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THE CANADA FARMER

Vol. II. No. 3.

TORONTO, CANADA, MARCH 15, 1870.

NEW SERIES.

The Field.

Liming Land

The application of lime to the land in greater or less quantities is a very common practice in Britain, though but little followed in this country. Considering how cheaply the article can be produced, and the lasting good effect of applying it to the soil, it is a matter of considerable surprise that the practice of liming land is not more general with us.

The properties to which lime owes its chief power in promoting vegetation are twofold. It is an alkali, or rather alkaline earth, that acts as a solvent on many vegetable acids by combination, forming with them a compound soluble in water, and thus more readily taken up by the roots of plants. Thus, on soils containing a large amount of humus it proves extremely beneficial. It is more porous than clay, and has therefore a mechanical effect in rendering clayey soils more friable and workable, as well as being of a manurial value in assisting the decomposition of the vegetable salts in the soil. This is termed correcting its acidity. Wheat and mangolds contain a considerable proportion of lime in their composition, which accounts for the necessity of having sufficient lime in any soil to ensure good crops of wheat or mangolds.

Lime acts most quickly and powerfully when used in its caustic state, in the form of quicklime, and applied in this form to the soil, especially to one abounding in vegetable matter, it soon acts, and reduces the half-decayed weeds and roots into soluble plant food. Hence the value of quicklime when applied to fallows or clover leys a week or so before wheat-sowing.

But lime in this state usually requires great care in handling, or injury to the person using it may result, and so the most general way of applying it is in the milder state of slaked lime.

The best time to apply lime is either in early spring, on the land after ploughing for spring crops, and before it is harrowed down preparatory to seeding, or in the fall on sod land that has been just broken up, to be followed by roots or corn. The lime will then have time during the winter season to decompose the roots of the grasses, weeds, etc., in the soil.

There are some soils that already contain sufficient lime for all practical purposes. These are usually called limestone soils, and overlie the limestone formation of rock, or have gravelly or shaly limestone in their composition.

As lime contains but little, if any actual elements of fertility, but rather acts as a solvent or digester of those already in the soil, its tendency is to cause the soil to become more quickly exhausted of its fertile salts, by enabling larger crops to be grown, unless they are returned to the land in the shape of organic manures. On soils that are poor, or have been already over-cropped and exhausted of these organic matters, the application of lime will be of no benefit whatever.

For the same reason, when once lime has been applied, if the land is still kept well supplied with organic matters through the use of barnyard manure, etc., it is well to renew the liming once every few years, if the greatest degree of productiveness is desired.

The quantity of lime that can be usefully applied to the land depends much upon the quality of the soil. The richer and heavier the soil the greater may be the quantity given.

In England it is no uncommon thing to apply a dressing of three hundred bushels

per acre, while the average rate may be estimated at one hundred bushels per acre. In France it is more commonly applied annually, in smaller quantities of from five to ten bushels per acre. This last plan would probably be most applicable here, as our system of tillage is like that of France, somewhat too shallow, and as lime naturally sinks into the soil after a time, a heavy application all at once, at intervals of ten to fifteen years, would soon settle down to the hardpan, and become inoperative before half its work was accomplished.

Lime needs to be applied evenly over the surface, and when both the lime and the weather are dry; otherwise it will run into lumps before it can be mixed with the soil.

Soils that are wet, or subject to retain surface water, will gain no benefit from the application of lime, unless they are first drained.

Culture of Sugar Beets.

Mr. James Howard, M. P., in his report on European Continental Agriculture, gives an interesting account of his visits of inspection to several large growers and manufacturers of Beet Root Sugar in France, Belgium and Germany. This portion of his paper, as stated in our recent notice of it, we reserved for future consideration, and now give an extract on the practical point of culture and management of sugar beets.

At Cologne he visited a large concern known as the Rhenish Beet Root Sugar Company, that in addition to the roots grown on a farm of their own of 7,200 acres, purchases large quantities of beets from the surrounding farmers at 20s. per ton, the pulp being returned to them free.

This firm has issued printed instructions for the guidance of the farmers, which translated into English are as follows:

" 1. In order to grow good sugar beet it is necessary that the land intended for the roots

should be ploughed at least 10 inches deep before winter, as the frost renders the soil as fine as ashes, it enables the farmer to work the land readily in the spring, and the rapid growth of the plant is greatly facilitated. 2. From experience it is proved that roots planted in ground freshly manured, either with farm yard dung or compost, suffer from unequal growth and various kinds of insects. The quality also, in most cases, is inferior. It is better, therefore, to highly manure the previous crops and avoid the direct application of manure to the beet field. 3. As soon as in the month of April as the land has become sufficiently warm (say 15 to 50 deg. Fahrenheit) the sowing of the seed should commence, for according to all experience, the earliest planted beet are always the best. Drilling in all cases is to be preferred to sowing by hand. The cultivator should always bear in mind that the soil should be as fine as meal, yet not too loose, so that the seed is not deposited too deep. 4. If sown by hand, the roots should be in 14 inch squares; within the radius of the Cologne fortification, a rich district; the rows should be 12 inches wide and the roots 8 inches apart, so that they do not become too big. If drilled with a machine, the distance should not exceed 15 inches, and thinned out at 10 inches. 5. As soon as the plants are visible, hoeing between the rows should commence. The growth of the weeds is thereby checked, and also, the ever-forming crust which shuts out the air, is broken, and insects and vermin are destroyed. When the plants have six leaves the thinning or singling out should be begun. Frequent hoeing subsequently is also necessary to keep the land from becoming bound. When, in the month of July, the heads of the roots show above ground, which heads are totally useless for the sugar manufacturer, their development must be checked by moulding-up, which operation also facilitates the getting up of the roots when ripe. 6. Leaves are to a plant what lungs are to an animal; therefore, nothing damages the beetroot more than taking off the leaves before harvest. Such a senseless course reduces the value of the crop one half. 7. Roots, which are to be kept for several weeks or perhaps months, before being taken to the factory, should be quite ripe when gathered, should not have been exposed to frost, and should have been harvested in a fresh or moist condition. The roots are seldom ripe before the middle of October, yet frequent frosts occur at the beginning of November; the beetroot cultivator must, therefore, make haste to harvest his crop before the frost commences, and postpone all other work until the crop is secured. If a long drought has occurred, the growers should wait until a good rain has fallen, for roots that are harvested in dry weather, and after a long drought, will not keep. 8. The raising of the roots is best performed by means of spades or shovels, forks are not suitable for this operation, for, from experiment, too many roots get pricked, and pricks are a certain

cause of decay, whereas a smooth cut with a shovel is not so injurious. In any case, however, wounding of the roots must be most carefully guarded against. 9. The leaves of the gathered roots should be cut off with a sharp knife close to the crown, also the under leaves, which in most cases are decayed, must be removed by the hand or the knife, because they induce rotteness, and if left on are troublesome during the washing process. 10. Roots which are to be conveyed to the factory within three or four days of gathering should be plentifully covered with leaves, because the sun's rays beget decay of the roots, and rotten roots produce dark coloured juices, which are valueless. If the roots have to be taken to the factory later, they must be thoroughly well covered with earth, either in pits or heaps, so as to protect them as well from the heat of the sun as from the frost, and thus prevent their losing quality or quantity. The beetroot cultivator should remember the well-known proverb, 'Out of the earth, into the earth,' i. e., the earth not only produces but preserves. 11. The pit or heaps should be 3 feet wide, and 1 spit deep, and of any convenient length. The roots should be laid with the heads outwards. The work of covering up as well as the removal to the factory should be carefully performed, so as to avoid the bruising or wounding of the roots as their soundness is of the utmost consequence. Heaps which are 3 feet wide should not be more than 3 feet high, so as to keep the roots cool and prevent their sprouting. The roots should be covered up immediately, with at least two feet of earth, in order to avoid thoroughly the admission of air, for every change of temperature is injurious to the roots. Ventilation by straw chimneys or other methods must be most strictly avoided. If the heaps cannot be completed before night, a thick layer of leaves should be used as a temporary covering to prevent damage by night frosts. 12. In carting the roots to the factory, great care must be taken against bruising or breaking off the tap-root (the tap root is the richest in sugar), for roots handled roughly soon show black spots and quickly rot. 13. That the foregoing rules are attended to properly, the inspector appointed by the sugar factory will satisfy himself from time to time by actual observation."

Mr. Howard says: "If I do not mistake, these rules contain matter for reflection, and may suggest to the thoughtful English farmer some useful lessons in the cultivating and harvesting of the ordinary mangold crop. The processes pursued in the sugar factories of the Continent are very simple. The roots, being first washed in a machine, are dried and pulped, the juice pressed out by hydraulic machines, followed by the usual refining process. At the great manufactory I have referred to at Cologne, at which 100 tons of beetroot are converted into sugar daily, the process of extracting the sugar is unique, and far more perfect than any other factory I had the opportunity of inspecting. In-

deed, the whole arrangements are complete. Every department was thrown open to me, and every process explained, without the least reserve. When the inspection of the factory was finished, a carriage and pair, belonging to one of the partners, was politely placed at my disposal for a drive round their extensive farm. To return, however, to the sugar-making: Instead of extracting the juice from the pulp by pressure, as is the general practice, the pulp is put into a kind of colander, placed inside of a cylindrical vessel; when filled, the colanders are put in action by the steam-engine, and a rapid rotary motion is imparted to them. The juice is thereby thrown off by centrifugal force. The result of this plan was said to be that two or three per cent. more sugar was obtained than could be extracted by the process of pressing. In Prussia the manufacturer has to pay the Government duty of 14s. 6d. per ton on the roots, instead of 17s. 8d. per cwt. on the sugar, as in France. The Prussian maker has, therefore, a greater inducement to extract every particle of sugar. This arrangement, again, has led the German cultivator to be much more particular in the choice of his seed. The best description I met with is the "Improved Vilmorin," propagated by M. Louis Vilmorin, of Paris, who claims to have had recourse to the process of selection and the establishment of pedigree in plants long before Mr. Hallet was heard of. M. Vilmorin informs me that the Vilmorin beet is more highly prized in Germany than in France, and accounts for it by the fact of the duties being levied in the different manner I have described. The refuse of the beetroot after the sugar has been extracted forms an article of cattle food, and is held in high estimation. About eighteen to twenty per cent. is the proportion of pulp left; the worse the quality of roots, the smaller the quantity of pulp. It is preserved in deep pits, generally bricked like a grave—very often the expense of bricking is avoided—a covering of earth is laid upon the top. The pulp is generally consumed within the year; but if well covered up it can be kept sweet and good for two years, or, as I was assured, even for three years.

"Much controversy has taken place both as to the relative value of pulp as feeding stuff and as to its real money worth. Many practical men maintain that a ton of pulp is equal in value to a ton of roots. I think the money worth is best settled by the price it fetches. The average price at the factories I visited will amount to about 13s. per ton. Although horses do not like it, bullocks, which cannot be fattened on the root alone, can and are sometimes fattened for the English and foreign markets, without any other food than the pulp. Pigs do well upon it when cooked. Sheep will eat about twelve pounds a day of raw pulp. It is unquestionably more easily digested than the root itself, but cows kept upon it are said not to produce much milk. I was fortunate enough to obtain a debtor

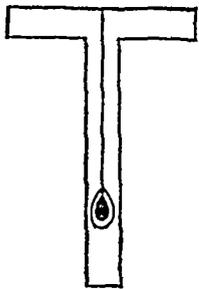
and creditor account of a sugar factory upon the continent, the locality of which, for obvious reasons, I am not at liberty to indicate. The proprietor is a large farmer. In it between 12,000 and 14,000 tons of roots per annum are made into sugar. The total expenditure, exclusive of the interest upon the money embarked, was £12,500, the total receipts about £33,000, leaving over £13,000 for profit and interest of money invested."

Practical Drainage.

BY ALAN MACDOUGALL, C. E.

As so much has been said about fall for drains and fall for water, it is necessary, now, that a few words of explanation be given, to show how the difference in level between two parts or points in a field may be ascertained. However true and regular the surface of the land may appear, the drainer, in attempting to follow that surface line with his drains cannot avoid having ups and downs in them. It is here the water lodges, and by not getting away, completely prevents air from coming up the drains and allowing them to work properly. It is very desirable, and should always be borne in mind, that the trench for the drains should have a regular grade, not be up and down anyhow, so long as the mouth is lower than the top.

To be able, therefore, to find out how his drains are to be laid, to work perfectly, the drainer needs some kind of a level, or instrument to help him take observations. The simplest thing that can be devised, and the one most readily presenting itself, is the *borning rod* already explained. Two pieces



of board, three or four inches broad and half an inch thick, are nailed together in the shape of the letter T, care being taken to have the head perfectly square to the body, which is usually about three feet long. Down the centre of the body a black line is drawn, and near the bottom a hole is cut to allow a plummet to hang. When the string of the plummet cuts the line, and the bob hangs freely, that is, is not resting on the body of the T, the head being placed at right angles to the body makes a perfectly level line, as level as it could be made by a carpenter's spirit level. It is not easy to sight along the top edge of the T, so it is well to have a sight nailed on to each end, and made to project from the side about two inches. They ought to be exactly level with the head of the T, or else, when a sight is

taken on the presumed level line, it will in reality be on a grade.

The operator having got his borning rod into adjustment, can easily hold it quite straight, so as to keep the string of the plumb bob on the centre line. He then has only to send his assistant with a staff to any point whose level he wants to know. By looking along the sights, he can see where the line will cut the staff, and taking the difference in height of the reading on the staff and the height of his eye, or the top of the T, above the ground, he can find out whether the land rises or falls in that distance, and how much. It is very convenient, however, to have a rod graduated with feet and inches, of any convenient length, say six



or eight feet, with a large target to slide on it, coloured in opposite quarters red and white. This can easily be seen by the eye, and with very little practice any one will be able to work with considerable accuracy. When the correct level has been got, the target is tightened by means of a thumb screw at the back of the staff, and it can be kept in that position until the operator comes up to measure the difference in height.

This is the readiest and simplest form of a levelling instrument. There are one or two others, which will be explained in the next paper, but the method of going to work is exactly the same in every case, and the method now explained is very simple. Any one can get this level, to give it a dignified name, made by any carpenter, or, indeed, make it for himself, and if it gets broken, the cost of repairing it is so trifling as not to be felt.

Hedges and Mice.

To the Editor.

Sir,—It is with great pleasure that I have read the late articles upon "Making Hedges" in your paper. The difficulty is not, I think, so much in the growth of the live hedge, but in the preservation of the fence when the whole of the obstacles towards a fair start have been overcome.

Now, it has been well shown in the articles to which I allude what kinds of plants grow the fastest or the best, which are most impervious, and which withstand best the frost but there is a worse enemy than all these, namely, the ravages of mice. I was speaking to a gentleman the other day upon this subject, and he mentioned a case which came under his observation a few winters ago. A very fine hedge of thorn (I think he said the English thorn) had been planted and carefully attended to until it had formed a

fence perfectly impervious to the attacks of the most evil disposed of breachy animals.

After much labour, time and money had been expended upon this hedge, and just as it had arrived at perfection, in one winter every plant was cut off by the mice, each stalk having been completely peeled from six to eighteen inches from the ground.

Now, such a case as this discourages many from attempting to substitute the beautiful hedge for the slovenly snake-fence. I have written, Sir, simply to draw from some of your staff, or readers, such experience as may show any easy method of preventing the ravages of these animals, or what kinds of plants seem to be most free from their attacks, thus hoping to provoke discussion, and call forth the opinions of those who have made experiments with live fences, upon this point.

C. E. W.

Ancaster, February 21st, 1870.

What has Science done for the Farm?

This is a question constantly and sneeringly asked by persons who pretend to dispute Book Farming, and who say, "I know all that twenty or fifty years of my experience can teach; I do as my father did, and so far as I can see my land is as good now as it was in my father's time, and I don't want to be troubled with "book farming."

There are thousands of such persons as these, and certainly book farming is very little use to them, for they have not the intelligence to make use of it, and yet these very people are the first to say when a crop fails, "times are not as they used to be, we had always good crops then."

The science of farming, and science in farming, has been more attended to in Britain than any place else in the world, and the consequence is that the average of the wheat and other grain crops has been within the last twenty years more than doubled, in some cases, and nearly doubled throughout England and Scotland.

Science in the first place went too far ahead of the times, the people could not understand it, and as the theorists who advanced the scientific assertions were not sufficiently practical, they could not always enforce conviction on the minds of their hearers and readers. Science first began to analyze the crops, and thus ascertained of what chemical elements they consisted. Then they analyzed the land, and prescribed as to what was required to render it fertile. Now, for want of material knowledge, the scientific people often went wrong, and every mistake was scored up against them, and widely blazoned abroad, while their successful hits

were confined to the parties benefited, and by them kept as quiet as possible, lest the landlord of a farm, if he found his tenants getting extra crops, should charge an extra rent, and thus get the benefit, or a larger share of the benefit than the tenant felt inclined to give him.

It was thus the interest of the scientific person to make his discoveries known, because it brought him customers, but it was the interest of the benefited farm tenant to keep the results as quiet as possible, and to prevent his success becoming public.

Of course but few believed the scientific theorist; it was his interest to make the most of his own discoveries, and this was a sufficient answer for the scoffers and doubters to give when questioned on the subject. Nevertheless, gradually it came to be seen that certain people would take hold of a farm of notoriously poor or bad character, and in the course of a few years would become comparatively wealthy, whereas previously, within the memory of man and within the legendary lore of the oldest inhabitant and Nestor of the village who had the history handed down to him for generations, every tenant on such and such farm in the parish had always either not benefited himself, or had been ruined out right. When therefore, a person on one of these farms was found to succeed, and it was seen that success followed the use of the new fangled manures, people began to see that there was something in it, and thus gradually success conquered ignorance and prejudice, and the sayings and recommendations of scientific men came to be over-appreciated. This naturally led to the advent of numbers of persons who, with either more or less scientific knowledge, established themselves as "Agricultural Chemists," analyzed soils, charged high fees, and ended by recommending the newly discovered manures, which in the first place consisted of crushed bone or bone dust only.

Now, as the use of bone dust can never be mischievous on any land, and on land that really wants it works like a charm, these good gentlemen, who had recommended the article under such high fees, acquired great honour, and the faith of the farmers began to get unlimited in their advisers.

At first bone-dust quite coarsely ground was used, also, as it was called, "half-inch bone," that is to say, bones crushed into pieces about half an inch large in each direction; the bone dust was found to benefit the ground for at least three years, although there is little doubt that it did

not yield up all its virtues even in that term. The inconvenience of manuring with one coat of manure which would last three years, was very soon discovered; if a tenant in the last year of his lease used the bone dust, he certainly got the benefit of a vastly increased crop, but he left an equal benefit in the ground for two following years, which he could not get paid for by the incoming tenant, and the consequence was a further reference to science to reduce the bone dust to such a state that the crop on which it was used might be expected to extract the chief benefit of it, without any large quantities remaining in the soil. Thus the use of capital would be saved, and the payment of two years' interest on the amount spent in this manner would be avoided. The result was the various preparations called "Superphosphates," in which the bones are dissolved in sulphuric acid, and thus reduced to their elements, and the beneficial influences of the manure are brought into the immediate use of the crop, so that the crop following the use of superphosphate is supposed to extract the whole of the benefit. Various other methods of reducing the bones were resorted to, all with greater or less effect, but all intended for the one object, viz.: greater economy in the use of the manure.

The use of these various preparations of bone increased so fast in England and Scotland, and also in the best farming districts in some parts of the continent of Europe, that bones soon became scarce, and again science was resorted to. The next speciality as a foreign manure used was "guano," which is found by the deposits of the myriads of sea fowls and sea animals which frequent the islands in the Pacific, amongst which the most famous was from the "Island of Ichaboe," off the western coast of South America. There were various other islands in the same vicinity, and all these being situated in a latitude where rain is almost unknown, the deposits of guano were never leached by the action of water, or even heavy dews, and consequently not only retained all the usual insoluble elements of such substances, but all the soluble elements as well, particular ammonia, which existed throughout the substance in a very large proportion. In a considerable period the collecting and bringing this guano to England employed an immense number of ships, and the pursuit became a most important one. But the guano-bearing islands in the Pacific belonged to the Governments of Chili and Peru respectively, and these Governments exacted so high a price for it per ton, as to lead to the most exhaustive search all through

the Pacific, Atlantic, and every other part of the tropical haunts of sea birds and animals, and fortunate was the captain and capitalist who discovered a guano island, belonging to nobody, where no export fees had to be paid. Such secrets were guarded with the utmost care, but of course could not long be concealed, and small wars were waged by private ships' companies, for the precious and coveted substance. Most of these deposits, enormous as they were, are now exhausted, or in a fair way to become exhausted, notwithstanding that in some of the islands the deposits were of hundreds of feet in thickness, and the substance was cut out of apparently solid cliffs, which towered one above the other to a considerable distance. The principal of these islands are now again abandoned to the birds and sea beasts, and the deposits are expected again to accumulate.

Guano was found in analysis to consist of the phosphates with a small portion of sand, and the substances resulting from decay of animal matter, particularly ammonia the birds who formed these deposits feed on fish and sea weeds, and the result was considered equal in phosphates, (from the bones of the fish consumed) to bone dust, and superior to it in ammonia.

As the Guano deposits began to fail in supply, science was again called in, and everything which would yield phosphoric acid to chemical tests was searched for, and when found, was converted to manurial uses. Mineral phosphate of lime, though entirely inert to vegetation, when used by itself, was found at once to yield up its treasures to the action of sulphuric acid, and consequently mineral phosphate, which is found in great abundance in certain rocks, was diligently sought for and converted to the use of the farm by scientific means. Coprolites also, another phosphate substance, was found in large quantities, and similarly reduced and passed into the use of the farmer.

Some of the largest deposits of mineral phosphate of lime which are known, are to be found in Canada, and that substance is now extensively mined, and exported to the all-devouring British Agriculturists, instead of converting and enriching our own fast failing fields. It is to be hoped, however, that this disgrace will soon pass away, and that Canadian phosphates will benefit Canadian lands.

After English farmers once allowed to themselves that science could help them, other substances as well as these already mentioned were sought for, and found, and are now in general use; but the further consideration of the subject must be deferred to a future occasion.

VECTIS.

Cow Manure.

The very best manure for all kinds of flowers, strawberries, and other small fruits, is cow manure. In fact, actual test has demonstrated that it is valuable as a manure for all kinds of vegetation, and better than anything else for the flower and small fruit garden. Cows feed upon herbage principally—the grasses, in their green or cured state—and the very essence of that herbage is applied to the plants in the shape of well-fermented manure. I saved two cords of this valuable fertilizer last fall and winter in the following manner: I kept two cows and a wheelbarrow and spade in my barn lot. I built two pens eight feet long, four feet high, and four feet wide, and covered them over with boards, leaving one end open. Knowing the value of this manure, and the difficulty of saving it properly if left lying about uncollected in the yard for the pigs and other stock to destroy, I told one of my boys that I wanted him to take it up with the spade and barrow every morning and evening, at milking time, and wheel it to the pens and throw it in. By way of encouraging him to do this work regularly, I agreed to give him twenty-five cents every Monday morning, as extra pay. He was faithful, and at the end of four months I had two cords of manure, worth more than the same quantity of any other fertilizer known, at a cost of only four dollars. I would not have taken twenty dollars for it on the first of March. At that time I composted the two heaps with an equal quantity of sods from the roadside, wetting down the mass with soap suds, and on the first of April applied it to my flower borders and strawberry beds; and such flowers and fruit I never had before. Its good effects will be seen for years, or as long as I desire to keep the beds in cultivation with berries and flowers.—*Cor. Rural New Yorker.*

Frozen Roots.

In a former number of the CANADA FARMER it was endeavoured to be shown that one of the best manurings which could be given to land for the purpose of renovating it, and preparing for a crop of wheat or barley, was a crop of roots destroyed on the land by the winter's frost, and then ploughed in as a coat of manure the following spring. Numerous instances were adduced in which such a course had been, both purposely and accidentally followed, and with excellent and permanent results, and it was argued that if the whole transaction were carried through in the cheapest and best manner, that it would be an economical arrangement. Like every thing new, it was received with incredulity, followed in many cases by unmitigated ridicule. People endeavoured to show that a crop of roots cost, in some cases, as high as forty dollars per acre, and although the more moderate calculators limited it to twenty dollars per acre, yet even at that rate

it was declared that such a course would be extravagant and suicidal in the extreme; and it would not be too broad an assertion to make, that the recommendation has not been followed out in a single instance.

The present, or rather the late exceptional season, has taken the matter into its own hands, and the past fall and early winter have seen many hundreds of thousands of acres of roots throughout Canada, covered with snow in the fields, frozen up, and finally abandoned. This has been looked upon as a heavy visitation, but like most visitations, which at the time seem hard to bear, it may, and perhaps will, prove beneficial to the cause of agriculture, and show on a large scale either the falsity or the excellence of the views explained in the former article on the subject. If it should prove that such a manuring is the best that could be given, then every one's ideas will at once be turned to the cheapest plan of carrying it out in future.

The writer was, a few days since, in conversation with a most intelligent and well-doing farmer, and on asking the usual questions as to the progress of the crops, the farmer, with a heavy sigh, stated that he had been caught by the frost and snow, and that the largest portion of his root crop was now under the snow in the open fields, and, of course, destroyed. The matter was discussed, and the profits which the roots would have realized, by feeding to cattle, taken into account, and after all the farmer seemed to take the thing rather philosophically, observing, "If I lose on the cattle, I shall gain in the land, for it is the best thing that could be done to manure it, and I shall be sure of a big crop of barley, and if prices only hold, my loss will be more than made up, and my land will be all the better of it besides." Delighted at the expression of congenial views, the writer enquired what the farmer meant, and what crops of roots were left out. The farmer replied, a large piece of carrots, about two acres of mangolds, and a large lot of turnips. The carrots and the mangolds would, of course, be a dead loss, but he thought that some of the turnips might be fed in the spring. He was asked, had he ever known a crop of turnips or mangolds to be destroyed by frost in the ground, and then ploughed in. He replied, yes, that on one occasion, on his father's farm, near by where he lived, he had what was then supposed to be the misfortune to lose a crop of turnips in a similar manner, that the part so lost was only part of a field, the remainder of the roots having been buried in time. The result was, that although the land where the turnips were buried was worked and treated in the usual manner, and produced a good crop, yet the part where the turnips were destroyed in the ground had produced a far better crop; that the wheat was at least a foot higher on that portion, and you could tell to a line where the turnips had been destroyed and ploughed in, both by the excellence of the yield and

the great increase in the produce of straw; and he added that the fact made so strong an impression on him that he should never forget it.

The writer then went into the subject with the farmer, discussed the merits of the plan and the cost, and finally received a promise of a full report of next season's operations, describing the improvement and otherwise of the succeeding crop, which was intended to be barley, and which results shall duly appear in good time in the columns of the CANADA FARMER. The writer will feel obliged if others similarly circumstanced will report through the same channel the results of their experience.

VECTIS.

Stocking Pastures.

A subscriber at Richfield Springs, N. Y., asks, "Is it best to stock a pasture to its full capacity, or allow the grass to grow faster than stock can eat it down?" It will be found most profitable to stock as heavily as the land will bear, and the pasturage is sufficient to maintain in good growing condition. If the land is too lightly stocked, the animals will become dainty in their choice of food, and graze some portions closely while others are left almost untouched. The coarser grasses will then be seen growing up tall and rank in scattered patches, while clover and the finer and more succulent grasses will be cropped closely. This entails a great waste of food, as when some of the coarser grasses acquire a strong growth, and begin to run up to seed, they will not be eaten by any kind of stock. The best plan is to keep the pasturage at as even a growth as possible, by grazing different kinds of stock one after the other. Begin with the cows, let them have the first of it, and as soon as they have grazed it sufficiently, which will be as soon as their yield of milk shows the least falling off in quantity, put them on a better pasture, and let horses and young cattle follow, then sheep, and by the time the last have grazed it closely, if the land has not been overstocked, it will be late enough in the season to take all stock to their fall pasturage, and allow the summer grazed fields to be shut up in order that the grass may sufficiently recuperate before winter to give enough top to act as a mulch to the roots against severe freezing and thawing during late fall and early spring.

Where but one kind of stock is kept, dairy cows for instance, the better plan is to have the pasturage divided into three or four fields, and put them a week at a time, turn about, in each field in succession, beginning with the driest and earliest, so that the first pasturage will have sufficient time to grow thick and stocky before

the last one is fed off. This is particularly the case with clover, which is best not to be allowed to grow rank at any time, and especially when intended for pasturing milch cows.

Thin Sowing.

To the Editor.

SIR,—When in England recently I was much struck with the extent to which the theory and practice of thin sowing are extending. Mr. Mechl says that his "wheat from two pecks an acre is thick, and that raised from three and a half and four pecks an acre wants thinning." A Suffolk farmer, who has practised thin sowing some years, has decided, from different trials, that three pecks and five pints, or rather less, is ample seed for wheat. Wheat so sown does not go ahead as fast at first as that which is sown thicker; this is much in its favour, as it thus gets a better root-hold, whilst it is not being impoverished by tender shoots striving to outstrip their rivals in reaching the fresh air, so necessary to the plant. Thick sown crops seem to grow as if their existence depended on each plant out-growing its neighbour, thus expending their vitality to no beneficial purpose.

Thin sown wheat has strong, good straw, many heads to each seed sown, and good plump grain. The straw being stout and not too long, stands well in the field.

When it is considered that many sow seven, eight, nine, and even ten pecks of seed wheat per acre, the saving accomplished, alone, is a great object gained. If this quantity only is sown, the sample must be clean and good.

Barley, also, has shown good results from thin sowing. R.

NOTE BY ED.—Such thin seeding may do very well in Britain, where the soil is made rich and brought to a high state of tilth and the best drills are used, but would not be advisable in Canada, where climate and circumstances are so entirely different.

To Keep Birds from Seed Corn

A good plan to keep crows and other birds from seed corn, and one of the efficacy of which we can speak from personal experience, is thus described in the *Country Gentleman*:

"The plan generally adopted by the farmers of this county, to prevent blackbirds from pulling up corn in the spring is: Put the corn, say one-half a bushel, in a tub or other convenient vessel, and pour over sufficient hot water to cover it; and let it stand a few minutes, or till the corn is thoroughly warmed; then drain off the water, and pour over the corn a very little gas or coal tar, which has been previously warmed till it is thin, and with a stick stir it thoroughly, which will give every grain a thin covering of the tar; lastly, dust over it some dry plaster or earth, to prevent the grains adhering to gether, and stir again.

Stock Department.

Breeding Horses.

In a former article on this subject we showed the folly of the too common practice of using mares as breeders without regard to age or fitness to produce healthy offspring. Having a mare that combines good form with perfect freedom from disease or defects of any kind, except perhaps those resulting from accident, and not attended with irritation, the next point to be attended to before commencing to breed from her is the selection of a sire.

Now one of the principal points to be looked to in a sire is purity of blood, from whatever source it is derived. There are but few fixed types of horses with the power to transmit those types to their offspring from common mares.

Those types are the thoroughbred racer, the Arab, the Suffolk, the Clydesdale and the Norman.

Of the first two we do not propose to speak, as the few we have of them are not the right kind, the tendency of the present racing customs being to breed animals of a leggy character, capable only of running a very short race at an unusually early age. Could we get a few sires of the thoroughbred class known in England as the old four-milers, and still found, to some extent, in Kentucky in the descendants of "Lexington" or "Scottish Chief," famous for their wind, courage and stoutness, and now chiefly used to breed weight-carrying hunters or extra good roadsters, much might be done to improve the quality of our travelling nags. For general farm work, combining strength, beauty of form, and colour, with docility and a quick pace in walking, the Suffolk is a most desirable horse.

The Clydesdale is perhaps the best known of any among us, and as a horse adapted to draw heavy loads over long distances at a slow pace, it stands unrivalled, but is too sluggish in temper and movements for farm work.

The pure Norman horse, an animal combining great strength and stoutness with moderate size and good action, has not yet been introduced here to our knowledge. The well known French Canadian horse partakes strongly of that type, having originated from a cross of Norman blood on the Indian ponies of the old settlers of Quebec.

