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THE ILLUSTRATED
JOURNAL OF AGRICULTURE.

Vol. III, from May 1881 to May 1882,

CONTAINING 166 ENGRAVINGS.

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THE ILLUSTRATED JOURNAL OF AGRICULTURE

PUBLISHED BY THE DEPARTMENT OF AGRICULTURE FOR THE PROVINCE OF QUEBEC.

Vol. II.

MONTREAL, MAY 1881.

No. 1.

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Butter and cheese factories.

We beg to inform our readers that the Hon. Commission of Agriculture and Public Works has secured for next season the services of Mr. J. M. Jocelyn, butter- and cheese-maker; whose duty will be to direct the management of one or more model factories in our province. Those who wish for full information concerning these industries may address themselves to the Journal of Agriculture, which will reply to their questions.

We hope to be able to announce, before long, at what place the first model combined butter- and cheese-factory will be established, and on what terms apprentices will be taken. All that we can say at present is, that there will be room for three or four apprentices at each of the factories managed by Mr. Jocelyn.

PEASE.

One often hears great complaints, about the end of July that the pease keep on running to bine and blossoming, but will not pod. In consequence, the harvest is late, the crop small, and the sample deteriorated by the presence of many half-ripened, shrivelled pease. Now this defect springs from some cause or other connected with the habit of the plant; it is due neither to the climate nor the soil; for the same seed sown in other countries never misconducts itself in this fashion.

Now, the pea, as every one knows, is a climber. Its tendency is to throw out tendrils ready to grasp at every thing in its way, to support it and bear it off the ground and nearer to its idol, the sun. To aid it in this object the gardener places sticks on each side of every row, and in order to produce an early maturity, he sows the seed as thickly as it will endure without the plants becoming spindly, a large space, sometimes 8 feet, being left between the rows, to allow the free passage of light and air.

We cannot stick our field-pease, but we might take a leaf out of the gardener's book in the thick sowing.

Instead of scattering 5 or 6 pecks of pease broadcast over the land, some of which fall into the open furrows, others on the surface, and are never covered by the harrows at all, I can see no reason why we should not make slight drills, 3 to 4 inches deep and 27 inches apart, and sow the pease in them as thickly as possible, say at the rate of 3 bushels an acre. Those who have grain drills would of course use them, but they are not common as yet. The small garden hand-drill, with a larger hopper, would put in three to four acres a day easily, and if carefully handled and kept well greased, it does its work very regularly and well. The pease once up, the horse-hoe could go to work between the rows, and the thickness of growth would cause each plant to support its neighbour through great part of the season, while the sun and air would have free access, the bine would, in consequence be much less tender, and the ripening would be hastened in accordance with the universal law, that a thick sown crop is always ten day earlier in ripening than a late sown one.

There is really no reason why pease in the field should not produce as abundantly as pease in the garden, other things being equal; but if we will persist in dotting about a pea here and a pea there, because such has been the practice of our ancestors, I fear we must continue to be content with fifteen bushels an acre, as usual. I never saw in any part of the world finer crops of garden-pease than I have seen here, but I never saw in any other country pease sown broadcast in the field. I have heard of its being done in Scotland, but I never saw it in England: they are invariably drilled at 27 inches apart, and from 2½ to 3 bushels an acre.

I think I observed last year, in my tour through the Townships, a tendency to sow greater quantities of seed to the acre. Now, I know well that very large crops of wheat have come from one bushel, but it was always autumn-wheat, and the land had been thoroughly well done. Oats and barley I never saw good after thin sowing. On land in average condition, I should sow of spring-wheat 2½ bushels, 3 bushels of barley, and at least 4 bushels of oats, at the beginning of the season; and if late, I should add half a bushel more of wheat and barley, and another bushel of oats. It is really pitiable to see on the worn out French-Canadian farms the attempt to grow a crop with a quantity of seed that would be scanty in the richest soils of Europe. Where land is in good heart and thoroughly stirred before sowing, it is marvellous how the plants will tiller and multiply themselves. Captain Hallett (of *pedigree* wheat and barley notoriety) mentions one grain of wheat sown early in September, that in July occupied with its offshoots a space of 5 feet in diameter, measuring from the points to which the outer leaves extended on each side! v. "Our new wheat-fields;" Nineteenth century mag.; Oct. 1880. But on poor land, badly cultivated, and sown late, the grain comes up quickly, starts into stem at once, and produces its little ear as soon as it can. Many

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of the best farmers in Scotland, notably two who were gold modallists of the great Highland Ag Soc. last year, sow, even now, eight bushels of oats to the imperial acre.

A. R. J. F.

Waste manures.

I have been asked to give instructions in full for the preparation of bones, butchers' refuse, tanners' refuse, and matters of a like sort, for manure. If people really read their journal, they would have seen that, more than once, I have given an entire description of the plan to be adopted; but I will repeat it once more:

For every bushel of ground bones take three bushels of earth. On a stone or earthen floor, make a layer of earth 3 inches thick on which place a layer of bones one inch thick, sprinkling earth and bones with water till both are thoroughly damp. Continue this until the heap, which should be flat-topped, is about 4 feet high, when it may be left alone for a fortnight, or until the heat becomes considerably raised—say 120° F. It should be turned over after the above lapse of time, sprinkled as before, and carefully shaped into its original form, and at the end of the second fortnight, the mass will be perfectly homogeneous and fit for use. Six bushels of bone dust treated in this way will have a much greater immediate effect than ten bushels unrotted.

Butchers' refuse: two of earth to one of refuse. The large intestines such be chopped in pieces, and the larger bones broken up with a sledge-hammer. If there are many bones, this kind will probably require two or more turnings, and it may take two or even three months before they are perfectly worked up.

Tanners' refuse varies so much in quality that it would be impossible to lay down absolutely strict rules for its manipulation; but, as a general thing, it will require three of earth to one of refuse, and two turnings with their concomitant sprinklings. Six weeks should finish it. These operations should be carried on under cover, and not on a wooden floor, unless it is desired to destroy the boards.

Poultry manure may be mixed with all or any of the above materials, without danger of losing the ammonia it contains. The earth and the sprinkling will retain and fix it.

Now, as to the way of using the preparations. Of the first, six bushels of bones with their eighteen bushels of earth, combined with half a coat of farm-yard manure, should be a sufficient dressing for any root, tobacco, or corn crop. Drill up the land, spread the dung, draw a light board over the drills to place a little earth on the manure, then spread the mixture of bones and earth as carefully and equally as possible over the whole, split the drills, and sow the seed.

I cannot tell, without inspection, how much of the other preparations will be necessary for an acre. But, with dung as before, five loads of tanners' and seven loads of butchers' refuse, including the earth of course in both, ought to be enough. They can be spread out of a cart with a broad shovel.

The fine state of disintegration in which the bones, &c. are found, when managed in the above fashion, enables the rootlets of plants to begin feeding upon them at once; a matter of more real utility in a manure than it is usually understood to be by practical men in this country; and, where the refuse can be obtained at a moderate price, the expense cannot be very great. In the tanners' waste there will be found a good deal of lime and ashes, but the spent bark should be carefully excluded (1). In the bones and butchers' refuse, the nitrogen will be found in the form of ammonia. In the tanners' refuse, is it not probable that it takes the form of nitrate of lime?

(1) It will not pay to buy.

These preparations are good for all kinds of crops, there is no danger in applying them as a top-dressing, and with the addition of a few bushels of ashes, they will be found to contain all that is necessary as plant-food for our usually cultivated crops—nitrogen, phosphoric acid, and potash. If the half dressing of dung is given, the ashes may be omitted, as farm-yard manure always contains a sufficient amount of potash.

If any tobacco-grower will try either of the above mixtures I am sure it will repay him for his time, trouble and expense. I have proved them all three, and they have always answered the intended purpose.

I wish to call the attention of all farmers to Mr. Goldstein's well written article on the curing and general management of the tobacco crop. It is very rare, indeed, to find one so deeply interested in a matter of business as the gentleman in question is so perfectly frank and open in his statements. If a new impetus, an impetus such as has never been felt before in Canada, shall not be found to have arisen this year in the general conduct of the agriculture of the province, it will not be for want of energy on the part of those who have so earnestly tried to advance the cultivation of the coming sorghum, sugar-beet, and tobacco crops. A. R. J. F.

The Art of Feeding.

To feed well is a most important part of the farmer's business. It not only includes the economical spending of the food, but the thrift of the animals to which the food is given as well. There may be thus a double saving or a double waste as the feeding is well or ill done. One cannot learn to feed by rote or by a set of rules, for animals, foods and circumstances all vary, and what may be well to be done in one case may be ill done in another. The principles on which the art of feeding is based are then a matter for careful study before the practice can be arranged. These depend upon the natural conditions of the digestive organs of an animal and upon the character of the food. The former are the most important to consider because from a thorough understanding of these one may choose such food as may be best, or may manage the food as to make it comply with the requisites of the animal. The intestinal or digestive canal begins with the mouth and ends with the lower intestines. Every portion of this has some important office to serve in the nutrition of the animal. The lips, the teeth, the tongue, the cheeks and other parts of the mouth which contain the salivary glands, the pharynx and gullet, the nerves, the stomach, the intestines proper; the liver, spleen and pancreas, all these organs have their distinct services to perform before the food can be prepared to enter the blood and convey nutriment to the system. Some of these organs possess more important functions than others, and these only will be considered at this time. The teeth reduce the food to a fine condition, aided by the lips, cheeks, and tongue, which turn the food and bring it under the grinding action of the teeth. The salivary glands then come into use, discharging their peculiar liquid copiously into the mouth to be mixed with the food which is ground into a semi-liquid paste. There are three principal salivary glands: viz: the parotid, the largest, which is placed near the angle of the jaw; the submaxillary, on the inside of the jaw near the angle; and the sublingual, which is under the tongue, is the smallest. The saliva secreted by these glands is really a digestive fluid, for it possesses the power of changing starch into sugar and rendering it more soluble. It is a complex fluid consisting of water with potash, soda, lime, an organic matter called ptyaline; sulpho-cyanide of potassium; chloride of soda, (salt); chloride of potassium; phosphates, and alkaline sulphates. It is limpid, colorless, and without smell or taste.

