston, 50cts; white currants, James Wardsworth, Kingston, 50cts; white gooseberries, James Wardsworth, Kingston, 50cts; Basket of fruit, Brockville Horticultural Society, Brockville, 4 dol; collection of American fruits, T. E. Lawrence, Oswego, N. Y., 5 dol.

Remark.—A collection of seedling peaches, shown by Judge Campbell, of Niagara, are well worthy of the attention of growers.

Class XXIX.—Garden Vegetables.—(394 Entries.)

Judges—The same as for Class XXVIII.

Best 12 roots salsify, G. W. Miller, Grantham, 2 dol; 2nd do R. Cooper, Brockville, 1 dol. 50c.

Best 4 heads cauliflower, W. Burgess, Toronto, 2 dol; 2nd do J. Logan, Montreal, 1 dol 50c; 3rd do J. Duff, Kingston, 1 dol.

Best 4 heads cabbages, summer, W. Burgess, Toronto, 2 dol; 2nd do, R. Cooper, Brockville, 1 dol 50c; 3rd do J. P. Litchfield, Kingston, 1 dol.

Best 4 heads cabbages, winter, W. A. Leckie, Kingston, 2 dol; 2nd do, W. Burgess, Toronto, 1 dol 50c; 3rd do R. Cunningham, Kingston, 1 dol.

Best 4 sorts winter cabbage, including savoys, 2 of each sort, R. Cunningham, Kingston, 3 dol; 2nd do do, 2 dol; 3rd do F. J. George, Kingston, 1 dol.

Best 4 heads red cabbage, W. A. Leckie, Kingston, 2 dol; 2nd do Dr. J. P. Litchfield, Kingston, 1 dol 50c; 3rd do W. Burgess, Toronto, 1 dol.

Best 12 carrots for table, long red, M. Kerr, Hungerford, 2 dol; 2nd do Dr. J. P. Litchfield, Kingston, 1 dol 50c; 3rd do R. Cunningham, Kingston, 1 dol.

Best 12 early horn carrots, M. Kerr, Hungerford, 2 dol; 2nd do F. J. George, Kingston, 1 dol 50c; 3rd do A. Stenhouse, Brockville, 1 dol.

Best 12 table parsnips, G. Berry, Kingston, 2 dol; 2nd do J. D. Humphreys, Toronto, 1 dol 50c; 3rd do W. A. Leckie, Kingston, 1 dol.

Best 6 roots white celery, R. Curry, Brockville, 2 dol; 2nd do W. Burgess, Toronto, 1 dol 50c; 3rd do J. Clark, Toronto, 1 dol.

Best 6 roots red celery, W. Burgess, Toronto, 2 dol; 2nd do J. Wardsworth, Kingston, 1 dol 50c; 3rd do, J. D. Humphreys, Toronto, Trans.

Best dozen capsicums, E. C. Campbell, Niagara, 2 dol; 2d do C. Skene, Kingston. 1 dol 50c; 3d do J. D. Humphreys, Toronto, Trans.

Best collection of capsicums, R. C. Gill, Colborne, 3 dol; 2nd do J. D. Humphreys, Toronto, 2 dol; 3rd do G. W. Miller, Grantham, 1 dol, 50c.

Best 6 egg plants, purple, H. Girouard, Hamilton, 2 dol; 2nd do H. J. Brown, Niagara, 1 dol 50c; 3rd J. D. Humphreys, Toronto, 1 dol.

Best 12 tomatoes, J. P. Litchfield, Kingston, 2 dol; 2nd do W. Burgess, Toronto, 1 dol 50c; 3rd do C. Weinecker, Kingston, Trans.

Best assorted collection of tomatoes, 6 of each sort, R. Curry, Brockville, 3 dol; 2nd do E. C. Campbell, Niagara, 2 dol; 3rd do G. W. Miller, Grantham, 1 dol 50c.

Best 12 blood beet, R. Dinwoodie, Seymour, 2 dol; 2nd do J. P. Litchfield, Kingston, 1 dol 50; 3rd do E. C. Campbell, Niagara, Trans.

Best peck white onions, H. J. Brown, Niagara, 2 dol; 2nd do H. Girouard, Hamilton, 1 dol 50c; 3rd do A. Brooks, Portsmouth, 1 dol.

Best peck of yellow onions, H. Girouard, Hamilton, 2 dol; 2nd do J. Fleming, Toronto, 1 dol 50c; 3rd do J. Logan, Montreal, Trans.

Best peck of red onions, H. J. Brown, Niagara, 2 dol; 2nd do G. W. Miller, Grantham, 1 dol 50c; 3rd do J. Fleming, Toronto, 1 dol.

Best peck potato onions, M. Kerr, Hungerford, 2 dol; 2nd do J. Rogers, Pittsburg, 1 dol 50c; 3rd do Geo. J. Smith, North Fredericksburg, 1 dol.

Best 12 white turnips, [table] J. Lucas Camden, 2 dol; 2nd do J. Wardsworth, Kingston, 1 dol 50c; 3rd do J. Logan, Montreal, Trans.

Best 12 yellow turnips [table] J. Wardsworth, Kingston, 2 dol; 2nd do D. Campbell, Glengarry, 1 dol 50c; 3rd do R. C. Gill, Colborne, 1 dol.

Best 12 ears sweet corn, J. Durand, Kingston, 2 dol; 2nd do J. Clarke, Toronto, 1 dol 50c; 3rd do T. Briggs, jr., Kingston, Trans.

Best and greatest variety of early potatoes, half peck of each sort, named, J. Fleming, Toronto, 3 dol.

Best 4 squashes, [table], J. Fleming, Toronto, 2 dol; 2nd do J. P. Litchfield, Kingston, 1 dol 50c; 3rd do Charles Skene, Amherst Island, 1 dol.

Best and greatest variety of vegetables, (distinct from other entries), each kind named, Prof. Williamson, Kingston, 4 dol.

Extra Prizes.—Collection of egg plants, R. C. Gill, Colborne, 1 dol; 12 turnips beets, G. M. Patrick, Kingston, 50c; garden peas and beans, J. Fleming, Toronto, 2 dol; tomatoes, J. D. Humphreys, Toronto, 1 dol 50; egg fruit, do, 1 dol; cucumbers, do 50c; Spanish radish, J. Ross, Sunnidale, 1 dol; seedling potatoes, J. Wardsworth, Kingston, 1 dol; sweet potatoes, D. Roblin, Napanee 1 dol; 4 table pumpkins, F. J. George Kingston, 1 dol; kidney beans, J. D. Humphreys, Toronto, 50c; egg plant, E. C. Campbell, Niagara, 1 dol; do, H. Girouard, Hamilton, 1 dol; collection potatoes, R Williams, Ernestown, 1 dol; top onions, D. G. Fraser, Napanee, 1 dol; peppers, R. Curry, Brockville, 50c; champion of England peas, J. D. Humphreys, Toronto, 1 dol.

CLASS XXX.—PLANT AND FLOWERS.—(123 Entries).

Judges.—The same as for classes 28 and 29.

Best dozen dahlias, named, W. Faris, Sorel, C. E., 2 dol; 2nd do G. Leslie, Toronto, 1 dol 50c; 3rd do E C. Campbell, Niagara, 1 dol.

Best and largest collection of dahlias, G. Leslie, Toronto, 5 dol; 2d do E. C. Campbell, Niagara, 4 dol; 3rd do W. Faris, Sorel, C. E., 3 dol.

Best bouquet of cut flowers [for table], Prof. Hirschfelder, Toronto, 2 dol; 2nd do W. Faris, Sorel, C. E., 1 dol 50c; 3rd do R. Curry, Brockville, 1 dol.

Best hand bouquet, Prof. Hirschfelder, Toronto, 2 dol; 2nd do W. Faris, Sorel, C. E., 1 dol 50c; 3rd do W. Linn, Montreal, 1 dol.

Best collection of green house plants, not less than 12 specimens in flower, Prof. Hirschfelder, Toronto, 10 dol.

Best 12 pansies, A. Stenhouse, Brockville, 2 dol; 2nd do J. Wardsworth, Kingston, 1 dol 50c; 3rd do G. Baxter, Kingston, 1 dol.

Best six fuchsias in flower, A. Grant, Kingston, 3 dol.

Best collections of annuals in bloom, W. Lunn, Montreal, 2 dol; 2d do Prof. Williamson, Kingston, 1 dol 50c; 3rd do W. Faris, Sorel, C. E., 1 dol.

Best six cockscombs, H. Girouard, Hamilton, 2 dol; 2nd do E. C. Campbell, Niagara, 1 dol 50.

Best collection of aster, T. Briggs, Kingston, 2 dol; 2nd do, do, do, 1 dol 50c; 3rd do G. Sheppard, Montreal, 1 dol; do W. Lunn, Montreal, commended.

Best collection of 10 weeks' stock, H. Girouard, Hamilton, 2 dol; 2nd do G. Baxter, Kingston, 1 dol 50c.

Best collection of hybrid perpetual roses, less than 12 blooms, H. Girouard, Hamilton, 2 dol; 2nd do W. Lunn, Montreal, 1 dol 50c; 3rd do John Gray, Toronto, 1 dol.

Best floral ornament or design, G. Russell, Brockville, 5 dol; 2nd do T. Briggs, Kingston, 4 dol.

Best collection of verbenas, not less than 12 varieties, A. Grant, Kingston, 3 dol; 2d do W. Lunn, Montreal, 2 dol; 3d do A. Stenhouse, Brockville, 1 dol.

Best six petunias, Prof. Hirschfelder, Toronto, 2 dol; 2nd do T. Briggs, Kingston, 1 dol 50c; 3rd do, do, do, 1 dol.

Best collection perennial phloxes, G. Leslie, Toronto, 2 dol; 2nd do G. Baxter, Kingston, 1 dol 50c; 3rd do, do, do, 1 dol.

Best collection of hollyhocks, R. Curry, Brockville, 2 dol; 2d do H. Girouard, Hamilton, 1 dol.

Best display of plants in flowers, distinct from other entries, J. Fleming, Toronto, 10 dol; 2nd do Prof. Hirschfelder, Toronto, 6 dol.

Best collection native plants, dried and named, R. Drummond, Kingston, 6 dol; 2d do Miss C. George, do, 4 dol.

Extra Prizes.—Glass covers for plants, Horsey & Smith, Kingston, 1 dol; India-rubber tree, A. Grant, Kingston, 1 dol; collection of petunias, Professor Hirschfelder, Toronto, 1 dol 50c; pampas grass, do, do, 1 dol; six foliage plants, do, do, 1 dol; collection petunias, J. Gray, Toronto, 1 dol; Marigolds, H. Girouard, Hamilton, 50c.

Remark by Judges.—We beg to protest against the whole duties of the three departments in Horticulture being laid upon so few judges as four; as the duties, from the great number of articles for competition, are two onerous for less than six judges.

CLASS XXXI.—DAIRY PRODUCTS, &c.,

Judges.—E. C. Fisher, Etobicoke; S. T. Wallbridge, Belleville, Daniel Campbell, Glengarry.

Best firkin of butter, in shipping order, not less than 56 lbs., P. R. Palmer, Thurlow, 12 dol; 2nd do E. Jackson, Kingston, 10 dol; 3rd do W. Tubbs, Hallowell, 8 dol; 4th do M. Kerr, Hungerford, 6 dol; extra, W. Lake, Storrington, 6 dol.

Best butter, not less than 28 lbs, in firkin, crock, or tub, J. Flanigan, Glengarry, 8 dol; 2nd do T. D. Farley, Sidney, 6 dol; 3rd do H. Wilmot, Pittsburgh, 4 dol; 4th do J. Hopkins, Kingston, 3 dol.

Best cheese, not less than 60 lbs., P. R. Palmer, Thurlow, 10 dol; 2nd do P. R. Palmer, do 8 dol; 3rd do S. Cass, W. Hawkesbury, 6 dol; 4th do P. Hinman, Haldimand Township, 4 dol.

Best two stilton cheese, not less than 14 lbs each, H. K. Parsons, Guelph, 10 dol; 2nd do, do, do, 8 dol; 3rd do C. Dollar, Fredericksburgh, 6 dol; 4th do H. K. Parsons, Guelph, 4 dol.

Best honey, in the comb, not less than 10 lbs., J. Curry, jun., Glengarry, 3 dol; 2d do Richard Arnold, Kitley, 2 dol; 3d do P. R. Palmer, Thurlow, Trans.

Best jar of clear honey, G. Miller, Markham, 4 dol; 2d do E. W. Thomson, York Township, 2 dol; 3d do E. Jackson, Kingston, Trans.

EXTRA PRIZES.—Bees' Wax, P. Brewer, Kingston, 1 dol; do do W. Tubbs, Hallowell, 50 cts.

REMARKS.—The Judges found very great difficulty in awarding the prizes for butter, as nearly all the samples were as good as they could be, and they feel convinced that they have had to reject many lots as good, or nearly so, as some to which they have awarded premiums. The cheese also was very superior, and better than the judges have ever before seen in the province.

CLASS XXXII.—AGRICULTURAL IMPLEMENTS, WORKED BY HORSE OR OTHER POWER.—141 ENTRIES.

Judges—H. J. Boulton, Etobicoke; Alexander Shaw, Toronto; E. Vandawaters, Belleville; Jonh Tilt, Toronto Township; Geo. Carrol, Toronto.

Best iron plough, G. Morley, Thorold, diploma, and 12 dol: 2d do E. Wilmot, Kingston, 8 dol; 3d do R. Mutch, Brooklin, 4 dol.

Best wooden plough, W. Mahaffy, Brampton, diploma and 12 dol; 2d do G. Morley, Thorold, 8 dol; 3d do I. Modeland, Brampton, 4 dol.

Best subsoil plough, Geo. Morley, Thorald, diploma and 12 dol; 2d do Hamilton & Co., Kingston, 8 dol; 3d do H. A. Massey, Newcastle, 4 dol.

Best double mould plough, Jas. Jeffrey, Montreal, 10 dol; 2d do Hamilton & Co., Kingston, 6 dol.

Best pair of harrows, E. Riley, Kingston, 6 dol; 2d do McCrone & Wilson, Landsdown, 4 dol; 2d do T. Scott, Newburgh, 2 dol.

Best horse-power thresher and separator, H. A. Massey, Newcastle, diploma and 20 dol; 2d do J. Hall, Oshawa, 12 dol; 3d do Haggart Bros., Brampton, 8 dol.

Best grain drill, J. Watson, Ayr, diploma and 12 dol.

Best straw cutter, S. Butterfield, Bradford, 5 dol; 2d do H. & W. J. Maclaren, Lowville, 4 dol; 3d do T. Drummond & Co., Kingston, 3 dol.

Best smut machine, J. Gartshore, Dundas, 6 dol.

Best portable grist mill, R. & R. S. Patterson, Belleville, 12 dol.

Best grain cracker, G. & J. Brown Belleville, 8 dol; 2d do A. Mowry, Peterboro', 6 dol.

Best clover cleaning machine, John Helm, jun., Port Hope, 12 dol; 2d do John L. Burley, S. Fredericksburg, 3 dol.

Best cider mill and press, W. Vandervoort, Belleville, 12 dol.

Best two-horse waggon, J. P. Lake, Napanee, 12 dol; 2d do N. S. Briscoe, Ernestown, 8 dol; 3d do S. Lake, Newburgh, 4 dol.

Best one-horse light market waggon, S. Lake, Newburgh, 10 dol.

Best horse cart, Jas. Jeffrey, Montreal, 6 dol; 2d do S. Lake, Newburgh, 4 dol.

Best farm sleigh, S. Lake, Newburgh, 8 dol.

Best horse-rake, G. Vandawaters, Sidney, 4 dol; 2d do S. D. Purdy, Ernestown, 3 dol; 3d do Lounsbury & Wilson, Saltfleet, 2 dol.

Best metal roller, R. & R. S. Patterson, Bellevill, 11 dol; 2d do Hamilton & Co., Kingston, 8 dol; 3d do H. A Massey, Newcastle, commended.

Best wooden roller, H. Leonard, Kingston, 10 dol: 2d do N. Leonard, Kingston, 5 dol; 3d do. G Patterson, Kingston, commended.

Best stump extractor, H. & J. W. Maclaren, Lowville, 8 dol.

Best reaping machine, Johnson Bros, Meadowvale, diploma and 20 dol; 2d do J. Helm, jun., Port Hope, 12 dol; 3d do C. H. Horning, Flamboro' West, 8 dol.

Best mowing machine, Patterson Bros., Richmond Hill, diploma and 20 dol; 2d do John Herring, Napanee, 12 dol.

Best combined reaper and mower, R. & R. S. Patterson, Belleville, diploma and 20 dol; 2d do H. A. Massey, Newcastle, 12 dol; 3d do E. Vandawaters, Sidney, 8 dol.

Best field or two-horse cultivator, Thomas Scott, Newburgh, 12 dol; 2d do A. C. Bruce, Glenmorris, 8 dol; 3d do Haggart Bros., Brampton, 4 dol.

Best horse hoe, or single horse cultivator, T. Scott, Newburgh, 4 dol; 2d do R. & R. S. Patterson, Belleville, 3 dol.

Best post hole borer, J. Helm, jun., Port Hope, 12 dol.

Extra Prizes.—Gang plough, E. Vandawaters, Sidney, 2 dol; Jos. Hall, Oshawa, steel mould board plough, 2 dol.

CLASS XXXIII.—AGRICULTURAL TOOLS AND IMPLEMENTS, CHIEFLY FOR HAND USE.—[67 entries.]

Judges—The same as for Class XXXII.

Best fanning mill, D. E. Norton, Toronto, diploma and 6 dol; 2d do R. & R.S. Patterson, Belleville, 4 dol; 3d do James McTaggart, Camden East, 2 dol.

Best seed drill or harrow, A. C. Bruce, Glenmorris, 4 dol.

Best straw cutter, H. & J. W. Maclaren, Lowville, 5 dol.

Best cheese press, E. L. Derby, Morven, 8 dol; 2d do C. H. Dorland, Wellington, 6 dol; do, George Hunter, Storrington, commended.

Best churn, J. Reid, Kingston, 3 dol; 2d do J. D. Thomson, Dundas, 2 dol; 3d do F. McConaghy, Belleville, commended.

Best garden walk or lawn roller, H. A. Massey, Newcastle, 4 dol; 2d do Hamilton & Co., Kingston, 2 dol; 3d do A. C. Bruce, Glenmorris, Trans.

Best half dozen hay rakes, Jacob Huffman, Camden East, 3 dol; 2d do T. Drummond & Co., Kingston, 2 dol; 3d do R. Brough, Gananoque, 1 dol.

Best half dozen manure forks, D. F. Jones, Gananoque, 3 dol; 2nd do, A. S. Whiting & Co, Oshawa, 2 dols; 3rd do do do, 1 dol.

Best half dozen hay forks, A. S. Whiting & Co, Oshawa, 3 dols; 2nd do, do do 2 dol; 3rd do, D. F. Jones, Gananoque, Trans.

Best half dozen scythe snaiths, T. Drummond & Co, 3 dols.

Best ox-yoke and bow, J. Huffman, Camden East, 2 dols; 2nd do, P. Hinman, Haldimand Township, 1 dol; 3rd do H. Rankin, Kingston, Trans.

Best grain cradle, T. Drummond & Co, Kingston, 2 dol; 2nd do, J. B. Lazier, Port Perry, 1 dol.

Best half dozen grain shovels, D. F. Jones, Gananoque, 3 dols.

Best half dozen iron (flat) shovels, D. F. Jones, Gananoque, 3 dols,

Best half-dozen spades, D. F. Jones, Gananoque. 3 dols.

Best half-dozen steel hoes, A. S. Whiting & Co, Oshawa, 2 dol; 2nd do D. F. Jones, Gananoque, 2 dols; 3rd do, A. S. Whiting & Co, Oshawa, Trans.

Best straw fork, wood, Jacob Huffman, Camden East, 2 dols; 2nd do, Jas. Scott, Camden, 1 dol.

Extra Prizes.—D. J. Woodwards, Rawdon, half-dozen fork handles, 50c; half dozen hoe handles, 50c; D. F. Jones, Gananoque, half-dozen steel reversible cultivator joints, 1 dol; A. S. Whiting & Co, Oshawa, malleable garden rakes, 1 dol; melleable weeding hoes, 1 dol; Wm. Vandervoort, Belleville, Picket fence, 2 dols; James Parrott, Ernestown, curd braker, 1 dol.

CLASS XXXIV.—CATTLE FOOD, MANURES, AND MISCELLANEOUS.—(9 entries.)

Judge—John Ker, Drummondville.

Best specimen oil cake, G. S. Hobart, Kingston, 4 dol; 2nd do G. S. Hobart, Kingston, 2 dol.

Best specimen ground bones for manure, P. R. Lamb, Toronto, 4 dol; 2nd do, do do, 2 dol.

Best specimen other artificial manure, G. S. Hobart, Kingston, 4 dol.

CLASS XXXV.—FOREIGN MANUFACTURED IMPLEMENTS, &C.—(2 entries.)

Judges—E. W. Thomson, Toronto; Hon. G. Alexander, Woodstock, M. Davidson, Quebec.

Portable steam engine, J. W. Forsyth, Cape Vincent, N. Y. State, diploma and 5 dol.

ARTS AND MANUFACTURES, LADIES' WORK, &c.

CLASS XXXVI.—CABINET WARE AND OTHER WOOD MANUFACTURES.—(85 entries.)

Judges—Wm. Irving, Kingston; Geo. Stevens, Cobourg; C. W. Meakins, Hamilton.

Best model bee hive, John Curry, jr., Glengarry, 3 dol.

Best collection of Canadian Woods, Dr. Craigie, Hamilton, 20 dol.

Best specimen of Cooper's work, David Dunoon, Kingston, 2nd prize 3 dol.

Best six dining-room chairs, James Reid, Kingston, 2nd prize, 3 dol.

Best 4 or 6 pannelled doors, William Hodson, Toronto, 3 dol; 2nd do, do, 2 dol.

Best half-dozen flour barrels, Williamson & Ballantine, Smith's Falls, 3 dol.

Best 100 feet machine-wrought moulding, William Hodson, Toronto, 3 dol.

Best side-board, Wm. Holgate, Kingston, 6 dol.

Best spinning-wheel D. McPherson, Napanee, 2 dol; 2nd do, Robt. Brough, Gananoque, 1 dol.

Best collection of specimens of turning in wood, John Condell, Kemptville, 2nd prize, 4 dol.

Best veneers from Canadian woods, J. E. Cotting & Co, Dawn Mills, 5 dol.

Best three wash-tubs, Andrew Bridge, Kingston, 2 dol; 2nd do, Aaron Dame, Belleville, 1 dol.

Best half-dozen wash-boards, not covered, R. C. Gill, Colborne, 2 dol.

Best half-dozen specimens of willow-ware, Andrew Moses, Toronto, 3 dol; 2nd do, do, do, 2 dol.

Best half-dozen of wooden pails, A. Titus, Camden, 2 dol; 2nd do, Aaron Dame, Belleville, 1 dol.

Best window sash, hung in frame, (12 lights) Wm. Hodson, Toronto, 4 dol and diploma.

EXTRA PRIZES—Hand weaving loom, G. A. Sargent, Bloomfield, 5 dol; washing machine, Geo. Wright, Ottawa, 2 dol; set of cheese hoops, A. Bridge, Kingston, 1 dol; cheese tub, do, 1 dol; two oval tubs, feathered edge, do, 1 dol; set of cooper's measures, do, do, 1 dol; Jenny Lind bedsteads, Adam Muir, Kingston, 3 dol; invalid's chair, J. P. Litchfield, M. D., Kingston, 2 dol; patent bedstead, R. E. Stevens, Owen Sound, 2 dol; window blinds, Wm. Hodson, Toronto, 1 dol; washing machine, H. A. Lawrence, Granby, C. E., 2 dol; half bushel measures, Aaron Dame, Belleville, 1 dol; cheese hoop, do, do, 1 dol.

CLASS XXXVII.—CARRIAGES, SLEIGHS, &C.—(54 Entries.)

Judges—Wm. Bowen, Kingston; M. Currie, Smith's Falls; H. Macdonald, Kingston.

Best wrought iron axle, A. C. Chewett & Co., Kingston, 3 dol.
Best half dozen bent shafts, A. M. Ackerman, Ernestown, 3 dol.
Best 2 pairs of carriage hubs, McCabe & Co., Hamilton, 3 dol.
Best specimen of carriage rims or felloes, S. Lake, Newburgh, 3 dol.
Best dozen machine-made carriage spokes, McCabe & Co., Hamilton, 3 dol.
Best two-horse pleasure carriage, S. Lake, Newburgh, 10 dol; 2nd do J.P. Lake, Napanee, 6 dol.
Best one horse pleasure carriage, J. Linter, Kingston, 8 dol; 2d do S. Lake, Newburgh, 5 dol; do Fralick & Bro. Picton, commended; do Treffle St. Charles, Montreal, commended.
Best child's carriage, [price considered] S. Lake, Newburgh, 3 dol.
Best one horse pleasure sleigh, Hart & Son, Picton, 6 dol; 2d do S. Lake, Newburgh, 4 dol; do Jas. P. Lake, Napanee, commended.
Best pair of steel carriage springs, H. Leonard, Kingston, 3 dol.

EXTRA ENTRIES.—Wagon boxes, Gurney & Carpenter, Hamilton, 2 dol; trotting sulky, McCabe & Co., Hamilton. diploma for workmanship: jaunting car, do, commended; Omnibus wheels, do commended.

CLASS XXXVIII.—FINE ARTS.—[165 entries.]

Judges—W. Hay, Toronto; Robert Checkley, Whitby; William Armstrong, Kingston.

Professional List—Oil.

Best animals, [grouped or single] Robert Whale, Burford, 12 dol; 2nd do, R. J. Griffith, Toronto, 6 dol.
Best Landscape, Canadian subject, Alex. Davidson, Hamilton, 12 dol; 2nd do W. N. Creswell, Harpurhey, 6 dol.
Best Marine painting, Canadian subject, W. N. Creswell, Harpurhey, 12 dol; 2nd do, Wm. Sawyer, Kingston, 6 dol.
Best other original composition, Alex. Davidson, Hamilton, 12 dol; 2nd do, do do, 6 dol.
Best portrait, Wm. Sawyer, Kingston, 10 dol; 2nd do, Charles Loeffler, Toronto, 6 dol.

Water Colors.

Best animals, [grouped or single], J. H. Caddy, Hamilton, 8 dol; 2d do R. J. Griffith, Toronto, 5 dol.
Best landscape, Canadian subject, J. H. Caddy, Hamilton, 6 dol; 2d do R. J. Griffith, Toronto, 5 dol.
Best miniature, C. Loeffler, Toronto, 6 dol.
Best other original composition, J. H. Caddy, Hamilton, 8 dol; 2nd do Mrs C. Walker, St. Thomas, 5 dol.
Best portrait, Mrs. Meyer, Toronto, 6 dol.

Amateur List—Oil.

Best animals [grouped or single], J. H. Whale, Burford, 8 dol.
Best landscape, Canadian subject, J. H. Whale, Burford, 8 dol; 2nd do Miss Imogene Jones, Brockville, 5 dol.
Best portrait, J. H. Whale, Burford, 5 dol.

Water Colors.

Best animals [grouped or single], Miss Kirkpatrick, Kingston, 6 dol; 2nd do do do, 4 dol.

Best flowers, Miss C. Foster, Toronto, 4 dol; 2nd do do do, 3 dol; 3rd do, Miss H. Gibbon, London, 2 dol.

Best landscape, Canadian subject, Miss Sanders, Kingston, 6 dol.

Best miniature, Miss Sanders, Kingston, 5 dol.

PENCIL, CRAYON, &C.

Best coloured crayon, Miss Sanders, Kingston, 4 dol; 2d do, do, do, 3 dol;

Best drawing, crayon, Miss E. Jones, Brockville, 4 dol; 2d do Miss I. Jones, do, 3 dol.

Best pencil drawing, Miss A. Machar, Kingston, 4 dol; 2d do, do, Mrs. J. V. Noel, Kingston, 3 dol.

Best pen and ink sketch, Miss H. Gibbon, London Township, 4 dol; 2d do J. F. Jones, Brantford, 3 dol; do A. M. Barr, Toronto, commended.

Best crayon portrait, Miss Christie, Niagara, 4 dol; 2d do, do, do, 3 dol.

ARCHITECTURAL DRAWING, MODELLING, ENGRAVING, &C. &C.

Best specimen of carving in wood, R. Thompson, Toronto, 8 dol.

Best specimen of carving in stone, E. Strong, Kingston, 8 dol; 2d do N. Steiner, Toronto, 4 dol.

Best drawing composition of natural foliage [Canadian] applicable to architectural details, R. Drummond, Kingston, 8 dol.

Best engraving on copper, A. M. Barr, Toronto, 6 dol.

Best engraving on steel, A. M. Barr, Toronto, 6 dol.

Best seal engraving, A. M. Barr, Toronto, 8 dol.

Best colored geometrical drawing of engine or millwright work, R. Drummond, Kingston, 6 dol; 2d do, do, do, 4 dol.

Best lithographic drawing, Fuller & Bencke, Toronto, 6 dol; 2d do, do, do, 4 dol.

Best collection of photographs, Carson, Bros, Toronto, 8 dol; 2d do Mrs. Meyer, Toronto, 5 dol.

EXTRAS.—Mrs. Clarence Hall, Seymour, "Magdalene" from an old master, 5 dol; pencil drawing, 4 dol; W. Knowles, Arnprior, table and counter tops, in limestone, 5 dol; Miss L. A. Piper, Toronto, "Holy Family," from an old master, 5 dol; Wm. Knowles, Arnprior, specimens of native marble, 8 dol; Educational Department of C. W., Toronto, school apparatus, diploma.

REMARKS.—The judges in Class 38 regret that professional artists have not availed themselves of the opportunity afforded for exhibiting their works so generally as might have been desired. Several of the works, however, of amateur artists are deserving of the highest praise, especially the landscapes in oil.

The Judges beg leave to call the attention of the Committee to the specimens of Marble Work, exhibited from Madawaska on the Ottawa, for which they have recommended a diploma, prize, and honorable mention.

The philosophical instruments and apparatus exhibited by the educational department, have also been examined, and are deserving of special notice, more particularly the raised maps and globes. They have been altogether manufactured in the province.

CLASS XXXIX—GROCERIES, PROVISIONS, &C.—185 ENTRIES.

JUDGES.—H. Ross, Kingston; A. Brown, Hamilton; W. Hargraft, Cobourg.

Best sample of barley [pot and pearl], A. Foster, Kingston, 3 dol; 2d do D. Hooper, Newburgh, 2 dol.