One of the greatest evils of the present day among horses is want of character, re-

sulting from the employment of animals as sires that have nothing to recommend them beyond their powers of trotting.

Now, it is an acknowledged fact among turfmen that there is no such thing as a breed of trotting horses. The Morgans and Black Hawks at best were but mongrels, having an infusion of the blood of the racer, and in no case has it yet been shown that a horse possessing trotting powers has been able to transmit his peculiarities in that respect to his offspring. There has never been any attempt made to fix the type of the trotting horse, nor can there be, for the gait itself is one that is acquired by diligent training, and as a rule, no trotting horse has shown any other quality that would be desirable to perpetuate.

A common mare may or may not produce a good colt by a trotting stallion, the result depending not on the trotting qualities of the sire, but on what blood he may have inherited from his ancestors. Stonehenge, the best authority on horses, says, "The pure blood stallion had no plebeian ancestors, and his colts, if not closely resembling himself, will still be good, inheriting the qualities of some ancestor, while the colts of a trotting stallion are likely to take after some dung-hill grandmother."

Our earnest advice to farmers who desire to breed good horses is to employ only sires that are really of pure blood, and particularly to avoid using any of the class of trotting stallions now so numerous, and so persistently encouraged by the mistaken policy of many agricultural societies and judges of horse-flesh, in awarding their prizes on the credit of what they may have been trained to do, rather than for any good character or qualities likely to be inherited by their offspring.

Were every stallion shown at an exhibition required to produce a pedigree showing his descent from a known ancestor, as is now done with cattle, to entitle to a prize, there would soon be an end to all breeding from fancy mongrels, now getting too common for the good of the country. An old writer justly says:—"The worst scrub of a hack of pure blooded lineage will produce better colts from a cold-blooded mare than the handsomest mongrel that ever went on a shodden hoof can do."

The Prussian Government has just adopted an extensive scheme for improving the breed of horses of all classes, by encouraging the formation of local associations for the purpose.

The Prince Consort's Farms.

It was only on that cheerless Sunday, when the Prince Consort's name first passed from our litany, that England seemed to awake to a full and abiding knowledge of what she had lost. None had more reason to mourn him than the agriculturists. He had united himself more closely with them than very autumn by becoming the President of the Royal Agricultural Society, and taking the chair at the first council meeting in the session of 1861. Agriculture held a high place among the subjects to which that broad heart and piercing intellect had been applied. Those who knew him best said that you could not take a country ride with him and fail to see that his mind was ever at work, thinking out some useful problem on farm stock, land, or tree. In his six farms he took especial delight, and each new invention and mode of culture was tested there without fear or favour. He also determined that they should be the neutral ground, on which farm stock, whose merits are so magnified or depreciated by local prejudice, should have an impartial trial, as well as the head centre, to which the first agriculturists of all nations should freely resort and exchange minds on food for the million, and the labourers' welfare.

The history of the six farms, including those at Osborne and Balmoral, has been done so fully and so ably by Mr. Chalmers Morton, that it is beside our purpose to enter into descriptions of soils, farm buildings, and modes of cropping. We may simply say that the four farms in the "royal county" comprise 2,400 acres, of which 700 are arable.

Her Majesty has a private sitting-room adjoining Mr. Tait's (the manager's) house, round which are hung pictures of prize cattle, pigs, and horses, which have nearly all been bred on the Royal Farms. They are by Herr Keyl, a very skilful farm-yard artist; and, in fact, we have rarely seen a prettier composition of the kind than the white Smithfield heifer, with a robin sitting on the wire fence. There are from eighty to a hundred Short-horns in the biggin, and forty to fifty of them are in milk. The dairy produce is all required for the Castle and the farm; and when the Court is at Balmoral, 120 pounds of butter are forwarded weekly. A dozen Alderneys are also kept as cream-stainers; and the great object has always been to retain the whole badger colour, as there is a better foreign sale for them. This, however, was found impossible of attainment as long as the Alderneys were tethered head to head with the Short-horns, and kept the roan and flecked colours perpetually in their eye. They are imported at an average of from 20 gs. to 25 gs., and increase considerably in size with the rich grass, besides growing rather lighter in their colour. No forcing can make them more than half fat, when their milking prime is over, and seldom more than £10 can be got for them at the butcher's. In the height of the grass one or

two of them have yielded sixteen quarts per day.

Cold Cream and Alix, two Short-horn cows of the famous Earl of Dublin milking strain, which were purchased for 100 gs. each at the Fawsley sale, have given as much as from thirty to thirty-five quarts apiece at two milkings. These two cows have made the herd; but, instead of the usual system of "Bates upon Fawsley," bulls of the Booth blood, and direct from Warlabby, have been used. Prince Alfred, Fitzclarence, Lord Hopewell, British Prince, &c. were here in turn, up to the time of the sale in 1867, and since then England's Glory has been in residence. The cross hit very fairly. Cold Cream had ten calves—three bulls and seven heifers—and they and their produce have already made £1,651 10s., while those left may be very fairly valued at £150. The old cow never had twins, and the highest price for any of her descendants was Mr. McIntosh's 100 gs. for Duchess. Alix has survived her, and has just had her sixteenth calf in her sixteenth year. Two sets of twins have been her lot; and she has so far had eight heifers, but they have not sold for the same prices as Cold Cream's, and have only realized £721, with £600 still to the good. The biggin can accommodate sixty cows standing face to face. Its stalls are nine feet by six feet, and furnished with iron troughs, divided into three compartments for food and water; and a raised platform, flagged with asphalt, and formed with slabs of Penryn slate, runs down the centre of the building. Old Alix was there, still giving upwards of twenty quarts; but Cold Cream had gone to the butcher. Some purchases have been recently made from Mr. Fowler of the Prebendal Farms, Aylesbury, who has been very successful with the "Bates upon Fawsley" cross.

The foreign cattle which Her Majesty has received from Eastern kings and rajahs are tied up with the rest. Three zebus stand side by side; the bull, which is grey, being the smallest of the lot. His Platonic consorts are both white, and one of them has its horns erect, and the other lying back, almost flush with the forehead. They do not seem to have a trace of vice about them as they gaze at you with their mild eyes, and stretch out their chocolate noses to be patted. A Bramah bull, from Mysore, stands near them, and seems about the size of a very minute Shetland trick pony. He is most courteous in his solitude; and, at the words, "Salaam, Joe!" down he drops on his knees. His hump is said to be porous, like a tongue. In a time of great drought it will shrivel, and then swell again when the rains descend. We believe it is the same with the zebus. The Alderney bull is in the next box to the Swiss one, which puts the *Ranz des Vaches* and all its associations of happy vales and hills at a discount, with its pot-belly and its head like a bushel. A tawny lion-colored African, which looked liked a fusion of West Highlander and Alderney, and was sent to Her

Majesty, with two cows, by the King of Portugal, has died. The calves have nothing but skim milk after the first two or three days; and the loveliest little black-and-white nosed Alderney we ever saw had no exception made in its favour. There are no Ayrshires kept upon the farm.

About two hundred Cheviot draft ewes are purchased direct from the Sutherlandshire hills, which ensures a freedom from foot-rot. Half of them are crossed with Southdown and the rest with Leicester rams, and the lambs are sold from the teat to the Windsor butchers about June. At one time only Leicester rams were used, but as the taste for the "black foot" crept in among a mutton eating population, the Southdown was introduced, and, although they gain in quality, there is a reduction of about four pounds in the dead weight of the lambs. The ewes are bought by character at the great Inverness market, and come by sea to London. It is very seldom that more than one crop of lambs is taken from them, and then they come to hand very quickly for the butcher.

Black Norfolk turkeys, grey Dorkings, and Aylesbury ducks are all reared on the farm, and those which are not used at the Castle are sold to poulterers and fancy breeders. The hen-house is constructed on very useful principles. A fountain plays all day to furnish fresh water, and large heaps of sand are put down specially for rolling in.—*Mr. Dixon in Gentleman's Magazine.*

Breeding Sows.

Although thrifty well kept pigs will procreate at four to six months of age, yet it is bad policy to permit the sexes to come together before they are eight or nine months, so that the sows shall not be less than one year when they farrow with their first litter, the period of gestation being sixteen weeks or 112 days—old sows produce the largest, strongest and best pigs. Successively breeding from young sows for several generations lessens the size and probably weakens the vitality of the pigs. Sows that are good breeders can be profitably kept for four or five years—and if such exclusively are kept for breeding it will not be necessary to change the boar annually.

Sows kept for breeding should neither be starved nor made very fleshy, but should be fed with a view to the most perfect health and vigor; they should never be kept in a close pen, but should have sufficient range for exercise; easy access to water, with such a variety of food as their instincts call for. Deprived of food which they crave, they frequently destroy their young, the cravings of appetite overcoming the maternal instincts; when properly kept and fed, this never occurs.

As the time of farrowing approaches, more generous feeding is required. The increased demand upon the vitality of the sow must be met by a full diet; but it should be composed mostly of green, succulent, and light diet,

carefully avoiding all heating and stimulating food. Little or no dry corn should be given. House and dairy slop, bran, shorts and coarse provender, with a good pasture range in summer, and when that cannot be had, as in winter, some kind of both vegetable and animal food should be given.

A few days before farrowing, the sow should be put in a warm, dry, well sheltered pen, and protected from all annoyances.

Little or no food should be given the day after farrowing, and but light feed and plenty of water for several days. A paill of swill at this time will often prove fatal to the sow. Careful attention to these suggestions will seldom fail to secure "luck" in raising pigs, while a neglect of most or all of them will have a tendency to make such a farmer an "unlucky" breeder.

The best season for sows to farrow is April or May. The weather is then sufficiently warm, and the sows can get a taste of grass and insects, a very important consideration. The pigs have the entire summer for growth, which prepares them to meet the inclemency of winter without injury. An April or May pig is worth two August or three November pigs. The early pig can be fattened if desired, the succeeding winter, and if kept till eighteen or twenty months, will attain the maximum weight of the race. The late pig must be kept through the first winter, and when fattened the succeeding fall, will weigh 50 to 100 lbs. less than the early pig, and his keeping will most likely have cost more.—*Prairie Farmer.*

THE WOOL GROWERS' AND SHEEP BREEDERS' ASSOCIATION OF THE COUNTY OF LENNOX.—Officers for the year 1870: President, Donald Fraser, Odessa; Vice Presidents, William Dawson, Selby; John Sharp, Bath; Secretary, Francis Van De Bogart, Napanee; Treasurer, John Dunbar, Napanee. Directors, Nathan Caton, Garret Vanalstine, Nelson Dollar, Henry Huffman, S. K. Miller, C. W. Huffman, Shipman, Reuben

LIBERAL PREMIUM.—We direct special attention to the advertisement of the East Riding of Northumberland Agricultural Society, who, with commendable spirit and liberality, offer the handsome premium of \$75 for the best stallion for general purposes exhibited at the Spring Show of entire horses, to be held at Castleton on the 20th of April. The competition is open to all without entrance fee.

CLYDESDALE HORSES.—When in Scarborough a few days since we had the pleasure of seeing two very fine young stallions of this breed, imported from Scotland by Mr. James Lawrie, of Malvern, in 1868. They are named respectively "Farmer's Fancy," and "Tinto." Their colour is bay, and they are very handsome animals, with good action and style. They are from a noted breeder in Scotland, and have very fine pedigrees. The dam of one of them has taken no less than seventy-four first prizes, and the dam of the other, four £50 prizes in one year, including that of the Highland Agricultural Society.

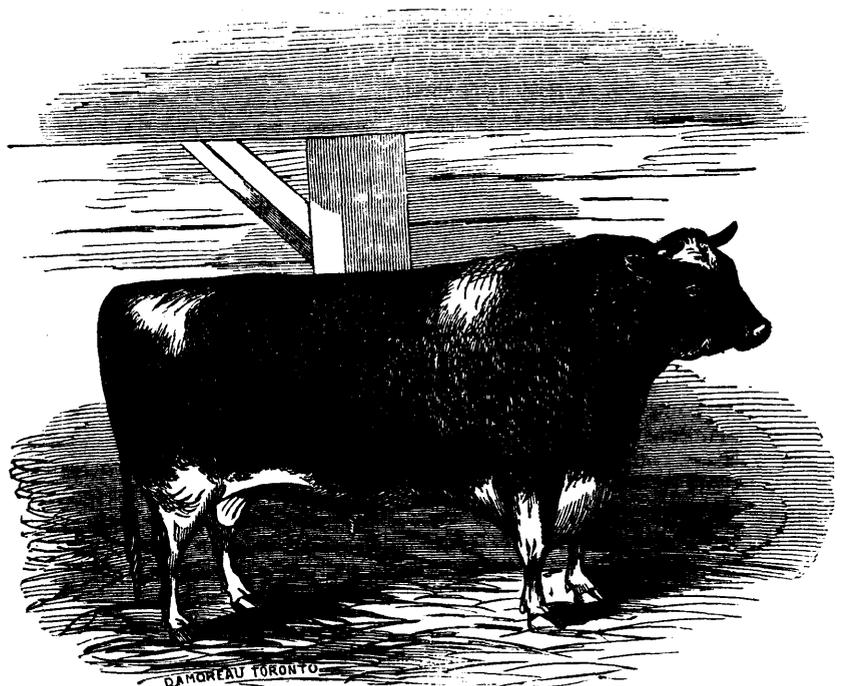
Holstein Cattle.

As the name indicates, this breed is of Danish origin, though now extensively spread over Holland and Belgium. It is believed that an early importation of these cattle to England formed the foundation from which the improved Shorthorns sprung, and their appearance indicates a strong resemblance to that breed, except in colour.

They have long been known and celebrated for their excellent milking qualities, and, no doubt, under the system of high farming and soiling carried out in Holland, have greatly improved in that respect of late years, the object being to breed them with a view to the develop-

two years 1,240 lbs. One of the cows gave, from 26th May to 27th July, two months, 4,018 lbs. 14 oz. of milk, or nearly 32 quarts per day. She continued in full milk up to the 24th of the following May, and the day after dropped twin heifer calves. This same cow, now 11 years old, is giving an average of 25 quarts of milk a day since February 10th, 1870, having calved January 18th. She gave 17 lbs. 14 oz. butter from six days' cream. Their milk is said to be exceedingly rich in casein as well as in butter, and they are likely to prove exceedingly valuable in cheese making districts.

Mr. Chenery has made two importations, but was unfortunate with the first, as they had no sooner arrived than that



ment of their lacteal productiveness to the utmost.

They are of large size, with a very compact frame, have short horns and a fine silky coat of hair, and are invariably black and white in colour, being pied or mottled, but rarely, if ever, all of one colour. The cows in their shape resemble the Ayrshire, being largest at the hind quarters, and somewhat of that wedge form so characteristic of good milking stock.

As yet they are a new and comparatively untried breed in America, but one importation of them having yet come out. These were brought out by a Mr. Winthrop W. Chenery, of Highland Stock Farm, Massachusetts, U. S. The weight of four imported cows, six years old, averaged 1,325 lbs. each—a heifer of

dread disease, the rinderpest, then alarmingly prevalent in Europe, broke out among them, and to prevent the disease from extending to the neighbouring herds, all except the bull had to be slaughtered. Even with the precautions taken, the disease spread to some of the neighbouring stock, but was finally stamped out by the energetic and uncompromising measures taken to stop the progress of the epidemic.

The bull Van Tromp, of which we give a portrait, was imported by Mr. Chenery along with the cows above noted, and his weight at five years old was 2,700 lbs.

The grade heifers got by this bull from native cows are said to inherit the good milking qualities of the Holstein blood to a very high degree. Their beef qualities

have not yet been tried, but their large size indicates that cows or that breed would be more profitable to turn to the butcher when past their best milking days than the Ayrshire or Alderney.

It is to be hoped that some of our stock breeders will try the experiment of introducing this valuable dairy stock, which, according to all accounts we have seen, are likely to be a much more valuable acquisition than the Jerseys, Alderneys, or, in fact, any breed excepting the Shorthorns.

Care of young Pigs in Winter.

It seems to be generally admitted that the stock of pigs in the United States is unusually light. At any rate, pork brings a very high price, and this fact, in the face of a tight money market, is pretty conclusive evidence that the supply is not equal to the demand. It is not improbable that farmers will make, or have already made, an unusual effort to raise a large number of pigs next spring, and if we have a good corn crop next year, we may see a marked decline in the pork trade in the winter of 1871-2. But the indications now are that pork will be in demand through the coming summer, and early autumn, and we should make it a point to have our pigs in such high condition that we can avail ourselves of the high price. Every farmer who has a litter of fall pigs should see to it that they are kept growing rapidly through the present winter, and during next spring and summer. A well-bred fall pig can easily and profitably be made to dress 250 to 300 lbs. at ten months old. But to accomplish this it is absolutely essential that the pigs be provided with comfortable quarters through the winter and furnished with a liberal and regular supply of nutritious food. We do not advocate fattening pigs during our northern winter, but we do most earnestly advocate keeping young pigs growing vigorously. So far as our observation extends, half our farmers do little more than keep their young pigs alive during the winter. Whatever food the pigs eat is lost. They do not gain a pound and they are so stunted that half the summer is past before they get into a thriving condition. No wonder such farmers say "pigs don't pay." Pigs kept warm, dry, and comfortable through the winter, with food enough to keep them nearly fat, will, when spring comes, grow with greater rapidity on food but little better than that which is ordinarily given to store pigs at that season; and so all through the summer, the effect of the good food and treatment in the winter will be very decided. With the run of good clover pasture, and the wash from the house and dairy, with a pint or so of corn a day, these well wintered pigs will gain rapidly, and will at any time be ready for the butcher. No matter what the price of pork may be, we are satisfied, from experience and observation, that it

pigs are kept at all, the only profitable way is to keep them well. They may not always pay, but the liberal feeder has a better chance of getting his money back than the farmer who half starves his pigs.

Next to liberal feeding, a dry, warm pen is of the greatest importance. Better have a good pen, so constructed that neither wind nor rain, nor snow can enter; but, in the absence of such a pen, the farmer is inexcusable who does not contrive some plan for keeping his pigs warm and comfortable. If made of boards, a few laths can be used as battens to stop up the cracks. We have seen pigs shivering in a pen close to a heap of stable litter, where half an hour's labour with a fork would have made the pen comfortable. No matter how the snow and wind are kept out. Any thing that will stop up the cracks will answer. With litter or corn-stalks a rail pen may easily be made comfortable.

Cut Feed for Horses.

The various opinions that exist, relative to feeding horses to the best advantage, can only be decided by their owners making the necessary trial, and this will prove much more satisfactory than all the theoretical teaching on the subject that a man can read in a long day. The kind of horse to be kept, and the various sorts of work he may be called on to perform, will certainly cause a great variety in the results and verdicts pronounced. I have had as much experience with horses of all kinds, and of almost all descriptions of work, as any man can generally possess, and my opinion is decidedly in favour of cut hay and chopped feed. The hay must not, however, be less than from three-quarters to an inch in length as many records of inflammation of the bowels prove that horses of ravenous appetite may die from its use, if cut at a third to half an inch in length.

A horse comes in from work, say ploughing, at which he has been engaged since seven o'clock or probably earlier, until twelve or half-past at noon; a little water is generally given to quicken his appetite, and his feed is supplied. If half inch cut feed is used he will be found to grind only about one-half thoroughly, the other half being generally swallowed whole, and unchewed. If a hungry horse is then fed, and is at all subject to gripes, one day out of every ten he will probably have an attack of the malady, more or less violent, and it will not seldom end in inflammation of the bowels, and occasionally in death. This is caused by the irritation in the intestines of the unmastered cut hay.

If cut feed of about one inch is used, the mastication will be much more com-

plete, as the horse is compelled to eat more slowly, and the cause of itself is thus avoided. For many years I have tried this, and established the fact, beyond dispute, and my opinion was greatly strengthened by that of an old Yorkshire horse doctor, who had found, by nearly forty years' experience, these ill-effects from cut feed (if half inch in length,) often occur.

With proper precautions and knowledge of how to use it; there is no doubt that cut feed is far the best and most economical, and amongst others, for these reasons:

1st. Horses so fed generally keep in better health, and as a natural consequence are much easier kept and are better up to their work, and less liable to ailments, especially *broken wind*.

2nd. After feeding at evening—without hay in the rack to keep pulling at—the horse will generally lie down and rest, which the temptation of good hay before him constantly, will often induce him to neglect to do; and he will occasionally also rise during the night to eat—another temptation which is to a great extent avoided if he is unaccustomed to find hay for his amusement.

3rd. You may feed cut hay and ground oats to any horse, young or old, no matter how warm, without danger of foundering.

4th. When cut feed is used, a very small quantity of water to damp the hay, (about half a pint is sufficient for each meal, before the ground grain is mixed with it) is absolutely necessary, or the hay will be rejected, and the grain be eaten, and by this alone a great benefit to the horses' wind is derived, immediate relief to a broken winded horse being the consequence. If a very small quantity of salt is occasionally added to the water, it will tend to the general health of the animal. Do not, however, use too much, which is as bad as too little.

My experience goes to show that for particular work, damped cut hay, with ground oats, or other grain mixed with it, is far preferable and goes much farther than feed grain in the ordinary way; but the saving in hay is nothing in comparison, to the saving in time, and general health of the horse, and increased ability to do his work.

We all know that some horses will continue to eat good hay almost all day, and and if they are taken out to work, at a fast pace, with stomach distended by such poor food, almost certain injury is the consequence.

The fattening properties of so much hay may well be doubted, as few horses will

thrive on hay alone, even without work. I would much prefer cut wheat straw and grain (to the same value) to hay alone under almost all circumstances, especially for colts, and other heres will do more work at less cost when fed the same way.

C.

Feeding and Rearing Calves.

Many people, particularly in towns, so manage that their cows calve early in the spring before the grass grows. It is frequently found that a liberal feeding of hay and bran mashes scarcely supplies sufficient milk-producing food in order that enough may be obtained to rear the calf and to give supply besides for the use of the family. I have found that the most nourishing food for the calf, when milk in large enough quantities cannot be had, or in cold weather when the "little stranger" requires plenty of food to keep up animal heat, is linseed meal, which proves an excellent substitute, and is in fact more fattening than the cow's milk itself. My plan of feeding is this: take the calf away from the cow so soon as it is born; if possible do not let it suck; feed it with milk from a common quart bottle at first; after a day or two it will learn to suck the finger and drink out of the pail. If there is not sufficient milk, boil a tea-cup full of linseed meal for half an hour in a quart of water, and stir it up with the milk. After the first two weeks the calf may be fed with half skim milk and the above quantity of boiled linseed, filling up the required quantity with water. Care should be taken to have the calves' mess as near as possible the same warmth that milk is when drawn from the cow. I have found that a calf will thrive and grow fat on this mixture.

Some people feed oat or corn meal, but there is danger of these "scouring," and thus losing the calf. Twenty-five cents' worth of linseed, or two and a half pounds per week, will be found quite sufficient, and this food will be found perfectly harmless. Calves should be kept in a warm, dry shed, with plenty of clean straw bedding, and properly and regularly fed. They can, with care and attention, be reared at any season of the year. I look upon it as a sin to kill heifer calves. "Spare the innocents"

P. G. B.

Ottawa, February 10th, 1870.

HEREFORD CATTLE.—Mr. Sandford Howard, the Secretary of the Michigan Board of Agriculture, who has paid considerable attention to the Hereford breed of cattle and written a valuable essay on the subject, says in a letter lately received: "I have strong faith in the profitability of Hereford cattle where they are properly cared for, and are kept only for legitimate markets, without reference to speculation; and I do not doubt that the increase of the breed in Canada and the United States will be of public advantage. Indeed, I cannot but hope that the time is coming when Mr. Stone will receive the thanks of practical farmers, on both sides of the border for his efforts in the introduction and preparation of some of the best specimens of this ancient and long celebrated race."

Veterinary Department.

Diseases of the Horse's Foot.

NAVICULAR DISEASE.

The foot of the horse, from its complicated and highly sensitive structure, is liable to many diseases, and one of the most common, and at the same time most serious affections, is navicular disease, generally known as coffin-joint lameness. The parts involved in this disease are the navicular bone and its connections, and the extent of injury or abnormal change in the parts affected is found to vary according to the severity of the disease, and the time it has existed. Navicular disease, it is our opinion, may either be produced from injury to the tendon, or result from concussion and compression of the navicular bone. This is followed by congestion, or a sub-acute inflammatory action, which extends to the cartilages and synovial membrane, and in fact involves more or less the whole tissues in that region. The bone becomes ulcerated, and the cartilages destroyed. Plastic matter is also effused, which almost completely destroys the motion of the part. As a result of this severe and continued disease, the whole of the tissues entering into the formation of the foot become altered, leading to a contraction of both its sensitive and insensitive structures. Contraction at one time was erroneously supposed to be the cause of navicular disease, and other lamenesses to the foot, but the contracted condition of the foot is the result generally of internal disease, and particularly of navicular disease, or an effect of the foot not receiving its natural pressure from the ground. Although the term "coffin joint lameness" is frequently applied to this disease in Canada, the parts principally implicated are the navicular bone and the cartilage on its inferior surface, which forms what is called the navicular bars. This is for the purpose of allowing the tendon to play freely over the bone. The sub-acute inflammatory action attacking those parts may exist for a considerable time without greatly altering the structures, and in these cases the lameness is not severe, and disappears with exercise. After a time, the continued inflammatory action will produce ulceration of the bone, the cartilages and synovial membranes also becoming diseased. The tendon is also implicated in some cases, becoming thin and attenuated, whilst in others it adheres to the diseased bone produced by the plastic material exuded, or formed in the

diseased parts. When the navicular bone or bursa presents these abnormal changes, permanent lameness is the result.

Like many other ailments to which horses are liable, hard work is often an exciting cause, as driving or riding horses rapidly when young, and not in a proper condition to undergo quick or violent exercise. It is also produced from injuries to the foot, or from cutting the sole too much when shoeing. It also results from a sprain to the tendon, or from allowing the shoes to remain too long without removing, the toe of the hoof in consequence becoming very long, throwing a greater strain upon the navicular bursa. Horses with short and straight pasterns are particularly liable to navicular disease when subjected to the tear and wear of streets and macadamized roads. In our next we shall notice the symptoms of navicular disease.

Stagers in Pigs.

To the Editor.

Sir.—On visiting my pig-pen a few days since I was surprised to find that two young pigs, aged about four months, which I had enclosed therein, were labouring under some disease of which I had not the most remote idea, and of which the following were the symptoms: They would walk about for a while in a state of evident stupefaction, and after a while would be seized with some spasmodic affection; they would then sit down on their hinder parts, and, elevating their heads in the air, would be seized with violent trembling, their under jaws quivering to a degree painful to behold. After labouring under these symptoms for a short time—from two to three minutes—they would again walk round in the state of stupefaction, and subsequently pass through the second ordeal.

Not knowing anything of the disease, I enquired of my neighbours if they had ever seen anything of the sort before. One told me the disease was called the "blind staggers," and recommended slitting their ears and cutting off a portion of their tails; this course was adopted. Another said the disease was called the "black tooth," and advised the punching out of all their black teeth; this course was also resorted to. Eventually, however, the sow appeared to be in a dying condition. I brought her into the house, and as it appeared to me, she was affected with cramps; but before I could administer any remedy she died.

I may say that the pigs have been kept up in the pen since November 1st. They have been well housed and taken care of, being fed on bran, house slops, etc. Perhaps you could inform me as to the name of the disease, and the best course to be adopted in such cases.

STUBSCRIBER.

REPLY.—The symptoms above mentioned were very likely the result of a disordered stomach, either from eating too much or from food containing some irritating or even poisonous ingredients. In similar cases we would recommend to give from three to four ounces of castor oil, and apply cold water or ice to the head. Cutting the ears and tail and knocking out of the teeth are practices too absurd to be tolerated in the present age.

WEAK KNEES.—A correspondent over the signature "South Dumfries" makes enquiry about a horse which is troubled with weak knees. "The only description," he says, I can give you of the trouble is that he shakes at the knees." Moderate work and plenty of nourishing food, together with good grooming and hand-rubbing of the legs, are the best remedies for weak knees.

BARREN HEIFERS—SWOLLEN UDDER.—A correspondent says he has "had three heifers at different times whose udders commenced to grow quite large when they were a little over one year old; they never got with calf. They would come in season generally every two weeks. The last of them I sent to bull in the fall. When I talked of sending her, one of my boys said, 'it is of no use sending her to bull, she will never get with calf.' 'Why so?' I asked. He replied, 'she has got a bag exactly like the others you had to beef on account of not getting with calf.' Now, it had never struck me that there was any connexion between the cases. However, it turned out just so. The heifer I speak of has been twice to bull, and has been in season again. Can you inform me whether those large-bagged heifers are apt to be barren, or can anything be done to cure them? The heifer is a very fine Durham grade, not too fat, but in good order.

REPLY.—In heifers that are highly fed the udder becomes enlarged, and sometimes also where there is a malformation of the generative organs.

TO PREVENT SOWS OVERLAYING THEIR PIGS—A railing or board should be fixed against the sides of the pen of a sow, before the pigs come, about eight inches above the floor, and it should jut out from the sides of the pen from eight to ten inches. When a sow lies down, if a pig or two happens to be under her, they will generally slide out and get crushed between the sow and the sides of the pen. If this railing is fixed around the nest, the sow's back, in lying down, will strike it, and the pig or pigs, sliding from under her, instead of getting crushed between the sow and the sides of the pen, will escape injury by sliding under the railing.

The American Farm Book mentions a horse that died at sixty-seven years of age, and another that was quite coltish in his forty-fifth year. These cases of longevity were doubtless the results of good care. It is never economy to put a horse to the utmost of his strength to obtain a great amount of work, or to feed sparingly to save provender.]

The Dairy.

Canadian Dairymen's Association.

ANNUAL MEETING.

The Canadian Dairymen's Association held their third annual meeting, at Ingersoll, on Tuesday and Wednesday, February 2nd and 3rd. A brief session to organize was held in the morning of Tuesday, in the Town Hall, the President, Mr. Chadwick, in the chair, and Mr. James Noxon being Secretary. The Chairman, at the request of the meeting, nominated the various committees, who were instructed to meet and report in the afternoon.

Business was resumed about two o'clock, and the committee reported the following order of proceedings:—

- 1st. The President's address.
- 2nd. Reports of Committees.
- 3rd. To what extent has the system of making cheese once a day been practised last year? Have curd mills been generally used, and what have been the results?
- 4th. Proper treatment of acidity in cheese making
- 5th. Rennet—Its nature and varied effect.

An adjournment from six to half-past seven, and for the evening session Mr. Willard's address.

The report was accepted, and Mr. Chadwick then delivered his address.

PRESIDENT'S ADDRESS.