In the horse these glands are very large and the secretion is unusually copious. In the mastication of the food, the saliva is intimately mixed with every portion, and, by its chemical action, prepares the food for ultimate digestion. The food thus prepared is formed into a ball or bolus, and is carried by the tongue to the pharynx, which by its contraction forces the mass into the gullet. This consists of a series of powerful muscles which by their contraction force the food into the stomach. The nerves of the mouth confer the sense of taste and also the power of motion of the numerous muscles which are called into action in the processes of mastication and swallowing. The action of swallowing is not voluntary, but of a kind known as reflex, which depends not upon the will, but upon the brain and nerves. As soon as the action of the tongue has passed the food to the pharynx, this reflex and involuntary action begins, and ends only when the food is passed completely through the intestinal canal. When the food reaches the stomach, it is immediately acted upon by the principal digestive fluid, the gastric juice. The coats of the stomach are very copiously supplied with blood by its arteries, one of which, the gastric, completely encircles the stomach by its branches. When food is received into the stomach, the circulation is excited, as are also the peculiar glands which secrete the gastric juice known as peptic glands. This secretion pours into the stomach and mixes with the food, being assisted in this by a peculiar churning action which is known as the vermicular, or wormlike, motion of the folds of the walls of the stomach. It is this gastric juice which in the calf's stomach produces the rennet used in making curd of cheese. The food when completely acted upon by the stomach is changed into a substance known as chyme, and is then forced by the peculiar motion above mentioned through the pyloric valve into the duodenum, which is the first division of the small intestines. It is connected with the liver, pancreas, and the right kidney, and receives the secretions of the liver and pancreas by the hepatic and pancreatic ducts, and these secretions mingle with the chyme contained in it. The former secretion is bile; the latter is similar to the saliva, but more powerful in its action, and seems to be specially designed to act upon the starch of the food as yet unchanged, and upon the fat. The duodenum is furnished with glands which secrete a peculiar fluid that assists in the digestion of the food and its change from chyme into a more advanced condition in which it is known as chyle. In its passage along the intestines this completely prepared food reaches its most soluble condition, and the perfect solution is absorbed by certain vessels and carried finally into the blood by a large duct known as the thoracic duct. The insoluble portion is carried onwards through the bowels and finally ejected as waste by the rectum. The consideration of this elaborate process is of great practical interest and several points are worthy of special study. As the perfect mixture of the food with the saliva is indispensable, a certain amount of mastication is necessary. Food that can be bolted then is neither economical nor fully digestible, and is likely to cause trouble in the intestines by its crude condition. On this account it would seem that dry rather than moist food, and ground rather than whole grain, are preferable, as being more likely to receive better mastication and salivation before they are swallowed. It does not appear that there is any necessity for the dilution of food with water in the stomach, because in all parts of the digestive canal from the mouth downwards there are abundant liquid secretions for the purpose of digestion. Further, it is known that water poured into the stomach is absorbed with great rapidity and passes at once into the blood by the close and fine network of veins in the coat of that organ, and that thirst is not caused by the want of water in the stomach but in the blood, and when the blood is fully supplied, the thirst is quenched. Water

then is not food, at least it is not truly an aliment in animals as in plants, because it passes at once by absorption into the blood, without decomposition into its elements as in plants; and water may be absorbed by the skin and thirst thus quenched, or the kidneys stimulated to action by its direct passage from the skin into the blood. It may therefore be considered as injurious to digestion to give an animal water with or directly after its food, but that it should be supplied sufficiently before feeding; for to fill the stomach with water when it is engaged in digesting food tends only to dilute the secretions of the stomach and to weaken their solvent action. But the water should be supplied before feeding, or otherwise the digestion may be interfered with for want of a copious supply of saliva. This reasonable deduction from the facts happens to accord with the practice and experience of practical horsemen, who have noted the effects of watering at different times. The discharge of undigested food through the bowels which is so frequently to be noticed is a waste and a constant menace to the safety of the animal. It is probable that this is caused more by mistakes in watering than in other ways. For a thirsty horse cannot grind its food because of a want of sufficient saliva to moisten it, and it is in part swallowed whole. The digestive fluids have not time to dissolve the whole grains, or even the finely ground meal swallowed without sufficient mastication, and these pass through the bowels, irritating the sensitive membranes and causing violent contractions which are known as colics, or inflammations; or they produce gases of decomposition, which being absorbed into the blood, disorder it, and produce febrile diseases, if not acute blood poisoning. Thus, while the system is weakened by insufficient nutriment it is attacked by serious disorder, and the double effect often overcomes the animal with a suddenly fatal result. Ex.

POULTRY DEPARTMENT.

Under the direction of Dr. Andres, Beaver Hall, Montreal.

Diarrhœa in Fowls.

The following appears in the Fancier's Gazette, as a translation from official documents founded on information supplied by the French Epizootic Committee, and signed by Professor Galtier.

The contagious disease peculiar to poultry which is known by the name of *diarrhœa of fowls*, although it attacks equally geese, ducks, and turkeys, is the cause of serious losses to agriculture. It may be regarded as of trifling importance when it attacks a solitary bird, but it becomes a serious thing when, as is more generally the case, it finds its way into a well filled poultry yard; which it may decimate, or even depopulate, in a few weeks. The disease may however do considerable harm in our rural districts where the production of poultry and of eggs is a very lucrative business. It is possible nevertheless to stop the development of the disease, and the following hints are published for the purpose of bringing the means which ought to be used for this end to the knowledge of farmers. All breeders ought to know what *diarrhœa of fowls* is.

As soon as the birds are affected, they have a downcast look.

They become sleepy, lose their strength, do not run away when chased, the temperature of the body rises, the comb turns violet-colored in consequence of a modification in the circulation, at last death occurs, generally some hours after the appearance of the first symptoms.

Recent scientific research has established the fact that this disease is caused by a microscopic organism which develops itself in the intestines, passes into the blood, and multiplies there with extraordinary rapidity.

The parasite is discharged with the evacuations, and may

be swallowed by the birds who pick the dung or eat the grains which have been soiled by it.

If a fowl dies, and there is any reason to fear that it has suffered from diarrhoea of fowls, the birds ought to be at once taken out of the poultry yard, and isolated from each other. The poultry yard and the fowl-house should also be thoroughly cleansed, the dung removed, and the walls, perches, and floor washed with plenty of water, a rough broom or brush being used for the purpose. The water employed in washing should have a little sulphuric acid in it, in the proportion of half an ounce of acid to each pailful of water. When ten days or so have passed away without there having been a death, it may be concluded that the disease has disappeared, and it will only be necessary to preserve the isolation of those particular birds which manifest depression, prostration, or somnolency.

These simple means will suffice to arrest the progress of the contagion and to hinder its return: applied at the outset, they would reduce the losses to insignificance.

Professor Galtier, writing in *La Gazette des Animaux*, and commenting on those instructions says: "The advice given by the consulting authority appears to me to be entirely inadequate to the circumstances of the case. I believe that if poultry were attacked with diarrhoea it would be necessary to apply sanitary measures of a very decided character."

The measures which should be recommended would be isolation, sequestration, change of place, it may be the sacrifice of the diseased birds, the burial of the dead bodies, and disinfection. All infected poultry yards should be sequestered, and diseased or suspected birds should be interdicted from association with others. It would be necessary to separate the ailing birds, and, on occasion, to sacrifice them: also to remove those which are still healthy and transport them to another well ventilated place. In this way the disease might be arrested by preserving the healthy animals from contagion.

When such a course is possible, the infected places should be abandoned altogether, the diseased animals should be got rid of, and the healthy birds should be removed and watched, so that they which fall ill may be taken away. The sale and exportation of even healthy poultry which comes from farms where the disease rages should be forbidden. The dead birds should never be eaten, but should be buried either in the ground at a convenient depth, or in the dung hill. In the latter case it would be well to sprinkle over them a little common phenic acid, or a solution of sulphuric acid.

When the poultry house and the poultry yard are clear of the disease, when the contagion has ceased, and the infected places have been abandoned, it will still be necessary to disinfect the poultry yard and fowl house, as well as the tools and utensils which have been polluted, not omitting the air of the fowl house. The dung which has been dropped should be sprinkled with a solution of sulphuric acid, which, according to Mr. Pasteur, is the best disinfectant. For this purpose it would be necessary to employ a solution of at the least from twenty to thirty of acid to 1,000 of water; and objects which are capable of being submitted to such an operation may be lightly singed.

The building, after having the objects contained therein and the walls wetted, might be exposed to the fumes of sulphur, then aired well for a whole day, and on the following day, the birds might be brought back to the place thus disinfected.