Best collection of specimens of biscuits, John Nasmith, Toronto, 4 dol; do Henry Dumble, Kingston, commended.

Best samples of shoe-blacking, P. R. Lamb, Toronto, 2 dol.

Best collection of bottled pickles, Mrs. R. C. Gill, Colborne, 3 dol; 2d do H. Brown, Kingston, 2 dol.

Best sample buckwheat flour, D. Hooper, Newburgh, 3 dol; 2d do P. R. Palmer, Thurlow, 2 dol.

Best 20 lbs of chicory, D. Crawford & Co., Toronto, 4 dol; 2d do R. C. Gill, Colborne, 2 dol.

Best collection of confectionery, H. Dumble, Kingston, 5 dol; 2d do W. Hessin, Toronto, 3 dol.

Best sample of flour, McNaughton, Bros, Newcastle, 6 dol; 2nd do, do, do, 4 dol; 3rd do, J. R. Hodgson, Storrington, Trans.

Best sample of glue (14 lbs), A. Brinzer, Berlin, 4 dol; 2nd do P. R. Lamb, Toronto, 2 dol.

Best sample of Indian corn meal, D. Hooper, Newburgh, 3 dol; 2nd do, R. Denison, Richmond, 2 dol.

Best sample of isinglass, Lyman, Bros, Toronto, 2 dol.

Best collection of medicinal herbs, root and plants (native growth), H. Girouard, Hamilton, 8 dol; 2nd do, R. W. Elliott, Toronto, 4 dol.

Best jar of mustard, D. Crawford & Co, Toronto, 3 dol.

Best sample of oatmeal, J. Wilson, Fergus, 3 dol; 2nd do D. Hooper, Newburgh, 2 dol.

Best specimens of oils extracted from plants, R. W. Elliott, Toronto, 3 dol.

Best specimen of linseed and rape oils, G. S. Hobart, Kingston, 3 dol.

Best six kinds of preserves, H. Dumble, Kingston, 3 dol.

Best box of soaps (28 lbs), A. Foster, Kingston, 3 dol; 2nd, do, do, 2 dol

Best collection of assorted fancy soaps, G. S. Hobart, Kingston, 5 dol.

Best 12 lbs of potato starch, McNaughton, Bros, Newcastle, 3 dol.

Best 12 lbs of corn starch, D. Crawford & Co, Toronto, 3 dol.

Best 12lbs of flour starch, McNaughton, Bros., Newcastle, 3 dol.

Best 30lbs of maple sugar, R. Affleck, Lanark, 4 dol; 2d do do R. Arnold, Kitley, Trans.

Best 14lbs Canadian Manufactured tobacco, A. Foster, Kingston, 4 dol; 2d do do do 2 dol.

EXTRA ENTRIES.—Neat's Foot Oil, P. R. Lamb, Toronto, 1 dol; Pale Ale, Meik & Co., Toronto, highly commended. Arrowroot, McNaughton Bros., Newcastle, 2 dol, Wedding Cake, H. Dumble, Kingston, 1 dol; other cakes, do do, commended. Boiled Plaster of Paris, G. S. Hobart, Kingston, commended. Split peas, D. McPherson, Kingston, commended. Perfumery and Druggist's preparations, Lyman Bros., Toronto, highly commended. Collection of Oils and Drugs, G. S. Hobart, Kingston, highly commended. Specimens of Candy, do do commended.

CLASS XL.—HATS, FURS, AND WEARING APPAREL —46 ENTRIES.

Best gentleman's business coat, D. McKay, Kingston, 4 dol; 2d do do do 2 dol.

Best gentleman's fur cap, William Groh, Kingston, 3 dol; 2d do C. Wright, Kingston, 2 dol.

Best fur gloves, mits, or gauntlets, C. Wright, Kingston, 3 dol; 2d do do do 2 dol.

Best fur sleigh robe, Wm. Groh, Kingston, 4 dol; 2d do do do 3 dol.

Best buckskin gloves and mits, M. C. Tooker, Ernestown, 2 dol.

Best gloves and mits of any other leather, M. C. Tooker, Ernestown, 2 dol.

Best gentleman's over-coat, D. McKay, Kingston, 4 dol; 2nd do do do 2 dol.
Best pantaloons, D. McKay, Kingston, 3 dol; 2nd do, do do 2 dol.
Best silk hat, C. Wright, Kingston, 3 dol; 2nd do do do, 2 dol.

EXTRAS.—Wm. Groh, Kingston, fur over-coat, 4 dol; Clark Wright, Kingston, assortment of ladies' furs, 4 dol; C. Wright, Kingston, felt hats, 2 dol: Charles Weinecker, Kingston, embroidered vest, 4 dol.

CLASS XLI.—INDIAN WORK.—(104 entries.)

Judges—G. M. Goodeve, Cobourg; T. J. Preston, Toronto; James Smith, Kingston.

In this class there were about thirty exhibiters, to whom were awarded prizes altogether to the amount of $35.50, in sums varying from 50 cents to $4.—The lists of articles exhibited by each were so similar in character, consisting of moccasins, caps, pouches, reticules, purses, baskets, pin-cushions, worked in beads, or porcupine quills, &c., &c., and the names of the individuals were so confused, in nearly every instance only the Christian name being ascertained, that it would be useless to give the prizes in detail.

CLASS XLII.—LEATHER. WHIPS, INDIA RUBBER, &c., (133 ENTRIES.)

Judges—Thos. Morrow, Cobourg; Alex. Smith, Kingston; Wm. Edwards, Toronto.

Best specimens of Gentlemen's boots, S. Sims, Toronto, 4 dol and diploma; 2nd do, T. Thompson, Kingston, 2 dol.
Best specimen of Ladies' boots, A. Sutherland, Kingston, 4 dol; 2nd do, S. Sims, Toronto, 2 dol.
Best set of carriage harness, double, J. Buchan, Newcastle, 7 dol; 2nd do, J. & R. Irwin, Montreal, 5 dol.
Best set of carriage harness, single, W. Steward, Toronto, 6 dol; 2nd do, D. A. Waddell, Napanee, 4 dol.
Best set of team harness, D. A. Waddell, Napanee, 2nd prize, 3 dol.
Best six pairs of wooden team hames, S. Skinner, Gananoque, 5 dol and diploma.
Best 50 feet of copper rivetted, 2¾ inches in diameter, Engine Hose and joints, Wm. Perry, Montreal, 6 dol; 2nd do, Wm. Marks, Toronto, 4 dol.
Best 3 hog skins for saddles, Wm. Ford, Jr., Kingston, 4 dol.
Best 3 sides brown bridle, Minnes & Bro, Kingston, 4 dol.
Best 3 sides harness leather, R. F. Carscallen, Newburgh, 4 dol; 2nd do, Minnes & Bro, Kingston, 2 dol.
Best 3 sides sole leather, Wm. Ford, Jr., Kingston, 4 dol; 2nd do H. Hamilton, Storrington, 2 dol.
Best 3 sides upper leather, C. Doering, Phillipsburgh, 4 dol; 2nd do Minnes & Brother, Kingston, 2 dol.
Best 3 kip skins, C. Doering, Philipsburg, 4 dol; 2nd do J. & J. Miller, Montreal, 2 dol.
Best 3 skins Cordovan, Wm. Ford, Jr., Kingston, 4 dol.
Best 3 calf skins, Wm. Ford, Jr., Kingston, 4 dol and diploma; 2d do Chris. Doering, Philipsburg, 2 dol.
Best 3 morocco calf skins, Wm. Ford Jr., Kingston, 4 dol.
Best 30 lbs belt leather, Wm. Ford, Jr., Kingston, 4 dol.
Best dressed deer skin, Joseph Threlkeld, Toronto, 2 dol.
Best travelling portmanteau, Wm. Steward, Jr., Toronto, 6 dol; 2nd do Wallace & Owler, Montreal, 4 dol.
Best lady's saddle, Wm. Steward, Jr., Toronto, 6 dol and diploma; 2nd do J. & R. Irwin, Montreal, 4 dol.

Best gentleman's saddle, J. & R. Irwin, Montreal, 6 dol and diploma; 2nd do W. Steward, Jr., Toronto, 4 dol.

Best wood trunk, covered with leather, Wm. Steward, Jr., Toronto, 4 dol; 2nd do, Wallace & Owler, Montreal, 3 dol.

Best specimens of Whips, collection assorted, Jos. Threlkeld, Toronto, 6 dol and diploma; 2nd do, do, do, 4 dol.

Best assortment of Whip thongs, Wm. Ford, Jr., Kingston, 3 dol; 2nd do, Joseph Threlkeld, Toronto, 2 dol.

EXTRAS.—Clark Wright, Kingston, dressed Otter skins, 4 dol; Edward McGivern, Hamilton, silver plated snaffle bits, 2 dol; Joseph Threlkeld, Toronto, cattle tube, 2 dol; Samuel Sims, Toronto, men's pegged boots, 2 dol; Minnes & Brother, Kingston, three hides shoulder blacked kips, 2 dol; Edward McGivern, Hamilton, collection of silver plated carriage hames, 4 dol; J. & R. Irwin, Montreal, express harness, 4 dol.

CLASS XLIII.—LADIES' DEPARTMENT.—[318 Entries].

Judges—Mrs. Briggs, Kingston; Mrs. Beatty, Cobourg; Mrs. C. Robb, Hamilton; Mrs. W. Wilson, Kingston; Mrs. Burnham, Cobourg; Mrs. E. Brown, Smith's Falls.

Best bonnet of Canadian straw, Mrs. J. Hopkins, Kingston, 4 dol; 2d do Mrs. Silverthorn, Toronto, 3 dol.

Best specimen of Braiding, Mrs. T. Briggs, Kingston, 4 dol; 2d do Mrs. Dumble, Kingston, 3 dol.

Best specimen of Crochet work, Miss Dupuy, Kingston, 4 dol; 2d do Mrs. E. Jackson, Kingston, 3 dol; extra, Miss A. Smith, Hamilton, 1 dol.

Best specimen of embroidery in muslin, Mrs. John Quail, Loughborough, 4 dol; 2d do Mrs. T. McIlwraith, Hamilton, 3 dol.

Best specimen of embroidery in silk, Miss M. Pollard, Toronto, 4 dol; 2d do Mrs. D. Bentley, Marmora, 3 dol.

Best specimen of embroidery in worsted, Miss P. Wolfe, Storrington, 4 dol; 2d do Mrs. W. Wilson, Kingston, 3 dol. Extra—Mrs. James Fenwick, Kingston, 3 dol; Mrs. Hickey, Kingston, 1 dol.

Best three pairs of Gloves, Mrs. Platt Hinman, Haldimand tp., 3 dol; 2nd do. Mrs. E. Jackson, Kingston, 2 dol.

Best specimen of Guipure work, Miss H. Gibbon, London tp., 4 dol; 2d do, Miss Bidwell, Cramahe, 3 dol.

Best hat of Canadian straw, Mrs. Silverthorn, Toronto, 4 dol; 2nd do Mrs. W. Faris, Sorel, C.E., 3 dol.

Best specimen of fancy knitting, Miss Mary R. Hill, Kingston, 4 dol; 2nd do Mrs E. Jackson, 2 dol; Extra, Miss A. Smith, Hamilton, 1 dol.

Best specimen of lace work, Miss E Matthews, Belleville, 4 dol; 2nd do Mrs James Ramsay, Pittsburgh, 3 dol; 3rd do, Miss Bidwell, Cramahe, 3 dol.

Best 3 pairs woollen mittens, Mrs A. McGreer, Napanee, 3 dol; 2nd do Mrs E. Jackson, Kingston, 2 dol.

Best specimen of ornamental needle work, Martha Briscoe, Ernestown, 5 dol; 2nd do, Mrs Barker, Kingston, 3 dol.

Best specimen of fancy netting, Miss J. Dupuy, Kingston, 4 dol; 2nd do, Mrs D. McKay, Kingston, 3 dol.

Best specimen of quilts in crochet, Miss L. Thompson, Portsmouth, 4 dol; 2nd do Miss P. Wolfe, Storrington, 3 dol.

Best specimen of quilts in knitting, Mrs. J. Ramsay, Pittsburg, 4 dol; 2nd do, Miss Unwin, Toronto, 3 dol.

Best specimen of Quilts in silk, Mrs. James Ferris, Kingston, 4 dol; 2d do Mrs. E. Jackson, Kingston, 3 dol.

Best specimen of Quilts in piece work, Mrs. A. McGreer, Napanee, 4 dol; 2d do Mrs. T. Guest, Kingston Township, 3 dol.

Best specimen of gentlemen's Shirts, Mrs. J. Gibson, Kingston, 3 dol; 2d do E. Jackson, Kingston, 2 dol.

Best 3 pairs of Woollen Socks, Mrs. P. Hinman, Haldimand Township, 3 dol; 2d do Mrs. N. Dollar, Fredericksburgh, 2 dol.

Best 3 pairs of Woollen Stockings, Mrs. E. Jackson, Kingston, 3 dol; 2d do J. B. Aylsworth, Newburgh, 2 dol.

Best specimen of Tatting, Miss Bidwell, Cramahe, 4 dol; 2d do Mrs. Wm. Boulton, Toronto, 3 dol.

Best specimen of Wax fruit, Mrs. Mary Bajus, Kingston, 6 dol; 2d do do 4 dol.

Best specimen of Wax flowers, Mrs. Bajus, Kingston, 6 dol.

Best specimen of Worsted work, Miss Unwin, Toronto, 4 dol; 2d do Mrs. J. F. Jones, Brantford, 3 dol.

Best specimen of Worsted work, raised, Miss Ferguson, Pittsburgh, 4 dol; 2d do Mrs. J. Ramsay, Pittsburgh, 3 dol.

EXTRAS.—Mrs. H. McGuin, Kingston, Leather frame, with Hair Flowers, 1 dol; Mrs. J. C. Miller, Seeley's Bay, Braided Hair, with frame, 2 dol; Mrs. James Davis, Kingston, Children's and Women's List Shoes, 2 dol; Mrs. John Harker, Kingston, Worsted work, 1 dol; Velvet paintings, 1 dol; Portfolios, 1 dol; Artificial Rose Tree, 1 dol; Miss Sarah Bibby, Kingston, Leather Watch Case, 1 dol; Mrs. Jacob Jones, Sidney, box of Hair Flowers, 1 dol; Mrs. C. Feins, Kingston, Embroidered Cotton Spread, 1 dol; Mrs. C. Dollar, Fredericksburgh, Embroidered Stand Cover, 2 dol; do Stool Cover, 1 dol; Mrs. Marshall, Toronto, fancy Portfolio, 1 dol; Miss M. E. Thompson, Innisfil, fancy Basket, 1 dol; Mrs. Joseph Ferris, Kingston, quilted Ladies' Wearing Apparel, 1 dol; Mrs. H. C. Grant, Kingston, Fancy Hair Wreath, 1 dol; Miss Cynthia H. Wilson, Kingston, Fancy Inlaid Table, 1 dol; Bead Work, 1 dol; Mrs. John Davy, Fredericksburgh, rag carpet, 1 dol; knitted hearth rug, 2 dol; Miss Mary Masson, Kingston, paper flowers, 1 dol; Miss Emily Storms, Wilton, hair work, 2 dol; Mrs S. Washburn, Belleville, hair flowers, 1 dol; Miss Irish, Cramahe, straw basket, 1 dol; Mrs. Hickey, Kingston, wax figure, 1 dol; fire screens in chenille, 2 dol; Miss C. M. Stephens, Cobourg, case of hair jewellery, 2 dol, and diploma, for "A new and useful manufacture in hair."

CLASS XLIV.—MACHINERY, AND MANUFACTURES IN METALS.—(183 entries.)

Judges—W. Williamson, Smith's Falls; Charles Robb, Hamilton; W. H. Gibson, Dundas; C. Dawson, Cobourg; H. H. Date, Galt; Geo. Davidson, Kingston.

Best iron bedstead, J. & J. Taylor, Toronto, 5 dol.

Best specimen of Coppersmith's work, W. Rodden & Co., Montreal, 5 dol; 2nd do, Hamilton & Co., Kingston, 3 dol.

Best cut nails, 20 lbs, Mitchell Murray, Hamilton, 5 dol and diploma; 2nd do, Isaac Briggs, Gananoque, 3 dol.

Best specimen of finishing in iron, [vice work,] John Gartshore, Dundas, 3 dol; 2nd do, James Morton, Kingston, 2 dol.

Best set of horse shoes, H. Doan, Toronto, 3 dol; 2nd do, Ensign Waite, Storrington, 2 dol.

[REMARK.—Many other samples of horse shoes came under our notice, but so highly polished that it was impossible to form a correct opinion as to the forging of the shoes.]

Best ornamental iron fencing and gate, Hamilton & Co., Kingston, 8 dol.

Best ornamental iron work, cast, James Morton, Kingston, 4 dol,

Best fire-proof safe, (price considered,) Robert Kershaw & Co., Montreal, 5 dol; 2nd do, J. & J. Taylor, Toronto, 3 dol.

Best specimen of locksmith's work, Robert Kershaw, Montreal, 6 dol; 2nd do, do do, 3 dol.

Machinery and Models thereof.

Best specimens of iron castings for general machinery, John Gartshore, Dundas, 6 dol; extra, R. W. Grant, Brockville, 2 dol.

[REMARK.—The iron of the casting shown by Mr. Gartshore is of very superior quality, particularly adapted for locomotive cylinders.]

Best cast wheel spur or bevel, (not less than 50 lbs. weight,) John Gartshore, Dundas, 4 dol.

Best fire engine, Wm. Perry, Montreal, 15 dol and diploma.

Best portable steam engine, 4 to 6 horse power, (open to foreign competition) F. G. Beckett & Co., Hamilton, 30 dol.

Best steam engine in operation on the ground, James Morton, Kingston, 40 dols.

Best specimen of malleable iron from the ore, A. C. Chewett & Co., Kingston, 6 dol and diploma.

Best specimen of malleable iron from scrap, A. C. Chewett & Co., Kingston, 6 dol and diploma.

Best specimen of plumber's work, Neil McNeil, Kingston, 6 dol.

Best metal pump, J. Morton, Kingston, 2nd prize, 2 dol.

Railway Castings, &c.

Best self-acting car coupler, S. T. Webster, Kingston, 12 dol.

Best two cast jaws and boxes for cars, Wm. Rodden & Co., Montreal, 3 dol, and diploma to the designer, Thos. Goff, Superintendent Car Works, G. T. R., Montreal.

Best two composition boxes for cars, Wm. Rodden & Co., Montreal, 3 dol and diploma.

Best locomotive truck wheels, (accompanied with specimens of the metal chilled and showing the fracture,) Jas. Morton, Kingston, 6 dol.

Best passenger car wheels, James Morton, Kingston, 6 dol.

Best refrigerators, (price considered,) Horsey & Smith, Kingston, 4 dol.

Best platform scales, Carpenter, Ware & Co, Hamilton, diploma and 4 dol; 2nd do, do do, 3 dol.

Best balance scales, Carpenter Ware & Co, Hamilton, diploma and 3 dol; 2nd do, do do, 2 dol.

Best hall stove, John McGee, Toronto, 4 dol.

Best parlor stove, Hamilton & Co, Kingston, 4 dol.

Best cooking stove with furniture, Wm. Rodden & Co., Montreal, 5 dol; 2nd do, Gurneys & Carpenter, Hamilton, 3 dol.

Best cooking stove for coal, Wm. Rodden & Co., Montreal, 5 dol.

Best parlor grate, Gurneys & Carpenter, Hamilton, 5 dol.

Best specimen of tinsmith's work, R. M. Grant, Brockville, 5 dol; 2nd do, Hamilton & Co., Kingston, 3 dol. Special prize—Considered the best but not seen when other awards were made, Horsey & Smith, Kingston, honorable mention and diploma.

Tools.

Best earth auger, H. Leonard, Kingston, 3 dol.

Best six narrow axes, Miles Cator, Newburgh, 4 dol.

Best collection of hammers, Peter Killduff, Kingston, 4 dol.

Best specimen of turning in iron, John Gartshore, Dundas, 4 dol.
Best 20 lbs. of pressed nails, Isaac Briggs, Gananoque, 5 dol and diploma.

EXTRAS.—A. C. Chewett & Co., Kingston, specimen Canadian steel, diploma; Carpenter Ware & Co., Hamilton, flour packer, commended; John Gartshore, Dundas, iron water wheels, 4 dol; Horsey & Smith, Kingston, japanned bird cages, commended; Philo Soper, London, rifle, 2 dol; Parsons, Brothers, Toronto, collection of coal oil lamps, commended; Jas. Jamieson, Kingston, bird cage, 2 dol; Benjamin Clark, Canada Powder Mills, Hamilton, blasting powder and sporting powder, commended as very superior; John Rook, Camden, cheese curder, highly commended; Peter Kilduff, Kingston, wrought iron anchor, 2 dol; stone cutter's tools, 2 dol; Richard Haselden, Hamilton, model of patent railway crossing, 2 dol; do model spring for railway passenger car, commended; John Fensom, Toronto, hand printing press, diploma; Abraham Byer, Pickering, mill stone dresser, highly commended; Horsey & Smith, Kingston, o namental fountain, diploma; B. D. Wallace, Montreal, 4 sewing machines, diploma.

CLASS XLV.—MISCELLANEOUS.—(84 Entries.)

Judges—James Wallace, Whitby; D. G. Carnegie, Toronto; Hiram Piper, Toronto; S. T. Drennan, Kingston.

Best assortment of brushes, Charles Boeckh, Toronto, 4 dol.
Best specimen of Dentistry, M. D. French, Toronto, 6 dol; 2nd do B. W. Day, Kingston, 4 dol.
Best specimen of Goldsmith's work, Geo. Spangenburg, Kingston, 6 dol and diploma; 2nd do Lyman & Savage, Montreal, 4 dol and diploma for best *Collection.*
Best collection of Mathematical, Philosophical and Surveyor's instruments, A. Potter, Toronto, 8 dol.
Best specimen of Banner painting, R. J. Griffith, Toronto, 2nd prize, 4 dol.
Best specimen of Heraldic Painting, Mrs. C. Walker, St. Thomas, 6 dol.
Best specimen of Decorative House Painting, R. McLean, Perth, 6 dol; 2nd do do do 4 dol.
Best specimen of imitation of wood and marble painting, R. McLean, Perth, 6 dol; 2nd do do do 4 dol.
Best Veneered Picture Frame, A. Calder, Kingston, 6 dol.
Best specimen of Silversmith's work, Lyman & Savage, Montreal, 6 dol and diploma; 2nd do G. Spangenburg, Kingston, 4 dol.
Best collection of Stuffed Birds, Mrs. Mary Bajus, Kingston, 6 dol; 2nd do R. M. Horsey, Kingston, 4 dol.
Best specimens of Canadian Varnishes, G. S. Hobart, Kingston, 4 dol; 2nd do do do 3 dols.
Best model of a Steam or Sailing Vessel, D. Campbell, Shannonville, 5 dol; 2nd do P. Durell, Toronto, 3 dol.

EXTRAS.—Andrew N. Cole, Brockville, gravitating plumb and level, diploma and 4 dol; Wm. Smith, Kingston, oxy-hydrogen microscope and dissolving views, commended; R. V. Rogers, Jr., Kingston, collection Canadian insects, 2 dol; Allen Turner & Co., Brockville, paints ground in oil, commended; S. Passmore, Toronto, collection of stuffed animals and fishes, 4 dol; G. S. Hobart, Kingston, white lead in oil, commended; Wm. Scott, Kingston, pleasure skiff, 2 dol; D. O'Gorman, Kingston, pleasure skiff, 2 dol; D. Campbell, Shannonville, revolving angle joint for tailors, commended; John Condell, Kemptville, artificial limbs, commended; John Gibbard, Napanee, specimens of native gold procured at the Chaudiere Falls, diploma; Sidney Warner, Wilton,

collection of rocks and shells, commended; Edward McGivern, Hamilton, assortment of silver plated goods, diploma.

CLASS XLVI—MUSICAL INSTRUMENTS.—[11 Entries.]

Judges—H. F. Chalaupka, Cobourg; R. S. Ambrose, Kingston; G. W. Strathy, Toronto.

Best Piano, Wm. McCabe, Whitby, 15 dol; 2d do, T. D. Pearce, Montreal, 10 dol.

EXTRA.—Joseph Roome, Wilton, metal pipes and wood pipes for organs, commended.

CLASS XLVII—POTTERY, BUILDING STONES, &C.—[16 Entries.]

Judges—James Wallace, Whitby; D. G. Carnegie, Toronto; H. Piper, Toronto; S. T. Drennan, Kingston.

Best collection of Canadian building and flagging stones, Wm. Knowles, Arnprior, diploma and 20 dols.

Best specimens of different sized draining tiles and pipes, Wm. Gibbs, Yorkville, 8 dol; 2nd do G. Smart, Bowmanville, 5 dol.

Best Water Filterer, John Burns, Yorkville, 3 dol.

Best assortment of pottery, John Burns, Yorkville, 8 dol.

EXTRAS.—John Burns, Yorkville, specimens pottery, 2 dol; Thomas Demmery, Yorkville, white water made pressed bricks, 2 dol; do do red do 1 dol; Isaac Mills, West Flamboro,' Victoria roofing tiles, diploma and 2 dol.

CLASS XLVIII.—PAPER, PRINTING, BOOKBINDING, &C. &C.—[17 Entries.]

Judges—George Barnes, Hamilton; Dr. Barker, Kingston; J. Somerville, Dundas.

Best specimen of bookbinding, blank book, J. Lovell, Montreal, 5 dol.

Best specimen of ornamental bookbinding, letter press, Brown Bros., Toronto, 5 dol; 2nd do, John Lovell, Montreal, 3 dol.

Best specimen of plain letter-press printing, R. R. Donnelly, Hamilton, 5 dol; 2nd do, J. Lovell, Montreal, 3 dol.

Best ornamental letter-press printing, R. R. Donnelly, Hamilton, 5 dol.

Best dozen rolls paper hangings, (on Canadian paper,) grounded, M. Staunton, Toronto, 6 dol.

Best dozen rolls paper hangings, (on Canadian paper,) self-grounded, M. Staunton, Toronto, 4 dol.

EXTRAS.—Brown, Bros., Toronto, embossed book case, 4 dol; do. do. specimens of binding, 2 dol; J. Lovell, Montreal, handsome library binding, 2 dol.

CLASS XLIX.—WOOLLEN, FLAX AND COTTON GOODS.—(170 entries.)

Judges—W. F. Murray, Hamilton; Wm. Brown, Smith's Falls; Wm. Wallace, Ramsay.

Bags, manufactured from flax, the growth of Canada, best 12 linen, D. Campbell, Charlottenburgh, 5 dol; 2nd do, Robert Denison, Richmond, 3 dol.

Best pair woollen blankets, D. Campbell, Charlottenburgh, 8 dol; 2nd do, do, do, 6 dol.

Best piece woollen carpet, 12 yards, Mrs. Henderson, Brockville, 8 dol; 2nd do, James J. Farley, Thurlow, 6 dol.

Best piece woollen stair carpet, 12 yards, Mrs. Henderson, Brockville, 6 dol.

Best piece of fulled cloth, 12 yards, J. Rosamond, Almonte, 6 dol; 2nd do. Wm. Lawrence, Loughborough, 4 dol.

Best piece of cloth, Canadian wool, Disher & Haight, Grantham; 2nd do, do do, 5 dol.

Best 2 counterpanes, D. Campbell, Charlottenburgh, 5 dol; 2nd do, R. Denison, Richmond, 3 dol.

Best 28 lbs. flax or hemp cordage, J. Cooper, Kingston, 6 dol; 2nd do, do do, 4 dol.

Best pair factory made woollen drawers, B. F. Smith, Hamilton, 4 dol.

Best piece of flannel, 12 yards, not factory made, P. Hinman, Haldimand, 5 dol; 2nd do, James J. Farley, Thurlow, 3 dol.

[NOTE BY JUDGES.—We find colored and checked flannels in this section, in competition with white, where the checks have no chance. The colored, &c., should have been entered as Minseys.]

Best 2 pairs of horse blankets, R. Denison, Richmond, 5 dol; 2nd do, N. S. Briscoe, Ernestown, 3 dol.

Best 12 yards of check for horse collars, R. Denison, Richmond, 5 dol; 2nd do, do do, 3 dol.

Best piece of linen goods, D. Campbell, Charlottenburgh, 5 dol and diploma; 2nd do, do do, 3 dol.

Best 12 yards satinet, Disher & Haight, Grantham, 6 dol; 2nd do James Rosamond, Almonte, 4 dol.

Best three shawls, James Ramsay, Pittsburgh, 5 dol; 2nd do Joseph D. Purdy, Collins' Bay, 3 dol.

Best 6 factory made woollen shirts, B. F. Smith, Hamilton, (highly commended) 5 dol; 2nd do do do 3 dol.

Best 3 pairs of mixed woollen and cotton factory made stockings, B. F. Smith, Hamilton, 4 dol.

Best 3 pair mixed woollen and cotton factory made socks, J. Elliott, Landsdowne, 2 dol; do. B. F. Smith, Hamilton, commended.

Best 12 yards of winter tweed, Disher & Haight, Grantham, 4 dol; 2nd do Fraser & Co., Cobourg, 4 dol.

Best 12 yards of checked minsey, H. McGuin, Kingston, 5 dol; 2nd do Joseph Brown, Camden, 3 dol.

Best 1 pound white woollen yarn, Disher & Haight, Grantham, 2 dol; do B. F. Smith, Hamilton, commended.

Best 1 pound woollen yarn, dyed, P. Hinman, Haldimand, 2 dol.

EXTRAS.—Disher & Haight, Grantham, piece of cassimere, $4, and highly commended. Mrs. John Davy, Fredericksburgh, hearth rug, home-made, commended. D. Campbell, Glengary, plaid shawl, commended. Platt Hinman, Haldimand, piece of doeskin, $4. Daniel Campbell, Glengarry, linen sheeting and table cloths, $2.

CLASS L.—FOREIGN MANUFACTURES.—(20 Entries.)

Judges—Dr. Beatty, Cobourg; Asa A. Burnham, Cobourg; J. E. Pell, Toronto.

Clement and Redington, Ogdensburgh, N. Y. five Melodeons, diploma; Jas. Fisher, Kingston, Child's carriage, American manufacture, commended; W. E. Foot, Bloomington, Illinois, specimens of Card and ornamental printing, diploma; Appleton, Tracy & Co., Montreal, Agents for Boston manufacturers, gold and silver Watches, diploma; S. T. Johnston, City of New York, samples of stove polish, perfumery, blue inks, tooth soap, commended; Olmstead and Jones, Syracuse, N. Y., Saddlery and Coach hardware, worthy of special attention to the trade of Canada, diploma.