The opening remarks of this very able and interesting address, of which only a brief summary can be given, referred to the improved condition and rapid progress of Canadian husbandry, and to the material prosperity of the country. Much of this improvement was due to organization, such as that by which the meeting was brought together, and to the consequent spread of information and stimulus to enterprise. The Association, though but in its infancy, had proved of very great advantage to the dairy interest; but it must not rest satisfied with its present position. It should be the aim of all connected with it to extend and perfect its influence and efficiency. The labours of the dairyman for the past year have been abundantly rewarded, a ready and satisfactory market for his products has been found, and a more than full average, both in yield and price, has been obtained, and the year closed with light stocks in both the productive and consumptive markets of the world. To maintain our success, it is necessary we should continue to furnish only the best article, and avail ourselves of all the aid to be derived from science and the practical experience of others. Provided Canadian dairymen can meet the tastes of their customers, the foreign demand for their products is likely to be permanent. The report of the Association for the last year, now published, was justly a source of much gratification, and gave good evidence of what had been accomplished. After referring to the interesting and instructive character of the American Convention which he had attended, and which strikingly showed what organization can effect, the President observed with respect to the Canadian trade, that the statistics of the cheese production for Canada were not to be accurately obtained, owing to the imperfect and irregular returns from the different factories. "I have endeavoured to obtain as correct a statement as I possibly could of the amount shipped at the Ingersoll and Woodstock stations of the Great Western Railway, which amount I find to be—from Ingersoll, 2,337,687 lbs.; from Woodstock, 256,867 lbs. This is about 40,000 boxes, at a cost of \$350,000. And of this sum \$315,000 has been paid by two Ingersoll buyers alone. These few figures give some idea of the extent to which the business has been developed in a very few years, and it is, I think, destined to be very largely and very rapidly increased. Of the durability and still more complete development of the factory system there-

can be no doubt, and this fact is beginning to be generally acknowledged. The importance, in connection with this industry, of all the light of science is fully admitted, and the absolute necessity of a liberal education more than ever felt. It should be remembered that there are products quite as important to the farmer in this age as wheat, corn, cheese, choice animals or delicious fruitage; these are, elevating ideas and ennobling sentiments, products which can be grown through every month in the year, uninjured by cold or heat or rains or drought. Our ordinary business should be but secondary to the growth of the higher faculties. The man should be more important than his occupation, and not merged in it. This is an age that demands the highest improvement in every department. Society is moving upward and onward, and the farmer must move with it. Success in agriculture is not completed by adding barn to barn and field to field; however desirable this may be, yet I consider that he is an unsuccessful farmer who has not improved himself from year to year, constantly ministering to the comfort of the household, cultivating the heart as well as the soil, imbued with the idea that if we wish to see our country accomplish its highest destinies, we must have loftier objects of ambition than the mere attainment of wealth, at the same time appreciating the dignity of labour, also realizing that labour becomes ennobled under the guidance of enlightened judgment, bringing in its turn a thousand blessings."

He congratulated the society on the re-engagement of Mr. Willard to deliver the annual address, and referred with pleasure to the satisfactory financial report of the year, urging all the members, in conclusion, to bestir themselves in promoting the extension and welfare of the Association.

After the reading of the address, the first question, in reference to *Making Cheese once a day*, came up for discussion.

Mr. YATES, of Belleville, said he was connected with a factory where the system had been adopted, and had been found to work well, saving labour, and producing cheese of a better quality and firmer texture. They used the milk of from 700 to 800 cows, divided over seven beats, the farthest point being about seven miles distant. In the evening the milk was put into the vats, to some of which ice in pails was applied, and in others Sterling Algure's Milk Agitator was employed. The Saturday evening's milk was in this way kept over till Monday, and had not been found deteriorated, except for a short time during the very hot weather. There was a slight difference in the cheese of Monday's make, but not enough to require any selection or culling in the sales. Preferred the Agitator to the ice, as it kept the cream from rising, which, if separated, could not again be properly incorporated. Cheese was considered better if made from a portion of old milk, provided it was sweet. Used 800 gallon vats, setting about 2,000 pounds of milk in each. The average yield of cheese had been 940 pounds to the 100 pounds of milk.

Mr. HARRIS had also adopted the plan of making once a day, and employed the Agitator. He coincided with the previous speaker.

Mr. LOSSE, of Norwich, had tried the plan for two years with satisfactory results, producing a better yield, of better quality, with less labour. It was necessary to have the milk come in early, and in good condition, rejecting all that was not so. Had two vats of 500 gallons each, and used about 8,000 pounds of milk each day. The average yield of the past season had been a little under 10 pounds to the 100 pounds, and had sold at an average price of 12½ cents.

Mr. BALLANTINE, of Stratford, had also tried the plan, but could not altogether endorse the views of the previous speakers. He thought it was absolutely necessary to the production of fine flavoured cheese to get rid of the animal odour from the milk, for which purpose a certain amount of exposure to the air was essential—that mere reduction of temperature did not effect the object. He acknowledged that Mr. Losse's make on the once a day system was

of prime quality, which he attributed to his extreme care in manufacture, and the good condition in which his patrons had been educated to deliver the milk. In his own experience he had found the plan of making twice a day the better practice, and thought it impossible to make a first quality cheese from entirely new milk.

Curd Mill's.—Mr. GRIFFIN said he had found benefit from their use in producing a better texture of cheese. There was, however, considerable difference in these machines, some of which scarcely altered the condition of the curd, and others tore it asunder too much, and thereby deprived it partially of its richness. The curd should rather be ground fine than torn asunder. In very hot weather he had used a temporary press, in which the curd had been subjected to slight pressure before adding the salt, the curd mill being used twice, before and after the addition.

Mr. FAYER said that he had used the curd mill during the past season, and found advantage from it. Sometimes, however, he had observed that cheese so treated, lost a portion of its richness during the curing. This he attributed to some imperfection in the curd mill, for in other establishments, where a different kind of mill was in use, this difficulty had not been experienced.

Mr. FARRINGTON thought the discussion a very important one, particularly in reference to the first question, which had brought out some points of special interest. He did not think that the subject of the animal odour of milk had been definitely settled—some eminent physiologists contending that its presence was not an essential condition, while others maintained that it was present in all milk, without being derived from any extraneous causes. He thought the night's milk would have more of this odour than the morning's milk, and, for this reason, required time and exposure to get rid of it, while the morning's milk, being comparatively free, might be made up at once, and that hence the mixture of the two was not injurious to the flavour of the cheese. During the day, the cow was heated, perhaps excited and over driven, and the milk was of too high a temperature, feverish and odorous, but, during the night, the cow being cool and quiet, the morning's milk was destitute of the animal taints. He thought it best, however, that in all cases there should be some interval between the time of receiving the milk and commencing operations in the vat. The plan of making once a day was universal in the States, and quite successful.

The question was laid on the table.

Acidity in cheese-making was the next subject brought forward for discussion. Mr. FARRINGTON explained that the cause of this acidity was the partial conversion of the sugar of milk into lactic acid. When this change had not commenced—when milk was used too new—the subsequent fermentation was apt to be too violent, and to result in hardness in the cheese. The proper degree of acidity was a matter to be learnt mainly by experience.

Mr. LEESE said that the application to the curd of a hot iron, heated short of redness, gave a sure index of the right degree of acidity. When this was reached, the curd so treated could be drawn out by the iron in small sticky fibres.

The next topic for consideration was *Rennet*, and, as no one was prepared to open the discussion, Mr. FARRINGTON read his essay which had been prepared before the American Dairyman's Association at Utica, on the same subject. The substance of this paper is given elsewhere, in the report of that convention.

Mr. WELLS, of London, diverged from the dairy business to pork packing, and condemned the interference of Americans, who flooded the market with inferior quality of swill-fed pork, which was calculated to damage the reputation of the Canadian article.

Some one present asked if it was profitable, at the close of the season, to make cheese out of skim milk, rather than feed it to the swine.

Mr. BALLANTINE thought the profit depended upon the market, and that there was not at present any demand for skim milk cheese.

Mr. FARRINGTON was of opinion that at the end of the season—say after the 20th of November—it was best to adopt the American plan, skim part of the milk, and use only part whole milk, mixing the two together, from which to make the cheese. To make pork out of milk when cheese was fifteen cents a pound, was dear pork.

An animated discussion on this point ensued, some members concurring in the views of Mr. FARRINGTON whilst others, and Mr. CASWELL especially, most earnestly deprecated the practice of skimming the milk—a practice likely to be very much abused, and to deteriorate the quality of Canadian cheese. He contended that without skimming, even at the late season, cheese of the very best quality could be made by extra care; adducing in evidence of this statement the success of Mr. Sackler, who had, so late as after the 15th of December, manufactured cheese of the finest quality, and that cream yielded the highest price. There was no practical difficulty in incorporating an additional quantity of cream in cheese-making, as was shown in the case of Still in cheese.

The subject of *sour cheese* was brought up, and it was stated that cheese of this description need not be sold at a loss, inasmuch as if properly branded, and not smuggled in, there was a market for it in Liverpool, where cheese of this description was in limited demand for a certain class of consumers. It was necessary, however, that only a small proportion of this sour cheese—say four or five in a hundred—should be mixed with the better sort.

The benefit to be derived from cutting and cooling food was then briefly described. Mr. BAILLEY, of Norwich, spoke in favour of the practice, having found cut hay, scalded and steamed, much more nutritious than cut food given dry. A saving was effected in the grain required, as he had found two quarts of grain fed in this way kept the animals in as good condition as four quarts mixed with dry hay.

Mr. FARRINGTON adduced the instance of an American dairyman, Mr. Hopkins, of Herkimer county, who had proved the advantage of cooked food by a very conclusive experiment. He divided his cows into two lots of twenty each, and to one lot fed dry food, to the other cooked. In the latter case the flow of milk increased, while in the former it materially fell off. On reversing the trial, and giving the cooked food to the lot that had previously been fed on the dry, a corresponding change took place in the flow of milk, which again rose in the second lot fed with the cooked food, and fell in the other.

A brief discussion was brought up on the practicability of using windmills for pumping water for stock or dairy purposes. It was stated that these mills could be erected at a small cost, and had been found very serviceable in certain cases.

The meeting then adjourned until evening.

EVENING SESSION.

In the evening the convention met again at half past seven. The hall was crowded to overflowing, and among the audience were a large number of ladies. In the absence of the President, from indisposition, the chair was occupied by the Vice President, Mr. George Hamilton, who introduced Mr. Willard to deliver the

ANNUAL ADDRESS.

This was a very able and instructive essay on milk and its products, of considerable length, occupying nearly two hours in the delivery, full of interest, and abounding in practical suggestions of great importance to dairymen and farmers generally. It is impossible in these columns to give the address entire, and any synopsis would fail to do it justice. All that can be attempted is to give the leading points.

Mr. WILLARD commenced by expressing in very grateful and cordial terms the warm regard which he entertained for the Canadian branch of the great Anglo-Saxon family, and in this feeling he was satisfied he represented a large class of the most enlightened American citizens, whose minds were not warped

by narrow sectional views, and who could rejoice in the prosperity of a sister nation so closely allied to them in blood and common interests—sentiments which were received by the audience with warm applause. He then entered on the special subject of the address by remarking that the natural home of the milk produce was a belt between the 40th and 45th parallel of latitude, stretching from the Atlantic to the Mississippi, and probably to the Pacific, comprising most of the Northern States and a large part of Canada. Of this belt only about a third is adapted to dairying. The dairy lands are quite irregular and not always contiguous. The best are characterized by high undulating surfaces, an abundance of never-failing springs and streams, a soil retentive of moisture and clothed with nutritious herbage of an enduring and hardy growth, a moderate temperature with an even rainfall, and a sufficient covering in the winter to protect the grass roots. Within this northern belt there is no description of farming that promises to be more profitable than the dairy, leaving out of the account such special cases as those situations which are peculiarly fitted for market gardening and fruit-growing near large cities. Compared with the chief branches of farming, dairying has the widest market and the least competition. It also gives peculiar opportunities for a mixed husbandry of the most remunerative kind, including that of raising the finest stock. The dairy farmer deals in three kinds of commercial product, milk, butter, and cheese, the last two highly concentrated articles of food of universal consumption and easy transport. In New York the question of comparative profit has been closely studied for years, and they have learnt that it is useless to compete with the West in grain, or with Texas and other sections in wool or in cattle; whereas, the demand for dairy produce has steadily increased, and the price has fluctuated less than that of other products. The annual yield of the dairy and grazing land is also more uniform than other branches of farming, and the nature of the husbandry rather enriching than exhausting to the soil.

The great question of dairy farming, especially since the introduction of the factory system, has been the possibility of over-production. But experience and statistics, thus far, have shown that both in Europe and on this continent production does not even keep pace with the demand. In the article of butter especially, though there has been a large increase, there is a great deficiency in the production. Everywhere in cities you hear loud complaints of the difficulty of procuring good butter, and the monstrous price at which it is sold. This deficiency is attributed by some to the operation of cheese factories, but is rather to be accounted for by the increase of population and the gormandizing habits of the people in the use of butter. There are no such butter eaters in the world as the Americans. Everything that they cook must be swimming in butter. Irish domestics who never ate a pound of butter during their whole lives before reaching these shores, seem never able to get enough of this unctuous food. Indeed, the waste of butter on this side of the Atlantic is frightful, and certainly the dairyman's prospects in this direction cannot be said to be at all discouraging.

In the article of cheese, also, there is a greatly increased demand for home use. The production of American cheese has advanced from 163 millions of pounds in 1860 to 270 millions of pounds in 1880, and yet the amount exported is but little increased. In addition to the growing use of cheese at home the distant market has been largely extended by new railroads, and it is possible that the cheese factories of the country will be tamed to their highest capacity to supply the demand.

In the remaining branch of the dairy business there is also a rapidly increasing consumption, and it becomes a matter of no small difficulty to supply the cities with fresh milk. The real question for the dairyman should be so to equalize the supply of the three products—milk, butter, and cheese—that the highest price may be obtained for each. The difficulty to be guarded against is not so much the

over doing the dairy business as disturbing its equilibrium

The difficulty of providing an adequate supply of fresh milk has led to the introduction of a process for condensing milk. An establishment for this purpose has been in operation for some time in Egin, Ill. City consumers who use this condensed milk prefer it to fresh milk as it is usually sold, and find it both cheaper, and every way more convenient for use. The condensing process consists in evaporating the milk at a temperature short of 212°, until it has lost 75 per cent. of its watery constituents. It is thus reduced to a thick fluid of the consistency of syrup, and is then put up in hermetically sealed cans. The greatest attention is paid in the first place to having the milk pure and in perfect order, and in the process of condensing, it is repeatedly strained. In some cases sugar is added during the operation; but this is not essential. This milk is sold at a price equivalent to fourteen and a half cents per quart of fresh milk, and as the cost of the process cannot exceed four cents, this brings the value of the milk to ten cents a quart.

Another branch of the dairy business that has been found very profitable in New York is the creamery, or butter factory. In these establishments the milk that is delivered by the farmers is partly sold as fresh milk or cream, and partly made into butter or "skim cheese." It has been found that fourteen quarts of milk will make, on an average, one pound of butter and two pounds of skim cheese. The milk is not robbed of all its cream, and the cheese is sold at a price but little below that of whole milk cheese; while the butter is of the very best quality.

The speaker then adverted to the extreme importance of farmers being trained to keep correct accounts, so as to sell in accordance with the cost of production; and he deplored the lamentable defect of this principle of sound business economy among the great majority of farmers.

In reviewing the operations of the past year, three great lessons were taught.

1st. That a low, even temperature, and a comparative humid atmosphere in July and August are of service in preserving cheese in flavour, and hence that more attention must be given to the construction of curing rooms, so as to meet the conditions of our hot dry weather.

2nd. That a healthy consumptive demand for cheese does not depend upon extreme low prices.

3rd. That there are markets and an outlet for our whole product at a price above cost.

The opening up of new railroads has dissipated all fear of over-production, and as new territories thus reached become peopled, the American dairyman will soon cease to export, and may even be compelled to purchase from Canada as their nearest market. Good cheese, of the finest quality, Mr. Willard contended, should be worth eighteen cents. Of the poor grades it did not much matter what was the price, and the makers of such needed the sharp lesson of loss to compel the adoption of a better practice. There is no profit in producing a poor article.

Mr. Willard next referred to a new economy introduced into the dairy system, namely, the manufacture of whey butter—that is, butter from the whey after making cheese. As much as twenty pounds of butter can be made out of 500 gallons of whey, and the quality of the butter, if properly made, is such that it can with difficulty be distinguished from the best cream made article. Moreover, after the process the whey is just as nutritious food for hogs as if the butter had not been extracted. Hence there is a great waste in omitting the manufacture of this article from the cheese factory system.

Adverting to the profits of dairy farming in Herkimer county, the speaker mentioned the great loss which had resulted from the prevalence of abortion among cows, and suggested that it might become advisable as a remedy for this evil to adopt the plan of spaying the cows—an operation comparatively free from danger, and which offered many advantages,

especially to dairies for the supply of city milk. It is affirmed as the result of experiments that a cow thus operated upon in her sixth year, and about forty days after calving, will continue to give the same flow of milk as long as her owner chooses to keep her.

The next topic touched upon was the necessity of a better concentration of forces and more thorough work—the determination to do at least one thing well instead of so many things superficially. This was especially necessary in the dairy business, in which a good article always realized a profit, while a poor one might be sold below cost. It costs no more to make a pound of butter that will sell readily for fifty cents, than a pound of grease that goes begging at ten cents. The requisites for producing a good article of butter were the following:

1st. Securing rich, clean, healthy milk, obtained, if possible, on rich old pastures free of weeds.

2nd. Setting the milk in an unfainted, well ventilated atmosphere, and keeping it at one even temperature—from 55° to 60°.

3rd. Proper management in churning.

4th. Thoroughly expelling the buttermilk, and working so as not to injure the grain.

5th. An even incorporation of pure salt, and packing in oaken tubs, tight, clean and well made, and storing in a perfectly sweet cellar.

Cleanliness in all the operations is an imperative necessity.

The best plan for securing an even temperature is to set the milk in vessels plunged in cold spring water; but in the absence of this convenience, a good method is the use of the Jennings' pan, which is a double receptacle, the inner one of tin for the milk, and the outer one of wood, with a space between for cold water.

Some details were given of the manufacture of Philadelphia butter, in reference especially to samples which were shown at the recent Dairymen's Convention in Utica. In the preparation of this choice article, the chief points attended to were, 1st. The food of the cows; 2nd. The temperature; 3rd. Neatness and dainty refinement at every step, from the moment the milk flows from the udder till the dollar in currency is paid for the pound of butter. In regard to the food of the cows, nothing had been found superior to clover or early mown hay. Indian meal was considered an important adjunct. Roots, with the exception of carrots, were not used. The temperature of the milk and of the churning did not vary much from 58°. In the after manipulation the butter was handled as little as possible. The purest salt is used in the proportion of an ounce to the pound. The mass is made up in pound balls, neatly printed, wrapped in a linen cloth, and sent to market in cedar boxes lined with tin.

The subject of curing cheese was next considered. In this process an even temperature of about 70° was the great desideratum; and the maintenance of such a temperature in the curing room during the hot summer months is the chief problem for practical men to solve. The past exceptional season had, from its low temperature, been peculiarly favourable, and had no doubt contributed much to the improved quality of the cheese of 1869. The proper temperature favours the breaking down of the tough curd, or casein, into the mellow, rich substance of the best cheese. Properly cured in this way, the cheese may be none the worse for the abstraction of part of its cream.

The speaker referred again to the importance of a home market for cheese, and the advantage of encouraging a home consumption of the article. One means of doing this was the manufacture of smaller cheeses—such as could be sold whole for \$2 or under.

Some observations were made on the cheese production of Great Britain, the amount of which varied but little, and Canadian Dairymen were warned against putting faith in unfounded reports of any large increase of the cheese crop of that country—reports set forth to induce a lower price for the Canadian article.

The address concluded with an appeal to farmers to see that they faithfully performed their first and essential part in this important industry, by providing clean, healthy milk for the production of good cheese and butter. There must be scrupulous cleanliness, and gentleness in the treatment of the animals. All nervous agitation is highly injurious to the quality of milk. In laying out farms, reserve the up lands for pasture and the lower lands for meadows. Use variety of grasses in pastures. Provide corn fodder at the rate of an acre for every eight cows, so that when pastures begin to fall in July and August, there may be an abundant store of succulent food at command to keep up the flow of milk, and in this way both land and stock will be turned to profitable account.

At the close of the address, the speaker was warmly applauded, and a vote of thanks was proposed by E. C. Bodwell, Esq., M. P. P., who justly eulogised the instructive character and literary merit of the address, cordially reciprocated on behalf of Canadians the fraternal feelings to which Mr. Willard, as the representative of his countrymen, had given utterance, and trusted that friendly relations would continue, and be yet more closely cemented, alluding in passing to the importance of liberal commercial arrangements on both sides.

The resolution was briefly seconded by Mr. Weld, and enthusiastically responded to by the audience rising and cheering heartily.

A vote of thanks to the ladies for their presence and encouragement was then passed, and the meeting adjourned till ten o'clock on the following morning.

SECOND DAY'S PROCEEDINGS.

MORNING SESSION.

On Thursday morning the Convention met again, and Mr. Chadwick opened the proceedings by calling for the Second Report of the Committee on order of Business. This was presented as follows:

1. Report of Committees. 2. Election of Officers. 3. Place of meeting. 4. What has been the general reputation of our cheese in the English market, and what are the defects to be overcome to bring it nearer the standard of the best English cheese? 5. Hoof disease. Has it prevailed among dairy herds, to what extent, and the best mode of treatment. 6. The best variety of corn for soiling, and where pure seed can be obtained. Adjournment from twelve to one. Financial report, and any other subject relating to the dairy or dairy farming.

This report was accepted, and the Committee on Nomination of Officers presented their report, naming for President, James Noxon, of Ingersoll; for Vice-President, W. S. Yates, of Hastings; 2nd Vice-President, Thomas Ballantine, of Perth; Secretary-Treasurer, E. A. James, of Ingersoll.

This report was also received, and the officers declared duly elected.

The next business in order being the choice of a place of meeting in 1871, it was moved by Mr. HAMILTON, seconded by Mr. BALLANTINE, that Ingersoll be the place appointed.

Mr. DALY, of Belleville, moved in amendment that Belleville be chosen. In support of his motion, Mr. Daly submitted that Belleville was situated in the midst of a good dairy district, where the factory system had been for some time in operation; that it was desirable to extend the benefits of this association and the influence of these conventions to other centres, and that the interests of the Association itself would be thereby promoted. He would only ask for the meeting to be held there one year, and would guarantee the hearty co-operation and friendly offices of the people in his neighbourhood to their visitors on the occasion, as well as an increase in the number of members from that district, and was perfectly willing that after next year the place of meeting should, if it were thought best, be permanently fixed at Ingersoll.

The amendment was seconded by Mr. WELD, and supported by Mr. FARRINGTON, who, while conceding to Ingersoll the undoubted prior claim, and he might

say the right, to the appointment, contended that considerations of the general interest favoured the removal of the Convention for at least one year to some other point. The Association professed to be Irvinical, but was in fact local

Mr. CASWELL enquired what had been the practice in New York State

Mr. WILLARD replied that with the exception of the last year the meetings had always been held at Utica. Through several efforts had been made to move it to other places. Utica was selected chiefly as being most central

Mr. NOYES thought that the slight attendance at a general of members from Hastings did not give evidence of a very warm or extended appreciation of the privileges sought and that they had no guarantee, even by a constitutional rule, which was itself subject to change, that if the meeting were once held at Hamilton, it might not be voted there permanently by an overwhelming local majority, for it must be remembered that they had to deal with ordinary business in nature, in which self-interest was ever paramount

The amendment was put and lost. The original motion was then submitted, and carried by a very large majority.

The Quality of Canada Cheese being the subject first in order, the Chairman called on Mr. CASWELL to open the discussion. He stated that during the past season the quality had been, on the whole better by far than that of last year, owing in part, no doubt, to the season, but not entirely so, for the improvement had been specially marked in certain factories, whilst others had deteriorated. He had sampled very extensively, had been extremely careful in suspecting and testing every lot, branding each according to its true quality; and he had invariably observed that where a defect had been noted on this side, a corresponding depreciation in the price had resulted on the other. He had taken pains in many instances to trace the cause of the defect, and had found it attributable in some cases to want of cleanliness in the milk cans, in others to some fault in referring to the use of bad rennets, and to a loss of cream. The most frequent complaint against certain cheeses was that they were "short of meat." In consequence of these differences of quality, the prices he had received had varied from \$1 to \$7 per cwt. in the same shipment. The first desideratum for cheese in the English market was quality, the next flavour. The best means to secure the finest quality were, in his opinion, besides scrupulous cleanliness throughout, the nicest care, an even temperature, and good ventilation in the curing-room—no factorymen should ever allow their cheese to be shipped before it was perfectly cured, and most emphatically no skimming should be permitted.

Mr. FARRINGTON observed that defect in cheese was often attributed to skimming where none of the cream had been removed, the faulty condition being due to some other cause. June cheese, for instance, is apt to be tough and to possess the appearance of salt cheese. The proper remedy in this case was to employ a lower temperature, and to continue the process longer. Some enquiry having been made on the effects of using the card of the most small with the rennet, Mr. Farrington had found no benefit whatever to result from the practice, but, on the contrary, it was apt to impart a salt flavour to the cheese

Mr. DALY called attention to the importance of a prompt delivery of the cheese at its destination, and cited instances where cheese had been detained in the vessel after its arrival at Liverpool for several days, had heated in consequence and suffered damage. He was pleased to be able to state that notwithstanding all these difficulties, he had found during a recent visit to England that the reputation of Canadian cheese was greatly raised, and he had seen samples of the manufacture in Liverpool that were considered equal to the finest fancy brands.

At this stage of the proceedings the meeting adjourned till one o'clock.

AFTERNOON SESSION.

Corn for Soiling was the first subject taken up, though not first in order. Mr. GALWAY had used it and found it advantageous as green food when pastures were short, and when it was cured and fed dry it was more nutritious and productive of milk than the best hay. His method of growing it was to plant on sod ground, ploughed and harrowed, in drills sixteen inches apart, using two bushels or two and a half for seed per acre.

Mr. BAILEY also testified to the value of this fodder, but his mode of culture was somewhat different. He chose rich ground, setting the rows as much as three feet apart, using three bushels of seed to the acre, and cultivating as idly as possible.

Mr. A. GARNER, of Drummondville, had found the best results from sowing the corn broadcast.

Mr. JAMES would not sow far apart, preferred sod land was careful to put in the seed early, by about the 25th of May, and, if possible, not later than the 2nd of June. Had cut the crop last year with a reaping machine the process by hand being tedious and expensive, had harvested with the reaper about four acres a day, preferred to cut while the plant was yet green and juicy, about the 1st of September. After cutting, left it for three or four days on the ground, then gathered it and plied it in sheaves or stooks in the usual way, hauling it away by a team and chain during the winter as it was wanted. By this feed he estimated more cows could be raised on the same land, one acre of corn being equal to five acres of meadow, and not more exhausting to the soil than grass. The Western corn was the variety best adapted for the purpose. It was to be procured from the Western States, and he recommended the purchase of selected seed corn

A paper on pastures was received from Mr. MACKEAN, of the CANADA FARMER, and reserved for publication with the annual report of the Association

Hoof Disease. A paper on this subject was read by Mr. HARRIS. The disease affects only the hind feet, is attended with inflammation, suppuration, and sometimes results in the loss of the hoof, and prevails most in the winter. The treatment he recommended was making a couple of incisions on each side of the leg above the hoof, and inserting into the cut red precipitate and garlic.

Some desultory discussion ensued, and it was evident that there was not a uniform discrimination in the nature of the disease, which was by many confounded with foot and mouth disease, or with the effects of inflammation and gangrene from frost

Mr. WILLARD said that the method of treatment adopted in Herkimer County was either corrosive sublimate applied to the sores, to promote suppuration, or red precipitate applied to the surface without any cutting of the skin.

FINANCIAL STATEMENT, ETC

The Finance Committee gave in their financial statement, which showed the receipts for the year to be \$396 49 The expenditure..... 208 86

Leaving a balance in hand of \$ 87 63

A vote of thanks was given to the Executive Committee for the very efficient manner in which they had discharged their duties during the past year.

The question of the best breed of cattle for the dairy was slightly discussed, Mr James giving the preference to grade Durhams, and Mr Farrington, looking more at the milking quality than the breed preferred, on the whole, cows of comparatively small size

On the subject of salt it was generally conceded that the quality of the Godes had been superior to any if it were only drier. In consequence of the defect of moisture, preference was given by some to the best Onondaga or the Liverpool dairy salt

After a vote of thanks to the retiring President the Convention adjourned about four o'clock

American Dairymen's Convention.

In consequence of our failing to receive, in due course, an exchange copy of the Utica Herald, containing a full report of the Dairymen's Convention held in Utica, we have not been able to give an earlier notice of this important and interesting meeting. From a supplementary copy of the Herald, kindly furnished by the publisher, we condense the following record of proceedings, and regret that our limited space precludes a more detailed account, for the meeting appears to have been of the most interesting and instructive character.

The convention met on the 12th of January, and, in the absence of the President, Hon. H. Seymour, the Vice-President, Hon. F. G. Alvord, occupied the chair, and opened the meeting with an appropriate address. The morning session was then occupied with the usual preliminary business of appointing committees, &c. In the afternoon, some reports of committees having been received, and among them one upon the subject of the tax on the sale of cheese, it was resolved to petition the Legislature for the repeal of the same.

Professor James Law, of Cornell University, then delivered an address on "The feeding of cattle in relation to their health and produce"

It was, he said, a matter of sincere congratulation that two of the maladies most dreaded by the stock owners of the world—rinderpest, and epizootic apthæ—were happily unknown on the American continent. The Texan fever, now that the mode of its propagation is known, need never again find its way north of the thirty-fifth parallel of latitude. Pleuro-pneumonia alone threatens our doors, but as the cattle trade is almost exclusively from West to East, the disease will continue to hover around our Eastern homesteads where-in circumstances are favourable.

"If the cattle trade went from East to West, not only Western New York, but the vast States of the East must be devastated. The sound policy for the American agriculturist to pursue in regard to this disease is to make a vigorous and sustained effort to annihilate it, until the last affected beast has perished.

He referred to the various constituents of food, and the importance of giving such as would supply the animal with the requisite material for repairing the waste continually going on in the body, and for maintaining health. Cows which are yielding milk and are pregnant experience a large demand for tissue-forming elements, that neither their own system nor that of their progeny may suffer in nutrition or development.

A certain amount of liquid in intimate connection with the proximate principles will serve to facilitate their assimilation, and thereby increase their value. As an example of this, he said a bullock may be kept in fair condition on one hundred and twenty pounds of turnips daily, but could not be supported on eight or nine pounds of hay, though as

judged by their relative amounts of proximate principle, their nutritive value should be nearly the same. The plentiful supply of liquid to the blood and tissues not only favours the destructive and reparatory changes in those, but maintains in full activity the various secreting organs. To combine the requisite objects, roots were especially adapted as food for dairy cows, and when their value was better appreciated would, no doubt, come to be extensively grown on this continent, as they had long been in England and Europe generally. In conjunction with these, corn or pea meal should be given in due proportion. The advantage of cooking food, and giving it slightly warm, was referred to, as well as the importance of variety in the diet. A brief but comprehensive review of the various diseases arising from errors in feeding concluded the very able address.

Mr. Willard next spoke on the profits of dairying. He dwelt on the necessity of every farmer keeping an exact account of profit and loss, so as to be able to regulate outlay and prices.

Reference was made to the profits of other branches of the dairy besides cheese-making, and statistics given to show that at present butter is a far larger and more valuable production than cheese; for while the cheese made last year amounted to about thirty-six millions of dollars, the butter during the same period reached nearly two hundred and ten millions. "The butter dairymen," said Mr. Willard, "have been very quiet. They have organized no societies, but have pocketed their profits without a word of complaint." Certain buttermen make 240 pounds of butter from each cow, for which they receive one dollar per pound the year round. This gives a profit of \$240 per cow, to say nothing of the skimmed milk. With regard to the production and consumption of cheese, it was stated that last year's produce was 230,000 000 pounds, nearly two-thirds of which were absorbed by the home market. The consumption of cheese on this continent has very much advanced, in consequence of the increased population, the opening up of new railroads and the improved quality of the article. He recommended the manufacture of small cheeses for home use, as they would be more convenient to retail dealers and consumers. Upon home consumption the dairymen must chiefly depend for the maintenance of remunerative prices, which should be regulated by the dairymen themselves, on the basis of the cost of production, and not by the dealers and shippers, whose object, of course, is to lower the price at which they buy from the former. It was for this reason that co-operation among dairymen was so important.

The speaker next referred to a branch of dairy industry which has recently been found especially profitable—the production, namely, of condensed milk, which had been very successfully carried on in Elgin, Illinois; and estimated that the milk so disposed of realized a profit of ten cents a quart.

The practice of spaying cows was briefly adverted to—an operation said to be neither dangerous nor difficult, and to secure the following advantages: 1st. An increase of one-third in the quantity of milk. 2nd. A uniform quantity. 3rd. Freedom from accidents to which the cow is liable during periods of heat. 4th. Immunity from the accidents of gestation and calving. 5th. Greater disposition to fatten when the animal is dry. Mr. Willard, in conclusion, strongly urged the necessity of organization and concerted action among farmers.