In order to prevent the infection from spreading to neighboring poultry yards, it would be well if the farmer whose birds have been attacked by the disease would inform the proprietors of the locality of the trouble he has had, in order that they may keep a watchful eye over their own poultry.

Nests for Hatching.

Now is the time when preparations for hatching early chicks is in order. The making of desirable nests for incubation is of considerable importance to the final result of bringing forth strong chicks from the eggs. The nest must combine within itself the conditions of warmth, moisture, and freedom from vermin. Much has been said and old has become this "nest" story to veteran breeders, though many new beginners will look to some of the "old ones" to help them with advice, etc. through the medium of reliable journals.

The making of desirable nests is of primary importance to successful hatching of eggs. A series of experiments with various styles of nests have met with the very best of results, by making nests suitable for every kind of season, as follows:

Take a "cracker box" remove, or leave on, the top, take out one end to within four inches of the bottom of the box; in this box place sawdust, as coarse as possible, two inches deep; saturate the saw-dust with water, though not to excess, pour on the top of it one ounce of carbolic acid; then place thereon, one inch deep, well pulverized, dry earth, or well sifted coal ashes: on this place clean straw, cut short, to prevent the hens feet from catching in it to the injury of eggs: hollow the nest only enough to prevent the eggs from rolling out in front; sprinkle some pulverized sulphur through the straw, and you are ready to give the hen possession. Place her on the nest, at night, on some worthless eggs for a day or two, and, if necessary darken the box by hanging a cloth in front, until she sits steady, when you find her returning to the nest promptly on being permitted to leave it, place the eggs you desire hatched under her, and those also at night. Nine eggs will hatch better this season of year than thirteen. The carbolic acid and sulphur will keep away the vermin from hen and nest, and also assist in the corrosion of the shell, enabling the chick to break through easily. This may all be some trouble to you, but, remember you cannot raise nice chickens without this, and other, trouble and care, and above all, a love for this very trouble and the chicks.

G. H. PRIM.

Rotations of Crops.

As bone-dust was used as a manure for turnips long before chemists recommended phosphoric acid, so rotations had become the custom of farmers long before the reason for their adoption was discovered.

De andolle was, if I remember, the first to investigate this question. After a good deal of research he came to the conclusion, that every plant arriving at maturity, left behind it, on separation from the soil, a certain quantity of excrementitious matter, positively injurious to plants of the same sort, but entirely innocuous to plants of other sorts. One would have thought that the simple consideration of a meadow or pasture would have shown him the absurdity of his theory; but even now, I observe from hints dropped here and there, that the excrementitious theory is not quite exploded.

I do not imagine that the more thinking part of the agriculturists were ever deluded by De Candolle's specious doctrine. They, as it has often happened in like matters, *felt* the real reason for an alternation of crops, rather than thought it out. They saw that wheat after wheat produced a badly nourished grain, and a weak spongy straw, and they jumped to the conclusion that the second of the two crops had not found enough to eat in the soil. Simple enough, but about the right idea, after all. There, doubtless, was enough to eat in the soil, but it was not properly cooked. Hence fallows came into vogue. Not, as it is sometimes thought to be, land in fallow meaning land lying idle, but land ploughed, harrowed,

and dragged, that new surfaces may be continually exposed to the air, and a more perfect disintegration of the mineral parts of the soil accomplished: in other words, the cooking of the dormant plant-food.

Soon, however, on the lighter class of soils, it was discovered that fallowing the bare soil was not only extravagant, but injurious to the retentive quality of the land. The introduction of turnips to field culture, and the demand for more mutton and wool, gave rise to the Norfolk or four course rotation, which is still, in the south of England, the system upon which almost all the best farms are cultivated. This course, or shift, or rotation—synonyms—had, as we shall see, one vital fault, but it was an adaptable plan, and it answered its purpose of preserving the land from too much exhaustion, for many a long year. It was, as most people know, made up of two grain-crops, one root-crop, and one clover-crop, the latter mowed or fed, as the case might be.

The root-crop, wherever it was possible, was fed off by sheep, hay and other light food being given in addition. The sheep manure, and the pressure of their pointed hoofs, produced the finest barley in the world, and the subsequent crop of clover, mowed generally twice for hay, yielded great wheat crops. Towards the year 1830, however, a terrible cry arose all over the east of England: the clover had failed! What was the reason? Nobody could say; the chemist had not considered the matter; the farmer could not reason much in those days, but he concluded that if clover could not grow, something else would and perfectly in accordance with the Verulamian teaching—by constant experiment, he discovered that it was necessary to avoid the too frequent repetition of this crop; and that, whereas grain crops might recur every second year without permanent injury to the soil, the clover would not bear repetition at a less interval than twelve years. Since that time, all the best practical men, both chemists and farmers, have been trying to get at the bottom of the cause of the failure; but up to this very day nobody has succeeded. My own idea is, that it is due to some defect in the *mechanical* condition of the land rather to a scarcity of clover-food in a proper state of preparation; but when *Dr. Lawes* says, positively, that he knows nothing about it, I do not think my opinion is worth much. The Scotch improved system took a different shape to that of England: instead of a four-course, they adopted a five- or six-course; beginning with roots, grain, and letting the grass lie out for two or three years, it ended as usual with grain. Very little hay was made, whereas all the clover in the English rotation was mown for hay. The clover did not fail in Scotland—why I cannot say—but quite as great a mischance has happened: the turnips are so terribly injured by the disease called “finger and toe,” that in many parts of the north, the farmers are seriously thinking of converting their five- or six-years course into one of seven or eight years, particularly on the heavier soils.

To whatever causes the practical failure of these two important crops may be due, it is clear that want of nourishment is not one. For the men of the east of England and the south of Scotland are the chief sufferers, and they are, certainly, the most liberal farmers in the world; they use large amounts of purchased manures, cake, &c., and nothing but meat, milk, and grain, is allowed to leave their farms.

The frequent recurrence of the potato-disease will occur to many as another instance of the extremely hazardous tenure by which the prosperity of the agriculturist hangs. But I believe we have nearly arrived at the cause of this malady, and its cure is not far off. Every day new sorts of potatoes, grown from seed, are brought to light, and all have the mysterious power of resisting the rot for a few years: but, for very few, I regret to say, as the *Champion*, in a

couple of years more will, doubtless, go the way of all its competitors, and some other newer kind will have to take its place.

I presume that wherever fallow-crops are grown in this country no one would be foolish enough to repeat the same sort on the same soil. For instance: where Indian corn occurred in one shift potatoes should come, where turnips, there beets or mangolds, and so on.

Every sensible man who breeds his own stock will see the necessity of adopting some fixed rotation, and thus preserving a balance between the number of his cattle and the crops designed for their support. The extent of each course must depend in great measure upon the situation of the farm. In the neighbourhood of large towns, where unlimited supplies of manure can be obtained at a nominal cost, the rotation will naturally be a short one. Mr. Irving, of Logan's farm, follows the five years course; Mr. James Drummond, of Petite Côte, extends his grass to three years. But I doubt very much if less than seven or eight years would answer the purpose of the farmers of Shefford, Compton, or Huntingdon. The small amount of manure attainable must, at first, make long rotations unavoidable everywhere, but as a farm gets well in hand, the course may be shortened with advantage both to the land, to the stock, and to the occupier. Again, where hay is saleable at a high price, the grass may lie out for a year or two longer, provided that a fair amount of manure is imported in return for the extra crops sold off the farm.

After all, the course selected must depend upon the judgment of the farmer, and this judgment will most likely be guided by the practice of the district in which the farm is situated. I would not advise any one on settling in a new neighbourhood to come to the conclusion that the customs of the inhabitants are all wrong. They, very often, are founded on causes which do not show themselves to a casual observer. Still, there are certain methods of cultivation which can be set aside at first sight. For instance, as more immediately connected with our subject, the course of cropping I have met with, not many miles from St Hyacinthe: three years in grain, followed by three years in grass. I take this to be, without exception, the very worst course in the world. (1) There is in it no chance of cleaning the land; to say nothing of the successive recurrence of three white-straw crops. Consider the effects of the unimpeded seeding down of every weed that occupies the land, and that for ever, or at least as long as this rotation is persisted in!

As a general rule, it may be observed that in the Townships, there is no course of cropping practised. The land lies in grass as long as any hay can be got off it, and the soil is improved, so long as the hay is consumed on the premises. Whether the farmer reaps much benefit from this very easy system is another question; I don't think he does; but, at all events, it is better than the sequence of grain crops as followed in the French country. ARTHUR R. JENNER FUST.

Mr. Brazeau, tobaccoist, St. Lawrence Main Street, informs me that he will take any quantity of true Canadian tobacco, of the small, narrow, pointed leaf kind.—If it is ripe, unsweated before drying, and properly turned out, he will pay as high as 50 cents a pound for it. At 27 x 12 inches, this would give 19,500 plants an acre—say 18000; of which ten ought to give a pound—the leaves are thick, and 15 may be left on each plant, as it always ripens if planted fairly early—yield 1800 lbs per acre; equal to \$900!!!

A. R. J. F.

(1) And yet, it is a vast improvement on the previous course, consisting of grain one year and bare fallow the other; yet not so bare but that weeds of the worst kind grew in abundance. We willingly admit that there is room for useful change. E. A. B.

Garden Seeds, and how to sow them.