ON THE CHEMISTRY OF THE SOIL, THE PLANT, AND THE ANIMAL, AND THEIR MUTUAL DEPENDENCIES.

Report of a Lecture delivered before the Agricultural Association, at Kingston, on Tuesday Eevening, Sept. 27th, 1859, by George Lawson, Ph. D., Professor of Chemistry and Natural History, in the University of Queen's College.

After some preliminary observations on the importance to a state of a judicious and enlightened system of Agriculture, Dr. Lawson referred to the great advances that had been made in several European countries of late years, and which were chiefly dependent upon two circumstances:—1st, the development of certain branches of chemistry which had brought us more correct views of the nature of vegetable and animal nutrition. And 2nd:—the application of steam as a motive power, in conducting farm labour. On this occasion it was his object to illustrate the first of these by pointing out some of the claims which chemistry had on the farmer's attention, as these were exhibited in the mutual relations and dependencies of the soil, the plant and the animal. Attention was directed to the character of this superficial layer of soil; its relation to the underlying rocks; its varying depth; its chemical composition and mechanical condition, and the varied circumstances by which these were determined The mechanical and chemical actions which result in the formation of soils, and the effective offices of the soil-making cryptogamic plants were detailed, some of the humbler forms of which are capable of vegetating even on the hard and smooth surface of the quartz crystal, and there forming a thin film of soil as the starting point for future accumulations of vegetable matter. Thus,

> "Nought so vile that on the earth doth live,
> But to the earth some special good doth give."

The rock being the great source of the soil, which, in fact, consists of a mixture of crumbled rock and the accumulated remains of decayed plants, the composition of the rock mainly determines that of the soil. And when we consider that rocks differ much in chemical composition, we have an explanation of the reason why soils differ so widely in this respect, even in cases where they do not present obvious distinctive characters to the observer. In those hilly countries where many different kinds of rocks creep out upon the surface, we naturally look for a greater variety of soils on a given area than in flat countries where the same surface-stratum of rock extends over extensive districts. Yet this is in reality less fully the case than might be anticipated, for every surface is exposed to the action of wind and rains, which, in course of time, while the soil is being slowly formed, sift, and sort, and mix up the earthy particles more perfectly than any florist can by artificial means mix up the compost for his favorite flowers. The effects of mineral springs, and of the addition of vegetable and animal matters, in varying proportions, and other causes which affect the character of soils, were also alluded to as tending to complicate our enquiries in tracing the connection between the rock and the soil. The rock, however, forms the basis of the soil, and illustrations constantly come before us of their relation,—the granites so often yielding poor and unprofitable soils as compared with those of the trap rocks, while the fertile soils of the lavas give rise to that rich vegetation which usually attracts attention in volcanic countries. The stratified rocks,—the sandstones, limestones, and clays were next considered with regard to their influence in soil making, and the effects of an undue preponderance of clay, or lime, or sand, or organic matter, on the mechanical as well as on the chemical character of the soil, were pointed out,—the best soils combining all without prominent excess of any. This led to a detail of the various

modes of estimating the comparative value of the soils,—from the fallacious one of the newly arrived emigrant who judges merely from resemblances, to the more judicious practice of the experienced settler who examines the timber crop of the land, or the more precise method of the chemist, who ascertains what substances are present in the soil, in what proportions they exist, and to what extent the needful ones are available for the intended crop. The plant, like the soil, consists of two portions, of combustible and incombustible matter.—Now, it is important at this stage of our enquiry to ascertain the sources of these, of the incombustible or "mineral" matter, as well as of the carbon, nitrogen and water, of which its tissues are composed; for neither chemical force nor vitality, nor indeed any force with which we are acquainted can create any thing. In all the operations of nature we see matter merely changing its place, its condition, and its relations: we can neither create nor destroy.

A detail was then given of the various sources of the materials required by the plant,—its carbon being obtained in the form of carbonic acid gas, which occurs in the atmosphere, in spring water, and soils; its nitrogen from the ammonia produced in the putrefaction and decay of organic substances, as well as (according to the recent observations of Ville) from the free Nitrogen of the atmosphere; and lastly the inorganic or mineral substances are obtained by the plant directly from the soil. These were enumerated and the conditions under which they exist pointed out. The mode in which plants feed was referred to; the absorbent roots, whose tissues, although presenting no visible openings, are in common with all the other tissues readily permeable by fluids; the stomata or "breathing pores" on the surface of the leaves and other green parts of plants and the various other structures concerned in assimilation were described.—The recent researches of Way and Liebig as to the power of soils in absorbing and rendering insoluble ammonia and potash and their salts, as well as silicic acid, phosphoric acid and phosphates, were referred to, and the power possessed by the plant of taking up these, and moreover of selecting from the soil the materials which it requires without reference to the comparative proportions in which they exist therein.

The formation of the tissues and their products having been then referred to, it was remarked:

Had we time to go over in detail the chemical changes that go on in plant-tissues,—could I trace before you the successive steps in the process of plant growth by which the vegetable products are formed, we should find in the words of Gregory, the distinguished organic chemist, that "in the formation of every form of vegetable products, of acids, neutral bodies, cellulose, starch, fats, oils, resins, bases, and sanguigenous matters, one character universally prevails, that viz. of deoxidation of the materials and liberation of the oxygen. When we deoxidize any substance in the laboratory, we do it by causing the oxygen to combine with another body; but vegetables, while they produce all matters essential to their own development, and to the life of animals, give out in doing so, the oxygen which is removed; and thus plants cannot grow without, as a necessity of their life, restoring to the air the oxygen withdrawn from it by animals." Thus the plant is perpetually giving off oxygen to purify the atmosphere for the breathing of man and animals, while they in turn give off carbonic acid to feed the plant, and the soil forms a storehouse for the waste products that are not immediately required for the use of either.

While the plant derives its nourishment from the soil and atmosphere, the animal is dependent upon the plant as its source of supply.

When an animal takes in food, a certain portion thereof is assimilated, becomes incorporated into the animal's tissues, while the remainder is discharged by excretion. That portion of the food which is assimilated goes to supply the

waste of the body; if fed sparingly, yet sufficiently, there will be no sensible increase in the animal's weight, neither will there be a decrease. But if we withhold food or give it in insufficient quantity, then the animal begins to lose weight, for it has now to use up the substance stored in its body, to enable it to carry on the functions of life, and provide for the consequent waste of tissues. If on the other hand we give an excess of food, the animal cannot use it all up; with such an abundant supply, the animal is enabled not only to maintain the process of respiration, and to repair the waste of tissues; but after all this is accomplished, there is still a certain excess of aliment which must be disposed of, and this becomes stored up in the animal's tissues, and shows its presence by an increase in weight of the animal's body. Thus a lean animal eats largely and completely exhausts its food; but when it comes into better condition, a smaller supply will keep it in good health and weight. If however the high feeding is still continued, there will be a continued increase in the animal's weight, limited only, by the physiological laws of its development; and if the food given is even greater in amount than can be exhausted by the assimilating process, then to a corresponding extent will the food-matter be excreted, and its value lost to the farmer.

In the feeding of cattle therefore, we have not only to ascertain the commercial price and feeding value of different materials; but we must also have regard to the requirements of the animal, and carefully regulate its supply of food. According to the nicety with which this is accomplished, will be the freedom from loss of material. The leading points of this question were well put by Dr. Anderson of Glasgow, in a recent lecture to the Highland Society of Scotland.

Food, however diverse its origin and aspect, essentially consists of oily, saccharine, and nitrogenous matters. The oily and saccharine matters support the all important function of respiration, and go to form fat, while the last mentioned,—the nitrogenous matters—are concerned in the formation of flesh. These are the two great classes of nutritive constituents, the *respiratory* and the *flesh-forming*. Now, as in the case of soils we do not want a pure sand, a stiff clay, nor a thoroughly calcareous soil, but a mixed soil containing due proportions of all the materials required to give mechanical condition to the soil, and to afford the materials required by the plant, so also in the process of animal feeding, it will not do to supply the animal with saccharine or oily food alone; nor will it do to feed entirely with nitrogenous matter. In the one case we should afford ample materials for supporting respiration, but not for the formation of flesh. In the other, there would be ample provision for the formation of flesh, but not for the support of respiration. These two functions must *both* be carried on simultaneously, and the food, therefore, must be of a mixed kind, must contain both nitrogenous matters and the other class of sugar or oil. Now this has a more direct bearing on feeding than may at once appear. Not only must the animal receive both kinds of food; but it must receive these in the proper proportions. If an animal is fed solely on one particular kind of food, which is proportionately richer in either one or the other of the two great classes of nutritive constituents, it is obvious that there *must* be a loss in some way. If, for example, there is an excess of flesh-forming, and a too small proportion of respiratory food, then if the quantity is regulated by the former, the animal must necessarily suffer,—while on the other hand if enough of the whole food is given to provide a sufficiency of respiratory elements, then the animal receives too much; in such a case it must in fact consume more nitrogenous matter than it requires in order to obtain enough of the saccharine and oily matters, and the excess consumed only goes to enrich the manure heap.

Now let us enquire what is the object of farming? Its object is two-fold,

and may be shortly stated to be to cover the soil with a more abundant food-vegetation than it naturally yields, and thereby to raise on a given surface, a greater amount of flesh and dairy produce than the untilled sod could afford. This increased supply is obtained by the application of labour, so directed in the first instance as to render the food-materials pre-existing in the soil more freely available to the plant than they were before; for while the atmosphere as we have seen yields no inconsiderable portion of the food of plants, the soil is called upon to supply an equally necessary portion. But it is obvious that by a continuation of this process, the food materials which the plant is constantly taking from the soil will become exhausted; at least such of them as exist in smallest quantity in an available condition will be used up, and the soil will no longer continue to give an abundant crop. How is this to be counteracted? If the cropping has been merely too rapid, and if there are still the elements of fertility in the soil, but in an unavailable condition, then these must be acted upon in such a way as to render them available. Fallowing, or the exposure of the soil to the influence of the weather, tends to make up for loss, by causing the decomposition of substances previously unfit for vegetable nutrition, and lime, and several other applications, often proceed on this principle. But if the soil be altogether deficient of certain neeessary constituents, then the simple method of inducing fertility is to restore the substances that have been carried off; and upon this simple principle depends all our operations of manuring. Some manures supply one or two of the substances wanted. But the most natural and the most generally applicable of all manures is farm-yard manure, because it supplies nearly all the substances that have been removed from the soil, and these happen to be the ones that are present in most soils in small quantity.

The addition of manure containing much vegetable matter, such as straw, &c., exercises a highly beneficial influence in many cases, independent of the supply of plant food which it contains. In a stiff unbroken soil, such as we so often see in Canada, such material serves to open up the soil and expose it to the action of the atmosphere. It, in fact, temporarily affords many of the advantages of covered drains—and the decay of the vegatable fibres, leaves the soil in a porous, friable condition, highly congenial to the roots of fast-growing crops.

One of the most discouraging circumstances which I observe in Canada, is the great want of appreciation of manures, a neglect of the great source of all fertility in cultivated soils. I do not grieve at the absence of nitrate of soda, guanos, and the race of special manures. For the present we want a more careful husbanding of the manures which we already possess, and which are within the reach of every farmer. This was one of the facts that struck me most forcibly on my arrival in Canada last year, and many illustrations have occurred since then. I have been told of farmers who have allowed their farm-yard manure to accumulate around their steadings for a period of seven or eight years, while their fields were starving for want of it, and themselves likely to starve into the bargain. I have been told of other farmers whose manure accumulated to such an extent as to prevent access to the out-houses in which the live stock were housed, and that the removal of the barn or sheds to a new site was preferred to the trouble of carting the manure to the adjoining fields.

I hope these are scandals not strictly true, or at least not now capable of practical illustration in this country; but the bare idea of such waste being possible, is sufficient to convey to the English or Scotch farmer a very exaggerated notion of the independence or riches of my Canadian brethren. And that there is a callousness on this subject is very well shown by the fact that, even in Kingston, manure has no commercial value whatever. Farmers continue year after year to bring in the produce of their farms to the market; but they for-

get that when they obtain their money, they only carry away part of the value of their produce. They leave behind them accummulating in the city and running to waste, the materials that ought to be carefully returned to the soil. I speak not of such cities as Montreal, where the effects of this system are seen in the bills of mortality, and where the waste of manure serves further to spread disease and death throughout the populous streets.

There are no household words more common than these, and no proverb more truthful: That "wilful waste makes woful want." and there is no application of it that can be made with more propriety and force than to the matter before us. The farmer who prizes most highly his manure heaps is the farmer who obtains the greatest return from his land.

The real value of the manure produced by stall feeding has been variously estimated, and of course depends to a considerable extent upon the nature of the food used; but Dr. Anderson has recently published a series of experiments which may be fairly taken as an example, and these show that of food generally about seven-eighths of the valuable matter appears in the dung, which is valued in money at about one-third to one-fourth of the price of the food consumed. This is an important item, therefore, and one which has a strong bearing on the question of stall feeding. In truth the *profit* of *feeding* is derived from the manure, and not from the flesh and dairy products.

In the neighborhood of Edinburgh there are some meadows, which consisted originally of worthless land, but from receiving the sewage of the city, they now bring rents of from $150 to $[illegible]00 an acre,—that is for the right to cut the grass for a single season of six or seven months. Some have been let at $287 per acre; and the amount is probably increased since these figures were obtained. Many simular examples might be quoted of the remarkable effects of sewage and other waste materials when employed in land irrigation.

Yet while other countries are going on enriching their lands, and not only maintaining but steadily increasing their fertility and produce, the very reverse of this is going on in too many instances on this Continent.

The late professor Johnston bears strong testimony in his works to the deterioration of the soil in Canada and the States through continued cultivation, but perhaps his sweeping charges have more of the high-colouring of eloquence than of sober truth. Yet it is well for us to recognise the truths which they do contain.

I find a recent statement by Dr. Elwin, made to the Agricultural Society in Philadelphia, to the effect that the wheat crops of the United States are fast diminishing, so far as the number of bushels raised to the acre is concerned. In Ohio, a State but little over fifty years old, the crop is stated to have fallen off from forty bushels to the acre to about sixteen; while in the best portions of New York, where thirty bushels used to be considered a fair crop, only twelve bushels are now raised. The falling off in other States has been equally marked.

In the absence of a perfect system of agricultural statistics, it is impossible to form accurate notions on such a subject as this, as regards either the United States or Canada, but I presume, few, who have had opportunities of observation, will doubt the general fact, that a rapid deterioration is going on over large areas of land, which is yearly lessening the capital and the annual produce of the districts in which this suicidal system is being carried out.

A country like this, possessed, if I may so term it, of an *excess* of land, is peculiarly ungenial to the promotion of scientific agriculture. Land is abundant, and cultivators are comparatively few. New regions are yearly being opened up to tempt the farmers to a change; and the great problem which European farmers have set before them, the "discovery of the means of producing more

bread and meat on a given surface," is not felt here as a national desideratum. The question with every farmer is, how to obtain the largest return from a given amount of seed and labour, irrespective of surface? Land is indeed apt to be regarded, and is by many regarded as in itself of no intrinsic value, as deriving its value from locality and other fortuitous circumstances alone. Yet I venture to assert that all real progress in agriculture, will be accomplished, in this, as it has been in other countries, not so much by *extending* cultivation, as by "producing more bread and meat on a given surface." So long as a farmer seeks the recompence of his labours in farming cheaply, in spreading as little seed and as little labour as possible over a great extent of surface, so long will a deterioration of the land go on, until eventually it reaches a condition of poverty which prevents it repaying even a minimum amount of seed and labour. I have seen fields in Canada which certainly did not yield more than the seed required to sow them. Such examples are apt to bring down a bad name upon Canadian soil, while in reality they are mere examples of the want of common prudence on the part of cultivators.

I call attention to this subject because I believe, after a country has become so well settled as Canada now is, that it is more the duty and interist of the state to *improve* than to *extend* cultivation. It does no good to any one to cut down trees and extend cultivation, if it be merely to spread poor farming over the country, for that serves only to impoverish the soil, to render it less productive, less valuable than it was before, unprofitable to present cultivators, and less useful to future generations. We all have our public duties to perform; and like other men, the farmer does not live for himself alone. He is doing a great work, and he does not perform it as it ought to be performed if he leaves the land behind him worse than it was before. Let me then appeal to every loyal Canadian, for his own profit, for the benefit of his family, for the good of his country, and for the glory of Canada as a British Colony, not to strive to cultivate *much*, but rather to cultivate *well*.

In conclusion the Professor remarked:—Without going into special points, I have rather chosen to state a few of the plain and obvious facts of science, and to connect these with a few thoughts on farming matters in general, as they are exhibited in Canada. I have tried to speak openly and plainly, without mystery, without flattery, without censure, and, I trust, without much prejudice.—It would have been a pleasing task to review the history of the past, to survey the great achievements that have been accomplished in bringing the broad acres of Canada under the dominion of the plough, and to trace the successive improvements that have been carried out. But you know in a great warfare there should be no looking back: the watchword is "Onward!" It is the duty of the Prize Committee to award to you the merits to which the produce of your labors entitle you. And I trust that the honorable decorations which they dispose this week will act as a stimulus to further exertion. What I have said to you has reference to the future. I have stated a few of the facts of this case. Let me ask you to ponder them, and compare them with the results of your daily practice. It is well that science and practice should be brought more closely together; for it is not by either alone, but by the combination of both, that true progress is to be made in agriculture.

I have sketched a rapid picture of the progressive phenomena which attend the denudation of the rock into a fertile soil, the growing up of the plant out of this soil, the passage of the plant's materials into the tissues of the animal, and the return of the elements of the animal body to the earth and air. This continuous and complete circulation of matter opens up to us many grand examples of the evidences of design and adaptation which are everywhere so deeply impressed on the works of nature; and it also affords many useful practi-

cal lessons to the farmer. But I should convey a very erroneous idea were I to leave any one to imagine that the subject is now exhausted. I have attempted only to allude to some of those general principles which are being established by science, and which ought to guide the scientific farmer. To be comprehended aright, and to be appreciated as they ought, they must be studied in all their details; and I can only hope that my remarks may excite in the minds of some a curiosity that will promote enquiry into a department of knowledge which is more pregnant than any other with results affecting the material prosperity of the human race.

You are living in an age of science, and of progress. You are cutting down the forest trees, to let the sun's rays in upon your fields, that they may bring forth their fruits. Take another step. Cut down the trees of ignorance, clear away the brushwood of superstition and error and adherence to things of the past which chokes the progress of truth; let the light of science shine in upon your minds, and guide your operations, and your fields will bring forth even more abundantly.

SCIENTIFIC AGRICULTURE:

A LECTURE *delivered before the Provincial Agricultural Association of Upper Canada, at Kingston, on Thursday Evening, September* 29, 1859.*

BY THE REV. HANNIBAL MULKINS.

I am to address you for a brief space upon the importance of Scientific Agricultural knowledge; or, more strictly, on the importance of scientific agriculture to the farmers of Canada. On this subject I do not hope to say anything new to the intelligent farmer of Canada, or to any person whose general reading keeps pace with the advance of science in this department of human knowledge.

Nature presents upon the globe to the senses of men, and through their senses to the minds of men, two classes or modes of being.

I. INORGANIC MATTER.

The first is the inorganic world, embracing all inanimate things, the plastic air, the yielding waters, the fruitful soil, and the solid rock. This inorganic world—this unorganized, lifeless matter, a vast compound of atoms, containing all the original elements—constitutes the material out of which the Divine architect has erected all that lives and breathes. He surrounds this world of lifeless matter by His power. He comprehends it in His knowledge, subjects it to His laws, exposes it to the action of dissolving agencies and the influence of natural chemistry until it is prepared to yield nutrition to plants.

II. ORGANIC MATTER.

The second class or mode of being is, therefore, that of organized existence

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* The writer of this lecture wishes it to be stated that it was not originally intended for publication. He prepared it for delivery before the meeting of the Association at Kingston, as professedly a compilation. For the facts, and the tables, he informs the editor, he is chiefly indebted to Liebig's Agricultural Chemistry, and to the articles Agriculture, and Agricultural Chemistry in the Edinburgh Encyclopedia Britannica, and a few other works of less note. At the request of the audience before whom it was delivered, however, and of the Board of Agriculture, Mr. Mulkins has kindly consented to place it at the disposal of the Board for publication in their Transactions.—ED.

—of life—in which the seed, surrounded by lifeless matter, derives therefrom the elements of its growth, drawing them up through its roots from the soil, drinking them in through its leaves from the atmosphere until the living plant in its woody fibre, its alkaline juices, in its foliage, flowers, fruits, and seeds, attains the utmost perfection of its nature.

The fact, then, is open to the observation of all,—that all things visible around in the living creation, or in the dead inorganic matter, are but aggregations of atoms; that vegetation is simply the process by which dead matter becomes living, organized into manifold beautiful forms. Each atom of matter is endowed by its Creator with strange powers and properties; and, obedient to their influences and forces, it draws to itself and coheres with other atoms, undergoes inexplicable changes, until the same dust which glittered in the diamond aggregates in the lordly tree, blends to produce the richly painted flower, or combines to yield the luxury of fruit.

It is the province of chemistry to explain how these mysterious changes are effected—a science to whose investigations and discoveries nature affords the only limits. Chemistry has already demonstrated that in all the various forms of matter, in all the variety of plants, in all the organized beings upon the earth, there are only a few different elements. It has analyzed the air, the earth, the waters, the soil, the solid rock, the hardest metals, the living plant and animal, and has proved as yet the existence of only sixty-six elements or simple substances; that is, substances not capable of decomposition.

III. ELEMENTARY BODIES.

Of these sixty-six elements, or elementary substances, all of which exist in dead matter, only nineteen have been found in organized bodies or plants; so that these nineteen elements in various combinations constitute the entire substance of all plants. Of the elements about thirty are very rare, being found only seldom, and then in small proportion, and never in connection with vegetable organisms.

Forty-two of those elementary bodies are metallic, of which small proportions of several in a state of combination are found in plants.

Of the elements which constitute the substances of the vegetable world, four are organic, namely: Carbon, Nitrogen, Hydrogen, and Oxygen, contained in that part of the plant which is volatilized by burning, but which nevertheless comprises a very large proportion of all plants. As it is important to every farmer that he should understand the nature of the plants and soils which he is cultivating, some particularity must be observed in describing the elements which enter into their composition.

1. *Organic Elements.*—The first of these is carbon (C), exisiting in a pure state only in the diamond; but in an impure condition in all vegetable and animal substances, of which it forms a large proportion. 2. Oxygen (O), is an organic element widely distributed in nature, a most powerful agent in all natural changes. It constitutes about one-fifth of the atmosphere, eight-ninths of all the water on the globe. It also constitutes a large proportion of minerals, and from thirty to fifty per cent. of all plants and animals. 3. Hydrogen (H), a third organic element, constituting one-ninth of all the waters on the globe, and five or six per cent. of vegetable and animal substances. 4. Nitrogen (N) is found in great abundance in an uncombined state; it constitutes four-fifths of the atmosphere, and from one to five per cent. of all living things. These are called the organic constituents of plants, because when plants are burned they become volatilized and disappear. These constituents of the plant are supplied to it during the period of its growth chiefly from the atmosphere.

2. *Inorganic Elements.*—In the ash, after plants are burned, are found the following inorganic constituents:

1. Potassia, the metal potassium combined with oxygen [KO]. 2. Soda, another metal combined with oxygen [Na O], chloride of sodium [Na Cl] is a compound of this metal and chlorine. 3. Iron [Fe]. 4. Calcium, another metal which, in the shape of lime [CaO.] and chalk [CaO, CO2], forms a considerable part of the earth's crust, frequently whole mountains, and which in limestone underlies these United Countries. 5. Magnesium, another matallic body which, in union with carbon and oxygen [Mg O C O2], forms a rock which often occurs in large masses It is a constitutent of sea water and many mineral springs. 6. Manganese [Mn], a very heavy metal, eight times the weight of water, and next to iron the most widely diffused of all metals upon the earth. 7. Silicon [Si] is found always in combination with oxygen, and with it constitutes a large portion of the crust of the earth. 8. Iodine [I] a solid elementary substance, existing in sea-water and all marine plants and animals. 9. Fluorine [Fa] a gaseous element. 10. Chlorine [Cl] occurs extensively in the mineral kingdom, as culinary salt [Na Cl] or chloride of sodium. 11. Sulphur [S]. 12. Phosphorus [P], small portions of which exist in combination with other elements in the watery vapor of the clouds. 13. Arsenic [As], Copper [Cu], and a few other elements occasionally occur or are said to occur in vegetable substances. All plants contain both classes of these substances, and although their relative proportions vary considerably, yet the four organic elements invariably form the chief part of the plant.

IV. AGRICULTURE, AN IMPORTANT AND BEAUTIFUL SCIENCE.

The usefulness, the absolute necessity of cultivating the ground, all may understand, and, under the pressure of want, myriads, yea, whole nations, have sometimes felt. For it is agriculture that produces, and holds forth in its hands to the world, from year to year, its daily bread. But it is science alone which sees what a beautiful work it is which results in such utility to the world—which supplies its necessity. The scientific farmer knows that he is a coworker with that mighty Providence which encompasses all—a coadjutor of the known and unknown laws and forces of nature, which produce and sustain all living things. His farm is an enchanted circle, and at his evocation forms of plant-life appear whose symmetry no sculptor can equal, whose tints no painter can copy—plants which fill the eye with beauty, which give forth a tide of perfume to regale the senses, shake their branches with delicious fruits, and pour into the garners of the husbandman a harvest which gladdens him and satisfies the world with food. Nature, for myriads of ages, has been crumbling down its rocks in rich debris to supply a soil; Nature also supplies a due proportion of moisture, of heat and light. She, too, supplies the natural chemistry (for Nature is a very ancient professor of that science), the electricity, the magnetism, the vital forces, requisite for vegetation. So far Nature supplies all the materials and agencies required, and at this point the work of a scientific husbandman begins. He arranges the necessary conditions for the growth of the plants which he intends to produce, sees that the soil is sufficiently pulverized and loose, dry and warm; that it is fertilized by being supplied with the elements necessary to the growth of the required plants, and that the seed is sound and inserted at the proper time. This is apparently a short and simple process; but in doing this and doing it rightly, the agriculturist proves himself the best of human architects, not building here a palace and there a temple, or yonder a pyramid—here a Doric column or there a Corinthian pillar, but constructing from the ground over his whole farm, myriad forms of life and beauty for admiration or use, for the happiness of man, and to the honor of the Great Builder of all things.

V. A DUE PROPORTION OF ELEMENTARY SUBSTANCES IS NECESSARY FOR THE PRODUCTION OF ANY GIVEN PLANTS.

It has been remarked before that all living bodies, however various in their structures or in their fruits, were composed of about nineteen elements, and that probably every one of these entered into the formation of each plant; it has been certainly ascertained that thirteen are essential constituents of plants. In order, therefore, that a plant may grow, it must receive by absorption from the air, or by capillary action from the soil, a portion of each element; and to be a perfect production a due proportion of each required element must be supplied to the plant. A soil composed of atoms of one element only, would be a waste. A seed planted, for instance, on pure carbon, on pure magnesium, or in a pure oxygen, could not germinate. Atoms of the same element may unite in crystalized forms, but they cannot unite in the form of living things. Yet a large proportion of carbon is necessary to every plant. It constitutes forty-six per cent. of wheat dried in a vacuum; forty-six per cent. of rye; fifty per cent. of oats; about thirty six per cent. of peas, and upwards of thirty eight per cent. of beans. It also constitutes 12 per cent. of potatoes, upwards of 3 per cent. of turnips, and on an average about 50 per cent. of the dry substances of all plants. Similar remarks may be made in reference to the other organic constituents of plants—constituents supplied to the plant while growing chiefly from the atmosphere, and the vapor it contains.

2. In regard to that portion of plants derived from mineral substances, the necessity of a due proportion of each element in vegetation has been ascertained in various ways. It has already been stated that plants contain about thirteen inorganic elements existing, as a general thing, in less or greater proportion, in all the products of vegetation.

I have copied a table (B) to show the amount of each of these substances, in wheat, oats, barley, rye, Indian corn and some forty other plants, and to show how necessary it is that the soil on every farm should contain in it, in fair proportion and mixture, these essential elements of all vegetation. The names of these mineral substances were before mentioned; among them are Potassium, Sodium, Chloride, Calcium, Magnesium, Iron, Phosphorus, Sulphur, and Silicon. If one or more of these elements are wanting, the soil is imperfect, and the plant defective. This imperfection in a soil, can only be overcome by the application of the right manures. Horsmer demonstrated that these substances were derived to the plant from the soil, and that if any of them were absent an imperfect vegetation resulted. He prepared nine different soils, in each of which one of these inorganic substances was omitted. In the soils thus prepared, he planted oats, and found that in the absence of Silica (SiO^3) the grain vegetated, but remained small in color, and incapable of supporting itself; without Lime (CaO) it died on producing its second leaf; without Potassa (KO) and Soda (NaO), it grew only to the height of three inches; without Magnesia (MgO) it was weak and incapable of supporting itself; without Phosphoric Acid (PO_3) it was weak, but could merely sustain itself; and without Sulphuric Acid ($HOSO_3$) the grain was weak and incapable of producing fruit. It is evident, therefore, that the growing of plants successfully and in perfection, depends upon the presence in a just proportion of all the inorganic elements. The chemists, Weigman and Polstorm tested this in another way. They prepared an artificial soil containing all these substances, imitating as far as possible a natural fertile soil. Into this soil they planted barley, which grew luxuriantly, ripened perfectly, and yielded a produce of two hundred fold.

NOTE B.—TABLE showing the amount of Mineral Matter of different Plants, in 100 parts.