The committee on prize essays next delivered their report, and announced the award for the best essay on cheese as an article of food in favour of Mr. L. B. Arnold, of Ithaca. The successful essay was read at a subsequent stage of the convention.

The election of officers was the next business taken up, and resulted in the appointment of the following officers for the current year:—President, Horatio Seymour, of New York. Vice Presidents, Hon. T. G. Alvord, New York; Anson Bartlett, Ohio; X. A. Willard, New York; Sanford Howard, Michigan; Henry Wade, Canada West; O. S. Bliss, Vermont; Moses Hawks, Illinois; Asahel Burnham, New York; — Bartholomew, Massachusetts; G. H. Kliphart, Ohio; T. S. Harison, New York; N. W. Woodfine, North Carolina; C. H. Wilder, Wisconsin; John M. Webb, New York; S. M. Wells, Connecticut; H. Calmes, Kentucky; Levi Wells, Pennsylvania. Secretary, G. B. Weeks, Syracuse, New York. Treasurer, Dr. L. L. Wight, of Whitesboro, New York. The names of G. B. Moss, of Greene County, and C. B. Chadwick, of Canada, were subsequently added to the list of Vice Presidents.

Mr. Arnold, of Ithaca, next read a paper on rennet, its nature and use. The subject was treated in a very comprehensive and practical manner, and no adequate idea can be given of the merits of the essay by such brief notice as can be given in this place. It was shown that the old idea of the active principle in rennet being an acid must be abandoned, as disproved by many experiments, and that its action was rather due to the presence and development of organic matter, composed of an almost infinite number of extremely minute cells. These organic particles retained their vitality, so to speak, under a great variety of conditions, but were destroyed by a high temperature, though how much below 212° did not seem to be exactly determined. These infinitesimal bodies, though insignificant, comparatively, when acting alone, work out most important results in their aggregate, and are the cause, not only of the coagulation of milk into curd, but of the subsequent change of the curd into cheese.

The structural nature of the active agent in rennet renders it susceptible of separation from the disagreeable odours that usually accompany it. To accomplish this has long been a desideratum among dairymen. It may be done by filtering rennet through charcoal. If the coals finely pulverized, and thoroughly saturated with water, so as to prevent the cells from lodging in its cavities, they will nearly all pass through with the fluid that contained them, while the odours will all be taken up by the absorbent power of the coal. A filter for this purpose may be made by per-

forating the bottom of a butter tub, or anything similar, and laying several thicknesses of muslin on the bottom to catch the coal dust; then lay on two or three inches of pulverized coal and on it one thickness of muslin; then lay on clean sand enough to hold the coal in its place. The sand will assist also in distributing the rennet over the whole surface of the coal. Then pass water through the filter till it will run through clear. The liquid rennet may then be passed slowly through by falling upon the sand in a stream proportioned to the size of the filter, when it will come through sweet and pure, with its efficiency but little abated. Rennet thus deodorized loses all tendency to buffing, and also its ability to give any bad flavour or smell to the cheese.

There is another method of deodorizing rennet that is more convenient, but not quite as perfect as the one just described. It consists simply in putting a small quantity of carbolic acid in the water, or whatever liquid the rennets are soaked in. Carbolic acid is a very powerful disinfectant, and a small quantity will neutralize the odours in a batch of rennet. Ten drops to a gallon of water are sufficient. It does not act instantly. It unites with the water slowly, and is slow in deodorizing the rennet. It should be put in at the time of putting them to soak, and by occasionally stirring it will have accomplished its work by the time the rennet is ready for use. If too much acid is used, the rennet skins will be dissolved, and animal matter be carried into the cheese, producing effects worse than if the acid had not been used. The difficulty of obtaining the acid pure is an objection to its use. Carbolic acid is also a powerful antiseptic, and may be used in the place of salt in preserving rennet skins. Under the most favourable circumstances, the use of salt in preserving green rennets occasions considerable loss. If salted and hung up to dry, the best part is lost by dripping, and if packed in brine, so much of the animal odour is retained in the brine as to make its use objectionable. In the use of carbolic acid these effects are avoided. Ten drops of acid are dropped into a bowl of water large enough to cover the green rennet when laid in it, say one pint. The stomach, when taken from the calf, is turned inside out, and carefully cleaned and laid into the acidulated water, and left there five minutes, and turned once in the time, so it shall be sure to be all wet. It is then stretched on a bow or crocheted stick and hung up to dry, the same as if it had been salted. It will dry rapidly and without dripping. The acidulated water is turned into a bottle and kept for the next rennet, adding a few drops occasionally to keep its strength good. Five cents' worth of acid would cure a hundred rennets, and may be procured at almost any drug store. The scent of the acid will escape in a little time, and with it will disappear the peculiar odor of the rennet. In soaking, they are treated as if cured with salt. A single rennet cured with acid and used alone, curdled the milk for 640 pounds.

After a temporary adjournment, the convention met again in the evening, and listened to an address by Professor G. C. Caldwell, of Cornell University, on "Fermentation and Putrefaction." The subject was treated at great length and in a thoroughly scientific manner; we can only refer to one or two of its more practical applications. It was shown that fermentation depends on the presence and development of extremely minute organic particles of the nature of fungi; that they were found in milk, and when developed and multiplied, were the cause of its souring and further changes; that they existed also in the air, and were readily absorbed; that they were given off by putrescent or decaying matters, which, hence, tended to induce a similar change of

the organic matter in their neighbourhood. Certain conditions of temperature, etc., were favourable to the development of these fungi. A Swedish physiologist, Alexander Muller, in the course of experiments with milk, had found that milk was most ready to turn sour at about blood heat, or 98° Fahrenheit—that a temperature either above or below that retarded the souring, but that at a higher temperature, another kind of change took place, one result of which was a disagreeable putrefactive odor; that rapid cooling of the milk to near the freezing point (32° F) before putting it into the milk room, kept it sweeter; in his experiment it remained sweet twice as long as the other portions which were simply allowed to cool down gradually to the temperature of the milk room—50° to 55° in one case, and 60° to 61° in another. Again, he found that the milk turned sour much more rapidly in closed than in open vessels. In an experiment, he put the milk in two vessels on a stove when its temperature rose to 75°, one of the vessels being closed and the other open. The cream and milk in the open vessel were perfectly sweet after twelve hours, while in the covered vessel, not only were both sour, but a disagreeable odour like that of sweat was emitted; this result shows that if pure sweet milk is essential to success in the manufacture of cheese, the practice of transporting milk warm from the cows is injurious—and if it could be cooled down to near the freezing point before putting it into the cans, less harm would result from confining it in closed vessels while moving it to the factory, and that by all means it should be kept as cool as possible from the time it leaves the cow till it goes into the vats of the cheese-maker. The preservative power of a free exposure of the milk to the air was repeatedly proven by Muller; he found that the shallower the vessel in which the milk was allowed to stand, the longer it would remain sweet; and that, moreover, if a current of atmospheric air or of oxygen was forced through the milk immediately after it was drawn, it remained sweet longer than other portions not so treated.

There are conditions, however, in which exposure to the air, containing as it does the germs of fungi, will bring about the very change under consideration. Then it is known that if the milk is boiled, the organism already in it will be destroyed, and if you protect it from direct exposure to the germs of the fungi in the atmosphere, in a flask whose mouth is closed by a plug of cotton, it may be kept unchanged as long as you will. On the other hand, boil it and expose it to the air again, and it will be found that the souring is retarded—but only retarded.

The speaker then, at considerable length, considered the action of rennet as exemplifying another phase of the existence and development of these minute organisms or fungi, and traced their history in the process of coagulation and the subsequent stages of curdling and ripening cheese.

After the delivery of Mr. Caldwell's address, a petition to Congress for the removal of the tax on cheese was submitted and approved, and the first day's proceedings were brought to a close.

SECOND DAY'S SESSION.

The proceedings of the second day commenced with the reading of a paper on ergot, by Professor Prentiss. This was an elaborate and able essay, in which the topic was very fully treated, and illustrated by numerous diagrams and drawings, showing the structure and growth of vegetable fungi, of which the several species of ergot were va-

rieties. The Professor pointed out the poisonous effects of these fungi as exemplified in ergot of rye, on the human subject, and, as he believed, of ergotized grasses on cattle, producing the most intractable cases of abortion. The remedy against this disease of plants can only be sought, in our present imperfect knowledge of the subject, in the general principles of good cultivation, and with old meadows or pastures the best plan would perhaps be to break them up and reseed.

Mr. Lyman, of New York, next gave an address on butter, the very great difference in the quality of which he aptly compared to that of Jeremiah's figs:—

“Those that were good
Were excellent figs;
Those that were bad
Were not fit for the pigs.”

He showed samples of Philadelphia butter, and gave some account of the method of preparing this choice article. A brief abstract of this process has already been given in the report of Mr. Willard's address before the Canadian Dairymen's Association. Mr. Lyman believed that it only required care and attention for any farmer to produce as good an article as the best Philadelphia butter.

Mr. Webb gave a lengthened address on the trade in dairy products during the past year. He showed that the consumption of cheese in America was largely increasing, and its quality was, on the whole, much improved. In England, he believed, deterioration rather than improvement had marked the operations of cheesemaking, and English dairymen were waking up to the conviction that to hold their own they must adopt the factory system. He recommended the use of Nicholl's English fluid annatto to give the favourite colour. He also alluded to the importance of using stronger boxes than were sometimes employed in shipping. He felt sure that there was no fear of over-production so long as a really fine cheese was manufactured.

The next paper read, after some matters of business, was by Mr. Bartlett, of Ohio, on the “Soil, climate, vegetation and water of the principal dairy regions of America.” This paper, as well as the others read before the Convention, will be given in full in the forthcoming official report of the proceedings, which we recommend all interested in the subject to procure.

The prize essay on “Cheese as an article of food,” was read by the writer, Mr. Arnold, of Ithaca. This was a very able paper, written in a scientific spirit, and gave ample evidence of the wholesome character, convenience and economy of this valuable contribution to our dietetic resources, the advantages of which are thus summed up:—“Besides being, when properly used, a wholesome and nutritious diet; besides being richer in nutritive value than butcher's meat, or any other animal food; besides its peculiar ability to enhance the value and improve the healthfulness of other food with which it is

consumed; besides the aid it renders in digestion, its readiness for use at all times without loss or trouble in cooking, its convenient form for handling and transporting; the ease and certainty with which it may be preserved for many months without loss or injury, all commend it to the favour of the public, and especially to the army and navy where it could not fail to prove not only a luxury to our soldiers and sailors, but a cheap, healthful, and substantial substitute for the continued use of salt meat.”

The proceedings terminated with a resolution that the next Convention should occupy three days, and the objects of the association be so enlarged as to embrace the subject of butter.

Vermont Dairymen's Convention

The first meeting of the Vermont Dairymen's Association was held at St. Albans commencing on the 19th of January and lasting over three days. The proceedings were opened by an address from Hon. E. D. Mason on the benefit of associated effort in Agriculture, as exemplified especially in the dairy interest. He was followed by the Hon. Henry Law, who read an able practical essay on the dairy, advocating among other things the use of sugar beet as food for milch cows. In the evening of the same day, an address on the factory system and dairy management was delivered by X. A. Willard, Esq., who stated that in New York State there had been during the year 1866 over thirty millions of pounds of milk sold, the value of which at four cents a quart would amount to nearly five millions of dollars. The cheese product of 1869 Mr. Willard estimated at 210,000,000 lbs., and the butter product at 700,000,000 lbs., both together representing a value of \$215,000,000. On the second day, Dr. Middleton Goldsmith delivered an address chiefly on the breed and management of dairy stock. This was followed by an paper by Hon. G. D. Alvord, on salt and its uses in the dairy. The afternoon session was opened with an address by C. F. Hubbard, on the breeding of dairy stock. The principal business of the third day was the reading of a paper on Grapes, by Mr. Richard Goodmar. All the meetings were well attended.

Dairy Meeting.

A dairy meeting was held in Markham on the 7th of February, when the following questions were discussed:—

1. The comparative profit of dairy farming, and its advantages in maintaining the fertility of the soil.
2. The selection and feeding of dairy stock to secure the largest amount of profit.
3. Cleanliness of the dairy, operations, utensils, and healthy cows necessary to the production of good butter or cheese.

1. The advantage of selling the milk at the farm over that of making butter, considered with a due regard to the value of the whey and skimmed milk.

The chair was occupied by Mr. J. Gibson, the President of the East Riding of York Agricultural Society. The meeting was largely attended. The chairman opened the proceedings in an appropriate speech, and was followed by Hon. D. Reesor, H. P. Crosby, M. P. P., J. Trann, J. Pike, and others.

The benefits of a mixed system of husbandry were advocated and illustrated by most of the speakers, and the peculiar advantages of dairy farming were especially set forth.

Mr. Trann stated that he had kept an accurate account of the amounts realized from his cows yearly during the past three years. From eleven cows in 1867 he realized \$600; from twelve cows in 1868 he realized \$772; and last year about \$850 from thirteen cows. These amounts include butter, cheese and calves sold during each year.

The great benefit derived from feeding green corn, and the use of the dried fodder from the same during winter, were attested by several speakers, and the more general cultivation of these crops on dairy farms was strongly advocated.

Cheese Factories.

J. K., Harper P. O.—You will find an article in the CANADA FARMER of December, 1869, on this subject. If you intend to start one on a large scale, you can get much information by calling on, or writing to, Mr. James Noxon, Ingersoll, Ont. The profits will depend greatly on the facilities for obtaining a sufficient supply of milk, and the quality of the cheese manufactured. Last year the business was a very profitable one in good hands. But little, if any, more expense for materials and labour would be incurred in a factory using the milk of 500, than one using that of 300 cows. Small factories are not proportionally as profitable as large ones, though they may be made so, where the proprietor does the work of manufacturing the cheese and can keep a large number of cows of his own, and buy the milk of his neighbours at a reasonable price. Calculating that ten pounds of good new milk will yield one pound of cheese, which is about the general average, and the value of the cheese at twelve and a half cents per pound, new milk would be worth about one cent per pound delivered at the factory. At this price the farmer would make more by selling his milk than by keeping it at home for the sake of the butter that could be made, unless, indeed, he has cows that give an average of over eight pounds of butter each per week, for the whole season.

In making calculations for the purchase of milk to supply a factory, it must be made a certainty that the milk of an adequate number of cows can be secured for the entire season, without fail, and each one who agrees to supply milk must stipulate to furnish all he obtains from the number of cows he agrees to supply the milk of, from the beginning to the end of the season of cheese-making.

Usually one or two cows are reserved by each patron to yield a supply of milk and butter for his own family; but while he cannot have the privilege of withdrawing any cows, the factory man is always willing to take on more, as the patron has them come in, or as new patrons wish to join. The annual report of the Canadian Dairymen's Association, which can be had from Mr. James Noxon, Ingersoll, by any one joining the Association and paying their annual fee, \$1, will give a large amount of interesting information on the subject of cheese factories and cheese-making.

Butter Factories.

In view of the now acknowledged fact that the establishment of cheese factories has done so much to improve the quality and increase the consumption, and therefore the value of cheese, it may be well to consider the necessity and feasibility of improving the quality of butter through the means of associated capital and effort, directed toward the establishment of butter factories. Notwithstanding all that has been said in the agricultural press on the subject of making butter, and the extra inducement offered in the way of higher prices for a really good article, there does not seem to be any general improvement in the quality of the butter sent to the leading markets of America. So far from improvement being the order of the day in this article, we are afraid that quite the reverse is the case.

To hard-working farmers' wives, a butter factory in their neighbourhood would prove a boon. It would be the means of lessening their labours greatly, while still enabling them to make money out of their dairies. It would also prove beneficial in another way, namely: encouraging the farmers to pay more attention to breeding stock, with a view to securing cows that would produce milk rich in quality as well as great in quantity—also in leading them to see the advantages of improving their pastures, with the object of keeping a larger number of cows on the farm. Under the present system of making butter at home, the ability of the farmer to profitably stock his farm is frequently curtailed by the impossibility of having more than the products of a very limited number of cows properly attended to.

The best plan to be followed in establishing a butter factory has yet to be discovered by the results of experiment, but in any case it would require much less outlay of capital for materials and costs of management than is necessary to start a cheese factory. There are two courses open to be followed. One is for several farmers in a neighbourhood to club together and start one, each supplying the milk from his cows, to be set and manipulated at the factory by a skillful dairymaid, the proceeds of the butter produced to be divided according to the quantity of milk supplied by each. This plan, however, would present many difficulties.

The other is for a person to start the factory with his own capital and buy the milk from the farmers, the price being regulated by the quality and richness of the milk, which can be ascertained by a lactometer. In this case the factory man would take the whole responsibility upon himself. He would require to visit occasionally each of those from whom he bought milk to see that the cows were healthy and properly managed, rejecting the milk of those who allowed their cows access to bad water and pastures overrun with weeds, or who treated them in a manner likely to make their milk prove injurious to the interests of the factory.

The milk could be brought to the factory either by the patrons or by the factory man, as might be most desirable. The churning of the cream, and even the working of the butter, could be done by machinery. A good supply of ice and a good spring of pure cold water would be necessary, and with all the details of management under the care of an experienced person, success in producing a first class article, that would command a ready sale at high prices, ought to become nearly a certainty.—*J. M. in Country Gentleman.*

Ohio Dairymen's Convention.

The Ohio Dairymen's Association held their sixth annual convention at Wellington, in Lorain County, on the 26th and 27th of January. Wellington is the centre of an extensive dairy district, and next to Little Falls is one of the largest cheese markets on this continent. During the last season, we are informed, nearly 4,000,000 pounds of cheese were shipped from this Ohio market. The Convention was of a very interesting and instructive character, the various addresses being carefully prepared and the discussions animated. The chair was occupied by Hon. A. Bartlet, the President of the Association, who opened the proceedings by an appropriate address. Among the subjects discussed was that of floating curds, the cause of which was generally admitted to be tainted milk, and the cheese manufactured from such was justly considered deleterious and unfit for food. Regarding the delivery of milk once or twice a day there were different opinions; but the meeting passed a resolution in favour of delivering once; and also recommending that the milk should be cooled before being carried to the factories.

The subject of pastures, and the bad effect of foul weeds, was ably treated in a paper by Mr. A. C. Benedict. The annual address was delivered by the Hon. G. Williams, of Oneida County.

The principal business of the second day's session, after the nomination of officers, was a discussion on Sunday cheese-making, in which papers on each side of the question were read, followed by a warm discussion, which resulted in the adoption of two rather conflicting resolutions—one endorsing the practice as a work of necessity, the other recommending that, whenever practicable, the milk should be kept over till Monday. Papers were read on milk fever and on rennets. A petition was adopted praying for the exemption of dairy products from tax on sales.

Poultry Yard.

Management of Peafowl.

My peahens lay twenty-five eggs each during the summer. Their eggs and the cock's feathers are worth more than their keep. I find them do best in a good sized aviary.—There is no comparison in the number of young birds that can be reared in one season by keeping them up and taking their eggs, rather than allowing them to hatch and rear their own. I prefer setting their eggs under a large fowl, as they can be more under control when so hatched. This is quite at variance with old notions, yet quite true. In every case they require a considerable quantity of green food. I give large quantities to my pigeons. I cut a cabbage with a long stalk to it, and put it into the neck of a bottle with water in it: this keeps it fresh. My pigeons eat it greedily, and are always in health. I am particular as to their food and water being clean, and often have the room whitewashed.—*Louisa Ford*

A Spring Poultry Show.

To the Editor.

SIR.—I met a gentleman to-day at the poultry sale, who stated that he had been led to infer, from a late communication of mine in your paper, that the Ontario Poultry Association was on the decline, and that, consequently, several gentlemen, in his neighbourhood, were hanging back from joining.

It was certainly not my intention to give this unfavourable view of the *status* of the Society, which has lately added several new members to its list, and has revised all its rules and bye-laws. Several gentlemen connected with it have combined and sent orders to Europe for thirty dozen eggs, and the interest manifested at the sale to-day does not give the idea of any decadence in the poultry fancy.

The prize list and rules for the fifth exhibition are merely waiting to be put into the hands of the printers, and some \$120 above the sum required for the prize list is on hand. The committee have the following questions under consideration as regards an exhibition:

The first is, as it cannot be held before the 15th of April, many say it is a bad time; and so it is, the hens being at maternal duties; but it is a period of comparative leisure, and perhaps the most convenient for visitors.

The second matter is a question of funds. About \$100 is required to be guaranteed for the coops, which are to be portable, and will thus constitute the show perpetual, as the money for prizes can always be had, and the coops, being portable, will always be on hand, and may even be hired out to other societies if required.

It therefore rests entirely with those fanciers who desire an exhibition to come liberally forward *without delay* with donations and subscriptions, and the difficulty will disappear.

F. C. HASSARD.

Toronto, Feb. 19, 1870.

Fowls vs. Worms.

M. Giot, the French entomologist, has lately found new employment for fowls. He says that French farmers have, during the past year, complained bitterly of the prevalence of worms which infest corn and other crops, the highest cultivated fields being the most infested. Fowls are known to be the most indefatigable worm destroyers, pursuing their prey with extraordinary instinct and tenacity. But fowls cannot conveniently be kept upon every field, nor are they wanted there at all seasons. Therefore M. Giot has invented a perambulating fowl-house, which is described as follows:

He has large omnibuses, fitted up with perches above, the nest beneath. The fowls are shut in at night, and the vehicle is drawn to the required spot, and, the doots being opened in the morning, the fowls are let out to feed during the day in the fields. Knowing their habitation, they enter it at nightfall without hesitation, and roost and lay their eggs as well as in any other house."

SALE OF FANCY POULTRY.—An auction sale of poultry took place in this city on Saturday, February 19th. The birds were advertised as "imported," and drew together, in consequence, a large attendance of poultry fanciers, some coming from a considerable distance; but there was very little merit in the collection, the majority of the lots being of inferior quality, and in poor condition. The prices realized were not such as to encourage the repetition of the experiment, ranging from \$1 to \$2.70 each for poultry, and from 30 cts. to 70 cts. for pigeons, of which there were only a few ordinary specimens. Good birds with such an assemblage of buyers would have fetched very different prices. The lots, with the exception of a few cochins belonging to Col. Hassard, were none of them. We are authorized to state, the property of any breeder of note connected with the Poultry Association.

WATER FOR FOWLS IN WINTER. One great difficulty with poultry in the cold winter weather, is the constant freezing of the water left with the fowls, and consequent adhesion to the vessel containing it, thereby causing much trouble in continually throwing it out. There is, however, a very simple remedy by which almost all the trouble can be saved—namely, to thoroughly grease the inside of the pan or dish in which the water is placed, and in freezing no inconvenience from adhesion will be found, as in moving the pan or dish it will at once part with its cake of ice, and so entirely obviate the necessity of placing the vessel on a hot stove to thaw.

C. D.

Correspondence.

Steam Cultivation for Canada.

To the Editor.

SIR.—A few words on the steam plough, as it has been, is, and ought to be, may prove instructive to some and interesting to others of your readers.

There are three considerations that have brought about the successful employment of steam as a tractive power for the plough—they are, speed, cost and efficiency. How far have these points been gained? As regards speed, success has been reached so far that where good systems are used and the work is well laid out, an acre of strong soil can be turned up in ten hours to a depth of eight or ten inches for each horse-power expended. In the matter of expense little has been gained, as so much of the work hitherto done has been by way of experiment that only a few have realized a saving in the cost of the operation, though the superiority of the work has been a fruitful source of profit. In regard to efficiency, steam is eminently triumphant. The greatly increased aeration of the soil worked by steam is become so well known as to be admitted by all, friends or foes to its progress. Steam-worked land has no pan, and water seldom stands on the surface. The one great object of most steam-users is to keep all possible weight off the surface, except when the operation of breaking down clods is necessary, and the present systems of steam cultivation require no weight but that of the implement to traverse the land to be tilled. This is one main reason of the land lying so very light. Some even drill the seed by steam power, at a cost greater than that of the same operation when performed by horses, for the simple reason that horses' hoofs inflict irreparable damage to any land in a fit state to receive seed.

Thus, it will be seen that a successful steam cultivating apparatus must be able to work quickly, cheaply, and without compressing the land.

Now, as the chief part of such apparatus is the engine—other parts only being made to suit it—let us consider what kinds of engines have been and are used, and what are the kinds that will and must come into use before steam can be generally used on American farms.

One system that has found much favour in some parts is called the "round-about." To work this any kind of engine is used. The traction ropes pass round sheaves at the corners of the field, and on the headlands, drawing the plough to and fro, while the engine is stationary. The only advantage this system has is that it keeps the horses off the land. It requires much manual labour, and is as costly as horse work. This system is quite different to American ideas of efficient machinery, and few here would have patience to work it.

There is the "anchor" system, in which the engine is locomotive, travelling one headland, and its traction ropes pass round the sheave of an "anchor," moving parallel on the other headland, as the work progresses. This system, improved, on properly prepared farms, might pay well here, but as it requires some time to shift from field to field, will not do for general use.

The last system remaining to be noticed is the "double-engine," which is the most recently introduced, capable of doing most work, taking fewer "hands," and the one able to work most efficiently and under the greatest variety of circumstances. Two engines are used, moving parallel, one on each headland. These draw the plough backward and forward between them, in turn, and while one draws the other can have its machinery attended to, "firing up" done, and be moved forward for next furrows. Very little loss of power, economy and handiness are great recommendations to the use of this system, over others. The main drawbacks it has are: the headlands, necessarily left unbroken, to facilitate work; and the unwieldy character of the engines that have been used; also, the first cost prevents many from introducing them.

Steam ploughing heretofore has been too tedious, inapplicable to a majority of farms, or the machinery has been too cumbersome and expensive.

One system proposed, and largely believed in by many, especially in America, is that the engine should draw the plough after it horse fashion, or that the engine and plough should be combined. The first cost of the apparatus would be little, compared with some systems, but, supposing there were no other objections, the working expenses would not be nearly so low. The engine would consume a large proportion of its power in continually moving itself (besides the great additional wear and tear incurred) against which there is no set-off in the double engine system. Fuel and water expenses would be increased, and time would be lost in lubricating, receiving the wood and water, and in turning at the ends. But the main reason that such a system could not succeed is, that almost as much harm would be done by the engine moving over the land to be worked as the operation would do good—the particles of earth would be so solidified that several operations would hardly eradicate the effects on the top soil; yet the greatest damage would be below. The drains, at a depth of thirty-two inches or more, are generally blocked wherever an ordinary ploughing engine has passed over, if the land is at all damp at the time; and the continuous use of heavy engines would soon produce an impervious pan. This system has been tried over and over again, and has hitherto failed, not because suitable engines have not been tried, for many such have been produced, at immense expense, but from the above practical difficulties. Some may say, try a light steel boiler and one of Hamilton's small ro-

tary engines. Such would be an improvement, but the first objection urged against the system would hold good. That an engine might be constructed to work on this system at an equal cost to similar work by horses, is certain, but where would the gain be? Horse flesh is the cheaper apparatus.

The system that will probably succeed eventually in America—for steam must come—will be either the double engine, improved, or the twin engine, perfected, system (in which both engines apply power simultaneously and continuously to the same implement).

Many improvements have recently been made in steam engines, and are about being introduced, which will enable engines to be built much cheaper, to work, on the two systems last named, with greater success than has been yet reached.

The great defect in all ploughing engines hitherto constructed has been that no dome could be placed on the boiler, for want of room. This Hamilton's engine wholly remedies, and also simplifies and lessens the necessary gear. Engines combining late inventions could perform all ordinary farming operations much cheaper than can be done by horses; they would be so simple that any one could work them; handy enough to turn into any common gateway; be equally available for traction purposes on ordinary roads, threshing, &c.; could pass readily over soft wet ground; and the sum for which they might be manufactured would be less than that of those at present employed.

There is now no real obstacle to the general use of steam farming machinery, and the capital taken to work any ordinary business would purchase and run such as described.

R.
Economy of Time.

To the Editor.

SIR,—It seems strange that men that have lived to the age of sixty, fifty, or even forty years, will lay out their farms and buildings to such disadvantage. It seems that they have no new ideas of their own, but do as their fathers and grandfathers did.

A person in travelling over the country sees many farms, and all differently laid out; and it really looks as though the owners laid them out so as to make plenty of work for the women and hired men.

Men who move on new farms in the woods are to be excused; for the first thing needed is a house, and that is built near the road, on a rise of ground, (if there is any to be found). But it is not necessary to have the barn sixty or eighty rods from the house, for fear of taking fire from the stovepipe, and the stable as far from the house in another direction.

If people would think a little, and talk the matter over with their neighbours and ask their advice, they would hit upon some new ideas by which they could have things more convenient, and save hundreds of miles of travel, which is quite a consideration, es-

pecially when it is muddy, or the snow deep. I know a farmer who has three different places, each forty rods or more apart, where he has to go to feed. One is near the house, another forty rods from the first, and the third forty from the second in another direction. Now, this farmer is always behindhand with his work, and always in a hurry; he keeps one or two hired men. He has but one gate in use on the two hundred acre farm; he had some new ones made about three years ago, but he keeps them in the old house out of the weather. I think it must be a pleasure to him to take down and put up the bars.

I know another farmer whose well is about fourteen rods from the house, and his cattle had to go about half a mile for water or go without.

I know of three men living on a rented farm, and they carry all the water for the house use from a neighbour's about forty-five rods distant. They have been living there over two years, and they must go on an average about once each day. Now, let us see what it amounts to; say, one man forty-five rods and return makes ninety rods; three times ninety (for there are three families) makes two hundred and seventy rods, multiplied by three hundred and sixty-five makes about three hundred and eight miles per year. Just calculate how long it will take a man to walk three hundred and eight miles: even at the rate of thirty miles per day it takes over ten days.

Let us set against this the cost of digging and curbing a well, say, for digging, two men, one day..... \$2 00.
Lumber, say 200 feet, (that is plenty). 2 00.
Nails..... 05
Other work..... 1 00.

Whole amount \$5 05.
Perhaps this is too low an estimate. The labour of two men might be required, one to dig and one to haul away the dirt, for more than one day; still, the expense is seldom considerable.

By this you can see how some men spend a good part of their time, and yet they cannot see why they do not get along better. There might be many instances of the kind enumerated, but the above is enough to set those who have any brains to thinking.

L. R.

The Engineer on the Farm.

To the Editor.

SIR,—Steam and mechanical expedients are rapidly being brought into subservience to the ends of the husbandman. On this side of the Atlantic we use machinery much more largely for some agricultural purposes than it is used in Britain, whilst for other farming processes mechanism is much more employed by the old country farmer than by our own. This is natural, and almost a necessity, considering the needs and position, of America and Britain: There are many ways, however, in which we might, with advantage,

use English agricultural devices. For instance, the English seed drills.

Steam is beginning to be used to a much larger extent in British farming than ever, not only for threshing, etc., but in many parts the plough is quite successfully worked by this means, and on one farm we know of, not only ploughing, but all the tilling is by steam, cultivating, harrowing and drilling the seed included. It may not, perhaps, be practicable to bring the steam threshing machine or steam plough into common use in Canada just yet, but there is a way steam could be made greatly to benefit us,—by applying its unlimited powers in lieu of the axe, in clearing our interminable forests. This seems a new proposition, and presents many difficulties; but in an engineering point of view it is quite simple, easy of accomplishment, and an ordinary operation, Machinery, peculiarly adapted to the purpose is largely in use in England in other ways; the capital to purchase this is the only real difficulty.

"How would you go to work?" perhaps some one asks. Simply to pull down the trees, or pull away the stumps.

Our old settlers, who have spent many a weary day in chopping out a clearing, would no doubt be inclined to ridicule the idea, at first. Let them, however, think of the many giants they have seen lying prostrate, uprooted, from the simple force of the wind. Considering what leverage the trunk of the tree offers the engineer as a means to extract the roots from the ground, it will be perceived that he would simply have to attach a steel rope or chain to such part of the tree as he deemed most advisable, and haul it down and away to any desired place.

I have no doubt but that this will sometime be the way the clearing of the forest will be performed, and the sooner the better for many. Machinery for this purpose could also be employed for sawing, grinding, ploughing, or any other purpose of the farm. The expense incurred in working would simply be interest on capital, and the time of from two to six men; giving a large return from receipts for work accomplished. Other ways of using engineering knowledge on the farm suggest themselves; but, for the present, I will only throw out the above suggestion as one that appears to me to be feasible and profitable.