Many people complain that the seeds they buy are not good, and assign as a reason for their complaints, that what they have sown never came up. The real cause of failure is, that they sow the seed improperly. Flower seeds, especially, are badly put in; and I think it will not be time wasted if I point out the depth at which each sort of seed should be buried, and thus show young gardeners how to avoid such an annoying mischance as sowing seed and seeing nothing come of it. Let us suppose that the ground has been well prepared and manured in preparation for the proposed crop. The seed should be put in at the following depths:

If the seeds are large, like lupins, sweet-pease, pumpkins, nasturtiums, scabious, etc., they may be buried from half an inch to three quarters deep. Daisies, balsams, mignonnette, phlox, zinnias, etc., prefer a quarter of an inch. Aggeratum, amaranth, antirrhinum, violets, myosotis, and others, should have only a little fine mould sprinkled over them; while calceolarias, lobelias, oxalis, petunias, portulacas, should be simply sown, pressed down with a board, and then watered with a very fine rose on the watering pot. Rodanthes, acroliniums, and globe amaranths, should have their woollen covering pulled off before sowing; and lupins, nasturtiums, etc., should be steeped in warm water for a few hours.

Last year, I adopted a plan of sowing my melons and cucumbers which answered perfectly. Having cut pieces of turf about six inches square, I sowed the seed about an inch deep on the earthy side, and placed them in my hotbed with the grassy side downwards. All I had to do when I wished to transplant them was to take each piece of turf bodily out of the earth in the bed, and they received not the slightest check to their growth, although they were in the fourth leaf, and had been already stopped by pinching.

Choice of Seeds for the kitchen-garden.

Very often, I hear complaints from my readers about the difficulty they find in selecting vegetable seeds. They receive from a seedsman a catalogue full of descriptions of a dozen different sorts of the same plant, and attributing such a mar-



Fig. 1.—Conover's Colossal.

vellous amount of good qualities to each that the choice of one of them becomes embarrassing. Nor does it seldom happen that the seedsman has some special interest to serve, and even were it not so, what may have succeeded perfectly with him, may fail entirely under quite different conditions of soil and climate.

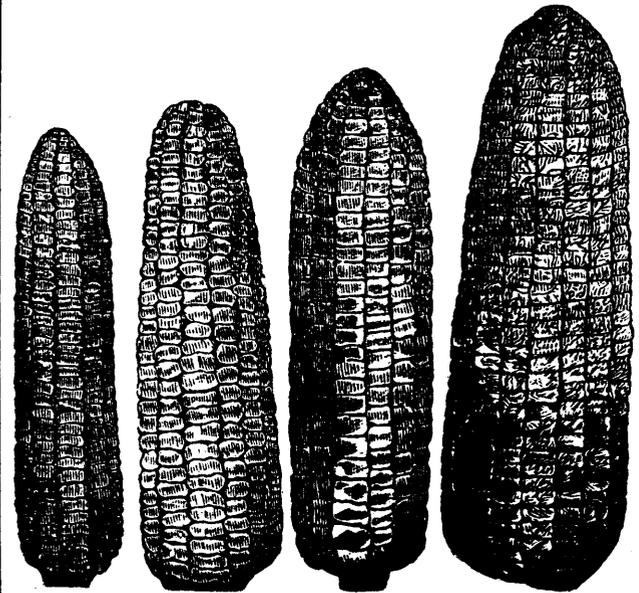


Fig. 2.—Round Egyptian beet.

I have chosen the varieties contained in the following list in this way: first, I marked the sorts which the whole body of seedsmen recommend. As some live in Canada, others in the northern States, and others, again, in the southern States, there can be no doubt about a

plant which they all agree in praising: those varieties which succeed everywhere must infallibly be good. Observations which I made for myself, and the remarks I heard from the best gardeners of Canada and the United-States, at the Montreal Exhibition, combined with my own experience of 15 years, as an amateur, formed other grounds on which I based my opinion.

I thought it as well to mention these things, that my readers might have confidence in the selection I put before



Minnesota.

Moore.

Russell.

Mammouth.

(Fig. 3.)

them, and I will now proceed to the enumeration of the varieties which are most worthy of confidence.

GARLIC.—There are two sorts of this pungent root. Both are equally good; the only difference is in size, but there

is no distinctive name to either.

ASPARAGUS.—Many different sorts are highly praised; but I am convinced that *Conover's Colossal*, if it receive proper care, will prove as profitable as any. The engraving (fig. 1) is about half the real size.

BET-ROOT—Of the numerous kinds mentioned I prefer the *Egyptian round beet* (fig. 2). It is shaped like a turnip, of good size, and does well in shallow soils; so it can be grown anywhere, if it receive plenty of manure (1).

INDIAN CORN.—A belief has existed for some time that sweet-corn could

with difficulty be grown in the western part of the Province, and not at all in the eastern part. This prejudice is now,

(1) I prefer the *long blood-beet*, except for the early crop. The secret of having good beet-roots is to grow them thickly and quickly. A. R. J. F.



Fig. 4.—Scarlet stump-rooted carrot.

happily, exploded. Ninety miles below Quebec, I have grown *Mammoth* sweet corn (fig. 3) 9 feet high, with always two, and sometimes three ears to each stem, each ear measuring,



Fig. 5—Turner's white dwarf.



Fig. 6—Celeriac.

on an average, 13 inches. *Early sweet Minnesota*, which should be sown later than the others; *Moore's Concord*, and *Russell's Prolific*, are three sorts I can also recommend (fig. 3).



Fig. 7—Early Jersey Wakefield.

They are all good, and the *Minnesota* very early, but its ears are small. I am, of course, speaking of corn for eating green. The *Mammoth*, however, ripens its seed, even below Quebec, but I do not think the others will.



Fig. 8—Drum-head Savoy.

from its shape, it is fitted for all sorts of soils, even for the shallowest. It is, really, the best of all the carrots grown (1).

(1) All right, but a few *early horns* should be sown for first crop. Soak the seed 48 hours (parsnips too) and, after draining, let it lie in a warm place till the white shoot is seen.

CELERY.—*Turner's dwarf white* is about as good as any (fig. 5). I recommend all who find that this delicious salad-plant demands too much space and care to try the *celeriac* (fig. 6). Its root is as large as a small turnip; the flavour full, and the flesh tender and crisp. It requires no earthing up, and in consequence, occupies little room. 100 plants may be grown where only 50 of the ordinary celery could find



Fig. 9—Lenormand cauliflower.

place. The root is the only part eaten, though the leaves give a good flavour to soups etc.

CHERVIL.—The curled variety of this potherb should be sown in every garden.

CABBAGE.—The *Early Jersey Wakefield* is recommended by all seedsmen as one of the best (fig. 7). Its principal good quality is that it heads well, which the other early ones do not (1). For ordinary late table use, there is no better sort



Fig. 10—Early white spine cucumber.

than the *Savoy* (fig. 8); it is large and firmly headed. Its keeping qualities are very superior (2).

CAULIFLOWER.—It is no use trying to grow cauliflowers unless the plants are put out into cold frames, and got well forward before they arrive at their ultimate place in the open air. The land must be very rich and well worked. The *Erfurt* does well as an early sort, as well as *Early Paris*, but they require great care. *Lenormand's short-stemmed* is



Fig. 11—Hubbard's squash.

late, but forms splendid heads, and lasts long in an edible condition. (Fig. 9).

CUCUMBER.—I have tried many sorts during the last few years, and I have come to the conclusion that the *white-spine* is the best. It is fairly early, the flesh is thick, the seeds few, it ripens slowly, and produces excellent gherkins for

(1) Try the *Early York*. A. R. J. F.

(2) The *St Denis* is hard to Beat. A. R. J. F.

pickling. (See fig. 10). It is very tender, and a large yielder. (1).

SQUASH.—The cultivation of the common pumpkin should be given up, now that we have in the squashes an excellent substitute, of the same family. One that possesses very superior qualities, *Hubbard's squash*, is praised by every one for the whiteness, the firmness, and the thickness of its flesh. It keeps as well as the best pumpkins, and is infinitely better than they for stewing, and for preserves of all kinds. (Fig. 11).

CRESS.—The common *curled-cress* I think as good as any of the pretended improved sorts.

HARICOTS.—*French beans*, in England, but, vulgarly, *beans* in Canada (2). For an ordinary garden, I give the preference to the *Early Mohawk*, for dwarfs; it is very hardy, and keeps tender for a long time, which is a quality wanting in many of the other sorts (3). For pole-beans, the *Lima* is one of the best. I treat of them here as gathered green, but the two kinds I have mentioned are equally good dried (4).

LETTUCE.—For those who grow salading in a hotbed, I advise the *Egg-lettuce*. For ordinary cultivation, the *cabbage-lettuce* forms a fine head, white and delicate (5). (fig. 12).

SWEET MARJORAM—*Summer Savory*, Thyme (common and lemon), with *Tarragon*, if procurable, should always have a place in the garden; not forgetting *Mint* to eat with roast lamb.

MELONS.—This fruit succeeds, as a rule, in the greater part of the Province, and I can advise its cultivation, if the plants are started in a hotbed, as far down as 75 miles below

(1) Canadian cucumbers are as bad as Canadian melons are super-excellent. The cause is the same in both cases—the sun. Even in England, the cucumbers are worthless after the middle of May, though they cannot, as a rule, complain of too much heat. Cucumbers, there, in February, are delicious, but when they want peeling, as they do all the summer, I would not give a farthing apiece for them. The melons, en revanche, are rarely as good as a well grown turnip.