NAMES OF PLANTS.	Potash.	Soda.	Chloride of Potassium.	Chloride of Sodium.	Lime.	Magnesia.	Oxide of Iron.	Phosphoric Acid.	Sulphuric Acid.	Carbonic Acid.	Silica.	Oxide of Manganese.	Alumina.
Wheat, grain	30.02	3.82	.....	.....	1.15	13.39	0.91	46.79	.....	.....	3.89	.....	.....
" straw	17.98	2.47	.....	.....	7.42	1.94	0.45	2.75	3.09	.....	63.89	.....	.....
" chaff	9.14	1.79	.....	.....	1.88	1.27	0.37	4.31	.....	.....	81.22	.....	.....
Barley, grain	21.14	.....	5.65	1.01	1.65	7.26	2.13	28.53	1.91	.....	30.68	.....	.....
" straw	11.22	.....	.....	2.14	5.79	2.70	1.36	7.20	1.09	.....	68.50	.....	.....
Oats, grain	20.63	.....	1.03	.....	10.28	7.82	3.85	50.44	.....	.....	4.40	0.42	.....
" straw	19.46	1.93	2.71	4.27	7.01	3.79	1.49	5.07	3.35	1.36	49.56	.....	.....
" chaff	6.33	3.93	.....	0.24	1.95	0.38	1.58	1.04	9·61	.....	72.85	0.92	.....
Rye, grain	33.83	0.39	.....	.....	2.61	12.81	1.04	39.92	0.17	.....	9.22	.....	.....
" straw	17.20	.....	0.30	0.60	9.10	2.40	1.40	3.80	0.80	.....	64.50	.....	.....
Maize, grain	28.37	1.74	.....	0.09	10.57	13.60	0.47	53.69	0.00	.....	1.55	.....	.....
" stocks and leaves	35.26	.....	.....	2.29	10.53	5.52	2.28	8.09	5.16	2.87	27.98	.....	.....
Rice, grain	20.21	2.49	.....	.....	7.18	4.26	2.12	62.23	.....	.....	1.37	.....	.....
Peas, (grey,) seed	41.70	.....	3.82	1.24	4.78	5.78	0.18	36.50	4.47	0.82	0.68	.....	.....
" straw	21.30	4.42	.....	.....	37.17	7.17	1.07	4.65	8.68	12.48	3.23	.....	.....
Beans, (field,) grain	51.72	0.54	.....	.....	5.20	6.90	.....	28.72	3.05	3.42	0.42	.....	.....
" straw	32.85	2.77	.....	11.54	19.85	2.53	0.61	0.49	1.40	25.32	2.61	.....	.....
Tare, straw	32.82	.....	3.27	14.03	20.78	5.31	0.65	10.59	2.52	18.73	1.28	.....	.....
" straw	31.72	.....	7.41	4.55	15.71	1.66	.....	10.34	4.67	20.37	3.57	.....	.....
Flax, seed	34.17	1.69	.....	0.36	8.40	13.11	0.50	38.54	1.56	0.22	1.45	.....	.....
" straw	21.53	3.68	.....	9.21	21.20	4.20	5.58	7.53	3.39	15.75	7.92	.....	.....
Rape, seed	16.33	0.34	.....	0.96	8.30	8,80	1.79	31.90	5.38	5.44	19.98	.....	1.02
" straw	16.63	10.57	.....	2.53	21.51	2.92	1.30	4.68	3.90	23.04	11.80	.....	0.63
Spurry	26.12	1.14	.....	8.90	14.46	8.88	.....	10.20	1.79	27.38	1.14	.....	.....
Red Clover	25.60	.....	9.08	6.02	21.57	8.47	1.26	4.09	2.96	18.05	1.95	.....	.....
Cow Grass	22.78	.....	12.39	1.86	24.42	8.86	1.09	4.94	2.66	20.16	1.12	.....	.....
Yellow Clover	27.48	.....	11.72	8.16	17.26	8.39	1.40	.....	4.82	4,31	1.76	.....	.....
Alsike Clover	29.72	.....	6.29	1.05	26.83	4.01	0.71	5.64	3,25	20.74	1.73	.....	.....
Lucerne	27.56	.....	11.64	21.91	20.60	5.22	2.23	5.47	4.80	15.94	2.53	.....	.....
Authoxanthum Odoratum	52.03	.....	7.03	4.90	9.21	2.53	1.18	10.09	3.39	1.26	28.35	.....	.....
Alopecurus pratensis	37.03	.....	9.50	.....	3.90	1.28	0,47	6.25	2.16	0.65	38.75	.....	.....
Avena pubescens	31.21	.....	4.05	5.66	4.72	3.17	0.72	10.82	3.37	.....	36.28	.....	.....
Bromus erectus	20.33	.....	10.63	1.38	10.38	4.99	0.26	7.53	5.46	0.59	38.48	.....	.....
Bromus mollis	30.09	0.33	.....	3.11	6.64	2.60	0.28	2.43	4.01	2.07	38.24	.....	.....

Spurry	26.12	1.14	.....	6.90	21.57	8.47	1.26	4.09	2.96	18.05	1.95	.....	.....
Red Clover	25.60	.....	9.08	6.02	21.57	8.47	1.26	4.09	2.96	18.05	1.95	.....	.....
Cow Grass	22.78	.....	12.39	1.86	24.42	8.86	1.09	4.94	2.66	20.16	1.12	.....	.....
Yellow Clover	27.48	.....	11.72	8.16	17.26	8.39	1.40	.....	4.82	4.31	1.76	.....	.....
Alsike Clover	29.72	.....	6.29	1.05	26.83	4.01	0.71	5.64	3.25	20.74	1.73	.....	.....
Lucerne	24.56	.....	11.64	21.91	20.60	5.22	2.23	5.47	4.80	15.94	2.53	.....	.....

Authoxanthum Odoratum	52.03	.....	7.03	4.90	9.21	2.53	1.18	10.09	3.39	1.26	28.35	.....	.....
Alopecurus pratensis	37.03	.....	9.50	.....	3.90	1.28	0.47	6.25	2.16	0.65	38.75	.....	.....
Avena pubescens	31.21	.....	4.05	5.66	4.72	3.17	0.72	10.82	3.37	.....	36.28	.....	.....
Bromus erectus	20.33	.....	10.63	1.38	10.38	4.99	0.26	7.53	5.46	0.59	38.48	.....	.....
Bromus mollis	30.09	0.33	.....	3.11	6.64	2.60	0.28	9.62	4.91	9.07	33.34	.....	.....
Cynosurus cristatus	24.99	.....	11.60	.....	10.16	2.43	0.18	7.24	3.20	.....	40.11	.....	.....
Dactylis glomerata	29.52	.....	17.86	3.09	5.82	2.22	0.59	8.60	3.52	2.09	26.65	.....	.....
Festuca duruscula	31.84	.....	8.17	0.62	10.31	2.83	0.78	12.07	3.45	1.38	28.53	.....	.....
Holcus lanatus	34.83	.....	3.91	6.66	8.31	3.41	0.31	8.02	4.41	1.82	28.31	.....	.....
Lolium perenne	24.67	.....	13.80	7.25	9.64	2.85	0.21	8.73	5.20	0.49	27.13	.....	.....
Annual ryegrass	28.99	0.87	.....	5.11	6.82	2.59	0.28	10.02	3.45	.....	41.79	.....	.....
Poa annua	41.86	.....	0.47	3.35	11.69	2.44	1.57	9.11	10.18	3.29	16.03	.....	.....
Poa pratensis	31.17	.....	11.25	1.31	5.63	2.71	0.28	10.02	4.26	0.40	32.93	.....	.....
Poa trivialis	29.40	.....	6.90	.....	8.80	3.22	0.29	9.13	4.47	0.29	37.50	.....	.....
Phleum pratense	31.09	.....	0.70	3.24	14.94	5.30	0.27	11.29	4.86	4.02	31.09	.....	.....
Plantage lanceolata	33.26	.....	4.53	8.80	19.01	3.51	0.90	7.08	6.11	14.40	2.37	.....	.....
Poterium Sanguisorba	30.26	.....	3.27	1.35	24.82	4.31	0.86	7.81	4.84	21.72	0.83	.....	.....
Achillea Millefolia	30.37	.....	20.49	3.63	13.40	3.01	0.21	7.13	2.44	9.36	9.92	.....	.....
Potato, tuber	43.18	0.09	.....	7.92	1.80	3.17	0.44	8.61	15.24	18.29	1.94	.....	.....
" stem	39.53	3.95	.....	20.43	14.85	4.10	1.34	6.68	6.56	.....	2.56	.....	.....
" leaves	17.27	.....	4.95	11.37	27.69	7.78	4.50	13.60	6.37	.....	6.47	.....	.....
Jerusalem Artichoke	55.89	.....	4.88	.....	3.34	1.30	0.45	16.99	3.77	11.80	1.52	.....	.....
" stem	38.40	0.69	.....	4.68	20.31	1.91	0.88	2.97	3.23	25.40	1.51	.....	.....
" leaves	6.81	3.72	.....	1.82	40.15	1.95	1.14	6.61	2.21	24.31	17.25	.....	.....
Turnip, seed	21.91	1.23	.....	.....	17.40	8.74	1.95	40.17	7.10	0.82	0.67	.....	.....
" bulb	23.70	14.75	.....	7.05	11.82	3.28	0.47	9.31	16.13	10.74	2.69	.....	.....
" leaves	11.56	12.43	.....	12.41	28.49	2.62	3.02	4.85	10.36	6.18	8.04	.....	.....
Mangold Wurzel, root	21.68	3.13	.....	49.51	1.90	1.79	0.52	1.65	3.14	15.23	1.40	.....	.....
" " leaves	8.34	12.21	.....	37.66	8.72	9.84	1.46	5.89	6.54	6.92	2.35	.....	.....
Carrot, root	42.73	12.11	.....	.....	5.64	2.29	0.51	12.31	4.26	18.00	1.11	.....	.....
" leaves	17.10	4.85	.....	3.62	24.05	0.89	3.43	6.21	5.08	23.15	11.61	.....	.....
Kohl-rabi, bulb	36.27	2.84	.....	11.90	10.20	2.36	0.38	13.45	11.43	10.24	0.83	.....	.....
" " leaves	9.31	.....	5.99	6.66	30.31	3.62	5.50	9.43	10.63	8.97	9.57	.....	.....
Cow Cabbage, head	40.86	2.43	.....	.....	15.01	2.39	0.77	12.53	7.27	16.68	1.66	.....	.....
" " leaves	40.93	4.05	.....	2.08	10.61	3.85	0.41	19.57	11.11	6.33	1.04	.....	.....
Poppy, seed	9.10	.....	7.15	1.94	35.36	9.49	0.41	31.38	1.92	.....	3.24	.....	.....
" leaves	36.37	.....	2.50	2.51	30.24	6.47	2.14	3.28	5.09	.....	11.40	.....	.....
Mustard, seed (white)	25.78	0.33	.....	.....	19.10	5.90	0.39	44.97	2.19	.....	1.31	.....	.....
Radish, root	21.16	.....	1.29	7.67	8.78	3.53	1.19	41.69	7.71	.....	8.17	.....	.....

In the absence of one or more of these elementary substances, or if they exist in great deficiency, the farmer will labor in vain for a maximum or even a medium crop. Such defective soils sometimes exist in nature; downs, along sea coasts; the heath and moor lands generally, and deserts every where, are of this description; having, among other defects, a total absence of several of those constituents which are essential to the growth of plants.

VI. The knowledge which an agriculturist should possess need not extend very far; but it should at least comprise a thorough knowledge of those elements which unite to form plants and animals; a knowledge of their combination in the soil, in the trees, in all plants which he wishes to grow. This knowledge, which could easily be given in the common schools, would be of the first importance in the selection of a soil.

The forest would speak and tell him the nature of the soil. The elements in the tree existed first in the ground. 'Ex nihilo nihil fit'; and the soil, consequently, could give to the tree or plant only what it possessed in itself. The vegetable mould, or humus, or even the subsoil, or a knowledge of the rocks of which it is the debris, is sufficient, their elements being known, to show whether the soil is adapted to agriculture or not. For this knowledge we are indebted to chemistry. Without it the farmer must labor continually in the dark; but with this knowledge he labors with a certainty that his toil will be rewarded.

VII. In an equal degree is this knowledge requisite, if you consider the object of cultivating the ground. About two hundred years ago, an old writer upon agriculture affirmed that the chief object of cultivation was to supply food to plants—a remark not fully appreciated till after Liebig published his great work on Agricultural Chemistry. It is now well understood that the plant must be fed, and that every plant is fastidious, and will only receive its own particular and proper kinds of food. The diet of plants is as necessary to be attended to for their health and maturity as the diet of a child for its health and growth.

Plants must be supplied with food, or else they will never become food in their turn for animals and men. The object of cultivating the ground, of draining, ploughing, digging, harrowing, the whole process of agriculture as an art, is to supply food to the plants. Mr. Elliotson, a writer on Human Physiology, makes the singular remark that "the negroes of Guinea, the Javanese, the New Caledonians, and many South American tribes, eat clay as a luxury." If this were the case in civilized countries, if their inhabitants could even eat clay as a necessary, it would save a large amount of labor and study.

But what we cannot do our plants can do—they can 'eat clay as a luxury'—and in addition, Silicon, Sodium, Carbon, and all the elements necessary to their growth and maturity. It is the food they need.

The primary object in cultivating the ground, is to give nutritious food to the plant's growth. Their food must be of two kinds, organic and inorganic, and is derived from two sources, the atmosphere and the earth.

1. The Organic constituents of plant-food are derived from the atmosphere, and supplied by nature without human aid. A plant needs Carbon as food, and in the air it is estimated there are not less than 3,300,000,000,000 tons of carbonic acid, (CO^2) ready prepared for its consumption.

The plant requires Oxygen, and cannot live without it. More than one-fifth (21-100) of the whole atmosphere is composed of this element.

In the same way if the plant needs hydrogen or nitrogen, nature has forestalled its wants, and bears to it its organic food upon the bosom of the air to

be absorbed by its leaves, or to settle down into the soil, and thence in companionship with other elements, to be forced up by capillary attraction to its assigned place and purpose in the living structure.

2. The inorganic constituents of plant-food are derived from the earth. Here also nature has given a bountiful supply. But not always in the place where they are needed, or in the required proportion, or in the condition necessary to be consumed by the plants cultivated.

The cultivation of the soil aims only to supply these defects of nature, in the dietetics of plants, which are somewhat epicurean in their taste, and will not consume anything that is presented, but only such elements as suit them; nor even these, until by the culinary chemistry of nature they have entered into the necessary combinations to fit them to be taken up and assimilated by the organs of the plant. The essential inorganic elements are about thirteen—Potassium, Sodium, Calcium, Magnesium, Iron, Silicon, Phosphorus, Sulphur, Chlorine, and two or three others. These constitute, not however in their elementary state, but as variously compounded acids, the inorganic food of all plants. These elements all exist in a fertile soil, and the object of cultivation or tillage is to prepare them to be consumed in vegetation. For this end the soil is ploughed and broken fine; is exposed to the action of rains; is made loose and porous, that the air and water may find their way down into it; it is pulverized by frosts; is affected by the light and heat of the sun; by electricity, and all the natural forces, until the elements have united in such combinations, as will satisfy the very scrupulous appetite of the plant, when they are at once consumed and appropriated to whatever purpose may be required. In this work of providing food for the plants, which in their turn are to provide food for him, man is a very humble imitator of nature. All the elements of plant-diet are contained in the rocky crust of the globe, and nature for many thousands of years has been busy in battering them down with all her forces. The process of disintegration has been universally in operation. Nature, with all her elements, has warred incessantly with the obdurate rocks, which held in their firm iron grasp, the essential constituents, for the nutrition and growth of plant and animals. For, strange as it may appear, the elements which the Chemist finds in the animal, are found in the plants which constitute its food; are found in the soil which supplies food to the plant, and are found in the rocks which supply this food to the soil. Long ere there was a green leaf upon the globe, the armies of nature were at war with these tyrants, the rocks; she swept them with her hurricanes, deluged them with her rains, and beat them with her storms. She scorched them with her heat, splintered them by her frosts; she battered them with her lightnings from heaven, and flooded them with her seas from below. She has upheaved and broken them by her Vulcans, the volcanoes, and shaken and crushed them by her giants, the earthquakes. She has abraded them by friction, scooped and gorged them by her torrents; has ploughed and grooved them by her glaciers, and shivered them by her hydraulics; and finally she has dissolved them by her chemistry, and scattered them over the face of the earth by her waters, until at length a soil has been produced, which, in its turn, covers the earth with verdure, bloom and fruit, and crowns the intelligence and labor of the husbandman with joy.

VIII. MANURES.

On the subject of enriching soils by fertilizing manures, scientific knowledge is becoming every day of more and more importance.

An ignorant man does not understand what constitutes the defect in the soil. He may find by experience, after the loss of much labor and means, that his

land will not grow, for instance, wheat; but he does not know why, and he cannot know how to remedy the evil. How to fertilise that soil is a mystery.

He is much in the position of some empiric who should undertake to cure a disease which he did not understand by using a medicine which he did not understand.

Barrenness or sterility of land is caused by the absence of some of the constituents of vegetable life; or by their presence in so small proportions as to be incapable of producing grain or other vegetables required. Some lands are in this condition by nature, deficient in some of the elements of vegetable food; and others are rendered sterile by exhaustion, that is by the persistent cultivation of one kind of plant, until the soil fails in the due supply of some of the necessary constituents of that plant. When a soil is thus defective, either naturally or by its exhaustion, it should be the subject of profound study to the agriculturist, until he understands the cause and the remedy of the evil. This evil may be overcome in some cases—

1. By an adaptation of the plants to the soil. When the ground abounds in the phosphates and silicates, Wheat, Rye, Oats, Peas and Beans may be grown; but if the soil is barren of phosphates, the seed or grain will be imperfect; if the soil is barren in silica, the straw will be defective; if barren in both, these crops cannot be cultivated. Nevertheless, though a soil be deficient in these elements, it may possess those which fit it to produce other plants. This explains why it is that a soil incompetent to produce Wheat or Rye, will nevertheless grow pea straw and clover luxuriantly. For the same reason a soil which will not grow the above mentioned grains, may be turned to good account in the cultivation of Maize, Turnips, Beetroot, Potatoes, and all other vegetables of a like character. It follows that a farmer ought to be as well acquainted with the different soils on his farm as the architects with the materials of the house he is erecting. And by simply adapting the plant to the soil he may produce all the desires, and he has always this advantage, that by working the ground deficient in phosphates and silica, and by exposing it to the action of the natural agencies, he is gradually enriching it, and fitting it for the production of cereal grains.

2. When, however, this adaptation of the plant to the soil, does not remedy the evil of sterility, there is left the alternative of fertilizing the soil by the use of manures.

1. These manures are applied to good soils to prevent exhaustion by continued cultivation, because each crop removes a large amount of the natural food of plants from the ground. An average crop of wheat removes about 250 lbs of mineral matter and nitrogen from an acre. [See the table in note A, next page.] Such a process would soon reduce to sterility the best soil in the world. To prevent this agriculturists have resorted to fallowing of lands, to frequent ploughing, and subsoil ploughing, and particularly the rotation of crops, all of which have answered excellent purposes, and have been followed with admirable results. But they have not rendered the application of manures unnecessary; on the contrary, notwithstanding their admirable results, they have served to demonstrate that where the ground is well fallowed, and a rotation of crops regularly made, fertilizing agents are absolutely necessary to preserve the soil from slow but certain exhaustion, and to restore to the soil again the inorganic matter from year to year extracted from it by the successive cropping.

TABLE A.—TABLE SHOWING THE WEIGHT OF MINERAL SUBSTANCES AND NITROGEN REMOVED FROM AN ACRE OF GROUND BY VARIOUS CROPS:

PLANTS.	Silica.	Patassa.	Soda.	Lime.	Magnesia.	Chloride of Potassium.	Chloride of Sodium.	Chlorine.	Phosphoric Acid.	Sulphuric Acid.	Nitrogen.	Weight of Grain and Straw separately.	Total of both.
Wheat, Grain...	1.2	10.5	1.0	1.2	4.1	...	...	...	15.3	0.1	38.0	71.4	235.8
" Straw..	96.8	27.2	3.7	11.1	3.0	...	...	...	4.0	4.6	16.0	164.4	
Barley, Grain...	17.5	11.7	0.8	1.0	4.1	2.3	0.5	...	16.0	1.0	36.0	90.9	165.5
" Straw...	129.7	6.0	1.6	18.4	2.7	...	...	...	5.4	4.0	8.0	164.8	
Beans, Grain ...	00.4	23.1	0.4	4.8	3.7	0.2	1.0	...	17.9	2.5	80.0	62.0	212.6
" Straw...	5.9	32.1	7.0	32.1	7.4	1.3	13.8	...	11.1	4.9	35.0	150.6	
Pease, Grain....	0.6	19.3	0.4	2.9	3.1	0.6	0.4	...	16.8	2.7	75.0	121.8	330.7
" Straw ...	9.7	30.7	4.5	67.5	11.8	...	6.4	...	8.1	10.2	60.0	208.9	
Turnip, Bulb....	4.0	112.0	26.0	32.0	8.0	...	26.0	...	32.0	40.0	76.0	256.0	494.0
" Tops....	0.0	50.0	1.0	70.0	2.0	11.0	14.0	...	11.0	29.0	50.0	238.8	
Potato Tuber...	2.0	87.0	7.0	2.0	7.0	...	...	9.0	18,0	29.0	81.0	242.0	424.0
" Tops.....	60.0	4.0	2.0	58.0	9.0	...	...	4.0	12.0	9.0	24.0	182.0	
Meadow Hay....	68.0	48.0	5.0	39.0	16.0	...	...	6.0	12.0	6.0	57.0	257.0	257.0
Rye Grass.....	147.0	31.0	10.0	25.0	6.0	...	6.0	...	16.0	7.0	68.0	316.0	
Flax, Straw.....	90.7	14.1	14.1	17.8	11.4	...	...	3.3	15.4	4.0	16.0	186.8	270.0
" Seed	0.6	13.4	0.6	3.4	5.2	...	0.1	...	15.2	0.7	44.0	83.2	
Oats, Grain.....	23.0	8.0	1.2	3.8	3.8	2.6	...	...	17.2	3.3	6.00	122.9	287.2
" Straw.....	83.5	18.7	20.0	11.1	7.2	...	3.8	...	3.0	3.0	14.0	164.3	
Red Clover.....	10.0	44.0	5.0	103.0	32.0	9.0	7.0	...	18.0	12.0	74.0	314.0	314.0

2. Fertilizing agents are still more urgently necessary in lands which are naturally sterile. In such case the first point with the farmer is to restore these lands to a state fit for cultivation by the application of manures. In this process he requires to know what are the best manures and the best way to use them; and, thanks to science, he is now not left in darkness on either of these important points.

(I.) As to the first, the most valuable agents in the fertilization of soils, there is no difficulty. Manures vary immensely in quality, and it is most desirable with manures, as with other articles, to get the one most valuable for the purpose needed. Chemists have determined upon a test for manures, and affirm that the value of any substance as a fertilizing agent is effectually ascertained from the amount of nitrogen it contains, irrespective of all other constituents. The importance of this discovery to agriculture is undeniable; it had led to the formation of tables in which the value of the various kinds of manure is expressed in figures, and how much of one manure is equal to a given amount of others. These tables may not as yet be perfectly correct, but they are a near approximation to the truth. In this way it has been ascertained that Peruvian Guano, dried muscular flesh, dried blood, sugar refiner's black, horn shavings, bones, feathers and woollen rags, are among the richest substances in fertilizing qualities, being from ten to fifty times more valuable than farm-yard manure.

I have here added a table of about forty different substances, [see table C.] together with their respective and comparative value as manures, from which it appears that decayed beet leaves are the most deficient, and woollen rags the richest, in fertilizing matter. On this point I shall merely add, that with far-

mers there is a great waste of manure on their premises; that decaying vegetable and animal substances, which, wisely garnered, are a store of food for plants and food in a state ready to be consumed by them, should be carefully husbanded; and that all solid and liquid substances about house or barn usually thrown to waste are among the more valuable auxiliaries to multiply the produce of the field.

NOTE C.—TABLE showing the per cent. of Nitrogen, and therefore the manurial value in 100 parts of different kinds of manures, and how much of one is equivalent to another.

MANURIAL SUBSTANCES.	Per cent. Nitr'gen.	Equivalents to	MANURIAL SUBSTANCES.	Per cent. Nitr'gen.	Equivalents to
Farm-yard Manure	0.41	100.0	Horse Dung	0.55	73.0
Dung from Inn yard.....	0.79	51.0	Horse's Urine.....	2.66	15.5
Wheat Straw	0.24	167.0	Poudrette of Belloni.....	3.85	10.3
Rye Straw	0.17	235.0	" Montfanion	1.56	25.5
Oat Straw	0.28	143.0	Pigeon's Dung	8.30	5.0
Pea Straw	1.79	22.0	Guano (Peruvian).....	13.95	3.0
Potato Tops	0.37	108.0	Silk-worm Litter	3.29	12.0
Withered Beet Leaves ...	0.05	80.0	Dried muscular Flesh....	13.04	3.0
Carrot Leaves.....	0.85	47.0	Dried Blood	12.18	3.2
Oak Leaves.....	1.18	43.0	Liquid Blood	2.95	13.3
Fucus degitatus.....	0.86	46.0	Bones (fresh).....	5.31	7.5
Salt Cod Fish.....	6.70	6.0	Sugar refiners' Black	13.75	2.9
White Lupin Seed.....	3.49	11.5	Animal Black	1.06	3.8
Malt Grains	4.51	9.0	Sugar Scum.....	0.54	75.0
Hemp-seed Cake.....	4.21	9.5	Feathers	15.24	2.5
Poppy Cake.....	5.36	7.5	Woollen Rags.....	17.95	2.0
Cider Apple Refuse	0.59	68.0	Horn Shavings.....	14.36	3.0
Cow Dung	0.42	125.0	Coal Soot	1.35	30.0
Cows' Urine	0.44	91.0	Wood Soot.....	1.15	35.0

(II). In no department of agriculture is scientific knowledge more needed than in the application of manures. How often are these priceless riches to the farmer indiscriminately applied, without knowledge of what the soil needs, or what the plant intended to be grown requires. The consequence is, that manure is often thrown away, not being needed, or not of the kind required by the soil. The general rule for the application of manure is to adapt it to the defects of the soil and the wants of the seed. It certainly will require some knowledge and experience, wisely to attend to this matter, but the agriculturist who hopes to heal the disease of the soil by a misapplication of manures, commits a blunder similar to the surgeon who should hope to cure a wound by applying his nostrum to a sound part of the body. An illustration of the importance of adapting the manure to the wants of the soil and the plant, occurred in the growing of turnips in the west of England. About fifty years ago bones were found to be beneficial to the ground. They were at first applied whole, then broken, afterwards ground, and finally dissolved in sulphuric acid, and they were found important, not only to increase the produce of the ground greatly, but in quickening the growth of the plant about fifteen days. Guano, of which probably from 500,000 to 1,000,000 tons are annually used in Great Britain, has been applied with similar effect. The bone manure was applied on account of the phosphates contained in it. A new source of this manure, of exhaustless extent, has been found in the geological formation in England

called the Crag, composed, in a great degree, of the fossil bones of extinct species of fish, shells and the remains of the gigantic sea-monsters of that period. It is considered that the discovery of these mines of manure is a matter of national importance, and that the prediction of the great German chemist is about to be realized, that 'in the remains of an extinct animal world, England is to find the means of increasing her wealth in agricultural produce, as she has already found the great support of her manufacturing industry in fossil fuel.

Properly speaking, there are no barren soils in Canada. Here and there indeed frequently the rocks obtrude themselves to prevent cultivation. In some instances the soils are defective, as is manifest from their producing, in some few places, but a single species of forest trees out of the seventy various kinds naturally growing in the country.

Leibeg states, that 'Every soil upon which a weed attains maturity, is fitted for culture, provided that weed yields, on incineration, alkaline ashes.'

Judged by this rule there are few soils in Canada incapable of cultivation, but none but what may be vastly improved by the proper application of manures.—Those who knew this country thirty years ago, and see it now, can bear witness to what an extent the wild beast and the savage have given way to the farmer, and how, by industry, he has made the wilderness to bud and blossom as the rose. But fruitful as its fields have been, wisely and perseveringly fertilized, they shall become as a garden, and bring forth an hundred-fold. In this respect also, the farmer has only to copy nature—the great fertilizer and agriculturist. Behold how she has stored up manures for use, how she has buried it in peat-bogs, how she has crystalized it in the coal formations; how she has laid it down in marls at the bottom of lakes; how she distributes it abroad in gases, in liquids, in solid forms; how it is poured out from the earth in her thousand of mineral springs; how the seas in their great breathings, expire it into the air, and the air spreads it out over the surface of the earth in rains; how she has laid it down in vast beds of gypsum (or plaster of Paris;) how the volcanoes betch it out from the centre of the earth in lavas; how she has taught the pisciferous birds to transmute the fishes of the sea into islands of guano; and the little coralline to elaborate it from old ocean and build it up in those submarine structures, the coral rocks; how her chemistry has locked it up in that exhaustless treasury of manure, the rocky coast of the globe; and, lastly, how all animals that breath and all plants that grow are rich in its elements, and, when they all decay, will render it back again to nature as she gave it, element for element, and atom for atom.

IX. Agricultural knowledge, whether you consider the nature of the soil or plant, the mode of preparing the one or cultivating the other, the instruments to be used, the kind of plants to be grown, of grass, of grain, of root, or fruit; is daily assuming more and more importance from the fact, that the ignorant agriculturist cannot compete with his enlightened neighbour. His scientific neighbor works with machinery, and does more work, does it better, and does it easier than he who will not learn, because he will not think and study. In the race to health and wealth, he is always behind, though he rises early, works hard, and retires late. And now when steam, which has long ploughed the surf and sea, is made to plough the turf and lea, to prepare the ground to sow, harvest, and carry the grain to market, the unscientific agriculturist must fall a long distance behind. I think here is an argument that will weigh with most men. The more knowledge which a man applies in the cultivation of his farm, the greater will be its produce, and the better it will pay.

X. There are considerations arising from the peculiar position of Canada

which renders scientific cultivation a matter of paramount importance. Canada offers many advantages to farmers—a rich soil, in some places rich almost beyond competition; ready markets; and by railroad, canal, river and lake, ready access to the best markets in the world. The produce of the fields are nearer the European markets by several days, than that of some of the neighboring states. And when the great line of transit to the Indies, as one day will be the case, shall pass from Quebec on British territory across the continent, then all the markets of the world will be at her very doors. In the meanwhile there are certain disadvantages to the agriculturist. In many places the surface is uneven, in others rocky, and everywhere covered with a dense forest. It takes a generation almost to clear a farm of trees, roots and stones. The farmer must make amends for this in the greater skill of his agriculture.

Canada has no prairie lands, and cannot have unless she at once stretch forth her arms and take to herself the boundless prairies of the Red river and Sackatchewan regions!—Another difficulty in the way of the Agriculturist of Canada, is the long winters; when France had lost Canada, she consoled herself by exclaiming, 'After all what signify a few acres of snow!' This exclamation, however, did not do justice to Canada, which then comprized a large portion of Western America. Nor was it just to Canada in its more limited dimensions now, as was evinced by the great attention which her department at the Universal Exhibition in Paris very generally attracted a few years ago.