R.

Broom Corn.

To the Editor.

SIR,—Will you be kind enough to inform me, through the columns of your journal, if it would be possible to grow broom corn in the vicinity of Hamilton. I presume we could raise plenty of stocks, but could we successfully grow it so as to insure its perfect heading? I have been informed that the broom itself does not attain a sufficient length for manufacturing purposes, and if this is the case, of course it is useless to raise it. I

would also like to know what soil is best adapted for growing it, whether the ground should be very rich, and also what yield could we expect per acre.

JOHN W. SMOAK,

Hamilton, Ont.

REPLY.—To grow broom corn successfully, the same climate, soil, and general culture are required that are suitable for the large Western corn, or for the Chinese sugar cane, which last is simply a variety of broom corn (*Sorghum*). As, however, it matures earlier than the large corn of the West, and should be cut for economical purposes before the seed ripens, it is quite possible it may be adapted for some of the warmer portions of this Province, and at least the trial is worth making; though from the nature of our climate it would probably be an uncertain crop, and only answer in very favourable seasons. Rich loamy soils, not stiff clays, are most suitable. About 500 pounds to the acre is considered a fair average yield.

Advertisements for the "Canada Farmer" must be sent in to the office of publication early, and in order to secure their insertion in the forthcoming number, must in no case be later than the 7th of the month.

The Canada Farmer.

TORONTO, CANADA, MARCH 15, 1870.

Agriculture and Arts in 1869.

The report for 1869 of the Commissioner of Agriculture and Arts, for the Province of Ontario, has been issued with commendable promptitude, and contains a large amount of interesting information. We noticed the report itself at the time it was laid before Parliament; but the statistics contained in the various appendices deserve more than a passing remark. These appendices are five in number, and may be referred to in their order.

The first contains an analysis of the reports of the various agricultural societies for 1868, so far as they have been sent into the Bureau. As a general thing, these reports have been made out in a very clear and satisfactory manner, and show, according to the Commissioner, a very great improvement on former years. Of course, some are not all which could be desired; but, upon the whole, they are very encouraging. There is an increasing desire and effort to improve the local exhibitions, by having fewer of them and amalgamating for this purpose two or more of the existing associations. No doubt this is a move in the right direc-

tion, especially when efforts are being put forth, along with the exhibition, to improve the breed of the various domestic animals by the Societies purchasing superior animals for stock purposes, and introducing for purpose of trial, new and improved seeds. From such a mass of reports, it might seem invidious to select one or two of marked interest and excellence. Considerable activity and interest seem to be manifested in the District of Algoma, for instance, though one of the newest and least advanced districts of the Province; while the older districts, not contented with the degree of excellence already attained, are with praiseworthy earnestness seeking to make still further advances. The continued growth of wheat for successive years, on the same land, is being dropped by an ever increasing number, injurious as it is in the long run to all concerned, though for the first few years apparently profitable. The report from South Brant well says:—"It cannot be sufficiently published for the benefit of all the great gain which may be made by adopting a judicious system of rotation, the growing of green crops, roots and vegetables." With good farming, Ontario may be made a garden. What bad farming can accomplish is testified by thousands of "lean and hungry" acres almost everywhere, which, once rich, now scarcely afford a wretched subsistence to their unskilled and thriftless proprietors. Sometimes people are foolish enough to try to excuse their bad farming by saying that they can't afford to do better. If good farming won't pay, bad farming need not be tried.

The conclusion of this report from South Brant is worth giving; and its sentiments ought to be impressed upon the minds of all who have the best interests of Canada at heart.

"We therefore say, educate your sons and daughters; never cease, in season and out of season, to impress upon their minds, the nobility, dignity, yes! the blessedness of labour; the Godlike virtue of truth; the necessity of honesty and liberality in their dealings with all men. Purchase books, old and new, for the use of your families; spend less in adorning the person, more upon the mind; more usefulness, less worthless display. Place the minds of your sons and daughters, by means of books, in direct communication with the best minds that have lived during the last three thousand years, and thus endeavour to make the rising generation, giants, mighty men of renown, who will go forth into the world to make their mark as artisans, mechanics, chem-

ists and farmers; men who will be eager to aid industrial progress of every kind, to help forward a new social organization, having for its object the banishment of poverty and distress from the face of the land, together with other much needed reforms; then, after a lifetime spent in usefulness and self-abnegation, in doing good and helping their weary, toil-worn fellow-men, "they will leave behind them honourable names to be remembered with those of the benefactors of humanity."

The second appendix has reference to Mechanics Institutes.

According to the new law passed by the Local Legislature a dollar a year is given by Government for every dollar raised by Mechanics' Institutes for evening instruction, up to a maximum of two hundred dollars. Thirteen Institutes availed themselves of this provision in 1868, though only three of them received the maximum. Among these thirteen \$1,610 were distributed. Last year seventeen Institutes received grants, and had \$2,356 07 divided among them. Of course there is a large number of other Institutes which have received no grants. Some of these seem to be in a very flourishing condition; others are rather languishing.

The Report of the Fruit-Growers Association will well repay a careful perusal, abounding as it does in useful suggestions and interesting facts.

The crop returns given in appendix 4th will be very useful to compare with those of coming years. While there have been partial failures in certain localities, in general the crop of '69 is much above the average. In many places the yield is given as double that of the previous year, while one-third, or even one-half more is not uncommon. The average yield of Fall Wheat in 1868 was 20½ bushels per acre; in 1869 21½. Spring wheat in the former year averaged 14 bushels; in the latter, 19½. In 1868 oats averaged 24 bushels; last year, 30. Barley in 1868, 22½; in 1869, 30½. The highest yield of fall wheat in 1869 was 28 bushels per acre. Of Spring, one county gives 30 bushels per acre, but generally from 20 to 25. Oats in some cases reached a yield as high as 50 bushels per acre; and 35 and 40 were quite common.

We hope the reports of succeeding years will be much fuller, and give even a more satisfactory view of the agricultural condition and advancement of our fair and fertile Province. Much has already been done, but a great deal more remains to be accomplished; and we sincerely trust that all will do their best in a work

which has so intimate and influential a bearing upon all the best interests of every class of the community.

No country can flourish where agriculture decays, and by way of eminence this is true of Ontario. Whatever facilities we have for developing manufactures—and these are great—such industries must always occupy a secondary place compared with utilizing to the utmost the resources of our fertile soil.

Agricultural Societies.

So thoroughly has the spirit of improvement now taken hold of the farmers that there is scarcely a county or township in Canada but has its Agricultural Society, and judging by the numerous reports of their doings the past year, as given in local papers, they seem to be steadily progressing in the work of increasing the interest taken by the rural population in the advancement of agricultural knowledge, and the improvement of the productive capabilities of the soil, as well as increasing the value of the stock raised on their farms.

Our limited space forbids giving any extensive notice of what is contained in the several reports that come to hand, as where all are striving to do their best, it would appear invidious to give prominence to a few of those that appear to have met with the greatest success in their efforts.

We were pleased to notice, in the cases where we attended agricultural fairs last autumn, that the matter of selecting competent judges, and judiciously arranging the prize list so as to give encouragement to individual effort in introducing improved stock, and better implements suitable to the wants of the farmer, was beginning to be appreciated.

There is one point on which the officers of the societies do not yet seem to place sufficient stress; viz: punctuality on the part of the exhibitors in getting their articles on the ground and properly arranged in their places at an early hour, before the time comes for the general public to be admitted.

There is too much latitude allowed to exhibitors in this matter, and as in most cases the fairs are now extended to two days or more, it will be well to insist on a close observance of the rules of the society, and in time the people will become educated up to a knowledge of the value of punctuality. A thorough classification and proper arrangement of all the articles on exhibition, placing each class in a division by itself, and affixing thereto a proper label in letters that "one who runs may

read," is a very great help towards bringing those who attend the fairs to observe and compare as well as see; for one of the great points aimed at in agricultural fairs should be to evoke a spirit of observation that will lead men on the right path towards improvement.

We might suggest that it would be well for the directors of one agricultural society to correspond with those of another, through their secretaries on the matter of appointing judges, and by this means an exchange could be made between them of men thoroughly competent. For instance the directors of a township society could either be appointed the judges at the fair of an adjoining township, or could give their brother directors of that township a list of those persons who in their opinion were likely to prove acceptable as judges, and at the same time had the advancement of the interests of agriculture sufficiently at heart to induce them to sacrifice a little of their time to so laudable an object. So with county societies. One object to be gained thereby would be the saving of expense, while insuring punctuality; for in cases that have come under our observation, judges have been appointed to attend at fairs, who resided at such distant points that they could not possibly attend except at great personal inconvenience and expense, which in all cases it is desirable to avoid imposing on men who take a real interest in agricultural progress.

Farm Labour.

It is much to be regretted that the old country system of employing labour on the farm all the year round, is not more generally adopted here. It would be better for both the farmer and the labourer he employs, if instead of our plan of hiring by the month, and then only during the season of actual tillage operations, and boarding at the house, men were hired by the year, and provided with a small cottage and garden. In this way not only would labour be cheaper, as a man will hire by the year at a much lower rate, with a certainty of employment, than if paid by the month for a short time, but it would bring a better and steadier class of labourers into the country.

What is needed is that farmers should give encouragement to married men with families to settle in the country. As things are now, the generality of farm labourers are either young men, sons of farmers, who would be in a better position if married and settled on farms of their own in the back country, or of that shiftless class of half mechanic, half la-

bourer, commonly found haggling about the skirts of towns and villages, always on the look-out for a job, that they often tire of and abandon when half done.

The right class of men are agricultural labourers—men that understand ditching, threshing, &c.; and such men can be got if they are given encouragement to come to the country.

A man of that kind, even with a family, can live and thrive on \$120 a year, and board himself, as a garden patch of half an acre, with pasture for a cow, or milk given from the farm house, will give him all he needs except meat and flour, which the farmer can supply him with at market prices.

Under this plan there would always be a man on the place to do the chores when the farmer himself is busy. He could be employed in winter in threshing oats or seed grain with a flail, cutting up a supply of firewood for summer, and even digging ditches for underdrains, if proper preparation had been made the previous fall for carrying on that work. The comfort and profit of having such a man ready at all times for any kind of work need only to be experienced to be appreciated.

Emigration to Canada.

We are glad to notice on every side evidences that Canada is attracting increasing attention in Britain as a very desirable country for the industrious and struggling poor to emigrate to. As the result of this, much more correct ideas are being diffused in regard to what sort of a place this Canada is. Even the Thunderer of Printing House Square condescends to give the Dominion a patronizing pat upon the shoulder and the information about the position and capabilities of the country are not at all so absurdly apocryphal as it used to be even a short time ago.

The Cottager and Artisan, for instance, a very nicely printed and illustrated paper which circulates largely among the working classes, has begun in its January number a series of papers on Emigration, for the purpose of advising who should emigrate, and to what countries they should go. It gives, in the first place, some account of the Dominion, and comes passably near the size of our promising country. The dimension of the whole Dominion it puts down at about 15 thousand square miles less than that of old Canada alone. New Brunswick and Nova Scotia, however, contain 47,200 square miles; and if the 15,000 of deficit be added to these, this friendly informant tells the working classes of England that the Dominion has 62,200 square miles of territory less than

it actually has, to say nothing of the North-West at all. Well, when the people of England get within 60,000 square miles of the true area of any British possession, a great step has been made. Things in that case will get into shape by and by. Though the writer of the papers in question is not quite accurate about the size of our country, he writes in a most friendly spirit, and gives good advice to those who ought to emigrate, as well as to those who ought not.

It cannot be too often stated that the idle, the dissipated, the purpoised, and the skilled workman who can do only one thing well, and will rather starve than turn his hand to anything else, ought not to come to Canada. A man who comes here must not be afraid of hard work—must make up his mind to encounter a good many disagreeable things, and must be resolved to meet such things like a man. He must be ready and willing to turn his hand to anything, and avoid strong drink as he would his greatest enemy. If he do that, and keep at it with health and ordinary care, he will find Canada a very good place for him and his. Paupers, who expect to be helped at every turn, had better go elsewhere; or, better still, stay where they are. These papers by Dr. Ford, in the "Cottager," will do good. The more the plain, unquestionable facts about Canada are known in Britain so much the better for us and so much the better also for the struggling, industrious masses in the old land. Money is not to be had for the lifting, either in town or country throughout our Dominion; but there is wealth and a reward for "honest labour," as tens of thousands can gratefully testify.

Returning Emigrants

The recent arrival in Toronto of several families from Illinois, *en route* for Muskoka, affords additional evidence of the difficulty of making a living in some parts of the neighbouring Republic. Some States which are possessed of immense quantities of prairie land and other apparent advantages, are in reality less adapted to farming than other places not apparently so highly favoured. Illinois, for instance, has land enough and to spare for all the population she can gather for many years; yet her principal city teems with men out of employment, amongst whom are many who have come in from the country. There is much to militate against their success as agriculturists. It is not the want of land, and as the complaint is made by many, there must be some cause for which the men themselves are not to blame.

The prairie lands farther North-West offer more inviting fields for farm-

ing operations than Illinois. Minnesota is far superior to the more southern States; its growth of wheat is enormous, and its climate fine.

Our own North-West Territory, by which is meant those districts watered by the Red River, Assiniboine, Saskatchewan, and neighbouring streams possesses greater advantages than any State to the south of it. The prairie land is of the most fertile kind, there is more wood at the hand of the settler, and there is a plentiful supply of coal. The country farthest west possesses a milder climate than Minnesota, and is equally wealthy.

Accounts of the resources of that portion of British North America, known as the "Fertile Belt," agree in describing the country as the finest on this Continent; and there is no doubt that when the road is open to Winnipeg a stream of immigration will set in which has never been paralleled in British America. The isolation under which the North-West has slowly thrived will be exchanged for easy and constant communication with the older Provinces. The coming spring will see numbers of Canadians settling in the newly-opened Territory, and the construction of a railway through the Settlement is not far distant.

The attractions which the North-West offers will not fail to draw many besides Canadians. The efforts which are being made in England to provide means for sending Englishmen to the Colonies will result in numbers finding their way to Winnipeg. Canada's popularity in England is greater than that possessed by any other Colony; and were our emigration interests in Great Britain attended to properly and regularly, there is little doubt that we should receive by far the greater portion of those who are leaving their homes. The prospects which the North-West offers to men of all ranks, but particularly to those who can command a little capital, are so great that, if properly understood in England, the opportunity would be seized by many who have now no thoughts of coming. The man who in England farms a small patch of fifty acres, and who is compelled to use several hundred pounds in capital, would find his means and his knowledge far better employed on this side of the Atlantic. He does not know that, however; he has only a misty idea of which is Canada and which the United States, and he would not know where to come to, if he made up his mind to come at all, without proper information being given him. There are numbers of men of another class who have just enough money to be useless in England, to whom the North-West offers a golden opportunity; and there is no lack of men, who, having one or two hundred pounds, which brings them in perhaps three or four per cent., would gladly remove to a country where their capital would, in a few years, be of a very different magnitude.

Notes on the Weather.

The winter so far has been characterized by very moderate weather, though the latter part of February has been colder than any other time of the season. Snow has been abundant throughout most of the country, there being excellent sleighing even at Toronto during a good part of the month.

Stock of all kinds seem to have wintered well, and a great demand exists for good animals, especially milk cows and heifers, which bring exceedingly remunerative rates, where well bred and in good condition.

The range of temperature for February has been considerable, though the figures indicate a slightly lower degree on the average than last year. The highest temperature was 19.7° on the 17th; the lowest, 6.7° on the 21st. The mean temperature of the month has been 21.7°, being 1.2° below the general average, and 1.2° below that of February, 1869. The amount of rainfall has been 0.529 inches; of snow, 20.2 inches. There has been little clear weather, 17 days having been entirely overcast, and 11 partially so. The prevailing winds have been westerly, with considerable variation to the northwest and east.

SIMMERS' CULTIVATORS' GUIDE FOR 1870.--

We have received a copy of Mr. J. A. Simmer's annual catalogue of field, vegetable, and flower seeds for the current year. Besides furnishing a complete and well arranged list of seeds, comprising all the latest novelties, the pamphlet contains, as its name implies, brief practical directions for the sowing and culture of the various garden plants. Mr. Simmer's well established reputation as a careful and reliable seedsman, his moderate prices, and the excellence of his stock of seeds, to which we have pleasure in bearing testimony from personal experience, give him a claim to a full share of patronage both among farmers and amateur gardeners. He has recently added to his facilities for business a garden for raising seeds and flowers, which is situated a short distance from the northern limits of the city. A copy of the "Cultivators' Guide" will be sent to any one remitting in a prepaid letter a three-cent stamp to return postage.

MILLER'S TICK DESTROYER. We have pleasure in directing attention to Mr. Miller's advertisement in reference to his valuable remedy for sheep ticks and other vermin that often prove so troublesome to the infested animals, impairing their health, and deteriorating the quality, as well as diminishing the quantity, of their wool. This preparation has now been before the public for several years, and has steadily gained in reputation, as it has been more extensively tried. It has found its way, not only over all parts of Canada and the United States, but into Great Britain, where, to judge by the testimony of eminent flock-masters, it is held in high esteem. We believe it to be a thoroughly efficacious, and with ordinary precaution a perfectly safe application, and have no hesitation in commending it to the attention of Canadian farmers.

Horticulture.

EDITOR - D. W. BEADLE,

CORRESPONDING MEMBER OF THE ROYAL HORTICULTURAL SOCIETY, ENGLAND.

Fruit-growers' Association of Ontario

The regular winter meeting of this association was held on the 3rd of February, 1870, at the Court House, in the city of Hamilton. There was a very good attendance of members, and considerable interest manifested in the subject discussed.

The meeting was called to order by the President, Rev. R. Barrett, and after reading of minutes.

Mr. Rykert called attention to the Fruit Prize List of the Agricultural and Arts Association, and suggested the desirability of having it extended and better classified.

Mr. Mills stated that he had no doubt the Agricultural Association would alter the prize list to meet the views of this Society, as they had made many changes last year upon his recommendation.

This subject was left in the hands of the President, and the meeting proceeded to the discussion of the first subject.

THE PEAR BLIGHT.

Mr. A. P. Farrell, of Cayuga, had tried iron filings, applied to the roots by mixing them with the soil, and at the same time carefully and thoroughly cut out the blighted and affected portions of the trees, and they had grown very thriftily since.

Mr. Bennett, of Brantford, had tried the same application and treatment, and thought he had found it to be very beneficial until this year, when very many of his trees blighted, and there seemed to be nothing left but to cut off the diseased portions as often as they appeared.

Mr. Arnold, of Paris, was entirely at a loss what to say or do concerning this disease. It had baffled all his skill, and set at naught all his attempts to devise a remedy, and he had none to offer.

Mr. Morse, of Smithville, had but little experience with the pear blight. (Fortunately) it was only when trees made a very luxuriant growth that he had found them liable to be killed back, probably by the effects of the winter. He mentioned an experiment that had been tried by some gentleman, who gave some of his trees very high cultivation, and some very little care. Those that were highly cultivated were all of them more or less affected, while those with but little cultivation were all good and sound. He was inclined to believe that the trees suffered most from sudden changes from heat to cold in the early part of the growing season. He thought that the application of ashes, and perhaps, of a little lime, was of the greatest possible benefit in the culture of the pear, both as regards the blight and the general growth and vigour of the tree.

Mr. W. H. Mills, of Hamilton, thought there were three causes of blight in the pear tree: First, frozen sap blight; second, summer blight, arising from different causes, and third, a blight caused by fungoid growth. He thought that if evaporation is rapid during the growing season, and the tree is not well supplied, and this condition is followed by a few days of warm rain with a close atmosphere, then the tree becomes gorged with sap, the over-trained sap-vessels burst, turn black, and are in a fit state to be attacked by some fungus, which finds in this condition of things just that which is most conducive to its own rapid growth.

Judge Logie, of Hamilton, had applied coal ashes, mixed with wood ashes and a little well rotted manure, and has never known the trees thus treated to become blighted. He thought the soil had much to do with the blight, and that in soils in which lime is deficient, the application of a moderate quantity was highly beneficial.

Mr. A. M. Smith, of Lockport, N.Y., said he had much faith in the use of lime and wood ashes. He also washes his trees with soap and lime-water, and does not cultivate very highly.

Mr. Holton had watched with much interest the progress of a pear orchard belonging to Mr. Lewis Springer, who had made an incision into the bark of the trees, running from the limbs down the trunk to the ground. This cut was made just through the outer bark, but not down to the wood, in the month of June. Thus far, this orchard had escaped the blight. He has also been seriously troubled with a blight in his crab apple trees, especially in the Montreal Beauty, which is not a very rapid grower, and thought the disease to be the same as the pear blight. It usually began in the tops of the trees, and worked downward.

Mr. Arnold asked if any one had seen a pear tree blighted, the cultivation of which had been wholly neglected.

Mr. Rykert replied that he knew of an orchard of dwarf pear trees in the vicinity of St. Catharines which had been totally neglected, was allowed to grow up with weeds and grass that nearly hid the trees from sight, and a large part of that orchard had been killed with blight.

Mr. Mills said he had for several years past been in the habit of making longitudinal incisions in the bark of his pear trees, in the manner mentioned by Mr. Holton, and had not found any of his trees to be affected with the blight since he had tried this plan.

Mr. Saunders, of London, stated that he had an orchard of pear trees in a light, hungry soil, and one of those trees was killed by the blight. That one had made the least growth of any.

Mr. Bennett remarked that the frozen sap blight which appeared in trees making too rapid growth was easily understood, but the other blight, which he thinks is quite distinct, known as the fire-blight, is a puzzle.

, Dr. L. Cross, of St. Catharines, has noticed a form of blight which is indicated by the bark turning black in spots, and that the trees which are attacked in this way *ultimately* die.

Mr. Freed, of Hamilton, thought that the blight was more prevalent after a severe winter. He was disposed to believe that the severe frost was the first cause of the blight, the hot summer finishing the evil then commenced.

Mr. Beadle thought there was only one disease, which was varied in its manifestations, and that it was well known by the name of fire blight. He had seen this disease in seedling pear trees that had never passed through a winter, and known them killed entirely by it. He had known charcoal used, and for a time it seemed to have the effect of preventing the blight, none having been seen among the trees so treated for some eight or ten years. But all at once the blight broke out again, and many of those trees were killed by it. He had seen trees growing in clay soils, in sandy soils, and in gravelly soils, alike suffer from this fire blight, had seen them blighted when growing wholly neglected in a fence corner, as well as when carefully cultivated in the garden. He trusted, however, that further and protracted experiments would be tried, in hopes of yet finding some remedy or preventive of this disease.

On motion of Mr. Morse, seconded by Mr. Rykert, leave was granted to introduce at this meeting a memorial to Parliament, in effect praying that our Government would impose upon fruit trees coming into Canada from the United States the same duty that is imposed by that Government upon the same articles, when sent there from Canada.

The meeting then took a recess until two o'clock p.m.

AFTERNOON SESSION.

Messrs. Holton, George Leslie, jr., and C. Arnold, were appointed a committee to examine and report upon the seedling apples and other fruits on the table.

There was a very fine collection of many varieties of winter apples and late keeping pears on the table, brought together by the members from different parts of the country.

The reports of the Society for the year 1869 were distributed to the members present. Members entitled to them who were not present will receive them by mail.

Mr. Morse introduced the memorial to the Legislature, stating that he was a free trade man, and felt that if our Government would impose upon the products of the United States the same duties that they impose upon our products, they would soon see the folly of attempting to drive us into annexation by the course they were now pursuing, and would be very glad to return to a more liberal policy.

Considerable diversity of opinion was expressed, and an animated discussion was maintained for some time, which we omit, as

throwing no light on the cultivation of fruits.

It was at length resolved, by a vote of seven teen to ten, to send the memorial introduced by Mr. Morse to the several branches of the Legislature, and that the President and Secretary sign the same.

Nothing new was elicited on the subject of winter pears. The President spoke very highly of the Beurre Millet, had found it a very fine pear, and thought it well worthy of trial.

The Beurre Millet, of Angers, is a very vigorous and productive tree. The fruit is of medium size, having a greenish skin, covered with russet, and thickly sprinkled with minute russet dots. The flesh is whitish, somewhat buttery, juicy, melting, with a brisk vinous flavour. In use in December and January.

SUMMER PINCHING

was the next subject discussed.

The President stated that for eight or nine years he had pursued the system of pinching in the growing shoots. This should be done in dry weather, and on no account is it to be done in wet weather. The effect of this summer pinching was to increase the quantity of fruit, and induce the trees to fruit earlier. This pinching should be done in the end of June or beginning of July.

Mr. Townsend, of Hamilton, said he had a large number of pear trees under his care, always summer pinched in the manner described by the President, and was fully satisfied of its beneficial effects.

Mr. Saunders agreed in the main with the President, but had found that you could not always depend upon obtaining greater fruitfulness by summer pinching. He had a plum tree which he had summer pinched most thoroughly, in the hope of making it fruit, but it had spent its whole force in making wood, in despite of all his pinching.

Mr. Beadle was of opinion that the tendency of summer pinching was to arrest the wood growth and induce the tree to form fruit spurs. There may be occasional exceptions, owing to some peculiar counteracting cause, but in the main the effect may be relied upon.

THINNING OUT THE FRUIT.

Mr. Morden, of Halloway, county of Hastings, thought there could be no question but that the thinning out of the fruit was very beneficial both to the development and perfection of the fruit that was allowed to remain, and to the tree.

Mr. Mills had had considerable experience in thinning out the fruit, and found it to be exceedingly beneficial. He instanced a dwarf apple tree, of the variety known as the Alexander. He commenced to thin this out when the fruit was quite young, about the size of a walnut, and removed about half of the fruit. Later in the season he became satisfied that he had left too much fruit on this tree, and he thinned it out again, and finally left about half a bushel on the tree,

and as the result of this thinning, every apple was perfect, they were of uniform size, and perfect beauties. He takes off the smaller and imperfect fruit, and is confident that the value of the crop thus obtained is decidedly greater than if the entire crop set were allowed to remain on the tree.

Mr. Morse and Mr. Freed confirmed what had been said, believing that both size and quality of the fruit were improved by proper thinning out, and that the price realized from the fruit of an orchard would be greater than if the whole were allowed to grow.

The President stated that if only the proper quantity of fruit were allowed to grow, which of course varied with the size and vigour of the tree, plenty of fruit spurs would be formed by the tree for the production of fruit the following year; but if all the fruit was allowed to grow and ripen, the tree would not form fruit buds for the next year, so that there would be always fruit only every other year. By judicious thinning a crop of fruit is secured every year.

Mr. Beadle believed from actual experience that it would pay to hire a good hand at a dollar and a quarter per day to go carefully through the orchard, and thin out the fruit from those trees that had set too much.

KEEPING FRUIT.

Mr. Mills said that while in attendance upon the American Pomological Society at Philadelphia, he saw fruit that had been kept for a year in a fruit house, without change or deterioration, and thought it was very desirable to adopt such a plan. He kept his own fruit in an ordinary cellar lined with water-limo.

Mr. Saunders said that it would be very easy to try the experiment of keeping fruit in an atmosphere of carbonic acid gas, which prevents the action of the air upon the fruit, and suggested that members make the trial.

Mr. Bauer, of Hamilton, said that he had kept currants and grapes in cans charged with sulphurous acid gas, if put in a cool place. He had tried to keep them in this way in a warm place and had failed. This gas had no effect on the flavour. He had kept cherries nicely until Christmas, and should experiment farther.

Mr. Saunders had tried sulphate of soda, but found it to give a strong nutty flavour, which was not satisfactory. Carbonic acid gas, on account of its great specific gravity, was very easily tried. Sulphurous acid gas escaped easily.

Dr. Cross said that sulphurous acid gas absorbed oxygen from the fruit, and kept it in a fresh state without fermentation or decay, while carbonic acid gas only excludes the oxygen of the atmosphere.

The President said he would recommend to pack fruit in nice, clean, washed sand. It would keep plums and cherries for a considerable time beyond their natural period of ripening. A cold room of even temperature would keep fruit much longer than where

the temperature was constantly varying. Pears placed in a close drawer kept in perfectly good condition for a month or six weeks longer than those exposed in the open air of the room. Pears tied up in paper bags keep much longer and ripen better than if exposed to the air.

Mr. Mills said he put some Belle Lucrative pears in clean washed sand. They kept for three weeks after the others were ripe, and were then not ripe, but on being taken upstairs ripened in a few days, but lost their flavour.

Mr. Hatt, of Dundas, headed up tightly in a barrel some snow apples, and kept them in a cold cellar, almost at freezing point, and they turned out exceedingly well.

SHIPPING FRUIT.

Mr. Bail, of Niagara, said that any clean-looking, well flavoured apple, can be shipped if properly packed. The chief point was the packing. He had shipped with sweating and without. Only first class apples should be used. Each basketful of apples, when put into the barrel, should be carefully shaken down, and the barrels filled nearly even with the top, the heads put on and pressed to their places. He had shipped several varieties—Russets, Ribston Pippins, etc. Apples required to be of good flavour and colour to sell well in Europe, and to be of uniform size, never more than two sizes in the same barrel. He did not think it advisable to press more than an inch and a half.

Mr. Mills described Mr. Springer's mode of packing apples. He does not shake them down as he puts them into the barrel, but after he has filled the barrel he puts on a cone of inferior apples to receive the crushing and then presses them down. Mr. Springer is very successful.

Mr. Keating thought that when the apples had to be transported over rough roads it was necessary to press more than when they need to be taken only a short distance in waggons or over smooth roads. He is in the habit of pressing the fruit down about three inches. Only the top ones are bruised.

Mr. Ball recommended that each shipper should put his name and mark on each barrel of apples he sends out. In this way the fruit and shipper become known and obtain a character in the market, and a price suited to its character. He also remarked that the Green Newtown Pippin sold for the highest price in England, and if it could be grown clean and free from spots on a favourable soil would be a profitable variety to ship to Europe.

Mr. Beadle said it was an utter waste of time and money to attempt to grow the Green Newtown Pippin for shipping from this country. It does not grow anywhere in this country in good order with certainty; it spots badly, and the tree fruits sparingly. It will not pay to grow it.

Mr. O. Hammond said he grew it in good order, but it did not bear so well as other varieties.

A resolution was passed recommending to all growers of fruit to mark their packages with their names, or some distinctive mark, by which they shall be known readily in the market.

Some discussion was had as to the time of holding the summer meeting, and the opinion of the meeting seemed to be that the best time would be when the Raspberries were ripe.

The subject of holding an autumn exhibition of fruit was laid over for consideration at the next meeting.

It was requested that the "Pruning of Fruit Trees" might be discussed at the summer meeting.

The committee appointed to examine the new seedling apples and other fruits on the table made their report, and the Association adjourned, to meet in London at the call of the President.

REPORT OF THE COMMITTEE ON SEEDLING APPLES AND OTHER FRUITS

Seedling apples shown:—

Mr. James Best, Toronto, a pretty medium sized red cheeked apple, much resembling the Wagner, but inferior to it in flavour.

W. J. Marsh, Clarksburg, two seedling apples, both past their season, one resembling the Holland Pippin, but not equal to it; and one resembling the Rambo in appearance, but earlier, and not having, in our opinion, any distinctive merits.

W. E. Coleman, Lyn, two seedlings, one a small to medium apple, mild flavour, no merit; the other a very large, exceedingly showy, red apple, very much dotted, rather over ripe, evidently a late Fall apple, flavour mild sub-acid; worthy of trial.

Mr. Atwood, London, shows an apple of large size, supposed to be a seedling, in flavour and appearance very much resembling the Ribston Pippin; if proved to be a seedling of Canadian growth, we consider it to be the best that has been brought before our notice.

D. Hammond, Toronto township, one seedling apple, conical, with a red cheek handsome, flesh almost white, rather coarse, mild flavour, core large; worthy of trial; also one called Andrews' Russet, a flattish medium sized russet, with a very red cheek, flesh white and of good flavour, specimens rather past their season.