(2) The real *bean*, or *five de marais*, is the English broad or Windsor bean. What is called here "câfé du pays" is the horse-bean. Mr Irving grows them every year at Logan's farm, and fine food they are, in moderation, for horses. A. R. J. F.

(3) French beans to keep tender, want, thick sowing, as do also pease. Neither of these most delicious vegetables are ever sown half thick enough, in this country. A. R. J. F.

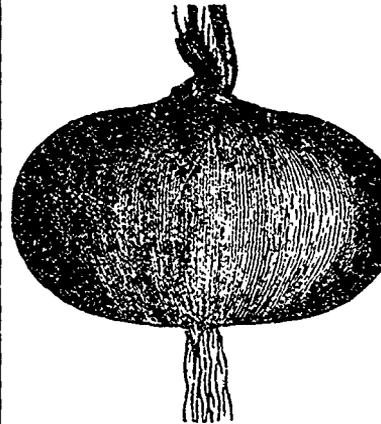
(4) If the runners are kept well picked off the climbers, poles will not be needed. I add to Mr Chapuis' list the fine flavoured old *Scarlet-runner* and the delicate *hatter-bean*. A. R. J. F.

(5) No one seems to grow the only lettuce worth eating—the *White Paris Cos*. They come to splendid size and quality here, and

Quebec, as I have seen there excellent ones. The easiest sort to grow, according to my experience, is the *Nutmeg*. It



Fig. 13b—Melon "Nutmeg"



Red Wethersfield onion.



Potato onion.

(Fig. 14).

best. The former won the first prize at the last Montreal exhibition.

EARLY POTATOES.—Some early potatoes should occupy

only want trying for ten days before they are as white as snow. I append a poetical recipe for salad sauce—as I quote from memory, I trust the ghost of Sydney Smith will forgive me if an error or two has crept into my version:

"Two mashed potatoes, passed through kitchen sieve,
Unwonted smoothness to the salad give.
The pounded yellow of two hard-boiled eggs
The Muse advises, and your poet begs.
Next, once with Durham mustard fill the spoon;
Distrust the condiment that bites so soon.
But deem it not, thou man of herbs, a fault,
To add a double quantity of salt.
Twice the full spoon with oil of *Lucca crown*,
And once with vinegar, procured from town.
Let onion atoms lurk within the bowl,
And, scarce suspected, animate the whole."

I am fond enough of onions, but the man who would join them to so delicately flavoured a vegetable as the *Cos lettuce*, deserves to be kept awake by indigestion. A. R. J. F.

(1) Not I, for the *White Round*, *Hertfordshire Mousetail*, or any white turnip, is, in my judgment, infinitely preferable. A. R. J. F.



Fig. 12—Cabbage-lettuce.

Fig. 13a—Melon "Casaba."

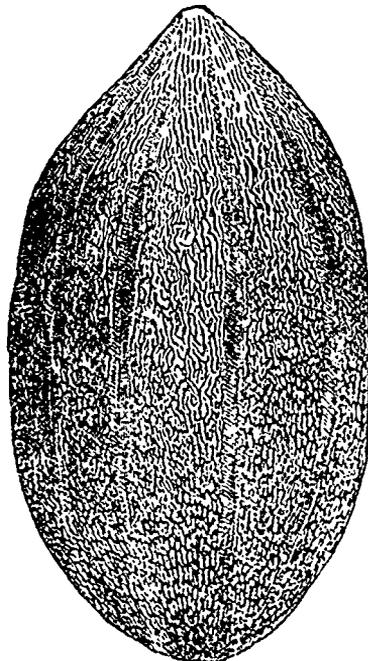


Fig. 13a—Melon "Casaba."

part of every garden. They may be put in at 18 x 9 inches



Fig 15 - Hollow crown parsnip | Fig 16 - Broad-flagged leek.

apart, and if never earthed up, they will be ready by the 21st June. The *Ashleaf Kidney* is the earliest, and is fit to eat at any size, whereas the *Early Rose*, as well as most of the other sorts, are not good till they are ripe.



"Blue Peter" pea.



"Champion of England" pea. (Fig 17).

LEEK. — A plant of the onion tribe. Very delicate in flavour, and far superior to the rest of the family as a flavourer of soups. The *Broad flag* is a good kind Grown on a hotbed, planted out in a shallow trench in rich soil, and earthed up.

PEASE. — Garden pease are divided, by seedsmen, into three varieties; very early, early, and late. As most gardens are too small to sow many pease in, I will only mention of the earlies, the *Blue Peter*, and the *Tom Thumb*, both of which are excellent. (See fig. 17 for "Blue Peter.") For second earlies, the *Champion of England* (fig. 17) has succeeded well with me (1).

TOMATOES. — The *Trophy* (fig. 18) is the best type of the improved kinds; and, though there are other

earlier ones, for flavour and firmness of flesh it is unsurpassed. *Hathaway's Excelsior*, and *Paragon* are also good.

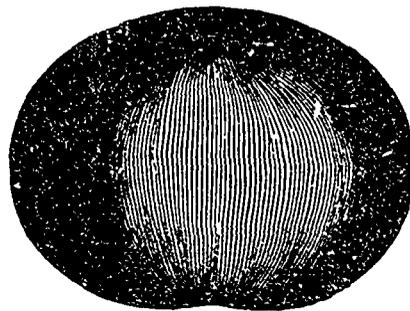
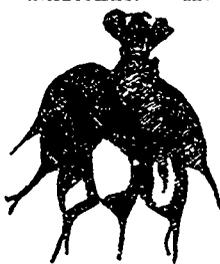


Fig. 18—Tomato "Trophy."

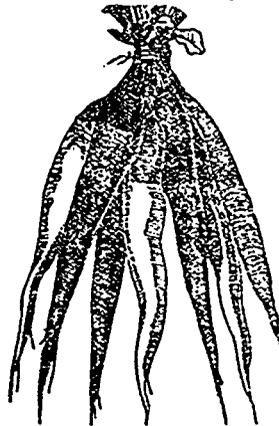
RADISHES. — An early and delicious vegetable. Of the numerous sorts, I prefer the red and white olive-shaped (fig. 19). The red round, and long red sorts (fig. 19) are both good. For winter radishes, the *Black Spanish* is excellent.



Red and white olive-shaped radishes.



Black Spanish radish.



Red and white long radishes. (Fig. 19).

RHUBARB. — It may seem useless to speak of a plant so well known to all (housekeepers as this is. I only mention it to remind my readers that *Myatt's Victoria* is the best.

This, I think, is about all. My list contains most of the plants that can be grown in gardens where there is a hotbed, and ordinary care is taken. I do not pretend to say that my list may not be altered with

advantage, but I am sure that the sorts I have pointed out may be cultivated with benefit to the household, and that is the task I undertook at the beginning of this article.

J. C. CHAPAIS.

On mixed Husbandry.

Much is said in this part of the country on the subject of raising stock, as being more profitable than raising grain, or dairying. Some contend that farmers should devote their attention entirely to the raising of young cattle, buying them when yearlings, and selling them when two or three years old, depending entirely upon hay for their winter's keep. Others contend that dairying alone without raising grain will pay the best, applying the manure as top dressing to their meadows.

(1) Mr. Myatt, who died about 1860, took the first bundle of rhubarb into London that had ever been seen there, and could not sell it.

(1) Dr. McLean is the best of the earlies. A. R. J. F.

As I am an advocate for a mixed system of husbandry viz. raising grain in connexion with dairying, I propose to examine the subject, and commit the result to the consideration of your readers. The great argument against the growing of grain and roots, is, that it requires so much expensive labour, which really is more in imagination than an actual fact, for no system of farming can be made profitable, unless sufficient labour is expended.

To arrive at a fair comparison between the two systems, without taking up too much space in the Journal, I will take the value of the produce of two farms, of one hundred acres each, at the end of the summer when most of the sales have been made, or the value of the produce ascertained. One a stock farm, the other a dairy and grain farm. The calculations I have made, are based upon the prices generally realized in this part of the country.