The long winters, nevertheless, are a great disadvantage to the farmer; the winter consumes, in fact, the products of the summer. The climate, however, may moderate in a degree in the course of time, but man cannot materially alter the decrees of Providence. But it can be overcome by a more scientific applica- of the farmer's energies. He must cultivate such plants as most abound in the elements necessary to preserve animal life, he must use more machinery on his farm, and less animal power. Machinery only requires to be housed, not fed, in winter. He must use the winter in making every necessary preparation for the summer's toil; he must make the winter a season of comparative rest, and recruit himself in health and strength; and finally he must spend the winter in studying agriculture, in acquiring a knowledge of the soil of his farm, the best manures to improve it, the plants most adapted to it, the most useful instruments, the best kinds of stock, and all other information needed for his business. In that long period, when the season forbids him to cultivate the ground, he may, at least cultivate his mind. In this way the long winters may be turned to real advantage, and especialy so, as nature in the cold days stands in the farmer's place,—doing a work with her frosts for him in his fields which his ploughs, harrows, rollers, and other instruments, could never effect.

XI. SUGGESTIONS ON THE DIFFUSION OF AGRICULTURAL KNOWLEDGE IN CANADA.

A great improvement during the last few years has already taken place in this province. For this, the Agricultural Societies and Annual Exhibitions, deserve the chief credit. A Professor of Agriculture has been appointed in the Provincial University; a Minister of Agriculture has been created by the Provincial Government, and a Journal of Agriculture published. All these are very important movements, but are rather the beginning than the end, the foundation, than the completion. Are there, therefore, any further steps which might be taken? Could there not be a Professorship of Agriculture in each of the great Colleges —Knox's, Trinity, Victoria, Regiopolis, and the University of Queen's College? A large proportion of the students in these Colleges respectively are sons of Far-

mers, and many of them will apply themselves hereafter, in all probability, to the occupations of the farm. Could not Agriculture, as a science, be taught in the Provincial Normal School! Cannot the Journal of Agriculture be ten times more widely circulated, and cannot each municipality make an effort in this direction? Cannot Agricultural science be introduced and generally taught in all the common schools of the Province? Cannot each County establish an Agricultural school and farm of its own? Are there not some Townships rich enough, and willing to do this? And finally, cannot the Board of Agriculture, in concert with the authorities of the Normal School and Provincial Government, establish some regulation requiring that every School Teacher educated in that Institution hereafter shall be qualified to instruct the sons of the farmers in this fundamental branch of human Industry?

But if all these means or any of them, are unavailable, that others cannot instruct the farmer, cannot he instruct himself? Has he no means of increasing his knowledge in regard to his own business? The greatest puzzle to a farmer in the study of Agriculture, is probably the scientific terms used. Let him get a few standard works on Agricultural Chemistry, a dictionary of the terms of Art and Science, and in three months, by doing a little each day, when resting from his toil, he will be astonished at the amount of information gained.—The knowledge thus gained, he will communicate to his sons and neighbors, and thus the circle of knowledge will go on continually widening.

There is one other means which I am sure may be made available to promote among the community, Agricultural knowledge—namely, the Public libraries in the School Sections of Canada West. Since 1853 the Educational department has established in School Divisions 258 Libraries, and put in circulation, 160,000 volumes of useful reading. These libraries Lord Elgin designated as 'the crown and glory of the School system in Upper Canada.' Up to the end of 1857 nearly 8000 volumes on Agricultural chemistry, and Agriculture, had been distributed in these Libraries. During the same period 27,000 of Voyages and Travels had been put in circulation, and 42,000 volumes of Tales. Here is a point to which I wish to call the attention of farmers. Why not apply to the Educational Department for more works on Agriculture? Every School Section might have a valuable Library of books, accessible to every farmer, on the business in which he is every day engaged. The department would prefer supplying such valuable works, in preference to the issuing of so many volumes of light reading.

It is evidently the fault of the farmers themselves if their School Libraries do not abound in the very books which they need to instruct themselves and sons in the most approved culture. But furthermore these books are supplied by the Department for Libraries at a discount of 50 per cent. Farmers may, therefore, through the liberality of Government, and the admirable educational Library system, receive these indispensable volumes at half-price—twice the amount in books, which they transmit to the department in funds.

XII. In conclusion, and passing many important subjects which might be introduced to show the importance of Agriculture knowledge, there is one, which as a Christian Minister, I cannot pass—the importance of Scientific Agricultural knowledge, in an intellectual and moral point of view.

Agriculture in the light of science is an exhaustless fountain of Knowledge. Here, if any where in the world, at work amidst the works of the Great Creator, man may recognize His presence, and hold communion with Him. No other knowledge seems so completely calculated to promote enlightened and religious

sentiments, to give to the trees tongues of wisdom and voices of praise, and to make it manifest that there are sermons in stones, books in the running brooks, and good in everything. Or as another has expressed it to—

> Give to the human heart a heavenward feeling;
> The beauty and the grandeur which is found
> Wrapping in lustre this fair earth around,
> Creation's wondrous harmonies revealing,
> And to the soul, in truth's strong tones appealing—
> With all the magic of those secret powers,
> Which, mingling with the lovely band of light,
> The Sun in constant undulation showers;
> To mould the crystals or to shape the flowers;
> Or give to matter the immortal might
> Of an embracing soil—Should from this sod,
> Exalt our aspirations up to God.'

MEETING OF THE BOARD OF AGRICULTURE.

TORONTO, February 23rd, 1860.

The Board met at noon, in the office, in accordance with notice given by authority of the President.

Present: Hon. Adam Fergusson, Messrs. E. W. Thomson, R. L. Denison, H. Ruttan, A. A. Burnham, John Wade, President of the Agricultural Association; Professor Buckland, Dr. Beatty, J. E. Pell.

Mr. E. W. Thomson, in the chair.

The minutes of last meeting were read and confirmed.

The Secretary read an official notice from the *Canada Gazette*, showing that Hon. Mr. Alexander, Messrs. Thomson, Ruttan and Denison, had been re-elected members of the Board.

Dr. Beatty and Mr. J. E. Pell, reported themselves as elected President and Vice-President respectively, of the Board of Arts and Manufactures of Upper Canada.

Moved by Mr. Burnham, seconded by Hon. Mr. Fergusson, that Mr. Thomson be President of this Board for the ensuing year.—Carried.

Moved by Mr. Ruttan, seconded by Mr. Buckland, that Hon. Mr. Fergusson be Vice-President of the Board for the ensuing year.—Carried.

The following communications and Reports were submitted:—

A communication from Mr. Hutton, Secretary of the Bureau of Agriculture, dated January 30th, 1860, relative to the appointment of a member of the Board of Agriculture, in consequence of Mr. Marks having tendered his resignation, and stating that, before an appointment could be made, the Minister of Agriculture must be informed of Mr. Marks' resignation having been accepted at a regular meeting of the Board.

A communication from Mr. Hutton, dated February 8th, 1860, in reference to the same subject, and showing that the four members of the Board who had retired by rotation had been re-elected.

A communication from Mr. Marks, dated February 20th, stating that the same cause stated in his letter of resignation would prevent him attending the present meeting of the Board, and offering certain suggestions for the future management of the Exhibitions of the Association. It was then—

Resolved,—That Mr. Marks' resignation of his seat as a member of this Board be accepted.

A communication was submitted from the Secretary of the Board of Arts and Manufactures of Lower Canada, stating that the sub-committee of that Board had resolved to endeavor, with the assistance of the Provincial Government, and the Agricultural Associations of the two sections of the Province, to hold a grand exhibition of the products of Canadian industry, during the coming summer, on the occasion of the inauguration of the Victoria Bridge, by a member of the Royal Family, and requesting to know if they might hope for the co-operation of the Board of Agriculture of Upper Canada in the undertaking.

A letter from D. B. Read, Esq., barrister, of Toronto, with a bill, amounting to £7 4s., for services in the case of Dunbar against the Corporation of the City of Toronto.

Ordered,—That Mr. Read's bill be paid when taxed.

A communication from Messrs. Perine, Brothers, of Conestoga, suggesting the propriety of designating the state of preparation in which samples of flax are

to compete in the Provincial Exhibition Prize List in future, more distinctly than has been the case heretofore.

A communication from Mr. James Keefer, of Strathroy, county of Middlesex, C. W., offering to raise a certain quantity of flax in 1860, and apply a part of the power of his steam saw mill to the purpose of manufacturing it into linen of different qualities, provided the Board would furnish the flax brake and heckle, upon certain conditions named.

A communication from Mr. P. De Grassi, of Toronto, pointing out the importance of flax culture and manufacture to the Province, and offering the use of his water power and saw mill on the River Don to be converted into a scutching mill, and of his flats on the river for the purposes of water retting, &c.

Moved by Hon. Mr. Fergusson, seconded by Mr. Ruttan, and—

Resolved,—That this Board has received with very great regret a letter from J. B. Marks, Esq., tendering his resignation as a member of this Board, in consequence of continued imperfect sight. In accepting Mr. Marks' resignation, this Board is desirous of expressing their deepest sympathy with him in this afflictive dispensation of Providence, and of bearing their willing and unanimous testimony to the value of his services as a member of this Board from its commencement.

A communication from Mr. Steers, of Toronto, offering the sum of fifty dollars for the tent and fixtures belonging to it, the property of the Association.

From Mr. Fleming, seedsman, on the same subject, offering the sum of one hundred dollars for the tent and fixtures.

A copy of correspondence was then submitted and read between the Hon. Adam Fergusson, Professor Buckland, and Mr. James McCall, Veterinary Professor, of Glasgow, Scotland, on the subject of the engagement of Mr. McCall by the Board of Agriculture, to come out to Toronto, and establish a shoeing forge, commence the practice and teaching of veterinary science in the Government House stables, placed by Government at the disposal of the Board for the purpose, give lectures, write articles for the Journal, &c., the correspondence embodying the details of the proposed agreement.

A communication from Mr. James Anderson, of Montreal, with a draft of petition from the Lower Canada Board of Agriculture to the Government, to grant a sum of public money, to a limited amount, under such regulations and restrictions as might be deemed expedient, to promote works of land drainage.

A report from the Treasurer and Secretary of the Board, of their visit to the Exhibition of the New York State Agricultural Society, at Albany, in the autumn of 1859, and suggesting certain changes in the mode of conducting the Exhibitions of the Agricultural Association of Upper Canada.

Moved by Dr. Beatty, seconded by Mr. Ruttan, that the report just read be received.—Carried.

Resolved,—That, in answer to Mr. Fleming's letter, the large tent with all its fixings be sold to him for the sum of one hundred dollars, with the understanding, however, that it can be obtained when required for the use of the Provincial Agricultural Associatlon, upon giving ten days' notice.

Resolved,—That, in reply to the communication of the sub-Committee of the Board of Arts and Manufactures of Lower Canada, this Board is of the opinion that, as the productions of Upper Canada are chiefly agricultural, and as the time spoken of as the probable time of the Prince of Wales' arrival, viz., the month of July, is peculiarly unpropitious for the display of such productions, this Board is reluctantly compelled to decline entering into the proposed arrangement.

A communication was submitted from Mr. Edwards, Secretary of the

Board of Arts and Manufactures of Upper Canada, with the Report of the sub-committee of that Board for the past year, embodying certain proposed amendments to the Act 20th Victoria, chapter 32, and also a proposal to take a part in the publication of the "*Agriculturist*," or Journal and Transactions of the Board of Agriculture, rendering it to a certain extent a joint publication of the two Boards.

The proposed amendments to the Act of Parliament were taken into consideration.

Resolved,—That the proposition of the Board of Arts and Manufactures, with respect to the *Agriculturist*, be acceded to, and that a committee of three members of this Board do meet a committee of the Board of Arts and Manufactures, to consult upon and arrange the details, and that the President, Treasurer and Professor Buckland, be such committee.

Ordered,—That the Secretary do telegraph to the Mayor of Hamilton, requesting him to communicate with this Board by twelve o'clock to-morrow, in respect to the exhibition of next autumn, personally if possible.

The Board then adjourned to 9 a. m. next day.

February 24th, 9 a. m.

The Board met.

The same members present as yesterday.

The President in the chair.

The Printing Committee submitted their report, stating that after full consideration, they had decided upon publishing the Journal and Transactions, from 1st January, 1860, semi-monthly, instead of monthly as heretofore, and showing the advantages that were expected to result from the change.

Resolved,—That the report just read be adopted.

A telegraphic message was received from the Mayor of Hamilton, in reply to that sent from the Secretary yesterday, stating that he could not attend the meeting of the Board; that favorable progress was making in the preparations for the Exhibition, and that all would be ready.

Resolved,—That a committee of this Board be appointed for the purpose of conferring with the Senate of the University, with power fully and finally to arrange for the transference to the University of the land now occupied by the Board, under University statute, for experimental purposes, and that the committee consist of the President, Professor Buckland and Mr. Denison.

Resolved,—That the Secretary of this Board do draw the attention of the Local Committee in Hamilton to the By-law of the Association, and to the 34th section of the Act 20 Vict. cap. 32, for the government of the Provincial Exhibition, wherein it is clearly laid down that the whole of the receipts for the year of the local societies must be paid in to the Treasurer of the Association, to entitle the members of the local societies to admission to the Exhibition, and that no expenditure of such funds for any local purpose will be recognized by this Board.

Resolved,—That on the Treasurer of any Local Society contributing the whole of the Government Grant for the year, in aid of the funds of the Provincial Association, and furnishing a list of all their members, at least two weeks before the holding of the Annual Show of this Association in each year,

accompanied with the amount of subscription, being not less than five shillings, of each member on the said list; then the Treasurer of this Association shall transmit to the said Treasurer of any such Local Society, as many tickets of membership of the Association as the said list contains names, and that no ticket or certificate issued by any local authority, be thereafter recognized by the Treasurer of this Association as entitling the bearer to a ticket of membership of the Provincial Association.

The proposed amendments to the Statute 20 Vict. cap. 32, were then taken into consideration, and the following were agreed to:—

Clause 7. The word "Agricultural," in the first line, to be erased, and the words "Provincial Exhibition," to be substituted therefor.

Clause 9. The word "Agricultural," in the first line, to be erased, and the words "Provincial Exhibition," inserted instead.

Clause 13. After the word "services," at the end of the clause, the words "and the Treasurer of the Association shall be *ex-officio* Treasurer of the Board of Agriculture," to be added.

Clause 31. The heading "Agricultural Associations," to be changed to "Provincial Exhibition Associations."

Clause 32. To read as follows:—

"The members of the Board of Agriculture, and of the Council of the Board of Arts and Manufactures, and the Presidents and Vice-Presidents of County Societies, and of all Horticultural Societies, and incorporated Mechanics' Institutes, (or any two members whom a County or Horticultural Society, or Mechanics' Institute, may appoint instead of its President and Vice-President,) shall be the Directors of such Provincial Exhibition Association, and it shall be lawful for the Provincial Exhibition Association to elect a Treasurer."

Clause 34. After the word "Vice-President," in the fifth line, the words "and three other members of the Council of said Board to be elected thereby annually," to be inserted. And at the third line from the end, after the words "such Council," the clause to read: "and the President of the Board of Agriculture, and the President of the Board of Arts and Manufactures, shall be *ex-officio* President and Vice-President of said Council, and the Secretary of the Board of Agriculture, together with the Secretary of the Board of Arts and Manufactures, shall be *ex-officio* joint Secretaries of the Association."

Clause 35. In the third line, the words "Board of Agriculture so constituted as such," to be erased, and after the word "Council," the words "of the Association," to be inserted.

Resolved,—That the President, Treasurer and Secretary, be a committee to confer with a similar committee, appointed by the Board of Arts and Manufactures, to review the amendments proposed in the Statute 20 Vict. cap. 32, so far as approved by this Board, with a view to prevent incompatibilities therein.

Resolved,—That a committee be appointed to see the resolution passed at the Annual Meeting, with respect to the receipts and expenditure of the Association, carried out as far as practicable, and that Professor Buckland and the Secretary be such committee.

Resolved,—That the President do take such steps, with regard to the preparations for the next Annual Exhibition, to be held at Hamilton, as he may think advisable.

Resolved,—That the draft of a petition to Government, contained in a com-

munication from Mr. Anderson, of Montreal, as to emanate from the Lower Canada Board of Agriculture, having been received and duly considered, this Board is not prepared to make a similar application, but, being fully convinced that the subject of Land Drainage is of the utmost importance to the country, hereby appoint a committee to take the subject into consideration and report thereon, and that the President, Professor Buckland and Mr. Denison, be such committee.

The proposal contained in the communication of Mr. Keefer, of Strathroy, read yesterday, was then considered, and referred to the Special Committee on Flax, with power to act in the matter.

Resolved,—That upon the application of any County Council, not exceeding six, to this Board, for the erection of flax machines within such County, this Board will advance, by way of loan, one-half the cost, provided such cost shall not exceed fifty pounds, the said applications to take precedence according to priority of date.

Resolved,—That as there have been several applications to this Board on the subject of Flax, they are all hereby referred to the Committee appointed last year on Flax Culture, to be disposed of as the Committee shall deem most conducive to the encouragement of the growth and manufacture of Flax in this Province.

The Board then adjourned.

ON THOROUGH LAND DRAINAGE, AND THE RESULTS OF ACTUAL OPERATIONS IN CANADA.

A Paper read by H. J. Boulton, Esq., of Humberford, Etobicoke, before the City of Toronto Electoral Division Agricultural Society, March 3rd, 1860.

How little are we aware of, or do we appreciate the intimate relationship and similarity which exist between the animal and vegetable world. This similarity is shown in an almost startling manner by the investigations of chemists, who in their researches have proved that one of the necessary constituents in the formation of all animal, as well as vegetable bodies, is sulphur, and that the sulphur compound dissolved in the juice of plants is identical with the Albumen contained in the serum of the blood and in the white of an egg; that the sulphur compound in the seeds of the cereals, possesses the same properties and composition as the fibrin of the blood, and that the nutritious constituent of peas and beans is actually of the same nature and composition as the casein of milk.

This identity then having been established in the actual constitution of these two kingdoms, let us pursue the comparison further into the conditions of life of their members. What are the consequences liable to animals of being fed on an impure and scanty diet, of breathing a vitiated atmosphere, of resting in a reeking loathsome lodging? Is it not a slow and stunted growth, the form shrivelled and prematurely aged, and its very poverty feeding its further misery by the propagation of noxious vermin over the surface of the body? Compare this state of things with an analogous one in the domain of vegetable life. A tree is planted in a poor and barren ground, soured with stagnant water, in a dank and heavy atmosphere. Its growth also, spindling and weakly, soon ceases; if it bears fruit, this is shrivelled, every branch and fibre will be found covered with parasitic insects, while the very flow of the sap is arrested by canker and decay. I have now adduced a case to which every eye can be witness, on account of the size of the example I have set forth, and lengthened period during which these results are produced from the conditions I have supposed. Continuing our examination down to the lower orders of vegetable existence, I think very slight consideration will lead us to the irresistible conviction, that the same effects are worked even more fatally when the plant lives but through a few short months, instead of years. A warm and dry lodging, with a free and moderately moistened atmosphere, are necessary appliances of the bodily comfort of animals; the same are indispensably requisite to vegetable healthfulness. It is not every one that seems awake to the fact, that his dumb animals stand in the same need, even comparatively, of the same treatment as himself, much less would it be generally supposed that the motionless, breathless herb could be amenable to evils or necessities in any way akin to those of either. The subject of this paper leads us at once to an element which, by the excess or sufficiency of its supply, affects to the last degree every form of life. I mean, of course, water, and it is to the command and control of this element that much of the labor of the husbandman has been directed, though the How and the Why have been generally too little understood and considered. As a soil impoverished by a super-abundant and stagnant moisture will produce a plague of mosses and parasitic insects upon the stalwart denizen of the forest or orchards, so the same causes produce the like effects in the many pests to which our grain crops are found liable to become the victims. Could our soils at some times be freed from too great humidity, at others furnished with sufficient moisture and

otherwise fed, strengthened and supplied by judicious cultivation, the plague of rust and mildew, and the ravages of the midge and other insects would have little power to affect them. In order successfully and effectually to accomplish the former of these operations, there has been invented, developed, and perfected the science, I may call it, of underdraining, which has been thoroughly and admittedly adopted and accepted in the old countries of England, Scotland, and Ireland, as the only sure basis of successful Agricultural Improvement. The use of this method of work has only been adopted generally during the last few years, though the idea itself is by no means new, and the wonder is, not that it was so long before being discovered, but that, having been discovered, so long a period has elapsed before being received into practical favor. It is even said that drain tiles have been found in old Roman excavations, but however this may be, we have handed down to us a treatise dedicated to the Protector Cromwell, fully expounding the principles which are now strictly followed in the treatment of lands affected with too much moisture. This was by Captain Walter Bligh, and he says:—"For thy drayning trench, it must be so deep that it go to the bottom of the cold spewing moyst water that feeds the flagg and the rush; for the wideness of it use thine own liberty, but be sure to make it so wide as thou mayst go to the bottom of it, which must be so low as any moysture lyeth, which moysture usually lyeth under the over and second swarth of earth in some gravel and sand, or else when some greater stones are mixed with clay, under which thou mayest go half a spades grass deep at least. Yea, suppose this corruption that feeds and nourishes the rush or flagg should lie a yard or four foot deep, to the bottom of it thou must goe." On the filling in of drains he speaks of using—"Good green faggots or pebbles or flint stones, and fill then into about fifteen inches high, and take thy turf and plant it aforesaid, the green sward downwards being cut very fit for the trench, so as it may joyne close as it is layd down, and then having covered it all over with earth and made it even as the other ground, *waite and expect a wonderful effect through the blessing of God.*" Bligh's suggestions do not seem to have been adopted. And although some instances of thorough draining have occured during a period of more than a century ago, yet no system was introduced till, in 1764, Joseph Elkington, a Warwickshire farmer, discovered a system of strata draining by deep trenches and boring, which, in some soils is most successful; and subsequently, Smith, of Deanston, introduced the system of shallow and frequent drains, when land was not affected so much by springs as by the stagnation of rain water. From these beginnings, the system has progressed to its present perfection of deep tile drainage, with cylindrical pipes, introduced under the auspices of Josiah Parkes, within the last twenty years. Although even this is not entirely new, as some lands are now to be seen which were drained deep with tiles 40 years ago, to which they owe their present excellent condition, the work having been carefully done, and still remaining effective.

The two systems introduced by Elkington and Smith have each of them their extreme advocates, as is the case with every other subject. This discrepancy of opinion with regard to them arises probably from want of varied experience. The man who deals solely with light and springy lands and subsoils, does not perceive that the treatment he successfully applied in his experience, would utterly fail and be useless in denser soils, and when the trouble did not arise from under-water. He on the other hand who found it necessary to use shallow and frequent drains, on account of the heavy and retentive nature of his soil, injured only by stagnant top water, would fail to appreciate the capability of water to permeate through any stratum to any greater distance than the few inches in depth and feet in width affected in his own experience.

Elkington's system was accidentally discovered by himself, while digging an

unusually deep trench, when he was very much plagued with water. He happened to force a crow-bar four feet through the bottom of the trench, with a view of ascertaining the nature of the subsoil, and on pulling it out, was surprised to find the water gush up from below. From this was derived his system of draining water-bearing sub-strata by tapping or boring, which in certain situations is the most economical plan for the escape of the water; but it has been found altogether inapplicable to land which consists to a great depth of absorbent earths, and in other cases very much of the practice of Elkington has been superseded by the later methods of deep draining. At present the general adoption of a rather uniform depth of four feet draining, which has been found in most cases advantageous, has originated an impression which should be removed, being perhaps a stumbling block in the minds of some against the favorable consideration of the subject, namely, that the advocates of Tile draining would drain all lands in the same manner and for the same purpose. We will speak first of the Lands. All lands certainly do not require draining. This is a matter which entirely depends upon the nature and shape of the different substrata.

Lands may be classified in two ways, sandy or clayey, and level or rolling, or sloping. I will first dispose of those which may not require any of this treatment.

Let us take a porous soil of moderate depth, composed in some cases of sand, in others of light loam or clay, of perhaps a rather stony nature, underlaid by a bed of gravel. If this gravel rests upon a bed, which follows the slope of the surface, or falls independently of the slope of the surface, so as to allow the water to run away through the gravel, such lands will require little or no attention in this respect. All that such soils require will be judicious tillage and manuring. As they are well open to the atmosphere, and easily tilled and entered by the roots of all plants, so their fertile qualities are more easily and entirely drawn out and exhausted from them than from heavier soils, and when this has once been done, a greater expense will be necessary to restore those qualities from sources foreign to the soil itself. It is the penetrable nature of these soils, so easily yielding up their fertilizing substances to plants growing upon them, that leads many to suppose that these substances are washed down by the rains deep into the soil out of reach of the roots, which are the mouths and feeders of vegetation. This is a mistake I think easily corrected by an examination of the water which escapes from the outfalls of underdrains, which will be found perfectly clear and pure even after very heavy rains when the volume of water discharged is very great, and in all such permeable and friable soils a very slight investigation proves that the roots of plants will penetrate an almost incredible distance, attracted, as it were, by the food necessary for their growth. This very tendency has occasionally caused great difficulty in draining. It is well known that there is no better or richer fertilizer than living spring water. This lies at the bottom of the principle of irrigation, and it has occurred where spring water has been led underground through common tiles, that the roots of crops planted in the field, through which this water has been conducted, have penetrated through the intervening soil, found their way into the fresh running water, spread through the pipes and effectually stopped them up. An instance of this has already occurred within my own experience. In the autumn of 1858 a three-inch horse shoe tile drain was laid down through a low springy piece of land. Being done during my absence, the man failed to follow my directions, and made the drain only about 20 inches deep. This, of course, partially dried the ground, and a constant stream of water was discharged from the mouth. Last autumn, a year after, I had the drain taken up, and laid down again four feet deep, when from the low gravelly subsoil I have drawn off a very

large flow of water. Within a few feet of this drain a willow tree is growing, and when the workmen got up the old drain to about thirty-five feet from the tree, they found the whole pipe filled with fibrous roots, which had grown all that distance down the running stream of water, and would no doubt eventually have choked the pipe. Unfortunately, I was not present when this obstruction was found, and in taking up the drain the man cut the mass into a number of short pieces, some of which I preserved, and have brought with me to exhibit, as the best exemplification of the difficulty I am speaking of. This will necessitate the destruction of the tree, as I have no doubt that the same will occur even at the depth of the present drain, as from the springy nature of the ground there will be a permanent flow of water.

The next class of land that I shall speak of is a sandy or other porous soil, underlaid by a gravelly or other permeable substratum. In many cases the course of the stratum below this again is greatly diversified with undulations and inequalities which embarrass or effectually debar the underflow, as it were, of the water, which is thus gathered and pent up in what may be termed subterraneous ponds, where are bred all the evils of stagnation almost as effectually as if the impediments existed on the surface. The evil in these cases may be successfully treated by the insertion of a very few branches, the duty of which will be simply to cut through the walls of retentive soil which impede the flow of waters already gathered in the permeable underlying stratum. There are many cases also, where the sandy or loamy soil lies very deep, but is fine and close in its nature, and holds a large quantity of water suspended in it by capillary attraction, similarly to the action of a sponge. A few branches in such soil will be most beneficial, especially when the ground is level and flat in its formation. In such soils as I have described, there is of course no necessity for drainage, when no water ever appears on the surface, or, on digging trial pits, say three or four feet deep, a few hours after heavy rain, no water is found standing in them. I hold however, the decided opinion, that wherever it is found necessary to have open furrows in ploughed or meadow land, to carry off rain or snow water, there underdraining is wanted. The escape of water by the surface is absolutely detrimental, and a waste of one of the most important sources drawn upon by nature for fertilizing and enriching the ground.

The two great cases, where perhaps it is patent to every mind that underdraining will be necessary, are: First, hilly and uneven lands, where strata of earth replete with moisture crop out to the surface, and discharge upon the lands beneath, slowly but constantly, their injurious springs, which we should hasten to tap before the water finds its way to the surface. Secondly, all low lying lands, from which, on account of the evenness in the formation of the ground, it is evident that it will be impossible for any water which exists in injurious quantities upon or beneath the surface to find a timely escape by any other means.

I have reserved for the last consideration a class of lands which are, perhaps, the most valuable description of all, and to which it is generally supposed that any treatment of this kind is the least applicable. I mean dry clay or other strong lands in every respect situated in the most advantageous manner. Fine, high, sloping, undulating lands, from which it is generally supposed to be the easy duty of good and judicious ploughing to lead off at once all the water which falls upon them. And I do not wonder that unthinking men should rebel against the idea of *draining* such lands, in which perhaps they have already sunk wells, thirty and forty feet deep, without meeting a drop of water, and beneath the surface of which they have found, to their cost, that the heaviest showers of rain can scarcely penetrate. This prejudice against, and distrust of the principles of draining, is produced and fed by what in this case is a misapplication of

terms, but may, I think, be counteracted and disarmed by a view of the subject which I have as yet never seen or heard advanced or explained. Although the mechanical means in all cases are the same, yet in this class of lands the first effect of the work is so entirely different as almost to induce the change of name, and instead of drainage it should assume the name of *ventilation*. The effect of this operation upon these soils is to bring the atmosphere into immediate contact with them, by which a process of disintegration will be brought about and the soil gradually opened, so as to admit the moisture, and, in our climate especially, the inestimable benefit of the low degree of temperature so common during our winters, and which in this respect is a most invaluable blessing. Frost is well known by experience to be the most effectual and rapid pulveriser, and the earth having once been opened and lightened by it, thus allowing rain and other moisture to be absorbed into it, if this moisture be carried off by artificial means beneath, instead of being drawn out by evaporation above, the atmosphere, with its accompanying beneficial influences, will necessarily follow down after it, thereby maintaining and increasing in the soil that free and open condition previously commenced. I have before alluded to the loss sustained by allowing the water which falls upon the earth to escape by the surface instead of finding its way beneath. The loss is double—first the positive removal from the cultivated bed of soil of the many fertilizing substances existing in it, by solution with the water thus permitted to escape, thus in fact absolutely robbing the land when it should be subservient to its increased fertility. A negative loss is the second, and is more thoroughly so in the case of those dry, hardened clay lands, than of those which are more penetrable by rain and air. This fact will be more clearly recognized when we consider whence is derived that most indispensable element of all vegetable structures, viz : nitrogen, which is furnished to the soil in the shape of ammonia, a combination of hydrogen and nitrogen. Ammonia again is supplied almost entirely from the atmosphere, into which it is ever escaping from the decomposition of previously existing substances, both vegetable and animal, and having an irresistible affinity for water, it is constantly conveyed to the surface of the earth, either in dew or rain, or snow. If then our lands are naturally incapable, and no means are used to enable them to admit these agents of supply, it will be easy to account for the absolute barrenness to which thousands of acres of such soils are now reduced. Even those ingredients which already exist in the soil, can only afford nutriment in a greater or less degree to plants in proportion as by the plentiful or limited circulation of water through them, they are enabled, when dissolved, to be assimilated as food by the delicate organization of their roots. In dense soils these important changes will necessarily take a longer time to develope themselves than in light ones. In the latter description, the benefits of drainage will be visible immediately, the water having already access to the earth beneath, and an outlet only is wanted for it to admit of an immediate circulation of air and moisture through the soil. While in the former the nature of soil has to be affected by the slowly operating action of the atmosphere before the water will begin to penetrate the obdurate mass, unless the drains be shallow and close together; and here arises the main difficulty in determining the plan upon which the drainage is to be carried out.