E. R. Morden, two seedlings, small fruit, both past their season.

In apples of cultivated varieties, the display was very large and fine. Amongst the best, we note Swayze Pomme Grise, Cayuga Redstreak, King of Tompkins County, Melon, Swaar, Wagner, Northern Spy, and Lady Apple.

The display of pears, comprising some twenty kinds, was, for the season, very good, but many kinds were past their season, and nearly devoid of flavour. Well preserved specimens of Bourre Die, Beurre d'Anjou, Vicar of Winkfield, Duchesse d'Angouleme, Winter Nelis and Verte Longue, were noted.

Mr. Cross, Oakville, exhibited samples of a strawberry basket that seemed to your committee to combine cheapness with durability to a very desirable degree.

CHAS. ARNOLD.

W. HOLTON.

GEO. LESLIE, JR.

MEETING OF DIRECTORS,

A meeting of the Directors of the Fruit Growers' Association was held in the Court House, Hamilton, on the evening of the 3rd of February, 1870.

After the transaction of some routine business, the Secretary laid before the Board the three essays which he had received in competition for the prizes offered by the Association, and the Board appointed the President, Mr. Mills and Mr. Holton a committee to read the essays and award the prizes.

After hearing Mr. Freed's report on some crab apples—

A resolution was passed, thanking Mr. Cowherd, of Newport, for his exertions in producing superior varieties of the crab apple.

Mr. Rykert gave notice that he should, at the next meeting of the Directors, move a resolution that a Fruit Show be held by this Association in the fall.

The auditors' report was read, and the Secretary instructed to obtain sufficient vines of the Humelan grape to give one to each member, and to each person who shall become a member before the first day of April, 1870, and who notifies the Secretary of his willingness to make the report thereon required by the Association.

Adjourned to the call of the President.

REPORT ON CRABS.

I examined and tasted the two varieties of fruit left at my place for my opinion, and beg to say:

No. 1, from Samia, is of very fair size for a crab, and although past its best, I would say it is a desirable fruit for a crab, particularly on account of its good keeping qualities.

No. 2, from Brantford (Mr. Cowherd's variety) is a very handsome fruit, of medium size, and very pleasant flavour, losing all the harsh and austere flavour of the crab, for the higher and finer flavour of our best apples approaching very near to the Scarlet Pimpernel, which is a very good early dessert fruit.

To call it a crab, I think, surely, is a misnomer, and one that I think should engage the attention of the Society for a more suitable definition.

And here I would beg to remark that I know nothing of its parentage, but understood it to be a cross effected by Mr. Cowherd. This success of Mr. Cowherd in breaking down the harshness of the crab for the better qualities of the apple deserves encouragement, and a special vote of thanks by the Directors of the Association.

And I trust the Directors will offer good inducements for the best six or any other number of cross seedlings, raised from our best varieties of crabs and Russian varieties of apples, in the hope of raising hardy fruits of good size, and suitable for cooking and dessert. Fruit that can be raised in our far northern counties, of good second quality only, would confer a great boon on them, and one which I think the Association should keep in view.

JOHN FREED.

P.S.—My remarks are meant to apply to our northern counties for the fruit in question, thinking that in our more favoured locality more crabs are not required.

J. F.

Hamilton, December 29, 1869.

Meeting of Grape Growers

The grape growers of Western New York have recently held their annual meeting. The writer was not able to attend, but from the reports, it seems to have been an occasion of much interest.

A long and animated discussion was held on the vexed question of pruning. Some advocated a partial pruning in the fall or winter, leaving a superabundance of wood, and then a second pruning in the spring or early summer, after the new growth has reached four or five feet in length. At this second pruning the new growth is not shortened in, but the entire shoot, leaves, fruit and all, cut away. The amount of pruning is regulated by the apparent strength of the vine.

This plan seems to us to entail an entirely unnecessary amount of labour, compelling the cultivator to go over his vineyard twice to accomplish what may as well be done at once. The reason given for only a partial winter or fall pruning was that the fruit sets better for leaving plenty of wood. This is true. But why does the fruit set better for leaving plenty of wood? It is because close fall or winter pruning causes the vine to suffer so severely in an intensely cold winter that the buds are injured, their vitality weakened, and, consequently, the fruit cannot set. The true and most economical method is not to prune in the fall or winter in this climate at all, but to prune between the 15th of March and the 15th of April in most seasons, and do all the pruning for the whole season at that time. Great objection has been made by some theorists to this spring pruning, on the ground that the vine weeps or bleeds at the cut, if made at this time, and that this weeping or bleeding was injurious to the vine. But this supposed injury is all a theory. After some years of trial of spring pruning, we have become perfectly satisfied that it is the very best season for pruning the vine, and that the weeping of the sap from the wounds is not in the least injurious. The plan pursued by the President (Mr. Pottle) is an approach to that of spring pruning. He prunes slightly in the fall or winter, and when it is apparent that the wood has wintered

well, prunes again. If too much fruit sets, that he thins by removing the whole shoot on which it is. Some fruit may be removed from the shoots that are left, but the shoot is not shortened.

Several of the gentlemen present testified to the fact that the weeping or bleeding of the vine from spring pruning did not produce any bad effects, and many were fully persuaded that close planting and summer pruning were very injurious.

These are symptoms of progress, and in time the vine cultivators of America will learn the distance best suited to our varieties of the grape, that our vines will not bear fall or early winter pruning in this latitude, and that it is worse than a waste of time to cut away the leaves in summer.

An experiment was described by the President which ought to satisfy the most sceptical, and which fully proves that the grape does not need light upon the fruit in order to ripen. A gentleman enclosed a bunch while the fruit was of the size of buckshot, and quite green, so as to be in complete darkness, and it ripened and coloured perfectly. He advocates for summer defoliation, for cutting off the leaves so as to let the sunlight in upon the fruit, what excuse have you now for your harmful practice? Did you ever see a wild grape vine that had covered some tree top, and count its purple clusters hanging in the deepest shade, where no straggling sunbeam ever had leave to enter? And did you never notice, after your summer's leaf stripping, that the fruit you expose to the full glare of the sun never would colour perfectly, no, nor ripen perfectly either?

It was also brought out in these discussions that the base bud, and sometimes buds, will not produce fruit, and that observing vine-dressers are depending for fruit upon the third and fourth buds.

The President cautioned the members against deep ploughing in the vineyard, and advised the use of the cultivator in its stead. He stated that it was very important to the early ripening of the fruit that there should be plenty of surface roots: that deep-rooted vines ripen their fruit late, if at all.

On the subject of varieties there was great diversity of opinion. Some esteemed the Concord very highly for profit. One said he got more pounds per vine from the Delaware than the Concord. It would seem that the Iona cannot be depended on where the Catawba does not ripen, though it was admitted to be a little earlier. Several spoke very highly of the Eumelan, and no one had anything to say against it.

The Eumelan is the variety which the Fruit Growers' Association of Ontario is distributing to its members, on condition of receiving an annual report for five years of its behaviour, and in a few years more it will have been fully tested in this Province. Any one becoming a member before April 1st can have a vine if he wishes, by sending his name and member's fee to the Secretary, Mr. D. W. Beadle, St. Catharines.

Report of the Fruit Growers' Association for the year 1869.

This report, covering seventy-two pages, is full of information relating to the cultivation of fruit of different kinds in the Province of Ontario. It contains the Directors' report, the Treasurer's report for the year ending 21st September, 1869, the Officers for the present year, the address of the retiring President, W. H. Mills, Esq., delivered at the annual meeting, and full reports of the discussions on different varieties of fruits and their cultivation, which were had at the three general meetings held since the last report, one of which was held in St. Catharines, another in Hamilton, and the third in Galt. There is also a very complete synopsis of the returns made from all parts of the Province to the questions which were issued by the Commissioner of Agriculture at the request of the Fruit Growers' Association. This synopsis is divided into nine heads, thus bringing together as nearly as possible the returns from those parts of the Province which are most nearly alike in their climate. These divisions are designated as the Ottawa, St. Lawrence, Ontario East, Ontario West, Niagara, Erie, Huron, and Internal Divisions, and the District of Algoma.

It also contains an essay on the culture of the apple, an article on the cultivation of the pear, a paper on the plum tree, another on the culture of the currant, several short articles on the grape, one on the raspberry in 1867, and other fruit reports. It should be in the hands of every grower of fruits in Ontario, and will be sent to every one who now is a member of the Fruit Growers' Association, and to any person who sends his name to the Secretary, Mr. D. W. Beadle, St. Catharines, together with one dollar, requesting to be enrolled as a member of the Association.

Does Nature Economize her Forces?

To the Editor.

Sir.—I do think, after all, the really valuable lessons to be learnt in horticulture are those obtained by a close observation of the laws which govern vegetable development and by a strict adherence to them. There are too many who turn the index finger in a wrong direction, and then pursue the course with a tenacity worthy of a better cause.

I scarcely know why I take my pen to address you, unless it is through the hope that the few remarks I have to make may fall, by means of your widely circulated paper, under the notice of parties deeply interested in the production and dissemination of new cereals and plants in our Province. It seems to me the too great haste to make rich often compels us to pursue with the greatest tenacity an idea (false in itself) until it becomes so thoroughly grounded in the individual mind, that the oft-recurring thought seems like truth at last, and by such process becomes conscientiously foisted into public literature,

and thereafter such error requires to be worked out by a tedious public experience.

Many experiments recently made go to prove that not only roots, but fruits and grains, when grown at greater than usual distances apart, will yield larger crops and give greater returns than we had any previous conception of. It was shown to be the case in the yield of the grape vine, satisfactorily established, I think, by Mr. E. F. Underhill, in the November number of the *Journal of Horticulture*, page 257. It has also been shown to be the case both in potatoes and corn, and recently with wheat. Mr. Charles Arnold states that in the course of his experiments in hybridizing this cereal, he obtained from one kernel the astonishing number of 4,800 kernels; and in the subsequent year, 1869, the same variety yielded seventeen bushels two quarts and one pint, from seven pounds of seed—a result which, however wonderful, is altogether out of proportion with the enormous product of the first single berry. The contrast will be better understood by taking each bushel as weighing sixty pounds. We have then 1.026 lbs. as the yield from seven pounds. Therefore, as one grain is to 4,800, so is seven pounds to 1.026 pounds. This result must have been produced from the space of ground occupied by each grain. There was nothing to interfere with the first grain's productiveness; there was no struggle for life against similar competitors; but in the planting for 1869 it was quite otherwise. I cannot, therefore, avoid the conviction that in case the same variety be planted as in ordinary culture, a relative minimum of productiveness will be attained.

It is found that the wheat plant increases in proportion as its roots have room to develop, without interference with those of its neighbours. I am unable just now to lay my hands on an experiment which went to prove when room was given for the development of the root, that the wheat furnished ears containing over 120 grains, and by the same experiment it came to pass, that on every fully developed cereal plant there was always one ear superior to the rest, and, what was still most remarkable of all, each ear contained one grain which, when planted, was more productive than its fellows. Now, here the finger of nature's index points pretty clear. Select the best grain from the best ear, and quietly continue this for a few generations, and it will certainly bring you to a point of glorious perfection. If this becomes a recognized law, its application may be made in various products. And to attain the grandest results from the works sent forth from the Creator, nature often presents numerous and auxiliary ways to the same final purpose, and the mind which embraces the widest range of these auxiliary aids, wins the race.

To make a further analysis of Mr. Arnold's wheat experiment, it will be observed that one single kernel produced 4,800 kernels. To do this it must have equalled forty foot-

stalks (which could scarcely have been the case), each foot-stalk containing one ear with the enormous number of one hundred and twenty kernels or grains each; this, it must be admitted, was a wonderful yield of the germ force. But such results may only be obtained, if ever, when planting takes place so that the roots may in no wise interfere and rob each other of that particular pabulum which goes to form the future germ or seed. I have frequently witnessed the ill effects of overcrowded planting in its non-productive results. It is thus clearly indicated that our trees and vines should be planted far apart. Avarice often defeats the very ends we wish to accomplish, and so we plant thick, hoping to double our profits.

I had the pleasure of witnessing a single Isabella grape vine this last season occupying a space of fifty feet long by eight feet high, with such an enormous load of fruit, that I can safely say that no other six vines of the same species could have been made to produce such a quantity on the same space. I am compelled to come to the conclusion that nature does economize her forces, when she can be made to produce from a single vine in a given space, as much as, or even more fruit than six vines occupying an equal space; or when a single grain may be made to produce more than forty grains improperly sown.

W. H. MILLS.

Hamilton, January 19, 1870.

On the Hybridizing of Pelargoniums.

The practice of impregnating flowers in order to produce varieties has of late been extensively adopted by gardeners and planters; but the proceeding is rarely, if ever philosophically investigated. Impregnation is effected by contact between the pollen and the stigma. The pollen is the farina or dust which escapes from the anthers of a flower when its valves burst open. The stigma is the point or termination of the pistil, which secretes a viscid juice. Whether the stigma be furnished with such juice or with a velvety pubescence, or whatever be the nature of its peculiarly appropriate surface, certain it is, that according to the most accurate observation, this organ is the only portion of a perfect vegetable which is not invested with a cuticle or epidermis.

The pollen emits a tube of extreme delicacy, which pierces the stigma, and still passing downwards into the ovary, enters the foramen of the ovule. So much has been written and published on cross-breeding, that it would be next to impossible to advance any

theory respecting it, yet a few hints on the practical part of the work may not be out of place, but might induce some to try their hand at this very interesting work, who are, perhaps, deterred from doing so, not knowing exactly how or when to apply the pollen, or other little matters connected therewith, so as to gain any satisfactory result.

One of the most important matters in connection with hybridizing, as in almost all undertakings, is to hit upon some kind of definite standard to be attained, so that the operator may have some decided object in view to look forward to and try to gain—in fact, have a decided reason for what he is about to do. By this course, the operator will be far more likely to arrive at some satisfactory result, than by merely trusting to the chance of getting something good just because he may happen to have crossed this variety with that. It is a common but delusive idea, that two varieties, being distinct will be sure, when crossed, to produce something different from either of the originals though it is just a chance if one of the seedlings so produced will be better than the parents, or even equal to them. Presuming, therefore, that the hybridizer is desirous of obtaining some particular cross with the object of arriving at the result he has set before him, and has fixed upon the varieties which he intends using for the purpose, the next important matter is to select good healthy plants as parents on both sides, as without healthy parents you can never expect seedlings from them to be strong and of good constitution; even though they be the most beautifully marked and distinct in flower, they can but be counted second rate. Having, then, made choice of good healthy plants of the varieties it is intended to hybridize, all the flowers that are expanded upon the plants that are to be used as seed-bearing parents should be taken off and the plants removed as far from others as possible, or if they can have the house to themselves so much the better; still, if care be used, this is not absolutely necessary. Watch the seed-bearing parents closely every day till the first flower opens, and immediately the petals are sufficiently expanded to admit of its being done without injury to the flowers, perform the first operation. The anthers, which are the male organs, appear as little knob-like portions, standing up prominently in the centre of the flower; these must be carefully taken out, without injury to the centre column or pistil. Always bear in mind that there are, in a perfect geranium flower, also two of the said anthers, lower down the centre of the flower than the rest, which must also be carefully taken out.

This can be done by a pair of sharp pointed scissors, or a penknife. Having satisfactorily accomplished this operation, watch carefully the progress of the female organ of the flower to its maturity, which in healthy flowers takes two or three days from the time the flower expands. Double flowers are an exception to this rule, for I find they take twice as long as the single to come to maturity. Last year I had sixteen seeds from Gloire de Nancy, and Triumph As I am writing this principally for amateurs, I ought, perhaps, to explain here that the female in a pelargonium is the stiff thread-like portion coming immediately from the centre of the flower, and surrounded by the filaments

bearing the anthers and having the appearance, in its earlier stage when the flower first opens, of one single thread-like projection, but which, as it advances to maturity, divides into five distinct parts, at the point, each division being the direct channel to a distinct seed-vessel at its base. Now, it is just this period of arriving at perfection in the female organ that is one of the most important matters in hybridizing. The best time, in my opinion, and what I generally follow in practice, is to apply the pollen as soon as possible after the division of the pistil into its distinct parts takes place, and before it has expanded to its full size. It is not only in its best state then for receiving the pollen, but the riskless likelihood of its becoming impregnated with other than that intended. I may add that once impregnated with the one desired, all foreign pollen coming in contact therewith availeth nothing. In selecting flowers choice should be made of the first eight flowers that open on the truss, for as a rule they are the strongest and best. I make it a rule to cut all the others away. And in the choice of plants for a beginning, the following cannot be surpassed, viz: Zonals, White Perfection, Surpass, Beauty de Surannes, Eugene Mazardy, Mme Warle, Julius Cæsar, Warrior, Criterion, King of Whites, Nosegay, Lady C. Grosvenor, Duchess of Sutherland, Indian Yellow, Dr Hogg, Le Grand, Pink, Stella and Violet Hill Nosegay. Let the beginner procure these few plants, for a start, and when purchasing be sure to get two year old plants.

JAMES J. CRAIG.

Toronto Horticultural Society.

This society held their annual meeting on the 8th of February. The report of the past year gave a very satisfactory account of the position of the Society and the state of its finances, a large portion of the debt having been cancelled, leaving at present only \$500 due, which sum, it was hoped, would be raised over and above the expenses during the current year, so as to leave the Society entirely unburdened by any debt whatever. The Horticultural Gardens had undergone several improvements, among them the introduction of a rosery, which promises to thrive, and add a very attractive feature to the grounds.

The officers elected for the ensuing year were as follows:—

President—Hon. G. W. Allen; 1st Vice President—Phillip Armstrong; 2nd do. F. W. Coate; Corresponding Secretary—Walter S. Lee; Recording Secretary—Henry Pollack; Treasurer—James E. Ellis.

Directors—Rev. E. Baldwin, Thos D Harris, Geo. Leslie, Senr., J. Gibson, J. C. Gilmour, J. Forsyth, John Gray, Wm Ince, Geo. Leslie, Junr., J. H. Mason, F Sutherland Stayner, S. A. Summers, Jas. Fleming, John Paterson, Geo. Vair.

A resolution was carried affiliating the society with the Fruit Growers' Association.

Orchard Wind-breaks.

To the Editor.

Sir, —I noticed a communication in the December number of the CANADA FARMER, signed "Observer," asking for experience respecting planting trees for wind breaks to shelter fruit orchards.

I write to give you my experience for the benefit of "Observer" or others that may be interested in planting trees to shelter their orchards.

Six years ago I prepared a strip of ground on the north-west side of my orchard, and set a row the full length of the orchard with the cuttings of Lombardy Poplars, setting them about fifteen inches apart. The result was they grew so rapidly that they astonished not only me but every one who saw them. I kept them well cleaned and cultivated, and cut about two-thirds of the centre shoots every year for four years, to make them branch out near the ground. It now makes a complete wind-break twenty feet high. During the summer and fall it is equal to evergreen trees, as the leaves hang on till the snow falls.

MY MISTAKES.

I made a mistake in setting the cuttings where they were to remain. Some few of the cuttings failed to grow; of course I filled up the spaces by planting more trees, but the others had possession of the soil, and they took the lead, so that I could not fill the breaches effectually. Those spots, though but few, are now an eyesore, and I would give almost any price to remedy them. Another mistake I made was in planting too close to my fruit trees. They should be at least twenty-five feet away; mine are only fifteen. If I were going to plant again I would plant trees two years old from the cutting, and cut them back well. There would not be the danger of their falling that there is when set without roots. The trees should be sorted and planted regularly according to size, beginning with the largest and finishing with the smallest, and those that grow the fastest should be cut back the most. Treated in this way they will make a good fence in six or seven years. Part of mine will now turn anything from a pig four months old to the wildest bull.

I am satisfied that the value of trees planted for shelter, not only to the orchard but to all exposed farms, can hardly be over-estimated. There are doubtless many kinds of trees that are adapted for this purpose. The advantages of the Lombardy Poplar are, first, they can be propagated so rapidly from the cutting that the trees cost less than almost any other kind. Secondly, they will thrive in almost any soil or situation. Thirdly, they will grow so close together that they almost touch each other, and still thrive. And lastly, there is perhaps no tree that will make wind break in so short a time.

S. H. MITCHELL.

St. Mary's, Ont.

NOTE BY ED.—This communication is just

what is wanted. The actual experience, for and against, of one person is worth a thousand-fold the best guessing of the wisest.

Toads vs Bugs.

We make the following extracts from some passages in Vogt's book, "on Noxious and Beneficial Animals," which are quoted at full length in the fourth number of *Le Naturaliste Canadien*. For the benefit of the American reader, we translate from the original French.

"A remarkable fact has lately been published in the newspapers. There is actually a considerable commerce in toads between France and England. A toad of good size and in fair condition will fetch a selling price (twenty-five cents) in the London market, and a dozen of extra quality are worth one pound sterling (five dollars). You may see these imported toads in all the market gardens where the soil is moist, and the owners of those gardens even prepare shelter for them. Many grave persons have shaken their heads, when they heard of this new whim of the English; but those laugh the best who laugh the last. This time the English are in the right. I used to have in my garden a brown toad as big as my fist. In the evening he would crawl out of his hiding place and travel over a bed in the garden. I kept careful watch over him; but one day an unlucky woman caught sight of him and killed him with a single stroke of her spade, thinking she had done a very fine thing. He had not been dead many weeks before the snails ate up all the mignonette that formerly perfumed everything round that bed.

"Toads become accustomed to man, and do not appear to be incapable of tender sentiments. Everybody has heard the story, which seems borrowed from some old popular legend, of a toad which for thirty years lived under an espalier tree, and came out every evening, when the family was taking supper, to get his share of the meal like the dogs and the cats. The family shed tears on the day when an accident deprived that devoted servant of life. Some of my friends believe that, after having heaped benefits upon a toad, they have obtained from that despised animal evident proofs of gratitude. A certain Capt. Perry has told me that, in travelling through the interior of Sicily, he once found on the road a snake that was just about to devour a toad. He killed the snake, and the toad went his way. Six days afterwards he returned by the same road. All of a sudden something hops along close behind him. It was his toad, who had adopted this mode of expressing his gratitude towards his preserver, and who had positively recognized him. 'But, Captain,' I said to him, 'how could you possibly identify the particular toad whose life you had saved? One toad is as like another toad as one egg is like another egg.' 'That is very true,' replied the Captain, 'but he looked at me with such grateful eyes, that I could not doubt his identity for a moment.'—*American Edomologist*.

Diseased Apple Trees.

To the Editor.

SIR,—Early last summer I noticed that one of my apple trees looked quite black in the bark, as if it had been scorched by fire. For a time I paid but little attention to it, till I saw the bark coming off in scales, and some of the branches showing signs of decay, though others were, to all appearance, perfectly healthy, and bore fruit. I thought, at first, the tree had been struck by lightning, as it was the only one affected. I am sorry to say such is not the case now; for I saw several trees showing the same symptoms. The bark turns black as described, in every case, at the fork of the tree first, extending gradually along the branches.

The trees are seven years planted last spring, and have been well taken care of, the land being tilled with root crops, till the spring of 1868, when it was sown with spring wheat and seeded down with clover. The soil is dry loam, and in good heart.

Could you, or some of your numerous readers, enlighten me as to the cause of, and if possible, the remedy for this blight, or whatever it may be?

J. R.

North Oxford.

NOTE BY THE HORT. EDITOR.—It is always very difficult to decide in such a matter as this, and particularly without seeing the trees and their surroundings. Are trees in other orchards in the vicinity similarly affected? Is the bark that turns black exposed to the direct action of the sun's rays? We have seen the upper side of branches that grew out in a northerly and north-easterly direction lose their bark, which died and turned black, and believe that it is in such cases caused by the sun's rays falling nearly perpendicularly upon them; for the bark not thus exposed to the sun retained its vitality. There is a disease known as the "fire blight," but that usually attacks the young shoots, turning them black.

Northern Spy Apple.

To the Editor.

SIR,—My attention has been directed to an article in your journal, over the signature of an "Amateur Fruit Grower," to which is appended a reply by yourself containing a request that I give your readers the benefit of my experience in the cultivation of the Northern Spy Apple, and my opinion of it as a profitable variety.

I have an orchard of 120 apple trees, 70 of the Northern Spy variety about 20 years old, which have been bearing annually for 9 or 10 years, and during the past four years have averaged 140 barrels of selected fruit per annum.

My method of cultivation is to top-dress the soil with short manure, either during the latter part of autumn or in winter, as may be most convenient.

As soon as the frost is out, go over the surface with a common harrow, for the purpose of pulverizing, and securing a more even distribution of the manure; follow with a shares harrow, which is so constructed that it will not cut or injure the roots. Going once over and afterwards crossing your work at right angles leaves the soil thoroughly comminuted to a depth of five or six inches.

Subsequent treatment consists in a repetition of the harrowing when weeds promise to become troublesome or the soil becomes compact.

On the subject of pruning I may remark that the Northern Spy tree requires careful management. The usual cut and slash system will not do; it adopted and adhered to, a rampant growth of long, straggling limbs may result, but fruit will be scarce, and in all probability inferior in quality. Thin the top by cutting out all middle branches, that the tree may acquire a spreading habit, and the sun's rays have a chance to penetrate freely.

Carefully husband all fruit spurs, whether found on the sides of large limbs or smaller ones; many of the best specimens of fruit grow on spurs of six inches or more in length, that may be found projecting from limbs four or five inches in diameter. Doubtless many of your readers will say all this involves considerable trouble. By way of encouragement to others to do likewise, I will state that the net profit on fruit sold from my 70 trees of Northern Spy last autumn amounted to the sum of \$560, an average of \$8 per tree.

Results similar to the above have so far established this apple, in my opinion as profitable to the fruit grower, that of an orchard of 30 acres, I have planted 800 trees of this variety.

O. T. SPRINGER.

Wellington Square, Jan. 19th, 1870.

When Apple Trees Bear Fruit.

A subscriber writes from Simcoe to enquire when his young apple trees will bear fruit. He says that within the past three years he has planted 700 apple trees of different kinds, which were from three to five years old when he planted them.

As a usual thing, apple trees begin to show fruit, if they are well cared for, by the time they have been five years planted in the orchard. The Red Astrachan, and Duchess of Oldenburgh begin to bear younger than most varieties, then the Ribston Pippin, Early Harvest and Hawley show fruit, but the Northern Spy waits until it has attained considerable size and age before it yields much fruit. The Baldwin American Golden Russet, Roxbury Russet, and King of Tompkins County will yield considerable fruit when they have been planted seven years. But the profit of an apple orchard depends on the care bestowed upon it. If the insects are allowed to devour it, or the cattle to browse it, or the water to stand about the trees, or pruning neglected, the fruit will not pay for the investment.

Fruit-growing in the County of Kent.

On a recent visit to this county we had an opportunity of making enquiries into the state of fruit culture, and find that the inhabitants are fast becoming convinced that the growing of fruit is one of the most profitable modes of husbandry. Those who have orchards in bearing find that the cash returns from an acre or two will often exceed that of all the rest of the farm. The climate of this county is very favourable for the raising of all the finer fruits of this latitude. The peach, the quince and the grape, on suitable soils, are here grown in perfection. We say on suitable soils, for while the country about Chatham is very flat and poorly drained, and, in consequence, very poorly suited to the profitable cultivation of fruit, yet the southerly portion of the county is broken by a fine ridge, upon which the trees and vines thrive in perfection.

The writer was informed that within a few years a great many thousand fruit trees had been planted, and a large quantity of vines of different varieties of grapes. It was estimated that the aggregate number of acres planted with grape vines would not be short of three hundred. These, if properly cared for, will soon be in bearing, and the quality of the fruit, and its value for market and for wine, will soon be ascertained. We have every confidence that they will be found to be of very fine quality, and well suited to every purpose to which this beautiful and delicious fruit can, in this climate, be applied. It is very gratifying to learn that so much attention is being paid to the raising of fruit, and we trust the day is not far distant when good fruit will be so abundant as to be within the reach of the masses in all our larger towns and cities, and that this wholesome, nutritious and agreeable food will be consumed in double and treble quantities.

The Fruit Growers' Association has a goodly number of members in the County of Kent, and we hope they will invite the Society to hold one of its summer meetings within their borders.

KEEPING PEARS.—The President of the Fruit Growers' Association of Ontario says that those who have but a few pears of a sort will find it very convenient just to place those of each kind in a paper bag and tie it up. They can then be laid upon shelves in a cool room, free from frost, and will be kept without shrivelling or losing their natural flavour.

DAVISON'S THORNLESS BLACK-CAP RASPBERRY.—The *Horticulturist* for December, 1869, speaks in high terms of this variety of raspberry, as being both early and profitable. It has been found to be exceedingly vigorous, quite productive, from seven to ten days earlier than the Doolittle, very large, and fine sweet taste. It succeeds best in moderately rich loam, growing weak on light soil or in a heavy wet bottom.

TOMATOES may be made to ripen early by sowing the seed in March, in a box of very rich soil kept in the kitchen window. After the plants come up, they should be thinned out to about an inch apart. When all danger of frost is past, plant them out in moderately rich soil. If the soil be very rich and the season moist, they will grow too much to vines. After a cluster or two of fruit has set up on each branch, pinch it back to the leaf just above the fruit, and keep it pinched back. This will hasten the development and maturity of the fruit. A late sowing will furnish plants for a succession.

SENECA RASPBERRIES.—A subscriber enquires whether the Seneca Black-cap raspberry is a good hardy berry for field culture, and where he can get a lot of plants, and also wishes to know if there is any more profitable berry for raising for the market. The Davidson's Thornless and Mammoth Cluster are both better sorts than the Seneca, and are hardy and productive. In some markets the red raspberries sell better than the black. You should ascertain which sell best at the place where you propose to make the crop. The plants can, no doubt, be had of all our nurserymen. See our advertising columns for names of most of our leading nurserymen.

CRANBERRY CULTURE.—A correspondent at Owen Sound asks whether the cranberry should be raised from seed or from runners. The easiest plan for him to adopt will be to procure a quantity of plants from some of the cranberry marshes. If there are none in his vicinity, any of our nurserymen could put him in the way of getting them. They could no doubt be raised from seed, but it would be a much slower process. Under favourable circumstances, the cultivation of cranberries is very profitable. There is an article on their culture in the first volume of the CANADA FARMER, page 106, which would well repay the trouble of perusal. If our correspondent does not happen to possess a copy of the first volume, he can be supplied from this office, either with the volume or with the number for April 15th, containing the article referred to.

PRUNING DWARF APPLE TREES.—A correspondent asks "When is the best time of the year to trim or prune dwarf apple or pear trees, spring or fall, and why?" In this climate, the best time for pruning apple, pear, and all other trees, is in the spring or early summer, according to the object for which the pruning is done. The reason why is this: the intense cold of our winters acts unfavourably upon a wound or fresh cut made in the fall, often causing the death of the branch so cut, if not wholly at least in part, so that the wound does not heal over at all, or so slowly that the wounded spot is always unsound. If limbs are cut off in June, when the tree is growing vigorously, provided there be not too many cut off, so as to check its growth, the wound will heal the soonest. But it does not follow that therefore it is best always to prune in June.

Poetry.

The Stream that Hurries By.

The stream that hurries by on yon fixed shore
Returns no more;
The wind that dries at morn yon dewy lawn
Breathes, and is gone;
Those withered flowers to summer's ripening glow
No more shall blow,
Those fallen leaves that strow yon garden bed
For aye are dead.

If laugh, of jest, of mirth, of pleasure past,
Nothing shall last,
On shore, on sea, on hill, on vale, on plain,
Nought shall remain;
Of all for which poor mortals vainly mourn,
Nought shall remain;
Life hath his hour in heaven and earth beneath,
And so hath Death.

For all spring gives, and winter takes away,
We grieve in vain;
Vainly for sunshine fled and joys gone by,
We heave the sigh;
On ever on, with unexhausted breath,
Time hastes to death;
Even with each word we speak, a moment flies,
Is born, and dies.

If thus, through lesser Nature's empire wide,
Nothing abides—
If wind, and wave, and leaf, and sun, and flower,
Have each their hour—
He walks on ice whose dallying spirit clings
To earthly things;
And he alone is wise whose well-taught love
Is fixed above.