Suppose we take the stock farm and put upon it 40 yearlings, costing \$10 each, to be sold at the end of the next summer at \$20 each. The 40 head will require 60 acres for pasture, two horses must be kept, which will require 6 acres, 2 cows must be kept for the use of the family, 4 acres more; leaving 30 acres for hay. This will leave the value and cost of produce as follows:

RECEIPTS.	
40 head of 2 yrs. old @ \$20 per head.....	\$800.00
30 acres of hay, 50 tons @ \$8 per ton	480.00
	\$1280.00

EXPENDITURE.	
40 head of yearlings @ \$10 each..	\$400.00
1 man 12 mo. @ \$20 per mo.....	240.00
1 boy " 10 "	120.00
1 extra man haying	20.00
	780.00

Profit..... \$500.00

The dairy farm will require 60 acres for pasture, keeping 25 cows, 6 acres for a pair of horses, this leaves 34 acres for tillage. Deduct 2 cows, as on stock farm, for the use of family, leaving the product of 23 for sale:

RECEIPTS:	
2 1/2 cows, 180 lbs. of butter each @ 20c. per lb...	\$828.00
25 calves fatted and sold @ \$3 each.	75.00
2500 lbs of pork @ 6c. lb.....	150.00
5 acres of oat 200 bus @ 30c. per bus.....	60.00
1 " potatoes 150 bus @ 30c. per bus.	45.00
4 " turnips 2400 " " 10c. "	240.00
5 " barley 200 " " 75c. "	150.00
5 " clover 10 tons " \$8 per ton.....	80.00
5 " wheat 100 bus " 1.25 per bus.....	125.00
9 " hay 18 tons " 8 per ton.....	144.00
15 " straw.....	60.00
	\$1957.00

EXPENDITURE.	
1 man 12 mos. @ \$20 per mo.....	\$240.00
1 boy 12 " 10 "	120.00
1 extra man 5 mo. 20 "	100.00
1 man 2 m. harvest. 20 "	40.00
2 tons artificial manure for turnips and wheat.	80.00
Seeds	10.00
	620.00

Profit..... \$1337.00

It is easy to see that there are great advantages in mixed

husbandry over the stock-farm. In the first place, the tillage farm will produce, besides the grain and turnip-tops, 226,900 pounds of feed for the winter; and the stock farm will have only 120,000 pounds. More manure will be made, and the two tons of artificial manure will be equal to the manure the young stock will make during the winter they are kept over. Secondly, the land under tillage will be getting richer every year and that of the stock farm getting poorer.

By the above calculation it will be seen, that a family that costs \$600 a year would be supported from the grain and dairy farm, and have a handsome income at the year's end, while on the other farm, the farmer, with as expensive a family, would find himself in debt at the end of the year. It may be seen that a dairy and grain farm is more profitable than a stock farm or a grain farm; for it would be impossible to keep a farm in good heart without cattle to make manure, and it would be equally impossible to make our dry lands produce good pasture without the plough.

Pymary, on Husbandry in Ireland in 1618, quoted in Mr. Barry O'Brien's recent volume on the Parliamentary History of the Irish Land Question. thus reports: "Many English do not plough or use husbandry, being fearful to stock themselves with cattle or servants for those labours, neither do the Irish use tillage, for they are also uncertain of their stay. So, by these means, the Irish using grazing only, and the English very little, were it not for the Scotch who plough in many places, the rest of the country might starve. Melbourne, 18th, March, 1881.

AYLMER.

OUR ENGRAVINGS.

The Boar, Berkshire of course, is the property of Mr. Phaneuf, St. Antoine, county of Verohères. It is of the modern style, as witnessed by the nose and forehead. There is a tendency, in England, to revert to the ancient type of Berks-shires; the nose longer, and, its usual accompaniment more lean meat. The bacon-curers absolutely refuse to buy hogs that very likely would win prizes at any show.

The Ram, whose neck is worthy of remark, is also the property of Mr. Phaneuf, and is a good representative of that hardy breed of sheep which has existed from time immemorial on that elevated table-land, the Cotswolds; or, as they were called in Shakespear's time "Cotsale." See *The Merry Wives of Windsor*: "Slender.—I hear your fallow greyhound was outrun on *Cotsale*, Master Page." The name is derived from the *cotes* or *cots* in which the sheep were kept at night, under an idea that the heat caused by their number improved the texture of the wool.

The vegetables explain themselves.

Bone Manure and Phosphates.

What attention I have given to the use of bone manure has led me to the conclusion that this fertilizer is often hastily and unjustly condemned. It differs in some respects from other manures, and this difference in its effect is not sufficiently considered. More than other manure, it is of a nature to remain where you put it, losing little by washing, its nitrogen being taken up readily by vegetation. This is its principal property, which gives name to it, retained until removed by the plant, which is sooner done when reduced to a fine condition, and in a soil that requires it. It is also of a nature requiring exclusion from the light if its best effect would be obtained. All this must be considered, and the more as it takes years before the full benefit is derived. In the meantime allowance must be made for the weather, which, in its changes, has an important bearing upon it. Should there be much drouth, the period of its continuance in the soil would be ex

tended, and the effect for a given time lessened, because it is slow to dissolve; hence, in dry weather, it is inactive. What adds to this is its place in the soil, at the surface, where the drying winds have a direct effect upon it. To apply it in the spring, with a dry season to follow, is to get comparatively little effect from even the best brand, if left exposed at the surface. We see this where applied to grass lands, or fields sowed to grain and left uncovered, thus exposing it more directly than where the grass shades it. To pass judgment upon it under these circumstances, without making due allowance, is to condemn what may be a good article and adapted to the soil.

To pass the harrow over it on sowed ground is a help: to harrow still more is a greater help; to pass the cultivator over lightly is the best of all. This gives it moisture and darkness. It is for this reason that drilled in with the grain, it has a better effect than if sown broadcast, or scattered along on the surface of the drill. It is perfectly safe an inch or two, or even more, in the ground; better, if well distributed or mixed with the soil to that distance. If applied on grass and given a coat of fine earth, say half an inch thick, the effect will be wonderful on land that requires it. I have tested it with road dust well charged with horse dung, with good surface soil, and with raw earth that was worthless. There was some difference in favor of the road dust, no doubt on account of its dung; and its finer reduction making it more compact. But the raw earth did finely, and the effect where covered was maintained more or less during a drouth. I know, from former careful experiment, that a coat of earth, or sand, or even gravel, will thicken the grass for awhile without phosphate, or any other manure.

In my experiments with reduced bone I have made due allowance for the effect of the covering. In the one case it lasts less than the season through, if applied early; in the other it extends to the third season, and longer if coarse-grained. Covering may in a measure be done with the harrow where

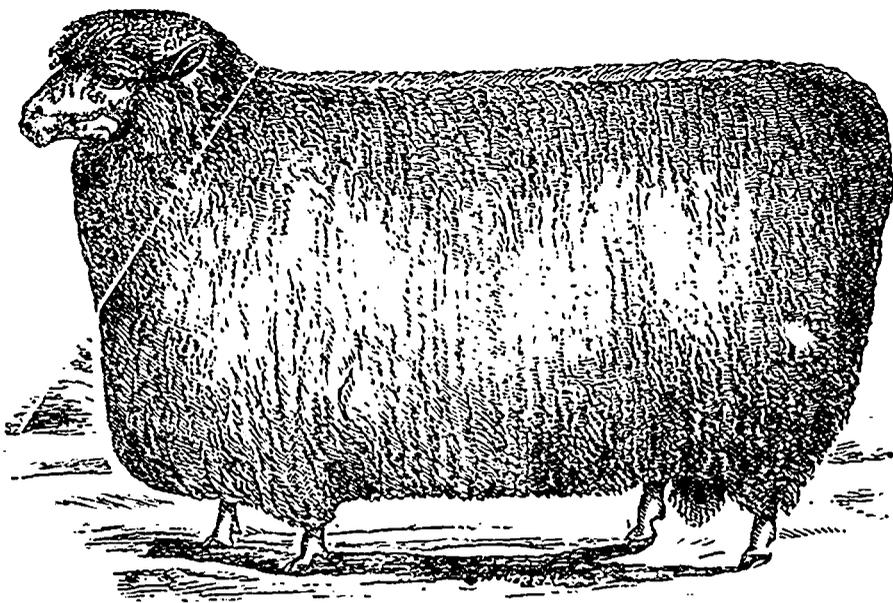
grass lands are somewhat run out and the soil favors phosphate. This should be done in the fall or early spring. When not followed by the harrow on grass lands this fertilizer should always be applied in the fall so as to get the benefit of the frost acting on the soil, burying it, the moisture also dissolving it to some extent, which favors an early start of the grass. It probably would be an advantage also on plowed ground intended for a spring crop, harrowing before the phosphate is applied. In using this manure, the aim should always be to

secure moisture and exclusion of light; and the two are obtained by covering it.

From all this and more that might be said, is it a wonder that we should hear of complaint about this manure? And is it not clear that much of this is unjust? A fair test has not been made. I am inclined to think the phosphates are adapted to more soils than they generally get credit for. Those who use them with little or no apparent effect at first—drouth or exposure the cause—are not apt to carry their observation much further, and so fail to note the future action which may occur, this fertilizer being well known for its extended effect, greater sometimes the second than the first year should a



BERKSHIRE BOAR.



COTSWOLD RAM.

drouth chance the first year and moisture the second. We cannot form correct conclusions if we ignore the influence of the weather, even when the phosphate is covered, as drouth easily extends through the thin coat, arresting thus the action of the manure. It is putting it on the surface, exposed to the light and getting the effect of every drying wind, that, to a large extent, gives to this fertilizer the uncertainty it possesses, and in which it differs from other manures. From this it is to be inferred that it is more effective in a moist than a dry

season, and adapted to a moist climate. — *F. G., in Country Gentleman.*

Special Fertilisers.

There is an opinion quite prevalent among farmers that special fertilizers act as a stimulant upon the soil, bring out its latest energies and leave it after a while poorer than before. No opinion could be more erroneous than to suppose that there is any such a thing as stimulating the soil. Stimulants owe their effects to their action upon the nervous system, bringing out the latent or reserved power of the body, sometimes exhausting it to that extent as to destroy life; but the soil has no nervous system, and plants receive no food through stimulation. A certain amount of heat and moisture does sometimes seem to stimulate growth—it would be better to say accelerate it. Heat and moisture hasten the preparation of plant food; they accelerate the decomposition of the minerals in the soil and quicken the flow of the sap, and heat causes the water of the sap to evaporate faster through the leaves. The more rapidly the plant grows the faster it draws the elements of fertility from the soil, and thus, by making a rapid growth, it hastens the exhaustion of the soil. The difficulty with which we in New England have to contend is this: We can draw the fertilizing elements from the soil three times faster than the earth can give them up.