In some soils, as far as the efficiency of the drainage is concerned, they can hardly be too deep; and it becomes a matter of economy of labor whether they shall be deep and distant or shallow and frequent. Each foot that is added to the depth of a drain will almost double the previous expense of the whole. Cases will occur where the sinking of very few drains of six or perhaps more feet in depth will obviate the necessity of any further work; but, in general, four feet is found the best depth to which drains should be sunk, and then the nature

of the soil must guide our judgment as to how far they should be placed from each other, the distance varying from thirty to forty and sixty and even more feet apart. This space of four feet will give an ample range for the roots of plants, and, when once the stiffer soils become opened and rendered permeable to water and air, will contain a good supply of moisture, held in suspension in it, and at the same time water which may exist beneath will not be drawn up by capillary attraction too near the surface, and will yet be within reach for supply by the same means. There are few soils in Canada that would require a less depth than four feet, and with this depth a distance of thirty-three will I think be generally found sufficiently close. When the density of the soil required them to be placed closer together, I would diminish the depth, but the minimum should not be less than three feet. In England some people contend that no drains should, under any circumstances, be laid at a less depth than four feet, while others affirm that in some very heavy and retentive clays four feet drains are perfectly inoperative, and have been obliged to be replaced or assisted by three feet drains at less intervals. It would therefore seem advisable, when a soil of this extreme character is met with, to lay out the drains for a depth of three feet at a distance of twenty-two feet. This will give 120 rods per acre instead of eighty, under the former calculation of the smaller branch drains. But as under ordinary circumstances the expense of four feet drains will be 16 or 17 cents per rod, and that of the three feet drains not over 8 or 10 cents, the main difference will be the additional number of tiles, say 660, which, at $5 per thousand, and deducting the difference, which will be in favor of the three feet digging, will give an increased expense of, say $5 per acre. This expense, however, may be incurred with the confident expectation of a full remuneration. Such soils, by the opportunity afforded by the effects of this treatment of easy, deep cultivation, at all times will be found to contain within themselves almost inexhaustible sources of vegetable wealth. In some remarks by Mr. Johnston, of Geneva, N.Y., lately quoted in our Provincial papers, he expresses his opinion that it is useless to sink drains any lower than the bottom of the porous soil, and that in his own land, when he meets with a hard, impervious substratum, at a depth of about thirty inches, he does not attempt, nor would he recommend, any deeper drainage. Unless the soil above this stratum is itself also of an extremely dense and retentive nature, I think that Mr. Johnston's opinion and practice are unsound; for, if the upper thirty inches of soil is of at all a permeable nature, there would be no difficulty in the water reaching through the lower twelve or eighteen inches, making in all four feet, which would then form a large reservoir, for the collection of water which could not immediately escape by the drains, in case they were of less depth, and would at the same time afford greater range for the roots of crops planted on the surface. It should also be borne in mind that there are few soils, however tenacious, which are entirely uniform, and not continually intersected with numerous veins of sand, and other porous material. To persons who have not and will not take the trouble to examine for themselves, the accounts of the depth to which the roots of plants will penetrate seem absurd misstatemants. In a field drained by myself last spring (1859) to the depth of four feet, of a moderately stiff, though not extremely retentive clay, I followed the root of a carrot down thirty-four inches, and then failed to find the end, the size of the root where it broke off being still 1-16th of an inch in diameter. This, too, was in a soil which I believe has never been manured.

The next point, upon which there is a diversity of poinion, is the direction in sloping ground in which the small branch drains should be run. The majority of opinions, and with them I agree, are in favor of running them immediately up the slope, and not transversely to the fall. There certainly are situ-

ations where one or two transverse drains will be most beneficial to intercept the water when it issues below a rise of ground; but, in most lands thoroughly drained, those drains which are dug transversely only drain from the upper side, while those in the contrary direction will act on both sides, which will make the drainage more uniform and perfect. I will now proceed to give some explanations as to the mechanical performance and probable cost of the work. Clay lands, though more laborious to work, are the simplest and easiest to drain securely, on account of there being little danger of the pipes being filled by the soil running in; so that although the labor part may be more expensive in the first instance, yet it is more likely to be safely done and permanent; and the best season for doing the work is when the ground is wet, as not only it is then easier to dig, but the water with which the soil is charged serves as the most correct index of the fall being properly kept. When this simple guide is not present, a common bricklayer's level, about twelve feet long, will be the most available guage of the perfection of the work; and the whole amount of fall in the field having been first ascertained, a false bottom can be adjusted to the level, which will give the proper slope to each section of the entire drain. In all cases I would recommend the land to be well ploughed, leaving deep open furrows at regular intervals where the drain is to be laid. If this is done, and the furrow filled with long stable litter in the autumn, this work can be proceeded with as easily during the winter on clay lands as during any other season. The next step will be to remove the loose earth from the furrow, and take out the first spit with a common spade, opening the trench to the width of from twelve to fifteen inches at the top, and gradually contracting in its descent; the remainder of the trench can then be taken out at two draws, with what is called the grafting tool, a round-backed spade, the blade of which should be about seventeen inches long, and five wide at the point, being wider above; the handle should be straight and strong, and almost in a line with the blade. Many suppose that different-sized tools are necessary to contract gradually the trench, so as only to receive the tile at the bottom, but a skilful workman with the above tool will narrow down the opening to any size required. After the last draw is taken out, the crumbs are removed and the bottom levelled, and shaped exactly to receive the tile with a long narrow-bladed scoop, drawn towards the workman. The tile is then laid in either by a man down in the trench, standing on each last-placed tile with his face looking up the drain, or standing on the surface of the ground and reaching down the tiles with a long-handled hook, which is inserted into each pipe. This latter is the better plan, especially in wet weather. For sandy lands some modifications will sometimes be necessary. If there is a stratum of clay within any reasonable distance of the surface, and the depth of the outfall will admit, the drain should be sunk down to it, as the clay not only forms the best bed for the tile, but furnishes the best covering for it also. In this case, from the greater depth of the drains, they can be placed much farther apart. If, however, such a stratum is not at hand, I think the following is the only safe and at the same time economical way of proceeding:—The bottom of the drain should be formed so as to admit a strip of board about an inch wider than the tile, which is to be laid upon it. Clay should then be sought and carted in from other places, and the tile covered to the depth of three or four inches with it. There are few situations where clay is not to be found near at hand, and I think it the only reliable means of isolating the tile from the sand, which otherwise is sure to find its way through the joints of the tiles, unless we have recourse to the expensive plans adopted in England in difficult cases of this kind, which is to put tile collars on the joints of the pipes, and even sometimes entirely encase small pipes in others of larger size; and even this I do not think so safe a plan as the

board with the clay covering, and generally it will of course prove vastly more expensive. This method I found necessary to adopt after several failures in attempting to lay pipes through a wet, boggy piece of land, which is now perfectly dry and planted with winter wheat last spring, after it was drained, being the first time it ever was ploughed. In draining land of this description, the work should be kept close together, and the tiles laid well up to the workmen and covered in as quickly as the trench is dug, and no more of the trench opened than is to be finished at once, for, as soon as the ground is opened, the water begins to gather, the soil becomes weakened, and the sides will soon fall in, thereby producing a great increase of labor, trouble, and consequently expense.

As to the cost of the work, I am, I think, able to show conclusively that this work is within our reach, and perfectly applicable to our condition in an economic point of view. Within the last twelve months I have laid over 40,000 tiles, averaging four feet deep, at a rate of expenditure for which the increased fertility of the soil will afford an immediate full return, although a large expense was incurred at first from want of that skill which practical experience only could give. The whole expense of laying these 40,000 tiles very nearly amounts to $500, and the men employed have many of them earned over the average amount of wages when they worked by the piece. Part of these were laid during the last two months; and though the men worked very short hours constantly, not over eight hours a day, they earned 66 cents on an average, at 16½ cents per rod, digging, filling and laying pipes. The actual cost of the above tiles was $8 per thousand for two-inch, $7 for one and-a-half inch, and $12 50 per thousand for three-inch, at the kiln. Two-inch pipes can now be had at $6 50 per thousand, one foot long, but if a larger demand was to spring up they could I think and no doubt would be furnished at $5 per thousand.

Most of this work having been done recently, I can give but a limited exposition of the benefits of tile draining from my own experience. The results of one field, however, are most satisfactory, as the following account will show. The field is the best on my farm, and consequently has been perpetually under crop since it was first cleared, but, from the ordinary rack-rent system of Canadian farming, has never received any manure from the same date. In 1857 a very poor crop of rusted, shrivelled winter wheat, about 13 bushels to the acre was the yield. In 1858 the land was reduced to an apparently excellent condition by ploughing and scarifying, and potatoes planted about the 8th or 10th of June; subsequent rains ran the soil together, and the heat of the sun baked it into a solid substance through which the potatoes could hardly force their sprouts; the crop was barely 50 bushels per acre. In April, 1859, 7¾ acres were underdrained four feet deep and 33 feet apart generally, there being 623 rods of drains; the labor cost $132, the tiles, as near as possible, $100, being in all $30 per acre, or $232; the preparation, sowing, tillage and harvesting of the crop cost $21 per acre. The whole expense of underdraining and cultivation of 7¾ acres was $408. The crop was—4½ acres mangel wurzel, 1,800 bushels; 3¼ acres carrots, 1,600 bushels; total, 3,400 bushels, at 10 cents—$340—leaving, at this low estimate of price, a deficiency of only $68, to pay for the permanent improvement and all the expenses of cultivation, from the first year's crop. The value of mangels in England is generally considered 50 per cent. more than turnips. This crop also was produced without any manure, (and from the defective method of sowing or other causes fully one-third of the seed missed,) but, as I wished to test the benefits of thorough draining, I think it has exhibited a very satisfactory result without. This field I shall sow with spring wheat this year, and I hope to be able to give an equally favorable report next harvest. It cannot

be said that the low cost of the labor done last spring and summer was owing to the small demand for labor, for all of my men earned above the average of wages during the whole time; one set of men earned 4s 11½d, wanting a fraction of $1 per day; another nearly 4s, and a third 3s 8d; others again, more unused to handling the necessary tools, earned still less, but this was owing to their own want of skill, which practice of course would soon have cured. The most advantageous manner in which the work can be done is for the men to work in gangs of two each, and when there are a number of gangs at work, for one man to be kept laying in the tiles, which he can easily do in favorable ground for twenty diggers; in ordinary good clay lands a handy workman will easily cut and fill five rods per day. All of these statements, which may be relied upon as strictly correct, conclusively prove that the system of thorough drainage, in point of immediate expense and ultimate profit, is as well adapted to Canada as to the old countries; and my own opinion is, that the effects will be more marked in the former than in the latter.

ORCHARD HOUSES, AND THEIR MANAGEMENT.

Read by Mr. John Gray, Lake View Nursery, Toronto, before the City of Toronto Electoral Division Agricultural and Horticultural Society, March 10th, 1860.

In a climate so variable as that of Canada, where the mercury ranges from 95° in the summer, down to 20° or 25° below zero in the winter, the peach, apricot, nectarine, and other fruits, natives of a more genial clime, cannot be cultivated to advantage, except by adopting some means of protecting the trees from the severity of our winters. Although they grow very well for one or two years after they are transplanted, and the cultivator is beginning to expect a return for his labor in the way of fine fruits, an early frost sets in and checks the growth in the midst of its luxuriance, and the young wood not being properly ripened, is killed by the winters' frosts.

All fruits grown in more favorable climates can be grown here in Orchard Houses; that is, houses covered with glass; and by adopting the pyramidal or bush system of training, a great many varieties of the choicest fruits can be grown to the greatest perfection in a very small space.

This system, introduced by Mr. Rivers, has been in successful operation in England for a number of years, and even now is generally adopted both in Ireland and Scotland.

Throughout the Northern States, we find that at the present time orchard houses are attracting considerable attention, and nurserymen are beginning to make it a part of their business to prepare dwarf trees specially for that purpose. In the last edition of the fruit catalogue of those enterprising Nurserymen, Ellwanger & Barry, of Rochester, N. Y., they say:—"The Orchard House is now becoming of so much importance, that in immense districts where the hardy fruits even are very uncertain, throughout a large portion of Central and Northern New York, the Eastern States, and Canada, gentlemen residing in cities and villages, having but small gardens, will add to the vinery, the orchard house; and to them it will be of vast importance, as being not only the source of a supply of fine fruits, but of rational, delightful occupation, both for mind and body, during leisure hours." They say also that the culture of the foreign grape under glass progresses steadily: "Gentlemen having small gardens in cities, find the grapery within their means, and a source of great pleasure, and no respectable suburban residence is considered complete without one. The erection of houses for this purpose has become a sort of specialty, and there are persons now in various parts of the country, who, by making a business of it, get them up cheaply and well. The management of the grape under glass has also become so well understood, that even amateurs without experience, or experienced assistants, are succeeding perfectly well. Pot culture of the grape is rapidly growing in favour. It enables a large number of varieties to be grown in a small house. The vines are easily managed, by being so completely within reach of the hands. Finally, nothing can be more beautiful. Last year we put into one of our propagating houses, after the spring propagation was over, some twenty or thirty plants in pots, and got from them an abundant crop of the most perfectly ripened grapes, with as little labour as an equal number of geraniums would have required."

Now as we have all had the opportunity of seeing the fine grapes shown at our Horticultural Exhibitions last year, the production of vineries in our own immediate neighbourhood, I think there need be no longer any doubt as to the prac-

ticability of growing the foreign grape in great perfection in cold vineries in Canada. Orchard houses have not been very long in operation here. About four years ago, the Honorable Judge Harrison commissioned me to prepare for him an assortment of dwarf fruit trees, consisting of pears, apricots, nectarines and peaches; these were planted in tubs twenty inches in diameter, by twenty inches in depth; they were trained as pyramids or bushes. The tubs were plunged in the soil in the orchard house, and I believe have produced satisfactory crops ever since. I have often had the pleasure of seeing those trees, and could not but admire their beautiful appearance when in blossom, and the fine specimens of fruit they produced. Nectarines grown in these tubs received the first prize at the fall exhibition here last year The Judge's trees are (at present) in fine health, and covered with blossom buds.

The situation most suitable for the orchard house, is one that is well protected from the north and west winds, and where the facilities for thoroughly draining the subsoil to at least four feet below the surface exist. If the soil is not naturally good, it should be made so, by thoroughly trenching it to the depth of at least two feet six inches, and by adding a good supply of fresh turfy loam, and well rotted stable-yard manure, all well mixed up together. There should be a good outlet for the drainage, and there should be also a good tank under the centre passage to hold the rain water that falls on the roof, and which should be conveyed into it by lead pipes from the eve-troughs in front. This is of great importance, as a house of this description will require a large supply of soft water throughout the growing season. There should be also a small tank for liquid manure, for in growing fruit trees in such a confined space, where they are not exposed to the influence of the outer atmosphere, they would soon exhaust themselves by their productiveness, if they were not regularly supplied with liquid manure during the growing season. But this supply must be withheld when the fruit begins to ripen, and the trees watered only with rain water.

The plan of the "Orchard House" I would recommend, where means are limited, would be to combine the vinery with it, in such a way that the vines could be planted in the borders on the outside, and the stems introduced under the front sills or board, and trained on a wire trellis nine inches or a foot from the glass. The vines to be planted five or six feet apart, and only a single vine kept to each plant, and pruned on the spur system, as it is called; that is, after the vine has attained the full length of the rafter, and is of sufficient strength to bear fruit, which it is generally on the third year after planting, and often earlier, it is allowed ever after to remain, and the fruit bearing shoots that annually spring out from the sides, are cut in to a single bud or eye at the pruning season. By this system the vines will not shade the trees inside too much. If the vines are close jointed, the eyes can be thinned out in the following manner, by which the vines produce larger branches of fruit than if they were allowed to break at every eye or bud: After your vine is cut to the desired length, commence at the top and leave the first bud; cut out the second and third, leaving the fourth; cut out the fifth and sixth, and leave the seventh; and continue so on to the lower part of the vine. The buds will then be regularly on opposite sides, and quite near enough to each other to produce good crops. I have practised this system for a great many years, and find it a much better plan than having to cut out the bunches, which I would have to do if I allowed all the buds to break. Vines may be also planted in pots or tubs in the inside.

I consider the best shape for the orchard house to be a span roof, with the ends facing north and south, and the borders for the vines facing east and west. With this aspect, the sun will at some time of the day shine on every part of the house, and the trees can be trained in a more regular shape than you could

have them in the ordinary lean-to roof, where the trees or plants grown in them generally become one-sided, if they are not very frequently turned to the light. Besides, it is more economical; for a span roofed house of fifty feet in length, and having vine borders on each side, is equal to one hundred feet in length of the lean-to roof, and will cost less. The width of the building should be, if you wish to have only two rows of trees, not less than twelve feet, and for four rows of trees, from twenty-two to twenty-four feet, which is better in any desired length. The sides should not be less than five feet high, the upper half of which should be made to open as ventilators, and if sashes, with glass, so much the better. The most convenient size for these ventilators, is from four to six panes of glass in width, by two in depth. The south end should be all glass to within one foot of the ground. The roof should be at an angle of from 34° to 40°, and the cheapest kind of roof and the one that has the best appearance is the stationary; that is, the bars for the glass are nailed on to the front and top plates; those bars can be had at any of our planing factories at about twelve and a-half cents each. The size of the bar should be one inch thick, by three inches in depth, and chamfered off at the under side. Every fifth or sixth bar should be of four by two inch stuff, for on this bar the weight of the grape trellis will hang, and this will be found of quite sufficient strength for the roof. There should be two strong pieces longetudinally, four feet apart, one by three inches, screwed on the bars to keep them steadily in their places. I would have a row of pillars of four by four stuff on each side of the centre passage, one opposite each of the four by two rafters, and the top of those pillars would support a rectangular frame the same width as the centre passage, and fifteen inches in height, on the cill of which the sash bars will rest. Along this frame on both sides, the top ventilators are arranged vertically; they may be arranged in length to correspond with the pillars. These ventilators should be made to open outwards, on a pivot or hinges, and can be all opened by one movement of an apparatus made for the purpose. This consists of an iron bar within eighteen inches of the length of the house, one inch broad, by half an inch in thickness. This is made to run in a groove on the cross ties, parallel to the lower part of the ventilators. This bar is connected by an iron rod of half an inch in diameter, placed obliquely to the centre of the ventilators. There is a pully at each end of the house, opposite the ends of the bar, over which a rope is passed and connected with the end of this bar; at one end of the house there may be a weight attached to the end of the rope; this will keep the ventilators firm in their place, and by pulling the rope at the other end, the whole of the ventilators will be opened at once by a sympathetic movement, such as opening Venetian blinds. By adopting this plan of ventilation at the roof, it will obviate the disadvantages of span roofed houses. The apex or top of the building over the centre passage may be covered with inch boards, tongued and grooved, and two-inch battens placed over the joints; cedar post, 9 feet long, set four feet in the ground, and the upper part squared and about 6 feet apart, will be found to be the cheapest way of making the frame on which the roof will rest. The sides may be covered with rough boards up to the frame for the front ventilators; they should be either tongued and grooved, or battened, the same as an ordinary fence, and if it is afterwards whitewashed, it will give it a respectable appearance. The sash bars should have two or three coats of white paint.

Having your building prepared, the next thing to do is to select the varieties of fruit you wish to cultivate. I will endeavour to point out the various fruits most suitable to cultivate in houses of this description, and their particular management:—Peaches, Apricots, Nectarines, and foreign Grapes, being those we cannot profitably cultivate in the open air, are those that should receive our first attention, but the choicest varieties of pears, plums, cherries,

apples, currants, and strawberries, may be grown to advantage, if required. As nurserymen are now beginning to raise trees specially for the orchard house, you can generally get trees three or four years from the graft, that, if removed with care, will come into bearing the first year. This, of course, will be so much time gained, and I would advise purchasers to select their trees one or two years before they require them, so that they may be trained in the proper manner, and root pruned once or twice. By this plan they will receive very little check on their final removal, and it will make them assume that dwarf habit so desirable. But if the purchaser wishes to train his own trees, his best plan is to select one year old, or maiden plants; these he can train into any shape he may desire, but the pyramidal is the most desirable. I cannot do better than give Mr. Rivers's own words for the instruction of parties wishing to adopt this system of training. He says: "The first spring, a tree of this description should be headed down, so as to leave the shoot about eighteen inches long. If the soil be rich, from five to six and seven shoots will be produced; one of these must be made a leader, and if not inclined to be perpendicular, it must be fastened to a stake. As soon in summer as the leading shoot is ten inches long, its end must be pinched off, and if it pushes forth two or more shoots, pinch all off but one to about two inches, leaving the topmost for a leader. The side shoots will, in most cases, assume a regular shape; if not, they may be this first season tied to slight stakes to make them grow in the proper direction, so that an open pyramid may be formed, for if it is too close and cypress-like, enough air is not admitted to the fruit. They may remain in this state till the end of August, when each shoot must be shortened to within eight buds of the stem. The second season the stems will make vigorous growth; the side shoots that were topped last August will each put forth three, four, or more shoots. In June, as soon as these are four inches long, they must be pinched off to within three inches, *all but the leading shoot of each side branch;* this must be left on, to exhaust the tree of its superabundant sap, till the end of August. The perpendicular leader must be topped once or twice; in short, as soon as it has grown ten inches, pinch off its top, and if it break into two or three shoots, pinch them all but the leader, as directed for the first season. By this plan in a few years most symmetrical trees may be formed." The third year, the perpendicular leader of the preceding year's growth will in spring put forth numerous shoots, which must be pinched in July in the following manner:—Those nearest the base of the leader, leave six inches in length, gradually decreasing upwards, leaving those next the young leading shoot only two inches long. This leader, and the horizontal leaders, must be shortened in August as before mentioned. When the tree has attained the desired height, the main leader may be cut out to within two inches of its base every year, and the same system of pruning may be continued ever after. The young wood of peaches, and nectarines must not be shortened to less than ten eyes, as they bear their fruit on the wood of the preceding year's growth. But as trees differ in their habits, some make shoots robust and vigorous; others under the same treatment are very delicate and slender. In the final shortening in, all those that are of a robust habit of growth may be cut in to eight or ten inches, and those of a weaker habit to six inches; regard must be had to the vigour of the tree, but eight or ten inches is quite long enough for the shoots of the most vigorous tree to be allowed to grow in any one season. By the August shortening in, you stop the luxuriant growth of the tree, and cause it to ripen off its wood before the winter sets in. And if this system were practised on fruit trees growing in the open air, it would have the same beneficial effect. There is another very ingenious system of training trees for orchard houses, whereby a greater number can be grown in a certain space. This is done by heading down the young tree to three

buds, from each of which a shoot will spring out. These are tied down to stakes in a horizontal position the first year; the second year there are eight stakes placed around the stem of the tree, at eighteen inches from the stem, and equidistant from each other; these stakes may be of the height you wish your tree to grow, a hoop may be placed round the top of these, and the stakes tied on to keep them in their position. Around these stakes the shoots are trained spirally, and if the system of shortening in is adopted the results will be equally satisfactory. This is called the cork screw system of training.

The trees should be planted in tubs of the size already mentioned. These, when made of cedar, cost fifty cents each, but a common flour barrel cut into halves will make tubs that will answer the purpose equally well. There should be two or three auger holes made in the bottoms, over which you should lay a piece of broken flower pot or some shingle, to act as drainage. There should be also several auger holes bored round the sides of the tubs to allow the roots to run into the surrounding soil, which they will do in a few years; this is better than allowing them to grow through the bottom of the tubs, or pots, as often recommended. If they begin to grow too luxuriantly it will be more convenient to get at the roots to prune them, and if they should require nourishment, it will be equally convenient to give it to them. Over the drainage place about four inches deep of half rotted turfy loam, then having placed the tree in its position, fill round the roots with the soil they are to grow in, shaking the tub well, so that the earth may be properly settled round the roots. The compost in which you plant your trees should be a light rich loam, of a friable texture, crumbling to pieces in the hand by rubbing, and containing a large portion of fibrous matter, such as the surface sod of an old pasture field, after the first crop of oats or peas is taken off the land. To this may be added some well decomposed vegetable matter, and rough bone dust. If this had been kept in a heap one year previous to use, and turned over once or twice, it would be in the best condition for all kinds of fruit trees.

If the building is twenty-four feet wide, (the width I think the most desirable), there will be room for four rows of trees; that is, two rows on each side of the centre walk; the tubs should be plunged in the soil, and four feet apart in the row from centre to centre. This distance will be found quite sufficient for all kinds of trees growing in an orchard house. However, in a house of fifty feet in length, there will be ample room for forty trees. This will form a miniature orchard, that if properly taken care of will be a delightful sight to look upon in the blossoming and fruiting season.

The proportion of the different varieties of trees I would recommend would be, for a house of fifty by twenty-four feet; four early and four late peaches; four nectarines; four apricots; ten pears, early and late; six plums; six cherries; and two apples. There may be a grape vine for each pillar; these may be planted in the soil, and trained spirally round the pillars. There will be also ample room for one or two hundred pots of strawberry plants. These should be planted in the pots the spring previous, and the pots plunged in the soil in some well sheltered situation, and liberally supplied with liquid manure during the growing season, but the pots should be kept in a pit or cold frame during the winter, and well covered with leaves from the forest, or some litter, to keep off the frost.—The pots may be taken into the orchard house in the beginning of April, where they will produce a good crop of fruit if properly taken care of. The varieties that I find produce the best crops here are the large Early Scarlet, Genesee, McEvoy's Superior, Triumphe de Gand, and Hovey's Seedling; but the McEvoy's Superior I find the most profitable, after trying between twenty and thirty varieties.

The varieties of peaches best known here, are the large early York, Craw-

ford's early, Coolidge's favorite, George the 4th, Yellow Alberge, Crawford's late, Grosse Mignon, and Jacques' Rare Ripe. These are all peaches of the first quality.

For nectarines, the best sorts are, the Elruge, the Boston, Red Roman, Stanwick and early Newington.

For apricots, the Large Early, Moorpark, Breda, and Early Golden.

The Duke and Morella cherries are best suited for growing under glass, and when budded on the Mahaleb stock, form very handsome bushes. They are much hardier than the Bigarreau and Heart cherries, and for the open air, are the only varieties that appear worth cultivating in this climate. When grown in the orchard house, the fruit is much larger than they generally grow in the open air. The best varieties are the May Duke, Late Duke, Belle de Choisey, Belle Magnifique, Reine Hortense, and English Morella.

Plums form very handsome pyramids when trained as such, and although not generally considered well flavored when grown under glass, it is very probable that this will be the only way of raising them here, as they are dying by disease, or the severity of the late winters, all over the country. With good cultivation, in some localities, good crops are yet obtained, but this is the exception, not the rule. Under glass, I think, there will be no difficulty, as they will be likely to receive more attention than they generally get in the garden. The six varieties I would recommend would be, the Green Gage, Coe's Golden Drop, Smith's Orleans, Bolmar's Washington, Reine, Claude de Bavay, and Imperial Gage.

Pears form the most attractive object of any class of trees cultivated under glass, and are found to produce most excellent crops. The following varieties will be found to answer; For early, Doyenne d' Ete, Beurre Giffard; and for succession, Bartlett, Belle Lucrative, Beurre d' Amaulis, Duchess d' Angouleme, Buerre Diel, white Doyenne, Louis Bon de Jersey, Napolean, Stevens's Genesee, Glout Morceau, and Vicar of Winckfield. There are several other varieties equally good, but these I think, for a small collection, will suit the taste of most people.

The varieties of grape I would advise planting on the inside, would be the more delicate growing sorts, as the Chasselas Musque, Chasselas de Fontainebleau, Grizly, Black and White, Frontignans. If you plant vines in the outside border, it must be well prepared, by trenching to the depth of three or four feet. I would prefer excavating the whole to the depth of four feet, then forming the bottom of the border with an inclination towards a drain, which should be at least eighteen inches below the bottom of the border. I would then run drains obliquely downwards from the front of the house to connect with this drain, which should have a good outlet. If the bottom were then covered with gravel to the depth of six or eight inches, so much the better. Over this, place the compost, which may be of fresh turfy loam, well rotted stable yard manure, lime rubbish, and any good garden soils. I prefer making the border in the fall of the year, raising it one foot higher than it is intended to be, then, in the spring previous to planting the vines, I would have the whole mass turned over and well incorporated together. I generally allow fifteen or sixteen feet for the width of the borders, but vines will do well with borders a great deal less. Seven vines on each side of a building of fifty feet in length will be quite sufficient, and not too many. They may be, Black Hamburgs, on one side, and one vine of each of the following sorts, on the other: Black St. Peters, Dutch Sweet Water, Black Prince, Chaptal White, White Nice, Royal Muscadine, and Zinfindal.

In the spring of the year after the necessary pruning is done, the vines and the branches of the peach, apricots, and nectarines, will require a good washing

of lime, sulpur, and tobacco water, put on to the consistency of paint. This will destroy the larvæ of any insects that may be harbored around the buds; and when the growing season commences, the trees and vines should be syringed with soft water, mornings and evenings, except in dull weather, or when the trees are in blossom, and discontinued altogether when the ripening season commences.

There should be always a humid atmosphere kept up within the house, and the soil never allowed to get dry, except in the fall of the year, when you wish to hasten the ripening of the young wood, and the winter season. Liquid manure should be liberally supplied to the trees throughout the growing season, and the soil in the tubs occasionally stirred up, and some fresh compost put in. Air should be admitted regularly in fine weather, by opening the ventilators, when the heat rises above 65°, and close them again early in the afternoons; but throughout the months of July, August, and September, the ventilators may be kept open night and day. In cold cutting winds, the top ventilators only should be opened.

In case of green fly or thrips making their appearance, the house should be closed up, and get a good fumigating with tobacco smoke, and the trees should be occasionally syringed with sulphur water to prevent mildew. There should be always a barrel of this water at hand, as the grapes, more particularly in moist, foggy weather, are more liable to be attacked with mildew. Lime and sulphur water is the most effectual preventive for this disease.