Three Roses.

Which is the happiest rose to-day,
(Of the three that I know, I wonder—
The rose in the window, the rose on the lawn,
Or the rose in the meadow yonder?

Fair as a pearl is the face of one,
While it dewily gleams and flutters
Close where its peaceful heart can hear
What the peaceful household utters.

Velvet petaled and crimson lined,
With mosses its stem enfolding,
One burns up from the flattered lawn,
A marvel to all beholding.

And one on the barren meadow lives,
Near a boulder huge and sullen;
A pale, wild thing in a lonely world
Of thistles and weed and mullein.

Happy those treasure garden blooms,
In their white and crimson hues,
But she of the meadow is happiest,
Who looks but to God for praise.

Departed Days.

Oh, memories of green and pleasant places,
Where happy birds their wood-notes twittered low,
Oh, love that lit the dear familiar faces
We buried long ago!

From barren heights their sweetness we remember—
And backward gaze with wistful yearning eyes,
As hearts regret, mild snow drifts of December,
The summer's sunny skies.

Glad hours that seemed their rainbow tints to borrow
From some illumined page of fairy lore,
Bright days that never lacked a bright to-morrow,
Days that return no more.

Household.

Catching Rats

Every one has found the difficulty of inducing these vermin to enter a trap, especially after one has been caught. Rat catchers say that the rats smell the iron, and at once tread difficulty and danger. I have been much troubled in our house by rats lately, and all attempts to catch them with ordinary means failed.

A friend with whom I was conversing on the subject, and to whom I stated my difficulties, told me to set the gin in the ordinary manner, and to cover it over by spreading a piece of thin wet paper on it. I did so, and placed some bread crumbs on the paper, and now find no difficulty in catching the rats. It seems they cannot smell the iron through the wet paper, which being softened offers no resistance to the action of the trap, and an excellent medium is thus obtained on which the rats will freely tread as being accustomed to, and death is the result. C.

How to Clean Old and Musty Barrels.

At this season of the year the farmer and beet and pork packers are often greatly troubled with musty, filthy smelling barrels, bottles, etc. How to cleanse them for use is an important question, which chemistry will answer satisfactorily.

Permanganate of potassa will entirely destroy all fungoid growths and fermenting matter, and render the barrel or bottle perfectly sweet and clean.

A pint of the permanganate is a sufficient quantity for a cider or beer barrel. It must be thoroughly ransied so as to touch all parts of the barrel. Its deodorizing and disinfecting qualities are wonderful, as it contains five equivalents of oxygen, and will even deodorize carbolic acid and remove its pungent smell from the hands immediately.—*Health and Home.*

FRENCH ROLLS.—Boil one pint of milk, cut up two ounces of butter into it, add a little salt; when tepid, sift in one pound of flour, one egg beaten, one teaspoonful of yeast; beat these well together, with a tish, and form into rolls with as little handling as possible. Bake on tins.

PASTE THAT WILL KEEP A YEAR.—Dissolve a teaspoonful of alum in a quart of warm water. When cold, stir in flour to give it the consistency of a thick cream, being particular to beat up all the lumps; stir in as much powdered rosin as will lie on a dime, and throw in a half dozen cloves to give a pleasant odor. Have on the fire a teacup of boiling water; pour the flour mixture into it, stirring well all the time. In a few minutes it will be the consistency of mush. Pour it into an earthen or china vessel; let it cool; lay a cover on, and put into a cool place. When needed for use, take out a portion and soften it with warm water.

Entomology.

Cabbage Butterflies.

Though we recently brought before our readers a short account of many of the insects that are destructive to the cabbage and other allied vegetables, we yet do not hesitate to insert the following interesting article from the pen of Mr. C. S. Minot, of Boston, Mass., which appeared in the last number of our valued contemporary, the *American Entomologist*.

"There is a certain group of butterflies known, scientifically, by the name of *Pieris*, to farmers as 'Garden Whites' or 'Cabbage Butterflies.' They are easily recognized by the following characters: The wings are generally white, with inconspicuous black markings, and occasionally with green or yellow underneath; they are very broad and have no scallops or indentations in the margin; the hindwings in outline resemble an

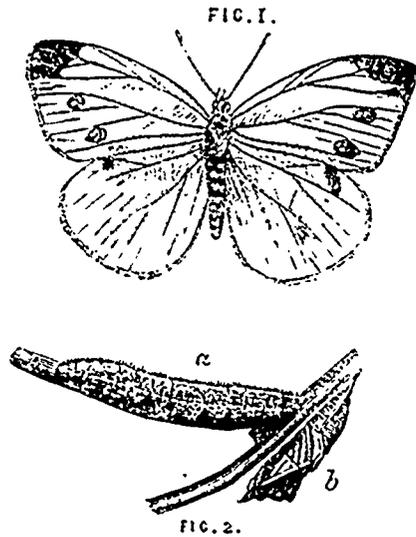


FIG. 1.

FIG. 2.

egg. 'The feelers (palpi) are rather slender, but project beyond the head; the antennae have a short flattened knob. Their flight is lazy and lumbering. The caterpillars are nearly cylindrical, taper a little towards each end, and are sparingly clothed with short down, which requires a microscope to be distinctly seen. They suspend themselves by the tail and a transverse loop, and their chrysalids are angular at the sides and pointed at both ends.' (Harris).

"This genus is interesting, though disagreeably so, to every farmer, for the different species are very destructive to various vegetables: among others, cabbages, nasturtium, mignonette, cauliflowers, turnips, and carrots. We propose now to notice only two of the species, as that number will serve to indicate the habits of the whole genus—which every farmer should be familiar with, so that he may be able to recognize and destroy such dangerous foes.

"The first species we shall mention is the Rape Butterfly (*Pieris rapae*, Schrank, fig. 1). This insect has been the occasion of some little

speculation and great interest to our Canadian and New England entomologists, inasmuch as it has been introduced to this country from England, and is probably one of the most perfect instances on record of any insect being imported from one country to another and becoming completely naturalized in its new quarters. There does not seem to be the slightest doubt that this is the English species. It was probably introduced in 1856 or '57. It was first taken in Quebec in 1859, and in 1863 it was captured in large numbers by Mr. Bowles in the vicinity of that city. As the eggs are laid on the undersides of leaves, it was probably introduced in this form, the refuse leaves being thrown out of some ship; after which the larvæ hatched, and finding themselves in the neighbourhood of their food, ate and flourished. Being, moreover, hardy little fellows, they were perfectly able to endure a change of climate. In 1861 it had spread about forty miles from Quebec as a centre; in 1866 it was taken in the northern parts of New Hampshire and Vermont; in 1868 it had advanced still farther south, and was seen near Lake Winnepesaukee; and finally this last summer it was taken around Boston, Mass., and a few stray specimens in New Jersey. There seems to be no doubt that this destructive insect will, in a few years, spread over the whole of temperate North America; for the other species of the genus have an extensive geographical range, and not being particular as to its food, it will have no difficulty on that score. Indeed, the larva and pupa seem to have an unusual power of accommodating themselves to circumstances,—for instance Mr. Curtis, in his *Farm Insects of England*, states that the caterpillars have been found feeding on willow.

"Now let us look at the larva (Fig. 2, a), and its habits. It is one and a half inches long; pale green, finely dotted with black; a yellow stripe down the back, and a row of yellow spots along each side in a line with the breathing holes. In England and around Quebec it has done immense damage to the cabbages and other Cruciferae (*Cress Family*) by boring into the very heart of the plant, instead of being content with the less valuable outer portion as some other species are. On this account the French call it the 'Ver du Cœur,' or Heart-worm. When about to transform, it leaves the plants on which it has been living, and fastens itself on the underside of some stone, plank or fence-rail, where it changes into a chrysalis in the middle or latter part of September, and in this stage it hibernates, producing, in New England at least, the perfect insect early in April. The chrysalis, or pupa (Fig. 2, b), is variable in colour, being sometimes yellowish-brown or yellow, and passing thence into green, speckled with minute black dots. The brood of butterflies that emerges from the pupa state in the spring lays eggs shortly afterwards, and these eggs produce caterpillars, which in their turn change to chrysalids in June, and in seven or eight days more the butterfly ap-

pears, which again lays its eggs for the second brood, which, as before stated, hibernates in the pupa state.

"In the perfect butterfly the body and head are black, and the wings white, marked with black as follows: In the female (Fig. 1) small space at the tip and three spots on the outer half of the front wings and one spot on the hind wings; beneath, one spot on the front wings, but none on the hind wings, which

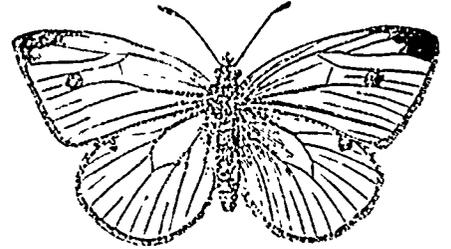


FIG. 3.

are commonly yellowish, sometimes passing into green. The male (Fig. 3) has only one spot above and two beneath on the front wings, and a black dash on the anterior edge of the hind wings. There is a variety of the latter sex which has the same markings, but differs from the type in the ground colour being canary yellow. Curiously enough, this variety has been taken both in this country and in England.

"These butterflies occasionally assemble in great numbers. At one time a slight crossed the English Channel from France to England; and such was the density and the extent of the cloud formed by the living mass, that the sun was completely obscured for a distance of many hundred yards, from the people on board a ship that was passing under this strange cloud.

The Potherb Butterfly (*Pieris oleracea*, Boisd., Fig. 4), is the next species to be described. It has a very wide range, reaching rarely as far south as Pennsylvania, extending eastward to Nova Scotia, and at least as

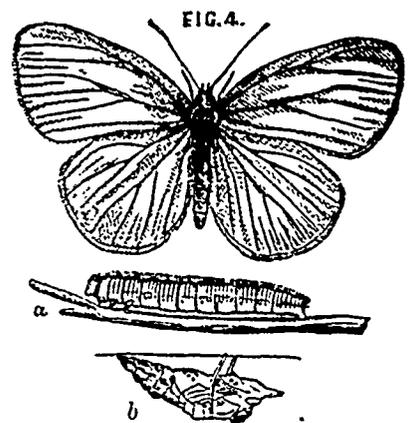


FIG. 4.

far west as Lake Superior, while in the north it is found as high up as the Great Slave Lake in the Hudson's Bay Company's territory. This butterfly has a black body; the front wings are white, marked above with black at the base, along the front edge and at the tip; the hind wings are white above and lemon-yellow beneath, but without markings except a few black scales at the base.

"About the last of May numerous specimens of this species may be seen over cabbage, radish or turnip beds, or patches of mustard, where, on the underside of the leaves, it deposits its eggs. These are yellowish, nearly pear-shaped, longitudinally ribbed, and one-fifteenth of an inch in diameter, and are laid seldom more than two or three together. In a week or ten days the young caterpillars are hatched; in three weeks more they have attained their full growth which is an inch and one-half long. Being slender and green (Fig. 4, a) they are not readily distinguished from the leaves on which they live. They taper a little towards each end, and are densely covered with hairs. They begin to eat indiscriminately on any part of the leaf. When they have completed the feeding stage they quit the plants and retire beneath palings, etc., where they spin a little tuft of silk, entangle their hindmost feet in it and then proceed to form a loop to sustain the front part of the body in a horizontal or vertical position. Bending its head on one side the caterpillar fastens to the surface, beneath the middle of its body, a silken thread, which it carries across its back and secures on the other side, and repeats this operation until a band, or loop, of sufficient strength is formed. On the next day it casts off the caterpillar skin and becomes a chrysalis (Fig. 4, b). This is of a pale green and sometimes of a white colour, regularly and finely dotted with black; the sides of the body are angular, the head is surmounted by a conical tubercle, and over the forepart of the body, corresponding to the thorax of the included butterfly, is a thin projection, having in profile some resemblance to a Roman nose. The insect remains in this stage for ten or twelve days, when the butterfly appears.

"In the last of July and first of August these insects may be seen in large numbers depositing their eggs for a second brood, which wintering in the pupa state, produces the perfect insect the following May.

"This butterfly varies considerably. There are never, we believe, perfectly white specimens, though often nearly so. Again, some specimens have very faint indications of spots arranged as in *P. rapæ*; but on the underside are found the widest limits of variation, for not only do the tips of the front wings become distinctly greenish, or lemon-yellow, and the veins of that portion bordered with grayish scales, but the hind wings may also have the ground colour distinctly greenish, lemon-yellow, or whitish, and the veins display gray scales on each side.

"By taking advantage of the habits of these insects, they might be nearly exterminated. If boards are placed among the infested plants, about two inches above the ground, the caterpillars when about to change will resort to them, and there undergo their metamorphoses. They may then be collected by hand on the underside of the boards and destroyed. As the butterflies are slow fliers,

they may be taken in a net and killed. A short handle, perhaps four feet long, with a wire hoop and bag-net of muslin or mosquito netting, are all that are required to make this useful implement, the total cost of which need not be more than fifty or seventy-five cents. The titmouse is said to eat the larvae, and should therefore be protected and encouraged."

Carrion Beetles.

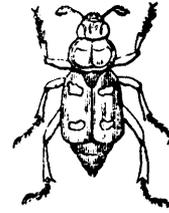
In a recent article on Water Beetles, we gave an account of two principal families belonging to that group, viz: the Diving Beetles, and the Whirligigs; there is yet another great family of aquatic beetles which we did not then mention, as it belongs to a different sub-tribe of this order of insects; its members are termed "Water Lovers," (*Hydrophilidae*.) from their habits.

The members of this family live either in the water, or in the damp margins and shores of streams and ponds; they are carnivorous in the larval state, but as beetles they feed upon refuse and decaying vegetable matter, thus uniting the qualities of the two families already noticed, and those of the scavenger beetles, which we now purpose bringing before the reader. A considerable number of these "water-lovers" are found in Canada; some of the species attain a very large size, while others are quite minute, and not to be discerned without close observation. As these creatures are not of any very general interest, we may dismiss them from our notice and pass on to the more conspicuous and more worthy Carrion Beetles.

These curious and interesting creatures belong to the family *Silphidae*; they are distinguished by the flattened form of their bodies, their knobbed antennæ, their habits, and the black nauseous fluid they discharge when handled. Their grand duty is to remove from the surface of the earth all dead or putrefying animal matter, which would otherwise become noxious and offensive. They are usually found in or close to carrion of all sorts, though sometimes they devour putrid fungus; occasionally we have taken them on the wing, and have even found them attracted by light into our rooms in summer. The *Silphidae* are divided into several genera, the chief of which are *Necrophorus*. including the Sexton or Burying Beetle, and *Silpha*, the Carrion Beetles; both of these genera are well represented in Canada.

The Sexton Beetles (*Necrophorus*), in spite of their loathsome occupation, are decidedly handsome insects. Their usual colour is deep shining black, variegated with rich orange-red spots; beneath they are frequently ornamented with yellowish silken hair like that of a Humble-bee; their antennæ are very remarkable, consisting of a jointed stem terminated by a rose-coloured or orange knob composed of four little cups or plates piled one above the other. The largest species we have is called the American Sexton (*N. Americanus*, Oliv.); it is nearly an inch and a half

long, deep black, ornamented above with large orange-red spots on the head, thorax, and wing-covers, and beneath with light yellow hairs on the breast. It much resembles in shape and general appearance the common species figured in the margin, the



Round-necked Sexton (*N. orbicollis*, Say), but is considerably larger and handsomer. These insects are wonderfully powerful for their size, their flight is vigorous, and they run with rapidity. They are not at all

uncommon during the summer months; no sooner, indeed, is any small dead animal or piece of flesh left in a decomposing state on the surface of the ground, than they assemble in troops to bury it. After a careful examination of the object, as if to take its dimensions, and ascertain how many labourers would be required for the job, several of them commence operations by creeping beneath the carcass, and digging away the earth with their fore-legs; they continue their labours till they succeed in sinking it several inches, sometimes nearly a foot, beneath the surface; and at the end of twenty four hours the object is generally out of sight, unless it be particularly large, or the ground difficult to work in. In this labour the males assist, and as soon as it is accomplished, the females deposit their eggs in the carcass. Many curious and interesting accounts have been published respecting the habits and instincts of these creatures,—two interesting narratives of the kind are given in the CANADA FARMER for July 15th, 1868, page 214. A German Entomologist relates that he confined four beetles of this genus in a small space, and supplied them with the following quantity of materials: four frogs, three small birds, two fishes, one mole, two grasshoppers, the entrails of a fish, and two pieces of ox's liver; they succeeded in interring the whole in fifty days. Of course this quantity was much more than sufficient for the nourishment of their future progeny, for whose benefit the burying takes place, and it was probably only because these carcasses were placed within their reach that they continued their burying propensities. (Westwood). As a further instance of their powers, we may mention the following case, related in the *American Entomologist* :—

"On one particular occasion, having deposited a full-grown rat upon newly-moved earth in a particular spot, as a trap for these Burying-Beetles, we found that in twelve hours' time the carcass had been completely buried, all but the tip of the tail, by a single individual of our largest and handsomest species, (*N. Americanus*, Oliv.) a beetle which is only one and a half inch long. It would puzzle an Irish labourer to bury a full-grown whale in the same length of time; yet proportionally this would be a task of precisely the same magnitude."

The Carrion Beetles (*Silpha*, etc.) differ from the foregoing in their more flattened shape, and dulness of colour, as well as in their habits and minor peculiarities of structure. Our largest and commonest species is the Surinam *Silpha* (*S. Surinamensis*, Fab.) Its colour is uniformly black, with a transverse irregular, reddish coloured band or series of spots, near the ends of the wing-covers. It is found abundantly in carrion during the summer, and may certainly be considered from its fetid odour and repulsive appearance an exceedingly disgusting, even though highly useful creature. It does not bury its food, like the Sexton Beetle, but may be found swarming in and over exposed carcases during the summer months, evidently revelling in filth. The handsomest species of this genus is the *Shining Silpha* (*S. p. lutea*, Catesby.) which is remarkable for the broad thin expansion of its thorax in the form of an ancient semi-circular shield, of a creamy-white colour, ornamented in the middle with a device somewhat in the form of a cross. We have occasionally taken it in numbers about the body of a dead fish. The larvæ of this genus, unlike those of the preceding one, are obliged to seek their own food, which is of the same character as that of their parents, and consequently have strong legs, and a crustaceous flattened body.

All of these insects, it is hardly necessary to say, in conclusion, are pre-eminently, though indirectly, beneficial to mankind, and therefore should by no means be destroyed.

New Species of Insects.

An esteemed correspondent has written to us as follows respecting a recent article on a new species of insect:—"You speak of this creature as something new under the sun—an insect that had no existence until lately. At least such is the idea I gathered from a hasty reading of your article. While I am not prepared to doubt it, the enquiry arises: Has the Almighty spoken into existence a special creation in this insect, or is it the result of creative laws by which spontaneous creations, so to speak, come forth at proper times? Or has this insect existed during all the past without manifesting its particular propensities until lately?"

We were rather surprised at having such questions put to us by our correspondent, as we thought that everyone knew the meaning of the expression "a new species," when employed by naturalists. It simply means a *species new to science*,—one that has not before been described, or come under the observation of man; not by any means a new work of creation. Since the time when the Almighty Creator "ended His work which He had made," and pronounced it "very good," we do not believe that any new acts of creation have been performed upon our globe, or that any new species of animals have been endowed with life, however much, through His providential care, and through the action

of laws which He set in motion, individual species may have been modified in their appearance, ornamentation, habits, food, or mode of life. It has been proved that many species have become *extinct* during recent times, (as, for instance, the Dodo among birds) and undoubtedly this process of extinction has been going on through all time; but it cannot be shown that any species has been *originated* during the observation of the human race. Immense changes are wrought in the appearance and habits of many animals and plants by domestication, breeding, climate, food, etc.; but the species remains the same through all its modifications; and whatever theory we may adopt as to the proximate causes of these variations, whether the fashionable one of "natural selection" or not, we must get back at length to the original fact that "in the beginning God created the heaven and the earth," and that "all things were made by Him, and without Him was not anything made that was made."

Currant-worm Parasite.

We are pleased to find that Mr. J. H. Thomas, of Brooklin, Ont., observed, as much as five years ago, a parasite affecting the larvæ of the Currant-bush Saw-fly; it was probably the same species as that recently noticed in our columns, which we had the gratification of discovering last summer, and which was named by Mr. Walsh *Hemiteles nematiformis*. Mr. Thomas writes as follows:—"At the time of which I speak I had a fine yard of red currant bushes, which I found to be literally covered with the larvæ of the Saw-fly. Learning from an old gardener that hellebore would destroy them, I purchased some, and when dusting the bushes spent some time in watching the worms and the effect of the hellebore. While doing so, I several times discovered a small insect resembling a mosquito nearer than anything with which I am acquainted, and yet as unlike that sanguinary animal as any one thing can be unlike another, thrusting its ovipositor into the bodies of the Currant-worms. This they did not appear to relish much, judging from their writhing and twisting during the operation, sometimes letting go their hold upon the leaf and falling to the ground. This ichneumonidly would thrust its ovipositor into the same worm three times in some cases, in others only once or twice. Seeing the pain, or manifestation of pain, the worms endured, I was half inclined to attack their ichneumon destroyers, which I took these insects to be, and let the worms escape, but concluding that my currant bushes were of more value than the worms, I turned in with my hellebore, and as the boys say 'gave them fits,' for the hellebore made them writhe even more than the ovipositor of the fly. I presume this must be the same as that of which you speak. It was of a dark colour, with long legs; in size between the common mosquito and the ugly beast called by school-boys 'Cock-mosquito,'

—a creature not to be confounded with 'Grandfather greybeard,' which in my younger days always told in which direction the cows were by raising one of its long hair-like legs; sure to be correct, point which way it would!"

THE SQUASH BUG.—My last summer's experience in this section with the Squash-bug (*Circulifer tenellus*, De Geer), showed no difference in favour of any variety of squashes. I raised the "White-bash Scallop" and found them to be as hard on it as on any other kind.

The best means that I hit upon of saving my squashes from the pest, was to remove the earth from the roots of the plants as low as it would bear, and fill up with a mixture of dry ashes and salt. Without this precaution I found them going down into the ground on the under side of the vine, and working where I could not get at them.

In addition to the salt and ashes application, I trimmed off all the leaves that touched the ground as soon as they came down, and spread them out under the plants, and upon examination, mornings and evenings, I generally found about all the old bugs nicely housed away beneath the leaves. I think leaves are far better to trap them under than boards or shingles. A decaying or wilting leaf seems to attract them; you will usually find them on such leaves when looking over your vines.—*J. P. Steele, in the American Entomologist.*

Many plants could not be perpetuated but for the agency of insects, and especially of bees; and it is remarkable that it is chiefly those which acquire the aid of this intervention that have a nectarium and secrete honey.

In some occasional cases, where the nectarium of the flower is not perceptible, if the spur of such a flower, which usually becomes the depository of the nectar that has oozed from the capsules secreting it, be too narrow for the entrance of the bee, and even beyond the reach of its long tongue, it contrives to attain its object by biting a hole on the outside, through which it taps the store.

ATTACKS OF INSECTS AFFECTED BY COLOUR.—Darwin (*Animals and Plants*, ii. 277) states that "it is certain that insects regulate in many cases the range and even the existence of the higher animals, whilst living under their natural conditions. Under domestication light-coloured animals suffer most; in Thuringia the inhabitants do not like grey, white, or pale cattle, because they are much more troubled by various kinds of flies than the brown, red or black cattle. An Albino negro, it has been remarked, was peculiarly sensitive to the bites of insects. In the West Indies it is said that 'the only horned cattle fit for work are those which have a good deal of black in them. The white are terribly tormented by the insects; and they are weak and sluggish in proportion to the black.'" We should like to learn from our farmer friends whether they have ever observed similar effects of colour upon the attacks of insects in this country. It would be both interesting and useful to know whether such is the case here or not.

Apiary.

Bees—Their Nature and Habits.

As I am daily receiving letters of enquiry about bees, in which many questions are asked concerning their nature and habits, I have thought it best to answer such questions through the journal, for the benefit of all, in a series of articles under the above heading.

Knowing that many are inclined to doubt a plain statement of facts, because they do not understand how such and such things could possibly have been discovered, or known, I have decided, in stating important facts, to explain how we know them to be facts; which course will perhaps better satisfy all our readers.

I will commence with the queen, or, as called by some, mother bee, from the fact that she is the mother of the whole colony—the only bee in the hive that lays the eggs which produce workers or queens. Though this is a well admitted fact, yet I have met those who doubt it and seem to think that the drones are the bees that lay all the eggs, and that the queen bee should be called a king bee. Others again have told me that they did not believe there was either a king or queen bee for, said they, "we have kept bees for thirty years and have never discovered such a thing;" and they would only be convinced of the fact by our showing them her majesty. That drones do not lay the eggs may be proved by examining a hive any time in the spring before drones appear; as there will be plenty of eggs in the combs, it is certain that some other bee or bees must have laid them. Then to prove that the queen produced them, remove her from the hive, and in four days there will not be an egg in the hive, as all the eggs will in that time hatch and become larvæ. Replace the queen, and in a day or two the combs are again filled with eggs. Hence it is easily proved that the queen is the mother bee of the hive. But there is no real necessity for going to all this trouble, for by killing one each of the different classes of bees, and dissecting them, it is easy to discover even with the naked eye to what sex they belong. A queen bee is produced from the egg in about 16 days, or from the larvæ in about 10 days. To prove this we have only to put a quart of bees in a small box large enough to hold two or three frames six inches square, filled with comb and honey, shut them in, and put them in the cellar, or any dark cool place for 48 hours; take them out at night and open the entrance; the next morning, introduce into this small hive a piece of comb containing eggs but no larvæ and in 16 days they will have produced a queen; or if a piece of comb be introduced containing larvæ not over five or six days old, they will produce a queen in 10 days. By this, it will be seen, that if a queen is removed from a colony the bees will produce themselves another in from ten to sixteen days,

and generally in from ten to twelve days, as there are usually both eggs and larvæ in a colony from which a fertile queen has been removed. It will therefore be remembered by those who may desire to remove an Italian queen from a stock, for the purpose of getting queen-cells to put in other stocks, that all such cells must be cut out on the morning of the tenth day after the Italian queen was removed, unless it be early in the spring when the weather is cool. Then it might be safe to leave them until the eleventh day. If left longer than that, some one of the queens will escape from the cell and destroy all the others. Yet it is not well to cut them out before the tenth day, as they are easily injured or chilled, and the operation is not as likely to be successful, especially in the hands of the inexperienced.

A queen remains in the hive after she has escaped from her cell from five to eight days (if she does not go off with a swarm), and then goes out on her bridal tour to mate with a drone.

IMPREGNATION.

I closed my last by saying that a queen goes out on her bridal tour to mate with a drone from five to eight days after she leaves the cell, provided she did not go off with a swarm. Many are not aware that a queen goes off with a swarm before she has mated with a drone; yet such is the case. As a rule, all swarms that come off after the *first* or *top* swarm, have young queens that are unimpregnated. Hence they must go out to meet the drones after the swarms are hived. I would not be understood to say that these queens will not go out about the usual time, that is, from five to eight days after they escape from the cell; yet going with a swarm may provoke an earlier flight by a day or two, or retard it to the same extent. Even when they do not go with a swarm, in some cases, they may go earlier than five days, and in other cases it may be over eight. From five to eight days, however, may be considered the rule, and unless the weather is very fine, and the honey harvest good, it will more likely be nearer the eighth day than the fifth, when the queen goes out. She generally takes wing in the afternoon, when the drones are flying abundantly; and if watch is kept at the entrance of the hive from twelve to two o'clock, the queen may be seen going out or returning. There is generally more or less commotion when the queen leaves, and especially so in small hives made for queen breeding, containing only a few bees. It is necessary to always have brood in the larva state in such hives at the time the queen leaves, otherwise the bees are almost sure to go with her—"swarm out," as it is called, and all be lost. The hives should also contain plenty of honey or feed. As has already been stated, the queen goes out to mate with a drone while on the wing in the air. If she does not meet with one in a short time, she returns to the hive, and remains a while, and then goes out again, and

so continues to do until she has become impregnated. This may not take place the first flight or the first day, and she may even require to go the second and third day, if only a few drones are flying; but where there are many on the wing she may meet with one in a short time, and return to the hive. In one instance I saw the queen leave the hive, and in fifteen minutes she returned impregnated. In the act of coition, the organ of the drone is always detached from the body of the drone, and left attached to the body of the queen, and must remain there for a certain time in order that the queen become fertilized; but how long it must remain is not known. It is stated upon very good authority that if this foreign substance is removed shortly after coition, either by the bees or by human aid, the queen will require to mate again. But more of this in our next. By what has already been stated, it will be seen how we know that a queen has mated with a drone. After being fertilized, the queen returns to the hive, not to leave it again, as a general thing, until she goes off with a swarm. The queen does not commence to lay immediately on her return. Generally, forth-eight hours after, or perhaps a little more, eggs may be found in the hive. In some few cases it will be much longer than that. If the colony is strong, and the honey harvest abundant, a young fertile queen will lay from two thousand to three thousand eggs in a day. This is easily determined by putting a swarm containing a young fertile queen into a frame hive filled with empty cards of comb. At the end of four days remove the cards, and find the number of square inches filled with eggs. Multiply by fifty, which is the number of cells to the square inch, and divide by four, and you have the number of eggs laid in a day. The fertility of the queen generally continues for three or four years, when she becomes worthless, laying only drone eggs, and soon dies or is destroyed. It will also be understood that when a queen has become fertilized she never mates with a drone again while she lives; and though it is her nature to mate with the drone on the wing, yet since the introduction of Italian bees it has been the wish of bee-keepers to discover some method by which impregnation could be controlled, and the queen caused to mate with such drones as might be selected. Some time since I stated in this journal that such a discovery had been made by a noted lady apiarian in the United States, and that as soon as I was at liberty to do so, I would publish the secret. I am now at liberty to publish it. In fact, it has already been published in the States. A Mr. Freeman Moore, of Ohio, claims that he made the discovery about the same time. Mrs. Ellen S. Tupper, of Iowa, the lady discoverer, learning that such was the case, requested Mr. Moore to publish his method, which he did in January last. It will appear in my next.

J. H. THOMAS.

Brooklin, Ont

Agricultural Intelligence.

Board of Agriculture.

The Council of the Agricultural and Arts Association met in the Agricultural Hall on Wednesday, Feb. 23, the President, Hon. D. Christie, in the chair.

The following officers were then appointed:—Hon. Jas. Skead, Vice-President; Hugh C. Thomson, Secretary; and Geo. Graham, Treasurer.

The time for the Fall Show was named for the 19th September next.

It was resolved that the Board memorialize the Legislature, asking a remission of duty on animals imported for the purpose of improving the breeds of cattle in this country.

After the reading of a communication from the Secretary of the New York State Agricultural Society on Shade Trees, the consideration of which was postponed, the annual report of the Association was read. This document, which has already appeared in the report of the Commissioner of Agriculture, briefly detailed the Society's proceedings during the past year, all of which are familiar to our readers. The satisfactory progress of the Veterinary College was referred to, and in regard to its present position it was stated that the Council had voted Mr. Smith an annual grant of \$150, to assist him in providing Lecture and Dissecting Rooms for the use of the school. In accordance with this arrangement, Mr. Smith has erected a commodious building adjoining his Infirmary, where the lectures are now given, and improved facilities are afforded to young men for acquiring the profession. 28 students are at present attending the lecturer, of whom the greater number design studying the Art as a Profession.

The abstract of the financial report shewed that the total amount received by the Treasurer during the year was \$34,527 77, and the total amount disbursed \$32,877 80, leaving a balance on hand at the end of the year of \$1,649 97.

All the premiums in connection with the Exhibition, and all the admitted liabilities of the Association, had been paid up.

The following gentlemen were appointed to constitute the Executive Committee for the year 1870:—The President, Dr. Beatty, Rev. Mr. Barnett, Messrs. Whyte, Gibbons, Graham and Rykert.

The committee were instructed to make arrangements with the Mayor of Toronto to secure the necessary accommodation for the Provincial Exhibition.