There are few countries where vegetable growth is more rapid than in New England. In six weeks, winter rye will grow so that a quarter of an acre will furnish feed sufficient for ten cows for a fortnight. As soon as that is taken off corn can be planted, and by the first of August from twenty to thirty or forty tons to the acre of green fodder can be taken off. Again, on the same piece of land barley can be sown with winter rye, and in October another crop of green fodder can be taken off. Thus the climate produces three crops in a season, but the soil unaided would not produce one of these crops, and so, knowing the capacity of climate, we go to work to make the soil equal to it. Our first effort is to apply our barnyard manure, but here we find the quantity to be unequal to the task, and man's inventive genius is taxed to produce other material to bring about the desired result. Guano was largely used, and found to be what was desired, but after a few applications it was found that the soil could not produce the required crops even with this assistance, and it was charged with having stimulated the soil, and thus exhausting it. The fertilizing elements contained in the guano were exceedingly soluble, and the plants fed rapidly upon them, but guano did not contain all the elements required by the plant, and these were rapidly removed from the soil. This being left exhausted of one or two elements, it was the same as though all had been removed, and it was barren even though guano was added to it.

Again, the charge of exhaustion was urged through stimulation, but it was really exhaustion of material, because the different elements were not duly proportioned to the wants of the plants. Then superphosphate was tried. This contained but one leading element, although two others were present, sulphate of lime and nitrogen in the form of ammonia. These produced large crops so long as other elements of food lasted in the soil, but when these were expended, then again the cry went up: "Exhaustion through stimulation." The only stimulant was the climate, which used the materials faster than they were supplied. The best way to furnish all the elements necessary for the plants according to the capacity of the climate for producing growth, is to use large amounts of decayed vegetable matter, either in the form of barnyard manure or some other material, then use in connection phosphate of lime and potash, and to this add a great amount of culture. Were

we to plow twice where we now plow but once, and harrow twice or three times, and use the cultivator as much as now, we should greatly accelerate nature in furnishing material from her laboratory. We must bear in mind that while we have a very sterile soil, on account of decomposition going on so slowly, we have one of the most productive climates in the world. While Great Britain has a much more fertile soil, much better cultivated and more highly manured, yet her climate is not nearly equal to ours, in productive capacity.

We may have an idea of the climate in some sections of England from the fact that at Oakworth House they cannot produce peas before August, in the open air, and early Mohawk beans have to be grown under glass. From this we may learn something of what they have to contend with on account of the climate, while our contention is with the soil, both of which tend to develop the energies of those who live by its cultivation. It may also appear strange to some that we should claim that there is more moisture in New England than in Old England, but such is the fact. The rainfall in this country is the greatest, but the mother country has a more moist atmosphere, which sometimes retards growth. Vegetation throws off moisture rapidly on a hot, sunny day; on a cloudy day less water is evaporated, and on a foggy day scarcely any. The more rapidly the sap permeates vegetation the faster it grows, and the more water is given back to the atmosphere. Old England has more cloudy days than we, and fewer hot days. It is true that one rarely or never sees vegetation wilt there as it does here, but that is because the water passes so much more slowly from the plant.—*Ex.*

STEEL WIRE FENCES.

The advertisement of Messrs. Ives and Co. is worthy of the attention of our readers. It is admitted by every one that wire fencing is the least costly and the most easily kept up of any kind of enclosures where wood is scarce. The large engraving (No. 1) explains itself: the posts need be no stouter than for the ordinary rail-fence, and they may be placed 18 feet apart, since *the cattle will not use them as rubbing posts*. In fact, the points attached to the wire are so sharp that the animals soon learn to respect them. The sizes of the wire are named in the advertisement, and the points are 7 inches apart.

For line fences, or along the line road, we recommend four wires, at from 8 to 10 inches apart according to their place above or below in the fence. A good plan is to plough two furrows, one on each side of the proposed line of fence, before setting the posts. At the beginning of the fence, and at every 60 yards afterwards, a stronger post, strengthened by a diagonal support well sunk in the ground, should be placed. The engravings show how fences of from three to five wires are made. Fig. 4 represents, exactly, the cramp by which the wires are fastened to the posts; and fig. 5 shows the lever or crow-bar used to tighten the wires. The crow-bar is of solid iron and may serve for many purposes; it costs about \$1.50. The wire varies in price, but it is about 10c. a pound, by retail. Twelve pounds are about 60 yards in length, so a three wire fence or a four wire fence will take 36 pounds or 48 pounds, respectively, to extend that distance.

We intend to enclose several acres with these fences, in the spring, and we mean to try live willows for the posts. One great advantage of the fence is that, being hardened and double, the wire will not contract as with single wire, which causes many a break. The points keep the most perverse animals at a distance, and ensure their owners' fields from all visits from his neighbours' cattle.

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Fig. 1.

**CORRESPONDENCE.
LUCERNE OR ALFALFA**

SIR.—As seed time is approaching, and farmers are laying out their plans for this year's operations, I wish to call their

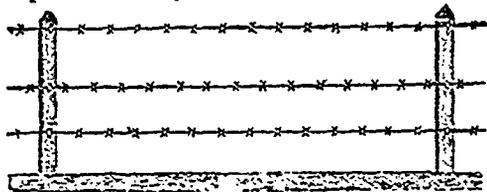


Fig. 2.

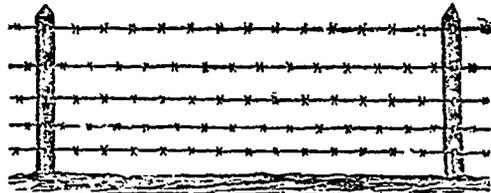


Fig. 3.

attention to a forage plant which unfortunately is but little cultivated, on account of its value not being sufficiently known. After a very satisfactory trial of three acres of Lucerne, I can

safely recommend it, feeling certain that, if it receives any thing like fair play and is treated as I am about to direct, every one who tries it will find it not only a profitable crop, but one particularly serviceable where pasture is limited.

The Alfalfa of California, derived from Chili, is simply the Lucerne of Europe, differing in habit of growth, as a result of difference of soil and climate. If not the best, it is certainly one of the choicest of fodder plants, because it continues to yield for many years without being renewed, and affords three or four crops in a year. It is a favorite forage plant in France and Germany.

Cut it when it has been in bloom for about eight days. It makes hay of good quality for stock of all kinds, but especially for milch cows, and is said to be superior to clover; increasing both the milk and butter, and improving their flavor. In using it in a green state, care should be taken not to give the animals too much at a time, especially when it is moist, as they may be hoven, or blown, with it, in the same way as with clover. Cows taken from ordinary grass and pastured on Lucerne will, it is said, increase in their yield of milk and butter more than 25 per cent.

Its very prolific and rapid growth renders it specially

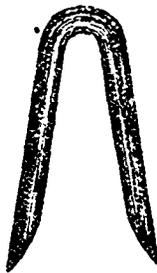


Fig. 4.



Fig. 5.

adapted to regions subject to continued hot and dry weather, as, after being cut, it very quickly shields the surface by a thick green coat, and, from the astonishing depth to which it sends its carrot-shaped tap-root, which has been known to go down to 12 and even 20 feet below the surface, it finds moisture when other plants would die. It will not thrive in a compact clay soil, or in any shallow soil with a hard-pan subsoil.

It can either be sowed broadcast or drilled in, but, if the land is not thoroughly clean, the latter mode would be decidedly preferable, as it admits of careful culture until the crop is able to displace the weeds.

The quantity of seed to the acre should be from 20 to 30 lbs. I sowed 25 lbs, and did not find it too much. Thin seeding results in coarse stalks, invites weeds to compete for the mastery of the field, and exposes the surface to the influence of the hot sun and drying winds; while thick seeding operates as a preventive against all these evils. The price is about 35c per lb.

The directions for cultivation are : plow deep, harrow mellow and fine, brush the seed in, and roll with a medium weight roller. The seed should not be covered deeply, but at the same time be well covered. If the above directions are carefully followed, and the field receives such subsequent treatment as any good pasture or meadow ought to receive, it will probably not require to be re-seeded for twenty years. When it has made a good stand, cut it, but do not draw too hard on it : the first season, two crops should satisfy. After this, you may safely increase your demand, cutting as often as it makes a fair stand ; bearing in mind, however, that some return should be made in the form of fertilizers, or by a top dressing of farm yard manure. It may be sowed down with a light crop of oats to furnish shade for the young plants.

I need hardly say that no farmer should think of trying this crop, unless he is prepared to give it a piece of good, rich, clean land. A field in which green crop had been raised the previous year would do well.

Yours, &c,

J. M. B.

Elmhurst, March 14th, 1881.

A full description of the mode of cultivating Lucerne may be seen at p. 21, vol I, of the Journal. Thirty five cents a pound for the seed is at least ten cents more than it ought to cost, and I have always found 20 lbs. an acre quite enough, if the land is really well prepared.

A. R. J. F.

How to cure rennets.

We have to thank Mr. J. B. Harris, of Antwerp, N. Y., for the following important article, on the curing of rennets. Mr. Harris is the Instructor selected and employed by the Eastern Ontario Dairymen's Association, in the making and curing of cheese, and his opinions carry much weight.