I may here mention that in the year 1837, Col. W. B. Jarvis had, at my suggestion, a house erected for the purpose of cultivating the peach and nectarine as standards. This house was upwards of 70 feet long, by 10 feet wide, 12 feet high in the centre, and 8 feet high in front. It had a Southern aspect, and had glass only in front, and one row of sashes on top; the north side was boarded. The different varieties of peach, and nectarine, were planted in the soil, and trained as bushes, and root pruned, in two or three years they came into full bearing, and had as fine fruit on them as I have ever seen in this country. The only difficulty I experienced was in checking their luxuriant growth. Unfortunately this house was burned down by some accident.

About fourteen years ago I had a peach house erected for Mr. Boulton, at the Grange, on the ordinary lean-to plan. The back wall was 14 feet high, front 5 feet, with sashes for ventilators; the width was 13 feet. There was one row of peaches and nectarines planted against the back wall, and trained in a fan shape, and another row of the same sort of trees planted three feet from the front, and trained to a semi-circular trellis. Foreign grape vines were planted in the front border, outside the house, and introduced under the front sill, and trained to a wire trellis, one foot from the glass. The whole of the vines and trees came into full bearing the third year after they were planted, and have continued to bear good crops ever since. The peaches from this house obtained a prize at one of our exhibitions last year. The trees appear to be yet in a good healthy condition.

There are other cheap systems of growing fruit trees under glass, that may be of advantage here, and might suit persons of very limited means. I would instance a house put up by Thomas White, Esq., of Manor House, Essex, England. The length of the house was 80 feet, width inside 12 feet, height at the back 8 feet, height of the front 14 inches, rafters were fixed 14 feet long, trellis, (15 inches from the glass), 13 feet deep, sunken path in the centre 2 feet deep. The front and back plates both rest on poles about 4 or 5 feet apart. A shutter, 12 inches wide, on hinges, with a slip of board, forms the front wall, the ends and back boarded up, and a door at each end. Perhaps no gardening structure ever was built so cheaply, and none ever produced

such marvellous effects. The trees, peach and nectarine, 12 of the former and six of the latter, were planted in February 1852, and in the season of 1854, only the third year of their growth in the house, they bore 5,000 peaches and nectarines. On one tree of the Noblesse Peach there were 500 peaches, and the same number or more on a tree of the Elruge Nectarine. Now there is nothing to prevent us arriving at the same results here, and I hope that experiments may be commenced as early as possible by all those who take an interest in fruit culture, and that the results may be laid before this society at a future day.

There are several very valuable horticultural periodicals now being published in the United States that would convey a great deal of practical information on every subject connected with horticulture. Among the best are the *Gardener's Monthly*, published at Philadelphia at one dollar a year; the *Horticulturist*, published at New York; and *Hovey's Magazine of Horticulture*, &c., published at Boston. Fruit growers and lovers of horticulture, would do well to have one or more of those publications, if they wish to keep up to the times.

THE ECONOMICS OF AGRICULTURE.

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Read before the City of Toronto Electoral Division Agricultural and Horticultural Society, March 17th, 1860.

In the remarks I purpose offering upon this subject, you must not expect to find any original matter. I do not profess to be giving you the results of my own investigations, but merely some few of the conclusions drawn from Agricultural Chemistry. I shall avail myself of the labours of others, but shall endeavour to put them into as simple a form as possible, so as to illustrate the subject I have chosen, without the necessity of going deeply into the science of Chemistry.

The very short time I have had to prepare this paper, without mentioning other reasons, rendered it impossible that I should attempt to produce anything new; nevertheless I hope that what I have put together may be of some interest to you.

To almost every science there belongs an art, and conversely to every art appertains a science. It is scarcely necessary to remark, that by the term *art* we understand the practice of any species of manipulation; while by a *science* we mean, the theory which accounts for the operations of the art to which it refers. In most of these arts the corresponding science is found very greatly to assist; by showing the causes of failure, and giving direction to experiments. And, although it is very common, especially among certain classes, to make a marked distinction between a practical man and a theoretical man; valuing the one, but decrying and sneering at the other, we generally find the art and science closely connected, and the connection recognised. And especially has this recognition been rendered essential in later days, now that science has so much advanced, and yielded such assistance in nearly every art. Yet even now the notion has not quite been done away with, that practice and theory are very different, that the latter looks well upon paper, but must be cast aside when the former is required to work to advantage. Perhaps, in no branch of human industry, have the science and the art been more widely separated, and continued more persistently divided than in the case of Agriculture. Farmers are, no doubt now, in many places beginning to perceive the advantages they may gain by studying the theory of their art. Competition indeed requires that every means should be taken of obtaining improvements; yet this feeling is by no means universal, and it would greatly tend to the advancement of agriculture, could a more general interest in agricultural science be diffused throughout our country. This object, gentlemen, you are endeavouring to achieve, and therefore it is that I address you this afternoon, mainly upon Agricultural Chemistry. Why it should be the case that in this particular branch of human industry, it is difficult to associate the art and the science, may not be quite obvious at first view. I think, however, that the reason is to be found in the fact, that in farming operations everything depends upon the agency of Nature; the farmer only assists these, he cannot interfere with or direct them. In almost every other art, on the contrary, it is man who does the work, and when *he* has it to do, he sees the immediate advantage of calling in the assistance of science. Thus in the art of dyeing, for example, every operation has to be performed by the workman. He has to select the colour,

plan for its being fixed upon the cloth, and in fact perform every part of the labour from first to last, including many operations which are obscure, and in which the aid of chemistry is therefore obviously valuable. In agriculture, the same necessity for assistance and guidance is not so apparent. True the husbandman must sow the seed, having previously prepared the field, but the main part of the work is entirely beyond his control, at least apparently so, for although he may greatly modify, by his skill greatly assist, or by his ignorance as greatly hinder, these mysterious operations of chemistry in Nature's secret laboratory, it is not obvious to the uneducated farmer that such is the case. The ignorant man knows not his ignorance; he imagines he knows as much about these operations as any one else does or can do, for nothing is more beyond the comprehension of the uneducated, than the workings of Nature. There is one other science, that of medicine, in which the work is beyond the power of man, and to which it would seem, therefore, at first sight, that this theory, if true, would equally apply; but a little consideration will show that the two cases are not parallel, because in medicine nearly everything depends upon the judgment of the physician; the path he must pursue is not so obvious. The difference between the two sciences is, in fact, this: in agriculture, every operation is natural, in medicine, they are all to a certain extent unnatural. Nature herself affords very little clue to the method of working, so that it is impossible in this latter science that theory and practice should be so entirely divorced, as too often occurs in the case of agriculture. One of the most important applications of science to the art of farming is to indicate wherein economy, either of time, of labour, or of material may be effected, and some of these ways I propose to point out now; and although it is very possible that I may mention nothing new to any of you in the way of economy, yet it may be of some interest to have a few such instances wherein chemistry has rendered essential service to agriculture, brought together, and explained by the theory of the chemist. I do not regard Chemistry and Agriculture as identical sciences. They are quite different, yet perhaps Chemistry renders more assistance to the art of cultivation of the earth, and its associate arts, then any other single science. We must regard these two sciences each as represented by a circle, which circles intersect, thereby including a certain space of common ground. The circle of Agriculture is however intersected by a large number of other circles than that of Chemistry. The circles of Zoology, of Botany, of Natural Philosophy and of Geology, all form a part of, all intersect the circle of Agriculture, and must therefore be studied by the man who aims to be thoroughly acquainted with the Encyclopedia, the circle of the sciences, of Agriculture. We might, perhaps, carry out the analogy a little further, and say that these circles resemble the map of the earth in this respect, they are not yet thoroughly known; as for example in Chemistry. The explorer has got a general idea of the whole, as we have of the shape and general geography of the earth. Some parts are thoroughly known. Some are known in their outlines, like Australia and Africa, but their interiors have not yet been explored; while there may be whole continents of whose existence we have not even an idea. Since the circles of chemistry and of agriculture only intersect, and are not concentric, in other words, have only a small portion of common ground, and are not contained the one in the other, it does not follow that a man is an agriculturist because he is a chemist, although he has attained an important part of the knowledge of agriculture. Perhaps the distrust of scientific farmers has arisen partly from a neglect of this important difference. Men have studied agricultural chemistry from books, and imagining that they, therefore of course, knew all about farming, have tried it, and *of course* (a more logical sequence than the preceding) have failed. After what

I have said, it is scarcely necessary that I should add, that you must expect me to look upon matters from a chemical, and not from an agricultural point of view. Although I have every faith in the truth and value of the science I advocate, I do not know that good chemistry is necessarily good farming, and that simply because it does not take into account the multitude of other things with which the agriculturist has to be acquainted. If therefore it should chance that I am fortunate enough to have called your attention to any point which may not previously have occupied it, it is merely for your consideration, and not necessarily for your acceptance.

The chemist regards a plant as a laboratory, or manufactory, wherein Nature by her unrivalled skill in chemistry, forms a series of products out of simpler substances, combining together various mineral matters, so as to form a variety of substances, which are of use or necessity in a large number of operations, and particularly as food for animals, so that it is true, as has been well remarked :—"The great test miracle of the tempter, to make bread out of stones, is actually daily performed in the vegetable world." Now since things are not made out of nothing, nor any element undergoes a transmutation into another element, it is one of the most obvious facts of science, that all the materials necessary to form the structure of a plant must be supplied to it from some source or other. A part of them exist naturally in the atmosphere or in the soil; those which do not exist in either of these two localities must be artificially supplied by the cultivator. We have thus two principal things to ascertain, viz: What elements or materials are requisite for plant growth? and how these are to be supplied? These are the two fundamental questions of agricultural chemistry. Analysis tells us what substances are contained in plants; and if we examine these results we shall see, that there are two or three substances contained in all plants in considerable quantity, and a number of others which are contained in much smaller quantities. The three primary elements are Carbon, Oxygen, and Hydrogen. These form the main bulk of the plant. Thus in 1000 ounces of wheat, there are of Carbon 455, of Hydrogen 57, and of Oxygen 431. In 1000 ounces of hay, Carbon 458, Hydrogen 50, Oxygen 387. These numbers apply to the dried substance; but in the process of drying, a large amount of water is driven off, and water consists of Hydrogen and Oxygen, so that if the proportions of these elements were ascertained before drying, they would appear considerably larger. In the ordinary state of vegetables it may be estimated that the oxygen forms one-half of their weight, while in the dried state, carbon forms nearly one-half. These three substances are supplied to plants by natural agencies, and their obtaining it in no way depends upon the care of the cultivator. It may be proper here to remark, that plants take up their food by the action of the roots and leaves, and all substances must be either in a gaseous or a liquid state before they can be taken up by the plant. Now of the snbstances named, one, viz, carbon, is an insoluble solid; the other two are gases. These two, hydrogen and oxygen, exist also in the state of water, combined to form a liquid; and in this state, probably, are absorbed by the plant. The supply of carbon is drawn from the atmosphere, for carbon exists therein in the state of a gas, combined with oxygen, to form what is called carbonic acid. This gas exists in the atmosphere in very small proportion, only from 4 to 5 parts, by measure, in every 10,000, or only $\frac{1}{25}$ of 1 per cent., yet this extremely small quantity, in proportion to the entire bulk of the atmosphere, is sufficient to supply all the carbon of all the plants in the world. Several interesting facts are connected with the supply of carbonic acid, as for example, this gas is poisonous, and did it exist in much larger proportion in the atmosphere, it would be prejudicial to animal life; it is formed during combustion and the respiration of animals, also

during decay, from which sources the atmosphere receives its supplies, the surplus being drawn off continually by the action of plants, which are thus shown to preserve the purity of the atmosphere, by withdrawing from it what would be destructive to animal life, feeding upon the waste products of animal respiration. But we must pass all these by, merely indicating the most prominent. We have thus seen whence the plant obtains the greater part of its substance. But there are several other elements equally necessary to the formation of the plant, with those already named, though not in equal quantities. Foremost among these is the gas nitrogen. This gas exists in wheat in the proportion of 34 parts in 1000, and in hay 15 parts in 1000. Nitrogen does not seem to enter into the composition of all parts of the plant, only of some particular portions, but those are the portions most essential to the nutrition of animals; for it may be safely asserted, that without nitrogen animal tissues could not be formed. Nitrogen is absent from the woody matter of a plant, and also from the starch, but is essential, for example, in the gluten of wheat flour, and in similar substances. The gas nitrogen forms a large part of the atmosphere, but does not seem to be taken thence by the plant; it is necessary that it should be supplied in other forms. The principal substances from which the plant obtains its nitrogen, is probably ammonia. (This is the chemical name for Spirits of Hartshorn, although it exists also in the form of a gas.) This substance exists to a very small extent in the atmosphere, being probably formed there as a result of the decay of animal matter. From the ammonia thus contained in the atmosphere, plants certainly derive some of their nitrogen, although the amount does not seem to be generally sufficient for the most rapid and complete growth of the plant. At any rate, it is found to be advisable, and materially to assist the plant growth, to supply this substance artificially. It forms therefore one of the most important and valuable ingredients of manures, and is the principal substance taken into account in estimating their value. Ammonia may also be supplied to plants by the decay of animal matter, which on that account form valuable manures, but in that case ammonia is probably formed, as it is an almost constant product of the decay of animal matters. Ammonia does not naturally exist in the soil, so that the plant has to draw all its supplies from the air, unless this substance be added artificially. There is another substance, from which also it is possible that the plant may obtain nitrogen; this is nitric acid, which occurs sometimes in the atmosphere in extremely minute quantities, but is generally found in combination with other substances, as potash, soda, or lime. These compounds are called salts, and bear the name of nitrates, as nitrate of potash, nitrate of soda, nitrate of lime, &c.

The substances we shall next name as essential to the growth of a plant, are not elements, but mineral substances of very simple nature. They are commonly termed the inorganic elements of a plant, those we have hitherto been considering, being termed the organic elements. The inorganic elements are found in the ash when the plant is burnt, and, put together, form but a small portion of its weight, yet the plant cannot exist without them; they are as essential as the substances already considered. In wheat the ash forms only 23 parts out of 1000, in hay 90 parts out of 1000. This proportion is the proportion in dried plants, if stated with reference to green plants, it would appear much smaller. It was therefore thought, not very long ago, that these constituents were merely accidental and varied with the soil on which the plant grew. But careful analyses show that the same species of plant generally contains nearly the same inorganic constituents, even though grown on different soils, while different species of plants leave different quantities of ash, even though grown on the same soil. It can thus be ascertained what inorganic

elements each plant requires, and the farmer can provide that any which d- not naturally exist in the soil, shall be artificially supplied, It is found bo analysis, that not only do different plants contain different quantities of inory ganic constituents, but also that different parts of the same plant contain very different quantities. The larger proportion of the mineral matters of a plant are found in the leaves and green soft parts, while the more woody parts contain but comparatively little. This fact is important, and we shall make use of it hereafter. There are a large number of these mineral substances, but the principal are Potash, Soda, Lime, Silica, Phosphoric Acid, and Sulphuric Acid. The first three are what the chemist terms bases, the remaining three are acids. These have a tendency to combine, or to unite to form various salts, so that it may frequently happen that one salt may contain two of these substances. Of all those named, probably, the most important are potash and phosphoric acid. This latter generally exists, combined with bases, which compounds are termed phosphates, thus we have phosphate of lime. The remaining mineral constituents of the plant are Magnesia, Alumina, Iron, Manganese, Chlorine and Iodine. We have now to inquire from what source are all these substances obtained by the plant. They all seem to be absorbed through the roots, and are therefore drawn from the soil, either existing in it naturally, or added to it artificially. So that before it can be ascertained what substances have to be added to the soil in order to supply the mineral constituents of the plant, we must know the general constiution of soils. Chemically considered, there are three great classes of soils, the clayey or argillaceous, the sandy, and the lime or calcareous soil. Neither one of these three taken pure is fertile, but a fertile soil consists of an admixture of the three in proper proportions. Thus a mixture of clay and sand, is called a loam, and a mixture of clay and lime, is a marl. The greater proportion of fertile soils are loams, mixed with more or less lime. Should there be no lime in the soil naturally, an addition of marl will greatly increase its fertility. Now sand is merely the popular name for silica, one of the six mineral substances which we named, as being the most important inorganic constituents of plants. Clay is a silicate of alumina; it therefore contains silica and alumina. Although this latter is named as one of the elements of plants, it is one of the least important, and it is indeed extremely doubtful whether it is essential to plants at all, chemically; its action is principally mechanical. Thus we see that a fertile soil contains considerable quantities of silica and of lime; two of the six important mineral constituents. But before these substances can be of any service to the plant, they must be dissolved in water, but into the enquiry as to how this is effected, we cannot enter; it would consume too much time. Of the other four substances, most soils, and all fertile soils, contain small quantities, but as these are constantly withdrawn by the plant, means must be adopted to supply them to the soil, and the main part of the Economics of Agriculture is to consider how this supply may be kept up. First of all, most soils are derived from the decomposition of hard rocks, by the gradual action of air and water, and several of the requisite substances are thus supplied to the soil slowly. For example, granite contains silicate of potash, and the gradual decomposition of granite rock will thus keep up a supply of potash. A great deal therefore, must depend upon the nature of the soil, and what substances it contains. This may frequently be indicated by the nature of the vegetation which naturally exists on the land. Accurately, however, to determine what constituents the soil contains, and the proportions of each; which are deficient and need therefore to be supplied to secure fertility, requires a rigorous chemical analysis. By this means the farmer can become acquainted with the precise nature of the instruments with which he is working, and this may form an important element in the economics of a farm.

Thus, for example, because a particular species of manure is found to be efficacious on a neighbour's land, a farmer may conclude that he should apply it to his land, when the two soils may be totally different as regards the substances necessary to be added to ensure fertility, or he may use it for a different crop, and thus, to a considerable extent, waste his money and perhaps injure his crop. It is obvious from what has been said, that in order thoroughly to understand what he is working with, and therefore to work economically, the farmer should know first of all the particular substances which the plant requires, and then which of these are contained in sufficient quantity in his land, so that he may add the deficient ones, and only the deficient ones.

Many soils may be restored by allowing them to remain fallow for a certain time; this is principally because by this operation, time is given to the rocks to decompose and thus to replenish the earth with the substances which they contain. The rocks may thus be regarded as a species of bank, out of which the soil may draw the elements it needs to keep up fertility. The fallowing is also aided by subsoil ploughing, inasmuch as this process turns up the lower portions of the earth and exposes them to the action of the air and of moisture. This plan of restoring the fertility of the land is mechanical, and does not consist in adding any substances, chemically indicated, but merely in giving the land time to recuperate itself. However fertile the land may be, each crop takes away somewhat of its essential constituents, and therefore with the removal of each successive crop, its productiveness is impaired. The most obvious means therefore of keeping up the fertility of the soil, is to restore to it each year the crop taken from it. To plough in, for example, the crop produced. But such a procedure would be impracticable. There are two modifications of this theoretically perfect means of conserving the richness of the soil, which may be adopted. The first is, to restore as much as possible of the crops, particularly the green parts, which, as we have seen, contain the greater proportion of the mineral matter of the plant. By ploughing these in, nearly the whole of the inorganic constituents will be returned to the field, and scarcely any other manuring will be required. The other way, which admits of more general adoption, is to preserve all the excrements of the animals which feed upon the crops and return them to the soil; for these excrements contain nearly all the mineral constituents of the plant. This is the most common method of manuring. But as farm yard manure is commonly employed, considerable waste ensues. For example, the excrementa are of two kinds, the solid and liquid. These two supplement each other. The liquid excrements carry off a large proportion of saline substances, and the greater in quantity these are, the less will be the solid excrements in value. Thus it has been observed that the droppings of the horse form a much more valuable manure than those of the cow, and the reason is that the cow produces more urine, which carries away a large proportion of the valuable constituents of the excrements, while the horse producing less urine, the solid excrements are much richer in mineral matters. A considerable loss also occurs in the case of the cow from the milk, which contains a considerable quantity of earthy matters, particularly of the phosphates, which have been mentioned as among the most valuable inorganic constituents of plants. The importance of preserving both kinds of excrements is thus quite obvious, whereas very frequently the urine is permitted to run to waste. The farmer should regard these excrementitious matters as so much money, for they contain substances, which, if he does not employ in that state, he will have to purchase in other forms, to fertilise his fields. Proper tanks for the preservation of the urine are very desirable. More especially because this substance contains ammonia and ammoniacal substances, which escape into the air if the liquid be exposed. A fermentation takes place in it,

and its value very rapidly evaporates. One method of retaining a large proportion of the ammoniacal substances of urine, is to dilute it with water. The quantity of ammonia retained by the urine, after dilution with an equal bulk of water, is in the same circumstances nearly *three times* as great as when it is allowed to ferment in its original state. Nevertheless, even when thus diluted the urine loses by fermentation during four weeks alone one-fourth of the ammonia produced in it during that period. The urine should therefore be allowed to ferment in covered cisterns to prevent this very serious loss of its most valuable constituents. The same effect may be produced by fixing the ammonia. This escapes because it is so volatile; it may however be combined with some substance which prevents its evaporation. For example, gypsum (sulphate of lime,) may be added to the urine, or sulphuric acid, either of which substances will act as a manure itself. Or again, peat soil, or, perhaps better still, peat charcoal might be added; this would absorb the ammonia and prevent its loss.

The recent urine of one cow is valued in Flanders at £2 stg. or $10 per annum. It contains about 900 lbs. of solid matter, which, estimated at the price of guano, is worth $20. It must be borne in mind that guano and urine have a somewhat similar composition, and that the farmer who suffers the urine of his stables and cowhouse to run to waste or to ferment, without using proper means to retain the ammonia, is actually throwing away a very valuable amount of manure, which he is compelled to replace by buying foreign guano. There is one whole class of excrements which are scarcely used at all as manures, but whose value is immense, and to neglect which might almost be termed criminal waste We refer to the excrements of cities and towns. In London, England, for example, the water of the Thames is contaminated, and the health of the city seriously injured, by allowing these sewerage matters to run into that noble river; matters which possess a real, an immense money value. Not only would these, if properly collected, be a very large annual saving to the country, but the prevention of their escape into rivers would very materially improve the healthfulness of all large towns. The main difficulty with such substances is their disagreeable odour, which would need to be neutralised. This, however, in the present state of chemical science, should be quite practicable, and it is hard to conceive why some plan of utilising these substances has not been generally adopted. The urine of cities indeed would be quite free from even this objection, at any rate, to as great an extent as the urine of farm-yards is, but it would probably be almost impossible to collect the urine separately.

The unpleasant smell of the solid excrementa of cities might be in a great measure removed, by mixing it with peat charcoal; gypsum would probably assist in this action. A new disinfectant has been mentioned lately in the newspapers as having been discovered in France, and its virtues have been considerably extolled. It consists of tar mixed with gypsum. Possibly this substance might prove effectual in deodorizing night soil, though it does not seem to have been introduced into this country at all. An immense amount is annually wasted in European countries, and also on this side the water, by allowing such valuable materials to be carried into the sea, while to supply their place, large sums have to be spent in buying guano, bone dust, and other substances, as manure, the money for which might much better be retained in the country. Somewhat similar remarks to those we made with reference to the loss in fermenting urine, might be applied to farm-yard manures in general. These by being permitted to lie about and to be trodden under foot, gradually ferment and lose the ammonia, one of their most valuable constituents. The ammonia might be retained by means similar to those already mentioned.

Although urine contains some phosphates, the most valuable source of these very important manures, is perhaps bone dust. Bones consist of an animal part called gelatin, and an earthy part, which is phosphate of lime. Bone dust, burnt bones, and bones dissolved in sulphuric acid, are all employed as sources of the phosphates. Guano is similarly used; this latter substance likewise contains very valuable amounts of ammonia. It may be remarked that guano is the droppings of sea birds. These probably fed upon sea weed, which again was nourished by the excrementitious matters carried into the sea, so that a part (probably, however, a very small part) of the matters which are lost, by being conveyed away as noxious substances, into rivers and seas, may thus be brought back again, and the very substances he has thrown away, purchased by the farmer at a high rate, as being a valuable manure. There are a considerable number of substances which possess great value as manures, many of which are allowed to run to waste. Thus all animal matters, from the ammonia and phosphates which they contain, form most valuable manures. The waste products of many manufactures, as the glue manufacture, the sugar refiners' waste, animal charcoal, all are valuable manures; but time forbids us to enter upon these subjects. There are many special substances used as fertilizers, to supply special needs, as nitrate of soda, gypsum, sulphate of soda, &c. From what has been said, you will see that we consider these as valuable only when rightly, that is to say, judiciously used. Analysis being the main method of ascertaining the deficiencies that exist, and the best means of supplying them. Finally, our general conclusion is this, that the Agriculturist should regard his field as a purse, containing some money to start with, but if he takes all out, and puts none in, he will soon see the bottom of his purse. We have pointed out one or two ways in which a saving may be effected; a thorough knowledge of Agricultural Chemistry would indicate many more, so that we may recommend farmers who desire successfully to compete with others, in these advanced times, to regard farming as a science as well as an art, and not resting satisfied with mere rule of thumb knowledge, which may at any time leave them in a difficulty, and does cause much heedless waste; to be scientifically acquainted with the reasons for their varied operations, and with the general principles on which Nature works, so that they may assist her, and not impede her; resting assured that even if this knowledge does not render them money advantages, it can do no harm, and will at any rate yield enough pleasure in its possession, to repay the labour bestowed in its acquirement.

REPORT OF THE NEW YORK STATE FAIR OF 1859.

SUBMITTED AT THE MEETING OF THE BOARD OF AGRICULTURE, FEBRUARY 23RD, 1860.

TORONTO, February 20th, 1860.

The undersigned, visitors to the Exhibition of the New York State Agricultural Society, held at Albany last autumn, beg leave to submit the following notes of their observations on that occasion:

ALBANY, N.Y., October 5th, 1859.

This, the nineteeth annual exhibition of the New York State Agricultural Society, is perhaps the most successful which the Society has ever held. Taking place at the capital of the State, the beautiful old city of Albany, where there is a large local population, with plenty of hotel accommodation, abundant traveling facilities in every direction, the city of New York itself at no very great distance, and delightful weather for visiting, everything has been, so far, favorable to a successful meeting, and the result has fully borne out the expectations of those interested.

The show ground lies to the eastward, about two miles from the centre of the city. The entrances to the grounds face the South-east, the business offices being placed along the front. Inside, on the right, is the Floral Hall, devoted to the display of fruit and flowers and the fine arts. It is about 130 feet in length, running North-east and South-west. To the North-west of this, running parallel to it, and at suitable distances from each other, are the Domestic Hall, the President's office, a refreshment shed, and six long covered sheds for sheep and pigs. To the right or North-east of all these is the horse ring, about three-eighths of a mile in circumference, enclosed by a slight board fence, with seats erected for the spectators to witness the action of the horses, trotting round the ring—this being one of the chief attractions. Going back to the entrance, and looking to the back of the ground, running in the same direction as the buildings already described, and parallel with each other, we have on the left two Mechanics' Halls, for the display of machinery and manufactures of various kinds, each nearly or about 200 feet in length and 50 in breadth, the dairy hall, a shed for carriages, and the vegetable hall for the exhibition of grain, roots, &c. Further to the left is the poultry shed. North-west of these buildings, and running north-east, are seven long sheds for cattle, parallel with each other, each about 200 feet in length, and each capable of accommodating about 40 head of cattle. In addition to all this accommodation for stock, all around three sides of the enclosure there are stalls or boxes for horses and bulls, to the number of some three hundred, or thereabouts. The implements are displayed between the mechanics' halls and the front and south-east side of the grounds. All the buildings described are slight temporary erections, of mere rough boards and scantling, which will, no doubt, answer very well with such fine weather as we have at present, but which, in case of a wet and tempestuous time, would expose the property exhibited to great damage. We have long come to the conclusion in Canada that such buildings are not good enough, or safe enough, for our Provincial Exhibitions, where property is exposed to all the risks of the weather for several days. The general plan of the grounds and buildings here, however, is excellent, affording plenty of room and convenient divisions for the proper arrangement and classification of animals and articles on exhibition. The ground itself is beautifully situated, and is in excellent condition for the purpose. It rises with a gentle ascent from the front or South-east towards the back, or North-west; the view in the back ground being terminated by a range

of hills, crowned here and there with trees. Looking in the other direction, the view beyond the front of the grounds, across the river, is charming, consisting of undulating fields, hills and slopes, adorned by groves and clumps of wood, now brilliant with all the gorgeous and changing tints of autumn.

The exhibition is extensive and excellent. The following is an abstract of the entries :—Cattle, 362 ; Horses and Mules, 517 ; Sheep, Swine and Poultry, 603 ; Agricultural Implements and Machinery, 495 ; Grain, Seeds, Vegetables, Sugar and Honey, 360 ; Domestic Manufactures, 364 ; Miscellaneous, 601 ; Fruits and Flowers, 253. Amounting in all to 3,555.

It is estimated that there were about forty thousand people on the ground today. The total receipts were over $5,000. The total receipts up to this (Wednesday) evening, are $7,800. They will probably be greater to-morrow. The Hon. David Christie, of Brantford, is here, and there are some other Canadians, besides the undersigned. Mr. Snell, of Chinguacousy, and Mr. Jeffry, of Vaughan, are here as exhibiters. Mr. Snell has sold a Liecester ram for $300.

THURSDAY, October 6, 1859.

We now propose to give a brief general notice of the several departments of this great "Fair," as this and similar exhibitions are somewhat incorrectly termed.

In the class of horses there was a very large display, the entries as we have already stated being over 500, and the several committees of judges have been occupied nearly the whole of yesterday and to-day in examining the merits of the animals in the various subdivisions. The ring in which they show their paces, some three-eighths of a mile in circuit, is constantly surrounded by a closely packed hedge of interested spectators, from three to ten in depth. We do not admire the system of showing horses at an agricultural exhibition in trotting sulkies and buggies, but here it is carried so far as to be almost universal, even with stallions, breeding mares and two year olds, and appears to suit the taste of the people better than any other mode. As to the quality of the horses exhibited, one does not see here the large, showy, slow-going draught and coach horses, which predominate at our own exhibitions. The moderate sized, active, compactly built and spirited Morgans and Black Hawks appear to be the favorites, and are here in great force. Some of the stallions of these breeds are of beautiful symmetry and action, and are held at high prices. A greater sprinkling than we have of these breeds of horses would be very useful in Canada. Amongst the "horses of all work," we noticed "Toronto Chief," bred in Canada, and sold by Mr. R. A. Goodenough, of Toronto, last spring, for $6,000, and now the property of Mr. L. R. Bowne, of Flushing. The Chief was looking in good condition, and was the centre of an admiring crowd. It would be impossible for us to specify particular animals. Although there are a great many very fine specimens, there are on the other hand, a great many others very inferior.