The salary of the Treasurer for the current year was increased to five hundred dollars.

The meeting adjourned till the following day.

SECOND DAY'S PROCEEDINGS.

In the afternoon of the next day the Board again met, and after the transaction of some minor details of business, proceeded to the new building erected for a veterinary college, and listened to an excellent address delivered by the Principal, Professor Smith, in which he reviewed the origin and progress of the school, detailed the course of study pursued, and explained the circumstances which had led to the erection of the present building, in which the students enjoyed the advantage of ample and suitable accommodation for lecture room, museum, and dissecting room, and the structure in its entirety being set apart for the purpose of the Veterinary College would doubtless tend, as it was meant to do, to give greater stability and permanence to the institution, and aid the progress of the Veterinary Science throughout the Province.

At the conclusion of this address, the members of the Board inspected the new building, the stables and outbuildings, and expressed themselves highly pleased with the admirable manner in which all the appointments were arranged.

The members of the Board returned to the Agricultural Hall, and business was resumed.

On motion of Mr. Rykert, seconded by Mr. White, in amendment to the motion made by Mr. Walton on Wednesday, it was decided to hold the Fall Show on the 3rd October next.

The subject of importing seed was then introduced by Mr. Walton, who moved, seconded by Mr. Cowan, "That the Hon. Commissioner of Agriculture at Washington be respectfully requested to place the Council of the Agricultural Association of Ontario on his exchange lists for grain, seeds, &c., with the assurance that the Council of the Agricultural Association will have great pleasure in sending, from time to time, exchanges of all the varieties of grain, seeds, &c., which may come into their possession."

The proposition was favourably received, and the resolution carried. Mr. Farley, however, stated that though he did not object to the proposition, he was convinced from experience that it would never do to import seeds from the South to the North. It would be better to exchange with Scotland or some other northern country. Experience had proved to him that not only seeds, but fruit and other trees from the South never thrived in Canada. The plan, however, was one which involved very little expense.

Mr. Weld said the Genessee and other kinds of wheat, in fact, our best species of grain, were imported from the United States. He also urged his own personal claims in the matter, as one who had for some time devoted particular attention and incurred considerable expense in efforts to import good cereals and other seeds into the country.

The following letter from Hon. Mr. Carling was read:—

"OTTAWA, Feb. 22, 1870.

"SIR.—I beg to submit for your consideration whether a plan might not be adopted which would render the working of the affairs of the Agricultural and Arts Association more economical than at present, without in any degree lessening its efficiency. A valuable library of books relating to Agriculture and Arts is in possession of my department, and the Association also has a very good collection. These might be amalgamated and made more available and of greater use to the public than in the places which they occupy. The working expenses of the Association also seem to be very large; the "miscellaneous" items so much so as to create a general feeling of surprise. The room formerly used for the Legislative library is now unoccupied. It connects with the present Legislative library. The larger portion of it might be fitted up for the united libraries, and the other portion as a meeting room for the Council and Committees of the Association. The joint libraries would be available for use by the members of the Legislative Assembly, during the sittings of the House, and would also be open at all times to the public for reading and reference. The person who would act as Secretary of the Association could also take charge of the library, whilst an officer of my department might act as Treasurer at a small addition to his present salary. This arrangement would be a great convenience, as both officers would then be accessible to the public at all times. The duties of messenger could no doubt be performed by the staff at present employed in the Parliament Buildings without any additional expense, so that the services of the messenger at present employed by the Association could be dispensed with. I have no doubt that, under the proposed arrangement the working expenses would be reduced by at least one half. Besides this, the present Association's building, which I believe is valued at about \$20,000, could be either sold or rented, and the annual interest on the proceeds of the sale, or the annual rent, could be appropriated for special prizes in the agricultural or the industrial arts. Will you have the goodness to give to the foregoing your careful consideration, and to bring it before the notice of the Council at its next meeting, which will commence tomorrow—and let me know if any action is taken in regard to it.

"Your obedient servant.

"JOHN CARLING,

"Commissioner.

"To the President of the Council of the Association of Agriculture and Arts for Ontario. Toronto, Ontario."

‡ This communication, which it was stated had only been received that afternoon, elicited a warm discussion, the President contending that the implied charge of extravagance was unmerited; that in the principal item of expenditure that had caused dissatisfaction, namely, Mr. Glaokmeyer's claim, Mr. Carling himself, as having introduced that gentleman and recommended him to the Board, was as much responsible as any one, and had shown himself as liable to make mistakes as others. He considered the Commissioner's proposition as the first step towards placing the whole control of the Association in the hands of the Government, and believed that such a result would be disastrous not only to the Association itself, but to the agricultural interests of the country. The Minister of Agriculture, newly

appointed from time to time as the Government changed, would scarcely ever be practically acquainted with the interests and requirements of the farmer, and it would be far better that the Association should be altogether independent of Government aid, than that it should be thus merged into the Bureau of Agriculture.

Professor Buckland explained that Mr. Carling deplored and condemned Mr. Glockmeyer's exorbitant charge as much as any one, and could assure the Board that the Commissioner had no intention whatever of interfering with the independence of the Association. He entirely agreed in the principle enunciated by the President that the Board should have no connection with parties, and nothing to do with politics.

After much animated discussion, it was resolved to postpone the further consideration of the subject till the next meeting.

A communication from the Ontario Poultry Association, asking for a grant of one hundred dollars per annum from the Agricultural Association was, at the suggestion of Mr. Rykert, allowed to stand over for consideration at the next meeting.

IMPORTATION OF CATTLE.

The SECRETARY submitted the following memorial to the Senate for the approval of the Board:—

To the Honourable the Senate of the Dominion of Canada, in Parliament Assembled:

The Petition of the Council of the Agricultural and Arts Association of the Province of Ontario,

HUMBLY SHEWETH:

That great benefit has heretofore resulted to the Agricultural interests of Canada from the importation from Great Britain and foreign countries, of animals of superior breeds for the purpose of improving the existing breeds of the country, and that the general prosperity of the country has been thereby promoted.

That there is much risk and expense involved in the importing of such superior animals, and that therefore it is highly desirable that such importation should not be burdened with any additional cost which can be avoided; but that on the contrary, it should be encouraged by a liberal policy on the part of the Government.

That the existing Customs duty of \$15 per head on horses, and \$10 per head on horned cattle, \$1 per head on sheep, and \$2 per head on swine, tends to discourage the importation of superior animals for breeding purposes, and thereby retards the progress of one of the most important interests of Agriculture, without being of any corresponding advantage to the public revenue.

Your petitioners therefore pray that such duties may be remitted in so far as they relate to animals of superior breeds imported for breeding purposes.

And your petitioners, &c. &c.

The memorial was adopted without discussion.

Some further business of an unimportant nature was then disposed of, and the meeting adjourned till the 1st of June next.

Mark Lane Harvest Reports

The *Mark Lane Express* has a lengthened article on the harvest returns of the past year, embracing in the estimates the crops of the European and American continents, and concludes that the present low prices for grain cannot be maintained during another season. It does not anticipate any immediate or sudden rise.

"But during the summer and early part of autumn," it observes, "we most assuredly (even under the most favourable prospects for the crops) expect a smartish rise, which will increase in intensity should anything occur to endanger the growing crops. Prices being low, cannot well go much, if anything, lower, but owing to their low standard, there is plenty of scope for a smart reaction upwards."

In a rather long review of the season in England, it is said that of fall wheat a somewhat larger breadth than usual was sown, but less (in fact for a series of years there has not been so little) spring wheat sown. As to the yield, it is said that "On the whole the wheat crop is considered 10 to 15 per cent. below an average, or twenty-five to thirty per cent. under that of 1868. In Wales, crops satisfactory in quantity and quality." In Scotland "what may be called nearly an average, though about 20 per cent. below that of last year; but quality and condition various." In Ireland there was about 4,033 acres less land sown to wheat; and "on the whole, the yield is about 15 or 20 per cent. below an average." In summing up it is said: "Taking everything into consideration, it is thought the yield of wheat in Great Britain and Ireland is one-eighth below an average, and that owing to diversity in quality more fine wheat will be wanted, and that an importation equal (in round numbers) to eleven million quarters of wheat and flour will be required."

There are detailed reports from other countries, but we only have room to state that in France the crop of wheat is called ten per cent. under an average in quantity, quality fine, but with the old stocks is supposed to have enough. Holland will have to import more or less, as usual; it is thought she will require even more foreign aid than last year. Belgium will require fully as much, if not more, than last year. Switzerland will require her customary assistance. Germany is said to be able to spare one and a quarter millions of quarters, against one and a half last year. Russia is considered as able to spare the same as last year, which was one and a half million quarters, although, if prices do not improve, the exports may fall short of this amount. In Austria and her provinces the crop is not so good, or two-thirds to three-quarters of an average. In Hungary, thirty to fifty per cent. under an average. Last year the exports were put at one and a half millions, this year at three-quarters of a mil-

lion wheat and flour. Reports from other countries are also given, but perhaps the above, condensed in the columns of the *Country Gentleman*, is enough to show the present supply of, and demand for, wheat in Europe, while it will give a much better understanding of the facts than the usual accounts and reports in the newspapers.

Testimonial

At the last annual meeting of the West Northumberland Agricultural Society it was resolved to present their Secretary, Charles Bourn, Esq., with some suitable testimonial, in token of the appreciation by the members of his long and faithful services to the Society. The testimonial consisted of a handsome mother-of-pearl inkstand, holding two beautiful cut-glass ink bottles, and a splendid gold pen and ebony holder. The presentation was made by G. Bennett, Esq., (late President of the Society), and the Treasurer, W. Riddell, in the name of the Society. Mr. Bennett paid a warm compliment to Mr. Bourn for the very efficient, zealous, and punctual manner in which he had discharged the duties of Secretary for the last twenty-one years. In all that time nothing could exceed the very satisfactory manner in which the business of the Society had been conducted, and this testimonial was presented to him, not so much on account of its intrinsic value, but as the most suitable means of giving expression to the regard and esteem in which he was held by the members of the Society. The speaker hoped he would long be able to use the pen in their service, and concluded with best wishes for the welfare of Mr. Bourn and family. Mr. Bourn in reply feelingly acknowledged this mark of approbation from the Society of which he had been elected Secretary for the twenty-second time, and said that while discharging the duties of his office, though his labours had been sometimes arduous, he had felt them less from the deep interest he always took in all agricultural matters; that during his long connection with the Society, he was happy to say he had formed many pleasant acquaintances, and made many sincere and warm friends; but that he had also been called upon to mourn the loss, by death, and removal to other parts of the country, of many active and useful members of the Society; that it would always give him pleasure while he lived to look upon this testimonial just presented to him, and that he trusted it would descend as an heirloom to his family, who, along with himself, would look upon it with feelings of gratification and pride. He concluded with heart-felt thanks for this token of esteem and approval from the Society.

The presentation took place at the North American Hotel, Cobourg, a number of the leading members of the Society being present, also several members of the County Council, which was in session at the time.

Agricultural Meetings—Fall Shows

In accordance with invitations issued by the Directors of the Darlington Agricultural Society, a meeting of representatives from the various County and Township Societies was held in the Council Chamber, Bowmanville, on Tuesday, 25th January, for the purpose of arranging for the holding of Fall Exhibitions in connection with each of the Societies, in such a manner that the fairs may not clash with one another, as heretofore.

The following Societies were represented: East Durham; Hope; West Durham; South Ontario; Clarke; Darlington; Cartwright; Whitby; Pickering.

The meeting was organized by appointing Mr. N. Choate, chairman, and Mr. R. Windatt, secretary.

The Secretary of the Bowmanville Horticultural Society, W. R. Clinie, was requested to take part in the proceedings.

The holding of County Fairs was first considered, and the following days selected:

South Ontario—First Tuesday and Wednesday of week following the Provincial Exhibition week.

West Durham—Thursday and Friday of same week as Ontario show.

East Durham—Tuesday and Wednesday of second week following Provincial Exhibition week.

The days for Township Fairs were fixed on as follows:—Pickering and Clarke on the Thursday and Friday of second week following Provincial Exhibition; and Cartwright on Thursday of same week.

Whitby and Hope on the Tuesday and Wednesday of third week as above; and Darlington on Thursday and Friday of same week.

The Secretary was instructed to communicate to the Markham and North Ontario Agricultural Societies the above arrangement, and request them to fix the days for their shows so as not to interfere with the decision arrived at by delegates.

The question of the appointment of Judges for the several fairs was next considered; and after some little discussion, the following resolution, moved by Mr. Foote, seconded by Mr. Bickell, was unanimously adopted:—

That, in the opinion of this meeting the best mode of securing judges will be, for each of the Boards of Directors to apply to their neighbouring society to send as many judges as they may require at their respective exhibitions—the travelling expenses to be paid by the societies receiving the said judges.

COUNCIL OF THE AGRICULTURAL ASSOCIATION.—The four members of the Council who retired in rotation have all been re-elected with the exception of the late President, in whose place Mr. James E. Farley, of Thurlow, has been chosen by the Agricultural Societies of the division formerly represented by Mr. Mallory. The contest, we understand, was very close, and the majority in favour of the successful candidate a very small one.

Advertisements.

NEW AND BEAUTIFUL HARDY FLOWERING SHRUB, DEUTZIA CRENATA FLORE PLENO.

THIS very handsome double flowering shrub is a great acquisition. The flowers are white, delicately tinted with rose. Worthy of a place in every gentleman's lawn, and every collection of shrubs. For sale at the St. Catharines Nurseries. 2211

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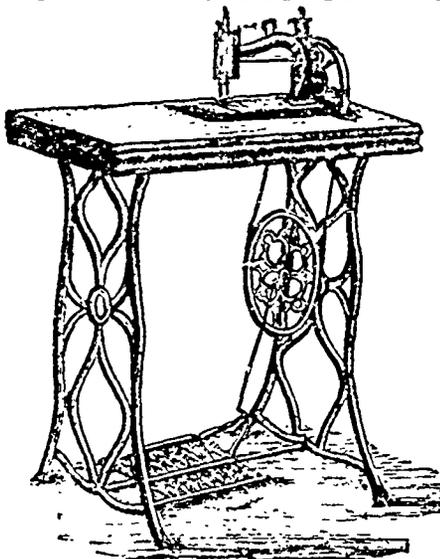
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WILSON, BOWMAN & CO.,

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MANUFACTURERS OF THE CELEBRATED

LOCKMAN SEWING MACHINE

TAKE pleasure in announcing that the popularity of the Sewing Machine manufactured by them is still on the increase. They are now turning them out at the rate of 600 per month, and yet have been compelled within the last two weeks to increase their facilities to a capacity of one thousand per month.

The Lockman Machine, from its capacity to sew the heaviest fabrics with linen thread, as well as the finest cambrics with No. 150 cotton, is pre-eminently the **FARMER'S FAVORITE FAMILY FRIEND**. It is so exceedingly simple in its parts, and so strongly and durably made, that it does not require a mechanical genius for its management.

The manufacturers challenge the world to produce its equal, and yet its price is from **FORTY TO FIFTY PER CENT LOWER** than that of any other First Class Lock Stitch Sewing Machine.

Every Machine is warranted by the manufacturers, who are determined that no inferior machine shall leave their premises. Parties purchasing to sell again can obtain liberal terms by addressing the manufacturers.

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1870.

NEW AND GENUINE SEEDS

Messrs. JOHN A. BRUCE & CO., Seed Merchants & Nurserymen HAMILTON.

NEW & CHOICE VEGETABLE SEEDS.

- Beans—Carter's Champion Scarlet Runner, very large pods. 25c
- Cabbage—Little Pixie, the earliest variety. 10
- " Schwinfurt Quatal, early, very large heads. 10
- Cauliflower—Extra Early Paris, the earliest. 12½
- " Demi-Tur, large, sure heading variety. 12½
- " Leonards, late sort, extra large and fine. 25
- Celery—The Prince of Wales, Dwarf White, new and extra fine. 50
- " Incomparable Dwarf White, a very fine variety. 10
- " Carter's Dwarf Crimson, the best red variety. 25
- Lettuce—Bruce's Nonpareil Cabbage, the largest and best. 10
- " Boston Curled, early and very beautiful. 10
- Melon—Extra Green Nutmeg, most exquisite flavor. 10
- " Long Persian, green flesh, very superior. 10
- Radish—French breakfast, early and very tender. 10
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- Tomato—Bruce's Extra Early Apple, the earliest and best. 10
- " General Grant, a very early and superior variety. 10
- " Keys' Early Prolific, very productive, solid and fine. 10

On receipt of Two Dollars and Fifty Cents we will send Free by mail, to any part of the Dominion, the above collection of new and choice seeds.

CHOICE SEED POTATOES.

- Early Rose—Per peck, \$1 00; half bushel, \$1 50; one bushel, \$2 50; one barrel, \$6; five barrels, \$25.
- Early Goodrich—Per barrel, \$3; five barrels, \$12 20; and other choice varieties. See Catalogue for full particulars.

NEW AND CHOICE FLOWER SEEDS.

- Calceolaria—James' International Prize. \$1 00
- " Dobson's Prize. 50
- Cineraria—Very Choice Mixed. 50
- Pansy—Bruce's Premium, extra good. 50
- Primula Sinensis—Extra large, rose and white. 25
- " Fern leaved, very choice. 25
- Verbena—Saved from a large collection, extra good. 25
- Carnation—Rose leaved, extra fine. 50
- " Perpetual Flowering, extra fine. 50

John A. Bruce & Co's Descriptive Catalogue of Nursery Productions for 1870, is now ready, and will be sent Post Free on application.

Hamilton, March, 1870

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WE ask the attention of purchasers to our full stock of **FRUIT TREES,**

Of all kinds, SMALL FRUITS, bushes and plants; Ornamental, Deciduous and Evergreen Trees; Flowering Shrubs, Climbing, Moss and Perpetual Roses, 100 varieties best Dahlia Roots, Hedge Plants; Herbaceous Plants, &c., &c. The Stock is grown with a view to *suitability to the climate of Canada.*

Packing done in the best manner to insure safe carriage. Orders by post will receive same attention as if purchasers were personally present.

Price Descriptive Catalogue, new edition, sent to applicants enclosing a two cent stamp for postage.

Address all orders and letters of enquiry, post-paid, to **GEO. LESLIE & SONS, Leslie P. O., Ont.**

N. B.—A splendid stock of Bedding Plants very cheap. 3-21

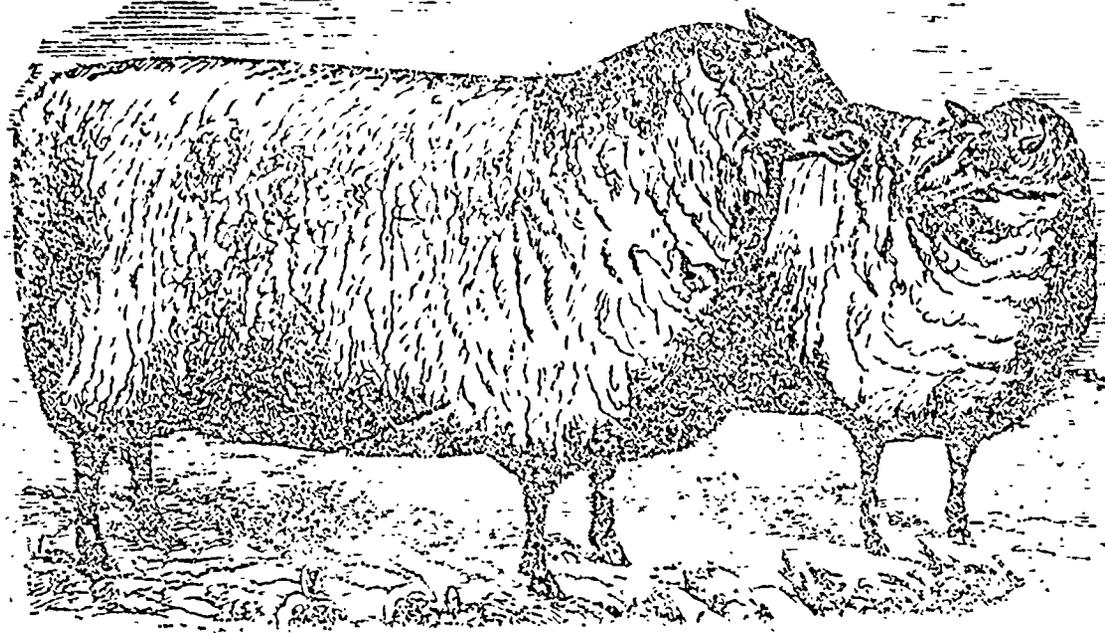
TO FRUIT GROWERS.

FOR SALE, a valuable Farm of 50 acres, with large plantations of fruit. Good house and out-buildings, two miles from St. Catharines, in the midst of the finest fruit growing region in Canada.

For further particulars address P. O. Box 63 St. Catharines, or Box 1372 Toronto P. O. 3-21

MILLER'S TICK DESTROYER.

**MILLER'S
TICK DESTROYER.**



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FARMERS are recommended to give this valuable preparation a fair trial. It operates promptly and efficiently in destroying Ticks and other vermin pests, as well as in eradicating all affections of the skin to which Sheep are subject. No Sheep-owner should be without it. As a certain cure it has hitherto proved infallible. Other Dips may kill all vermin seemingly alive, but on examination after a short time, the Fleeces will be found to be as full of Vermin as ever. The Tick Destroyer penetrates to the Vermin in all grades of development, extinguishing both hatched and unhatched life.

HUGH MILLER & CO., Proprietors, Toronto.

NOTICE.

The East Riding

OF THE
COUNTY OF NORTHUMBERLAND

AGRICULTURAL SOCIETY

WILL OFFER A

Prize of \$75 for the Best Stallion for general purposes exhibited at the Society's Spring Show of Stallions, to be held in the

VILLAGE of CASTLETON,

on

Wednesday, 20th April, 1870.

THE above prize is open to any Stallion in the Province, without any entrance fee. The owner of the Stallion that is awarded the above prize shall be bound to travel him in and through each Township in the Riding, making at least one over night stand in each Township, during the season of 1870.

The above prize will not be awarded to any Stallion, unless the same is considered worthy by the Judges.

By order,

R. P. HURLBUT,

Secretary.

Secy's Office, Warkworth,
Feb. 21, 1870.

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Important to Farmers.

CROPS ripened from ten to fifteen days earlier, and yield increased 100 per cent. by using:

- Lamb's Super-phosphate of Lime, \$40.00 per ton.
- Fine Bone Dust, 27.00 "
- Half-inch Bone Dust, 22.00 "

Cash to accompany all orders

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FREE BY MAIL

My new Descriptive Catalogue of Small Fruits.

ALL the best varieties Strawberries, Raspberries, Blackberries, Grape Vines, &c. Gives instructions for planting. Plants sent by mail free of U.S. postage. M. N. WILSON, Macedon, N.Y. 3-11

IMPROVE YOUR SEED.

Genuine Imported Hungarian Seed Grains.

THESE seeds are carefully selected and warranted to be as represented

LIST OF PRICES		
	per bush.	per quart
Wheat.....	\$4 00	\$1 00
Rye.....	3 50	1 00
Oats.....	5 00	2 00

SAVE YOUR SEED FROM VERMIN AND BIRDS.

LASSING'S PATENT IMPROVED MODE OF PREPARING SEEDS. This patent powder protects all kinds of seeds from vermin and birds, and feruliz as after planting, and costs \$2 per pound, which is sufficient for 2 bushels of Seed. State, County and Town rights for sale.

Sent by Express to all parts of the country on receipt of price. Send for circular containing valuable information to farmers.

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STRONG, well grown, one year old vines of Allan's Hybrid, Iowa, Isabella, Rogers' Hybrids, No. 15 and 19, Ives' Seedling, Alvey, Delaware, Concord, and Miles', 25c. each, \$2.50 per dozen, \$20 per hundred. Salem, the best of Rogers' Hybrids, 50c each, \$5 per dozen. Isabella and Clinton, three years old, 20c each, \$2 per dozen

JOHN FORSYTH,

Box 1135, Toronto P. O.

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RASPBERRY PLANTS.

THE subscriber has for sale a choice stock of the Doolittle, Blackcaps and Lawton Blackberries, which he offers at seventy five cents per dozen, mailed free of charge. Cash orders mailed in rotation. E. H. CRYSLER, Bartonville, Ont.

N.B.—I have Wilson's Early and Kittatinny's, which will be for sale next spring. 3-21

50 barrels Early Rose Potatoes to be given away.

FOR \$5 I will forward to any address 2 lbs. Vandevere, 2 lbs. Harrison, 1 lb. Climax, and 1 lb. (105 lbs.) Early Rose Potatoes. Last year the Harrison sold for \$1, Vandevere \$1, and Climax \$3 per pound, and are well worth all I ask for the whole. The Early Rose were awarded a first prize last year at the Provincial Fair.

Address H. M. THOMAS, Brooklyn, Ont. 3-11

WINDSOR NURSERIES.

A FINE stock of Fruit Trees, &c., for Spring planting, more particularly in

Dwarf Pears, Dwarf Apples, Vines, &c.

Intending purchasers should send at once for Catalogues, which will be sent free. Also for the "CANADIAN FRUIT CULTURIST," mailed free for 25 cents.

Address.

JAMES DOUGALL,

Windsor, Ont.

3-11

AYLESBURY DUCK EGGS.

FOR Sale in spring, a limited number of Aylesbury Duck Eggs, warranted pure. Orders received in advance. Price \$2 per dozen.

JOHN FORSYTH,

Box 1135 Toronto P. O.

3-11

SEED POTATOES.

EARLY GOODRICH, early and prolific, \$2.50 per barrel. HARRISON, the best and most prolific late potato, \$2.50 per barrel. All warranted pure.

JOHN FORSYTH,

Box 1135 Toronto P. O.

3-11

DOMINION OF CANADA



EMIGRATION TO THE PROVINCE OF ONTARIO.

To Capitalists, Tenant Farmers, Agricultural Labourers, Mechanics, DAY LABOURERS,

And all Parties desirous of Improving their Circumstances by Emigrating to a New Country.

THE attention of intending Emigrants is invited to the great advantages presented by the Province of Ontario.

Tenant Farmers with Limited Capital

Can buy and stock a Freehold Estate with the money needed to carry on a small farm in Britain.

A FREE GRANT OF LAND (WITHOUT ANY CHARGE WHATSOEVER.)

Every Head of a family can obtain, on condition of settlement, a FREE GRANT of two hundred acres of land for himself, and one hundred acres additional for each member of his family, male or female, over eighteen years of age.

All Persons over 18 years of age can obtain a FREE GRANT OF 100 ACRES.

The Free Grants are protected by a Homestead Exemption Act, and are not liable to seizure for any debt incurred before the issue of the patent, or for twenty years after its issue.

Registers of the Labour Market

And of Improved Farms for sale, are kept at the Immigration Agencies in the Province, and arrangements are made for directing emigrants to these points where employment can be most readily obtained.

Persons desiring fuller information concerning the Province of Ontario, are invited to apply personally, or by letter, to the Canadian Government Emigration Agents in Europe, viz: Wm. Dixon, 11 Adam Street, Adelphi, London, W. C.; J. G. Moylan, Dublin, Charles Foy, Belfast; David Shaw, Glasgow, and E. Simays, Continental Agent at Antwerp.

Also to the Emigration Agents in Canada, viz John A. Donaldson, Toronto, R. H. Rae, Hamilton; Wm. J. Willis, Ottawa; Jas. Macpherson, Kingston; L. Stafford, Quebec; J. J. Daley, Montreal; E. Clay, Halifax, Nova Scotia, Robert Shree, St. John, and J. G. G. Layton, Miramichi, New Brunswick, from whom pamphlets issued under the authority of the Government of Ontario, containing full particulars in relation to the character and resources of, and the cost of living, wages, &c., in the Province, can be obtained.

JOHN CARLING,

Commissioner of Agriculture and Public Works for the Province of Ontario

Department of Immigration, Toronto, October, 1869.

2121.

Markets.

Toronto Markets.

"CANADA FARMER" Office, March 9th, 1870.

FLOUR AND MEAL.

The Market is quiet at the following rates:— Flour—Extra, \$4, Fancy \$3.70, Superfine \$3.55 to \$3.60

Oatmeal - \$3.62 to \$3.70.

Bran—\$9.

GRAIN AND SEED.

The transactions in grain are few, and rates continue low.

Wheat—Fall \$6c, to \$8c, Spring, \$2c. to \$3c

Barley—48c to 60c.

Oats 34c.

Peas—53c to 55c.

Rye—51c. to 52c.

Clover—\$6.25 to \$6.40

Timothy—\$2.75 to \$3

Alsike - \$8.25 to \$8.75

Tares \$1.50 to \$1.70

Hungarian Grass 45c. to 55c.

HAY AND STRAW.

Hay has been in large supply all week, and selling at \$6 to \$8 for inferior, \$9 to \$11 for fine quality.

Straw—The supply and demand have been about equal, \$4 to \$6.50 being about the range of price.

PROVISIONS.

Pork Mess, \$23.50 to \$24.

Bacon Cumb. rind cut, 10 1/2c. to 10 1/2c.

Hams 13c to 15c

Lard—12 1/2c. to 14c.

Butter Packed, 16 1/2c. to 17 1/2c., Roll, 10c to 24c.

Cheese 12 1/2c. to 14 1/2c.

Eggs—18c to 20c.

Salt—Goderich, \$1.55, American, \$1.35 Liverpool

Salt, per bag, 85c. to 87 1/2c.

Dressed Hogs—\$7.75 to \$8.50.

Potatoes—30c. to 35c.

Grease—50c. to 70c.

Turkeys—\$1 to \$1.50.

Chickens—per pair, 50c. to 75c.

CATTLE MARKET.

There has been a good business done at steady, and in some instances, advanced prices.

Beeves—From \$5 to \$8.

Sheep—Scarce and in good demand at from \$3 to \$5.

Lambs—From \$2 to \$5.

Calves—From \$4 to \$12

Hides—5 1/2c. to 6 1/2c.

Calveskins—10c to 12c

Sheepskins—75c to \$1.50

Wool—23c. to 25c.

New York.—Flour Steady, receipts 6,000 bbl's., sales 7,000 bbls at \$4.75 to \$4.99 for superfine State and Western; \$5.05 to \$5.85 for common to choice Extra State, \$5 to \$6 for common to choice Extra Western Rye Flour, firmer at \$4.30 to \$5.50. Wheat, without decided change in price, receipts 12,000 bush.; sales 16,000 bush. at \$1.60 to \$1.70 for choice white State Corn, firm; receipts 4,000 bush.; sales 19,000 bush at 92c to 96c. for new mixed Western Barley, Dull; sales 2,000 bush Canada West at \$1.12. Oats, quiet; receipts 10,000 bush.; sales 16,000 bush. at 55c. to 66 1/2c. for Western. Pork, firmer at \$26 to \$26.25 for new mess Lard, Heavy at 14 1/2c for steam, and 15 1/2c for kettle rendered. Butter steady at 14c to 25c. for Ohio; 20c to 46c. for State, Cheese, Dull at 16c. to 18c. for common to prime.

PROVINCIAL MARKETS.

Montreal.—Flour—Extra, \$4.40 to \$4.45; Fancy \$4.20 to \$4.25. Bag flour 100 lbs., \$1.60. Wheat, Canada fall, 80c to 90c, Spring, 90c. to 92 1/2c. Oats, per 32 lbs., 25c to 27c. Barley, per 45 lbs., 40c. to 45c. Butter, dairy, 17c. to 18c. Lard, Mess, \$23.75 to \$24, Dressed Hogs, \$8.50 to \$8.75. Peas, per 66 lbs., 70c.

Collingwood. There is very little alteration in our market prices this week. Spring wheat 68c to 72c; fall wheat 70c. to 75c.; Barley 32c. to 38c.; Oats, 25c.; Peas, 40c. to 42c.; Pork, \$6 to \$7.50; Butter, 16c.; Eggs, 13c. to 14c.; Potatoes, 15c. to 24c.

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Communications on Agricultural subjects are invited, addressed to "The Editor of the Canada Farmer," and all orders for the paper are to be sent to

GEORGE BROWN, Managing Director.