In cattle the exhibition is beyond all praise, and quite exceeds in the beauty and value of the animals any exhibition that we have yet had in Canada. In this remark we refer more particularly to Durhams and Devons, for in Ayrshires we are of opinion that our Kingston Exhibition was better than this, and of Galloways they here have none. There are a few fine Herefords, of which breed we have in Canada no good specimens, and a few Alderneys, of which we have none. Samuel Thorne, of Thorndale, Washington Hollow, Dutchess County, N. Y., who is the largest exhibiter of Durhams on the ground, is believed by those well informed upon the subject, to be the possessor of one of the largest and best herds of high bred Durhams in the world. He is a young

man with ample means, and he has entered into the business of importing and breeding cattle, sheep and swine on the most extensive scale, boldly picking up the choice lots at the great sales in England, and carrying them off over the bids of some of the wealthiest English breeders, anxious to secure them. Amongst the bulls which he exhibits here are "Grand Turk" (12969) which takes the 1st prize as an imported bull over three years old; "Second Duke of Thorndale," 1st prize as a yearling, and stated by many experienced judges here to be the finest animal they have ever seen; and "fourth Duke of Thorndale," under 1 year old. Amongst the cows and heifers are "Lalla Rookh," of European celebrity as a prize taker at English exhibitions, and who has also carried away the palm at every competition on this continent; her cost in England was $3,000; she is a perfect model of a Durham cow, and takes the 1st prize here as an imported cow. "Mistress Gwynn," 1st prize as a cow 3 years old and upwards, bred in the country; "Fornarina," 2d prize do; "Favorite," 1st prize, 2 years old; "Gertrude," 2d do.; "Lady of Oxford" and "Princess of Oxford," 1st and 2d prizes as yearlings. We cannot describe the merits of these animals in the technical language used by breeders, but they are superb, and should be seen to be appreciated. There are many other good animals on the ground in the hands of other breeders, as will be shown by the prize list, but we have not time to particularize. Amongst the exhibiters of foreign cattle, that is, cattle owned out of the State, is Mr. W. R. Duncan, of Kentucky, who has fifteen or twenty Durhams. They are good serviceable cattle, but somewhat old in style, and not equal in beauty to those from the herds of the chief New York breeders. In the class of Devons, Mr. C. S. Wainwright of the "Meadows," near Rhinebeck, Dutchess County, is, we believe, the largest exhibiter, and we believe he is also the possessor of the largest herd of this breed of cattle in the State. Nearly all of the animals he exhibits have all the points of the Devon in perfection. His Bull "Omer Pasha," which obtains the first prize here as an imported bull, was awarded the first prize as a yearling at the show of the Royal Agricultural Society of England, at Carlisle, in 1855. Still, Mr. Wainwright, although he takes the largest number of prizes in Devons, has been obliged to yield the first prize, whether rightly or not we cannot say, to other competitors, in some of the subdivisions of the class. While speaking of Devons, we will observe that scarcely anything can be more beautiful, in the way of an exhibition of cattle, than the large numbers of yokes of Devon oxen on exhibition here. They are all so much alike in their general appearance, color and symmetry, and their long tapering graceful horns, that when a large number of them are displayed together, as they are here, the effect is very striking and agreeable.

In sheep, the exhibition is also large, there being over 600 entries of sheep, swine and poultry. The largest number of sheep on exhibition are Merinos and Saxons, which, although they have an indisputably fine fleece, have no great attraction for the Canadian breeder. There are a good many Southdowns on exhibition. Mr. Thorne has a very fine lot. They are bred from recent importations, either from the flock of Jonas Webb, Babraham, or from sheep that were prize winners at the show of the Royal Agricultural Society of England. The long-wool sheep exhibited by breeders in the State are not, generally speaking, very good. Mr. Snell, of Chinguacousy, U.C., has the best lot on the ground, and he has sold several of them at very good prices.

The show of pigs is not very large, and nothing very noticeable in it, except some particularly beautiful Essex pigs, shown by Mr. Thorne.

In poultry there is nothing deserving of very particular remark. We consider the display scarcely equal to that at some of our own Provincial Exhibitions.

The attendance to-day has been immense. Every part of the twenty-acre enclosure, and of every building in it, has been crowded to such an excess that it has been difficult to move about. The receipts to-day have been over $7,000, making, we believe, nearly $16,000 to the present time, (Thursday evening.)

FRIDAY, October 7th, 1859.

The show of Agricultural Products here is not extensive; we would scarcely see so meagre a display at one of our county or township shows in Canada. There are only two or three samples of wheat, and these of indifferent quality, two or three of oats, &c. We notice three lots of Swede turnips, of which only one lot is more than of very ordinary quality; and three of Mangel-wurzel, in all of which there was only one really good root. Even in Indian corn, which we should expect to find very good, the display was not equal to that at some of our shows in Canada, the ears being small, and the grains on the same ear of different colors and varieties. In potatoes there was a very fair display. Again, in garden vegetables, there was only a very moderate show, the carrots, parsnips, beets and some other varieties were inferior, and would scarcely be shown at an exhibition in Canada; the onions, celery, cauliflower, cabbage, were very fair in quality. Amongst the articles attracting particular notice in the "Vegetable Hall" were some specimens of the Chinese potato, (*Dioscorea batatas*) the roots being 40 inches in length, and weighing 8 to 12 pounds each. The exhibitor, Jacob G. Sickles, of Stuyvesant, Columbus County, about 18 miles from Albany, states that they have been grown from seed planted this year and under ordinary cultivation. He also states that the quality for the table is quite equal to that of the best varieties of the ordinary potato, and he believes that when the proper mode of cultivating the root is well understood, it can be planted with profit. Mr. S. V. Thornton, of Watervliet, exhibits the Feejee tomato, said to be a new variety of that vegetable, and superior to those previously in cultivation. It is very solid, and has been the favorite variety this year, where it has been introduced. Why the exhibition of the important products of the field and garden should be so poorly represented, we can only account for by supposing either that the country around Albany is not a very good agricultural district, which we believe is really the case, or else that the society does not attach much importance to a show of mere agricultural products as compared with cattle, machinery, &c., and consequently does not offer large enough premiums to induce the farmers to bring them out. At Syracuse last year, we are told, there was a large display in these classes of products.

In Fruit the show was large and good, particularly of pears and apples, of which the specimens were remarkably fine; of plums and peaches there were none, the season being too late for them; grapes were good, but not very remarkable. The fruit table was 120 feet in length, with three wide and well filled tiers on each side. The show of flowers was also large and fine, particularly of dahlias. The Fine Arts, exhibited in the same building as the fruits and flowers, were not very well represented.

In the Dairy Hall the large display of cheese should indicate that more attention is paid to this branch of farming than to some others. There were some fifty specimens, weighing 100lbs. or over, each, and, we should judge, of excellent quality. Butter was not so well represented, there being only a dozen or two small lots.

In Implements, there was a very large and excellent display. They were reapers and mowers, ploughs, straw-cutters, farm boilers, harrows, rollers, churns, cultivators, fanning mills, threshing machines, portable mills, cheese presses, clover mills, portable grist mills, seed drills, corn shellers, hay packers, &c., in

great variety and profusion. The implements, we think, covered some 3 acres of ground. It would be impossible to specify more than a few articles. Amongst those deserving particular mention is Sherwood's grain binder, a little machine which may be attached to any reaping machine for binding the grain in sheaves before it is deposited on the ground. The exhibiter of the binder states that he has bound 150 acres of grain with it this year; and that it is of perfectly practical application. Numerous testimonials from practical farmers certify to the value of the invention; but at all events, whether it is perfectly applicable in all cases or not, it has unquestionably solved the problem of binding grain by machinery, and shown how, with possibly some modifications under certain circumstances, the labor of at least five men per day can be saved. We consider this a most valuable improvement, and one which ought to be brought into general notice. It received a high premium at the United States Exhibition, at Chicago, in September. The material used to bind with is a light wire, which is passed round the sheaf, cut off the proper length, and the ends twisted together so as to hold firmly. It binds as fast as the reaper can cut, and in a much neater manner, and with less waste than by the ordinary method. The price of the machine is, we believe, $30. The manufacturer is Allen Sherwood, Auburn, State of New York. George Merritt, of Tecumseth, Michigan, exhibits a little machine for husking corn, which does its work neatly and expeditiously, and would effect a great saving of labor where much of that crop is grown. It is worked by hand and only costs three and a half dollars.

In the two "Mechanics' Halls" may be seen every variety of machinery and manufacture, from steam engines and printing presses to the smallest articles. The exhibition in this department is much more extensive than we ever have in Canada, and would well repay an attentive examination, but we have no time to report upon particular articles.

In the "Domestic Hall" were exhibited all sorts of small manufactures, including pickles, sauces, groceries, specimens of bookbinding, ladies' work, harness, upholstery, cabinet work, saddlery, trunks, carpeting, turning in wood, &c., &c., in endless variety. We noticed in this department, a less number of the elegant and fancy articles contributed by the ladies, such as crochet work, embroidery, netting, needlework, &c., than we usually see at our own exhibitions.

To summarize the comparison between ourselves and our neighbors, we should say we must improve a good deal before we can equal them in our horses, Durham and Devon cattle, fine wooled sheep, implements, machinery, manufactures generally and dairy products, at least in cheese; while in our Ayrshire cattle, we are at least on a par with them; in long wooled sheep, pigs, grain and roots, the latter especially, we excel them. In implements, some particular sorts of ours are perhaps better than theirs; their ploughs, for instance, would not be fancied by many of our farmers, and certainly do not do nearly so neat looking work as our own, but they excel us greatly in the variety and quantity of the implements displayed.

In one respect our neighbors greatly excel us, and that is in the concourse of people who flock to the grounds. This is partly attributable to their greater population, and partly to their greater propensity for sight-seeing. On the greatest day, Thursday, with the grounds and buildings completely thronged in every part, by thousands upon thousands of restless spectators, machinery and implements of every sort in perpetual motion, horses showing their paces in the ring, the steam plough, or rather the motive engine without the plough, perambulating the ground in all directions, a dozen church bells on exhibition of from 3,000 lbs weight and downwards, continually sending forth their clanging sounds,

there was presented to the eye and ear, one of the most indescribable scenes of din, bustle, hubbub and confusion which can well be imagined.

To-day, Friday, we leave early, but we do not doubt that the attendance will be again large, and the receipts are certain to exceed $20,000, which is several thousand more than on any former occasion.

A ploughing match takes place to-day in a field adjoining the grounds, but being obliged, as we have above stated, to leave early, we could not spare the time to examine the work, we could easily see however, at a glance, that it was not of that clean, smooth character, which we see done in Canada, the style of plough used here not admitting of it, although perhaps it may be argued that the work they do is really as useful for practical purposes.

We here close our Diary. Our principal motives in visiting Albany, were, in the first place, to indulge in a little recreation after the fatigues of our own exhibition; Secondly, to institute a comparison between the products and stock exhibited and those at our own shows, in order to report for the public benefit, any class of products in which our neighbors might seem to excel us, so that we might thereby, if possible, induce some improvement in that respect on our own side, and Thirdly, to study their system of managing their exhibitions, so as to ascertain if there was any particular in which we could copy from them with advantage, for the better conducting of our own Provincial Exhibitions.

In regard to the first object, we enjoyed our visit, and have to thank the worthy Secretary, Colonel Johnson, and other officers of the Society, for much polite attention. In regard to the second object stated, we have in the foregoing observations given some of the results of our comparisons. As to the third point, we beg to submit the following remarks:—

One of the points in which the conducting of our exhibitions heretofore has chiefly failed, has been in the arrangement of the articles in a systematic manner, after their arriving at the ground, so that not only the judges could readily find all the articles in a particular class for convenient comparison, and be thus enabled to discharge their duties satisfactorily and thoroughly; but that visitors, and the exhibiters themselves, could also have a good chance of finding and examining any article in which they might be interested; or of obtaining any information which they might desire to have. The articles might be all correctly entered in the Secretary's books, ticketed, and be on the ground in good time, but when they have been taken into the buildings, or other parts of the grounds, it has frequently been the case that they have been placed in the most promiscuous manner; many articles have been put amongst others of a quite different class to that to which they belonged; the judges have been unable to find them; there have not been competent persons, or a sufficient number of them to assist the judges; and consequently many deserving articles have been entirely overlooked. In the grain department there have not been proper persons in charge, to prevent the grain being carried away in handfuls, or thrown about, and the samples mixed. Notwithstanding the experience we have had, and the constantly recurring complaints we have had, year after year, we seem scarcely to make any improvement in these respects. Last autumn, an efficient system of classification and arrangement was suggested and recommended, and the mode of conducting it pointed out, and it was hoped that the working of the show would be more satisfactory than heretofore; but, except in the stock departments, there was no improvement on former years. In the Agricultural products department, particularly, that is in the grain, roots, &c., the arrangement was as bad as it well could be. The articles were huddled together in the greatest confusion, and so crowded that neither the judges nor

the visitors could see or examine anything satisfactorily, while the grain was thrown about and trampled under foot, and the prize samples actually carried away to the extent of half-a-bushel or more from some of the bags. The real cause of these unsatisfactory results has been, in our opinion, that the arrangement and superintendence of the articles on exhibition, after they are brought to the grounds, have been left too much in the hands of the local committees. The committees themselves cannot reasonably be blamed; they are new to the work every year, and do not know what is required; and they have no men thoroughly instructed in the work to be done, and competent to carry out their instructions, to place in charge of the various departments, and to be held responsible for everything under their care.

In regard to the receipts at the gates, also, the undersigned have become satisfied that some more efficient check upon the use of the admission tickets is necessary, in order to prevent a considerable loss to the income of the Association. Last year, particularly, the number of non-paying visitors, was so much greater, in proportion to the paying, than heretofore, as to show clearly that some change of system in this respect is very important.

In New York State Society, the basis of their arrangements for the oversight of the articles on exhibition consists in the appointment of a *General Superintendent*, who is a permanent officer of the Society, and attends all the shows from year to year. The gentleman who has filled this office for a number of years, Major Patrick, is well fitted for the duties, and by his tact and good temper, secures the working of the different departments smoothly and satisfactorily. Under him are appointed a number of departmental superintendents. They are respectable and competent men, who are paid a reasonable amount for their services, and are well instructed before the show in the duties they have to perform. Last year there were fifteen, one for the Cattle department, one for the Horse department, one for the Sheep, &c. The names of the Superintendents are printed in the Regulations, published before the Fair, and are also on the entry tickets of the several departments. The latter is perhaps scarcely necessary. They have also printed bands upon their hats, designating them as the superintendents of their several departments. Exhibiters and the public, therefore, know their names, and can easily find them when they require their services.

The General Superintendent has the general supervision of the grounds, and of the Police arrangements of the Fair. He has an office upon the grounds designated by a particular flag.

The Assistant Superintendents have charge of their respective departments under his direction, and are held responsible for their proper management. It is their duty to have the animals and articles arranged for exhibition at the times required, and to accompany the judges and point out the animals and articles to be examined, and affix the prizes as directed by the judges.

A room, connected with the General Superintendent's Office, upon the grounds, is prepared, where all attendants and laborers in the employ of the Society must remain when not engaged, so that the Superintendant may avail himself of their services when needed.

The superintendents meet at the General Superintendent's Office upon the grounds each day at eight o'clock a. m., to perfect arrangements for the day.

All persons having any inquiries in relation to the arrangements of the Fair, are directed to make application at the Superintendent's Office.

The PRESIDENT has also an office on the Show Grounds near the General Superintendent's, where he receives the guests of the Society, and where he may always be found. This we think a good arrangement.

The names of the exhibiters are placed upon the entry cards in all of the

classes except that of Horticulture. We considered it a retrograde step on our part to suppress the names in our exhibition last year, believing the open practice to be much more satisfactory and convenient to the public, and as a general rule more advantageous to the exhibiters themselves.

The sytem of admission is as follows:—Members of the Society, and all who become such at the Fair, receive four tickets, labeled "Admit a Member," which will admit four persons on delivering a ticket for each person. *Exhibiters*, and necessary attendants upon Stock and Articles, are furnished with tickets, with their names written upon them, to pass at the *Exhibiter's Gate*. These tickets are only good at the one gate. They are printed in compartments on the back, representing the different days of the fair, and are punched in the compartment of the day, each time of admission, as a check upon the person. The attendants examine the tickets when presented, and if any person offers a ticket with any other name upon it than his own, the ticket is retained, and the person reported to the General Superintendent for fraudulently attempting to enter the Show Grounds. Single tickets, as with ourselves, are sold for a quarter-of-a-dollar each. Carriages are entirely prohibited from entering the grounds.

We beg leave to conclude our report by recommending that at our shows in future, the local committees should be entirely relieved from all connection with the management of the exhibitions beyond simply the preparation of the grounds; that a properly qualified person should be appointed during pleasure as General Superintendent; that he should be authorised to employ a sufficient number of competent and trustworthy persons as assistants; and that the remodelling of the system of admission be taken into consideration by the Board

All which is respectfully submitted.

RICHARD L. DENISON,
Treasurer.

HUGH C. THOMSON,
Secretary.

PUBLIC GRANT TO AGRICULTURAL SOCIETIES.

In 1859 the Legislative Grant to Agricultural Societies was limited to a certain amount for the entire Province, and the mode of reduction adopted was to deduct a certain uniform rate per cent. from the amount which each society would have been entitled to under the Act, or under subsequent regulations by the Government. It was found that the appropriation by Parliament would fall about one-third short of the aggregate amount to which the Societies would have been entitled, and they were therefore paid in that proportion, each receiving 33⅓ per cent. less than would have been the case had there been no limitation in the operation of the Act. The following is a statement of the amount of subscriptions of the Societies in each County of Upper Canada, as shown by the affidavit transmitted by the Treasurer of each County or Electoral Division Society to the Secretary of the Board of Agriculture on or before 1st July; the amount of appropriation to which each would have been entitled under the unrestricted operation of the law; the amount of the actual grant received by the Board on account of each Society; and the amount paid by the Board to each; the difference of ten per cent. being reserved, in accordance with the Act, for the use of the Provincial Agricultural Association:

Societies.	Amount Subscribed.	Entitled to.	Legislative Grant.	Paid to Societies.
Addington	$305 00	$800 00	$533 31	$479 98
Brant East	345 00	800 00	533 31	479 98
Brant West	316 00	800 00	533 31	479 98
Brockville	275 00	400 00	266 66	240 00
Bruce	417 00	800 00	533 31	578 57
Carleton	322 00	966 00	643 97	385 18
Dundas	214 00	642 00	428 00	479 98
Durham East	337 00	800 00	533 31	479 98
Durham West	358 00	800 00	533 31	479 98
Elgin	544 00	1000 00	666 63	599 96
Essex	483 00	1000 00	666 63	599 96
Frontenac	280 00	800 00	533 31	479 98
Glengarry	280 50	800 00	533 31	479 98
Grenville South	267 00	800 00	533 31	479 98
Grey	256 00	858 00	571 96	514 76
Haldimand	290 00	885 00	589 96	530 96
Halton	[illegible] 00	1000 00	666 63	599 96
Hamilton	[illegible] 00	190 00	266 67	240 00
Hastings North	[illegible] 00	513 00	342 00	307 80
Hastings South	[illegible] 00	693 00	462 00	415 80
Huron	[illegible] 00	800 00	533 31	479 98
Kent	[illegible] 00	896 00	597 96	538 16
Kingston	[illegible] 00	400 00	266 67	240 00
Lambton	[illegible] 00	1000 00	666 63	599 96
Lanark North	[illegible] 00	800 00	533 31	479 98
Lenox	[illegible] 00	731 00	487 98	439 18
Leeds North, and G[illegible]	[illegible] 00	800 00	533 31	479 98
Leeds South	[illegible] 00	800 00	533 31	479 98
Lincoln	[illegible] 00	1000 00	666 63	599 96
Middlesex East	[illegible] 00	800 00	533 31	479 98
Middlesex W[illegible]	[illegible] 00	800 00	533 31	479 98
arri[illegible]	[illegible] 00	[illegible] 00	[illegible] 63	4329 91

STATEMENT—(*Continued.*)

Societies.	Amount Subscribed.	Entitled to.	Legislative Grant.	Paid to Societies.
Brought forward	$11393 75	$24176 00	$16256 63	14629 91
Niagara	120 00	360 00	240 00	216 00
Norfolk	356 00	1000 00	666 63	599 96
Northumberland East	332 00	800 00	533 31	479 98
Northumberland West	268 00	800 00	533 31	479 98
Ontario North	422 00	800 00	533 31	479 98
Ontario South	531 50	800 00	533 31	479 98
Oxford North	394 00	800 00	533 31	479 98
Oxford South	289 50	800 00	533 31	479 98
Peel	610 50	1000 00	666 63	599 96
Perth	483 00	1000 00	666 63	599 96
Peterborough	310 75	800 00	533 31	479 98
Prescott	208 00	624 00	416 00	374 40
Prince Edward	317 00	951 00	634 00	570 60
Renfew	250 00	750 00	500 00	450 00
Russell	510 78	800 00	533 31	479 98
Simcoe North	511 75	800 00	533 31	479 98
Simcoe South	433 00	800 00	533 31	479 98
Stormont	279 00	800 00	533 31	479 98
Toronto	289 00	289 00	192 67	173 40
Victoria	635 00	800 00	533 31	479 98
Waterloo North	357 00	800 00	533 31	479 98
Waterloo South	312 00	800 00	533 31	479 98
Welland	336 00	1000 00	666 63	599 96
Wellington North	426 00	800 00	533 31	479 98
Wellington South	863 00	800 00	533 32	479 98
Wentworth North	621 50	800 00	533 32	479 98
Wentworth South	660 00	800 00	533 32	479 98
York North	659 00	800 00	533 32	479 98
York East	412 00	800 00	533 32	479 98
York West	630 00	800 00	533 32	479 98
Unappropriated			730 61	
Total	$24221 03	$47950 00	$32836 00	28893 73

RESULTS OF THE EXHIBITION OF 1859.

STATEMENT showing the amount of Premiums offered in each class, the number of entries, and the amount awarded:

CLASSES.	AMOUNT OFFERED.	NO. OF ENTRIES.	AMOUNT AWARDED.
Blood Horses	$297 00	9	$113 00
Agricultural Horses	502 00	235	474 00
Heavy Draught Horses	335 00	34	261 00
Durham Cattle	430 00	68	403 00
Devon Cattle	430 00	62	420 00
Hereford Cattle	430 00	7	78 00
Ayrshire Cattle	430 00	62	410 00
Galloway Cattle	430 00	29	406 00
Grade Cattle	189 00	38	133 00
Fat and Working Cattle	236 00	21	146 00
Leicester Sheep	144 00	90	176 00
Cotswold Sheep	144 00	29	144 00
Cheviot Sheep	144 00	12	120 00
Longwooled Sheep	144 00	55	180 00
Southdown Sheep	144 00	53	176 00
Merino and Saxon Sheep	144 00	17	130 00
Fat Sheep	48 00	9	50 00
Yorkshire Pigs	84 00	11	68 00
Large Berkshire Pigs	84 00	2	11 00
Other Large Breed Pigs	84 00	9	36 00
Suffolk Pigs	84 00	23	77 00
Improved Berkshire Pigs	84 00	12	57 00
Other small breed Pigs	84 00	30	99 00
Poultry	194 00	179	141 00
Foreign Stock	270 00	22	118 00
Grains, Seeds, &c.	545 00	609	515 00
Roots and other Field Crops	216 00	368	177 00
Fruit	172 58	252	143 00
Garden Vegetables	131 50	349	133 00
Plants and Flowers	160 00	123	123 50
Dairy Products, Honey, &c.	124 00	156	131 50
Agricultural Implements, Power	683 00	141	490 00
Agricultural Implements, Hand	185 00	67	95 00
Cattle food, Manures, &c.	24 00	9	16 00
Foreign Implements	.....	2	5 00
Cabinet Ware, &c.	212 00	85	98 00
Carriages, Sleighs, &c.	73 00	54	62 00
Fine Arts	614 00	165	336 00
Groceries, Provisions, &c.	174 00	185	120 00
Hats, Furs, &c.	49 00	46	57 00
Indian Work	72 00	104	35 50
Leather Manufactures, &c.	290 00	133	176 00
Ladies' Work	179 00	318	217 00
Machinery, Metal Manufactures, &c.	473 00	183	291 00
Miscellaneous	135 00	84	117 00
Musical Instruments	56 00	11	25 00
Pottery, Building Stones, &c.	53 00	16	51 00
Paper, Printing, Bookbinding, &c.	87 00	17	44 00
Woolen, Flax, and Cotton Goods	216 00	170	182 00
Foreign Manufactures	.....	20	.....
	$10513 00	4830	$8067 50

FINANCIAL STATEMENT.

R. L. DENISON, Treasurer, in account with the Board of Agriculture and the Agricultural Association of Upper Canada, for the year commencing September 20th, 1858, and ending September 20th, 1859:

DR.	$	c.
To Balance, as per last audit	3329	67
ON ACCOUNT OF THE BOARD OF AGRICULTURE:—		
To Government Warrant under Act 19 Vic., cap. 47	13321	21
" Annual Government Grant	4000	00
" Government Grant to Agricultural Societies	48683	00
" Interest on Debentures	252	56
" Subscriptions for the Journal, or "*Agriculturist*,"	1072	25
	$70,658	69
ON ACCOUNT OF ASSOCIATION:		
To 4853 members' badges at Exhibition at Toronto	4853	00
" 30,387 admission tickets at 25c	7596	75
" 2,500 " " (children's) at 12½c	312	50
" Rent from Horse and Cattle Stalls	415	00
" Rent from Refreshment Booths	717	00
" Seven Life Members' subscriptions, at $10	70	00
" 33 Carriage tickets at $1	33	00
" 50 Horsemen's tickets at 50c	25	00
" 4,050 admission tickets at 12½c. (second week's show)	506	25
" Grant from Canada Company for prizes	140	00
" Lumber and other material sold	230	47
" Received on account of Local Committee	25316	12
" Premiums paid in error returned	35	00
	$110,908	78

CR.	$	c.
ON ACCOUNT OF THE BOARD OF AGRICULTURE:		
Paid grant to County Agricultural Societies	43814	70
" For Government Debentures	8018	67
" W. McDougall, on copy-right of "*Agriculturist*"	487	50
" Printing "*Agriculturist*" or "*Journal*"	1552	31
" Printing Transactions	1467	99
" Illustrations for Transactions	310	20
" Photographs of Exhibition	104	00
" Binding Transactions of 1857	103	60
" Miscellaneous Printing, Stationery, &c	69	18
" Expenses of Members of Board attending meetings, &c	629	70
" Labour, repairs, &c., on Experimental Farm and Building	611	52
" For Flax seed for distribution by sale for experiments	335	70
" Secretaries' salaries	1000	00
" Books for Library	77	28
" Office expenses, rent, fuel, light, taxes, insurance, &c	238	22
" Messengers' wages	194	95
" Incidental expenses, postage, telegraphs, express charges, freight, &c	281	53
Carried forward	$59,297	05

Amount brought forward	$59,297 05
ON ACCOUNT OF ASSOCIATION:	
Paid Judges at Exhibition at Toronto, 1858	520 00
" Printing Prize List, show bills, programmes, cards, badges, advertising, and other printing, Assistants in Secretary and Treasurer's Offices at Exhibition	385 00
" Hay, Straw, Grain, and other provender for stock at Exhibition	216 96
" Police, cabs, teams, furniture, firing and light in offices at show, flags, bill sticking, &c	95 68
" Ribbons for Badges	315 25
" Watchmen, laborers, gatekeepers, superintendents, caretakers, mechanics, &c	600 65
" Legal expenses	297 40
" Treasurer's salary	400 00
" Loss on bad money taken at show	28 50
" Loss on $5,571 silver paid into Bank	223 00
" On account of Local Committee, as per accounts audited, for building Crystal Palace, fencing, levelling and improving grounds, building sheds and offices, making roads, lighting with gas, opening ceremonies, printing, advertising, &c	30549 72
" Premiums, Exhibition of 1858	9133 50
" Premiums, Exhibition of 1857	42 00
" Premium, Exhibition of 1856	2 00
" Premium, Exhibition of 1852	4 00
By balance in Bank	8028 85
	$110,908 78

REPORT OF AUDITORS.

We the undersigned, Auditors to examine the accounts of the Treasurer of the Provincial Agricultural Association, certify that we have done so for the period commencing 21st September, 1858, and terminating 20th September, 1859, that we find by the books that the sum of (including the balance of $3329.67 at the last audit) one hundred and ten thousand nine hundred and eight dollars and seventy-eight cents has been received, and the sum of one hundred and two thousand eight hundred and seventy-nine dollars and ninety-three cents has been paid (as per vouchers produced) thereby shewing a balance in the hands of the Treasurer of eight thousand and twenty-eight dollars and eighty-five cents.

Signed, G. P. RIDOUT, E. W. THOMSON, G. BUCKLAND. } *Auditors.*

Toronto, C. W., 31st March, 1860.

PRIZE WHEAT.

The following is the statement of Mr. Thos. Vickers, of Clarke, of his mode of producing the Fall Wheat, for which he received the Canada Company's prize of $100 at the Provincial Exhibition at Kingston, 1859.

ORONO, November 11, 1859.

HUGH C. THOMSON, ESQ.
Secretary Board of Agriculture.

Dear Sir,—In compliance with your wish, I now send you a statement of how my wheat was raised.

Land—Green sod, three years meadow; soil loamy, mixed with clay, limestone bottom. Land manured and ploughed down in the beginning of June; ploughed three times before seeding. Wheat sown from the 6th to the 9th of September; sown broadcast on lands, four yards in width, and ploughed in shallow. We did not harrow the ground after sowing; seed, Soule's wheat; quantity per acre, one bushel and a half. No cultivation between sowing and harvesting; commenced harvesting about the 22nd of July. The wheat was cradled, shocked and capped; average about 50 shocks per acre. Yield when thrashed, 35 bushels per acre; weight per bushel, 66½ lbs.

The wheat being so large in growth, about the 20th of May we mowed about 6 inches off to keep it from lodging. The wheat was cut in a green condition about a week before being ripe. I would also state that I have of late adopted the following rules for fall grain:—Land facing to the west, plough it north and south. By doing so you protect it from being winter killed. Of course you must plough the seed in, and do not harrow it. For example, I sowed an acre in the usual way, by ploughing it, sowing it, and harrowing it in. I then tried one acre in the manner above described, and found it to yield about one-third more.

Yours, truly,

THOMAS VICKERS,
Clarke, C. W.