First—A rennet that is taken from a calf that has never been suckled or fed is rank poison, and should never be saved. The calf should be at least three days old before killing. (1) They are usually in their best condition when the calves are from 5 to 10 days old, but they do not vary much in strength so long as the calves live entirely on milk. As soon as they begin to live upon solid food, the strength of their stomachs, as rennets, begins to abate. The stomachs of calves five days old are generally preferred by cheesemakers to those of older or younger.

To obtain the best rennets, the calf should be allowed to suck or be fed a moderate meal 12 hours before killing. It is a good way to give the last meal at night, and kill the next morning. 15 hours is not too long, but in going too long without being fed, the stomach becomes inflamed and congested with blood, giving them a dark reddish appearance, and the disturbed condition thus

(1) Good heavens! Surely, with our animals in such demand in England, the practice of breeding calves which are not worth rearing will not exist much longer.

A. R. J. F.

occasioned is carried with the steepings of the rennet into the cheese and affects it very unfavorably. The calves should live till the curd from their last meal is nearly dissolved, and no longer. As the curd disappears the coagulating agent accumulates, not in the juices of the stomach, as might be supposed, but is deposited on the inside of the stomach, forming a delicate coating, faintly flesh color and very tender, which breaks off in thin flocculent scales upon slight friction.

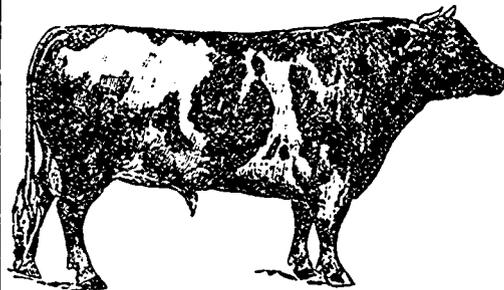
As this coating contains the concentrated strength of the rennet, it is desirable to preserve as much of it as possible. To this end, the sack, when taken from the calf, should be handled with great care. The contents should be emptied out carefully, sack turned inside out, and any specks of dirt or hairs that may appear on it, picked off. If further cleaning is necessary, it may be carefully wiped with a moist cloth; water should never be used in cleaning. When sufficiently dried and lightly salted, it is ready for drying, which may be done in any convenient way, so that it shall not waste by dripping or injure by tainting. It may be stretched on a crutched limb, its ends may be tied and inflated, or it may be cut open, and laid on a dry board, which will aid in drying by absorbing its moisture. These modes of preserving are very much better than salting in pickle, or filling with salt.

If exposed to too much heat, rennets lose strength quickly; 120° F. heat will kill the strength entirely, therefore they should never be dried on plates or tins round the stove.

J. B. HARRIS.

SPLENDID AYRSHIRE CATTLE.

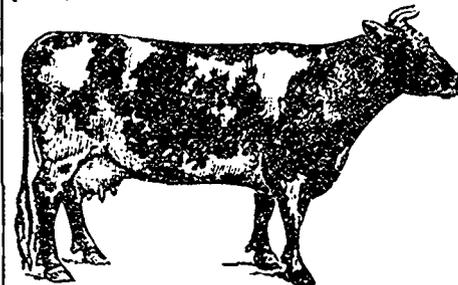
Lately, we had the pleasure of inspecting the fine herd of Ayrshires, belonging to the Hon. Louis Beaubien, Outremont, Montréal. Our engravings are no fancy portraits



but represent faithfully two of this herd which have taken more than one first prize at our Dominion and Provincial exhibitions.

The bull, Frontenac, appears to us a perfect type of his kind. He is in a thoroughly healthy condition, and is kept full of activity and procreative power by the simple plan of employing him in carting all the season.

Mr. Beaubien cultivates with skill, and therefore with profit, a farm which would have resisted the best efforts of



most agriculturists. All the energy which he so well is known to possess has been necessary to conquer the obstinate nature of the soil. But by blasting rocks, by draining, by cul-

tivating root crops, he has succeeded in converting it into a perfect garden.

We heartily recommend our readers to visit Mr. Beaubien's establishment; and, if any of them require breeding stock, they had better make haste to obtain them, as the herd is much sought after, and the sales are so numerous that in a short time the choice of animals will be very limited.

"The Coming Sheep."

Pray let us have this wonderful sheep without further delay, as competition is the life of business, and if the Hampshire is as good as you think him to be, some of us are very much mistaken,—in referring to your last issue I find the following: "There he will see lambs which present you with a pound weight per quarter from the day they were born."

Now, Sir, the conclusion that we must come to, if this be the case, is this: that if we go to Salisbury we can see lambs that at 90 days old would weigh 360 pounds.

I must confess that although I have seen in England some of her best sheep, and am well acquainted with most breeds, yet it has never been my good fortune to meet with any, coming to this wonderful weight, that is, in the time you mention, indeed it makes me wonder why England should require to import either beef, mutton, or pork, if she can raise such quantities of mutton in so short a time, but I have no doubt you will enlighten us, poor Canadian farmers, as to the way these sheep are raised.

Now, Sir, for the last thirty years I have been more or less connected with sheep raising, and therefore presume I know a very little about it, though perhaps only a little.

20 years ago, it was our practice to get a Hampshire lamb to use on Leicester Ewes, for lambs for the butcher, and they did well. I once bought 60 Shropshires Ewes, thinking to do better, but did not repeat that experiment, up to that period. I had never tried the Shropshires, but now having been an importer and breeder of Shropshires for some years past, I say most confidently, that they are not only the sheep for Canada for to day but for the future, especially if we wish to improve our sheep for the requirements of the English market. The Hampshire requires more feed than the Shropshire, and I think it is generally admitted by those best acquainted with the subject that three Shropshires will live and thrive on the same food that would maintain two Hampshires.

I cannot but notice the style in which you speak of the two breeds, which already shows that you would write up the Hampshires, and down with the Shropshires, but if that is your intention, I hope you have "good staying powers" as you are clearly in for a "big thing." Referring to the Journal of last September, you say: "I wish he would get a flock of Hampshire downs;" then immediately after, in speaking of Shropshires, you say: "a fine useful breed of sheep, but as farmer's stock, inferior to the Hampshire"

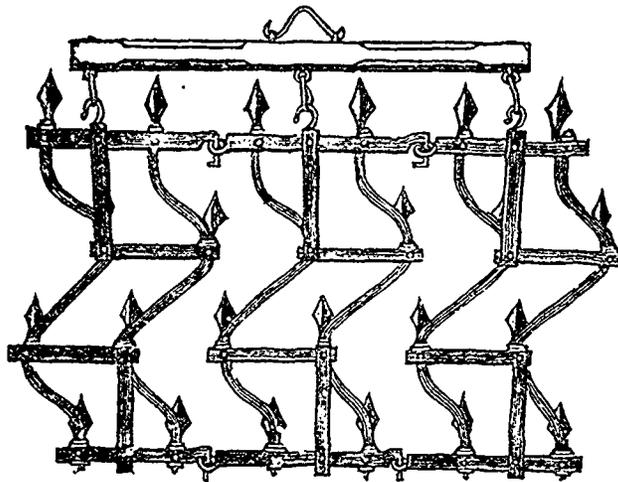
And pray, Sir, in what way are they inferior? You say also in the same number, page 76 "that at the last Smithfield Club Show, lambs weighed 33 pounds the quarter." You also repeat this statement in the March number, with the addition of the lambs being 9 months old; if my memory does not betray me most of the Hampshire and other black-faced lambs are dropped long before March, some before Xmas, some even earlier than that, and the lambs that come to the weight you mention, must not be thought to have "picked about" for a living but are well fed with grain and cake, right along from the time they are three weeks old,—in speaking of prices paid for Shropshires during the last year you mention one Ram being sold for £160 sterling, (or nearly eight hundred dollars of our money) but state it was an exceptional price. Here I think you are in error, as I find from the published list, three that made that price, and several made £100 each. It may be true that the Hampshire lamb would for a short time gain more rapidly than the Shropshire, but if the two were kept on the same food until two years old, and that the fare of Canadian sheep generally, I know the Hampshire would look very like a section of a rail fence, while the Shropshire would look, and be, a handsome, compact, thrifty sheep. Indeed he is one that can get

and earn his own living anywhere. If the Hampshire has all the cake, meal, grain, and roots he can eat, he is a good sheep, if not I say he is not half as good as the Shropshire for Canada.

Professor Sheldon says: "It appears to me that Shropshires and Border Leicester are calculated to improve the flocks as Short-horns are to improve the herds of Canada;" and in looking over the report of the Ontario Agricultural College and Experimental Farm for 1880. I find that they have introduced the Oxford Down, the South Down, and the Shropshire Down, but I do not find any mention of the Hampshires. Surely they cannot know that a Hampshire lamb would weigh 80 pounds when 20 days old. If you will tell us how we can do this, I shall be glad to learn, meantime I say: "Shropshires for ever."

Shropshire, North Hatley, P. Q.

Drag or Scarifying harrow.—Once more we beg to draw the attention of our readers to an implement of which we have before made mention (p. 34, vol. 2, French Journal) and which should be employed by every intelligent farmer. With this it is as easy to work the seed into the autumn-ploughed as in to the spring-ploughed land. The couch-grass and other weeds are easily eradicated by it, and brought under the influence of the sun and wind they quickly perish.



Where land is difficult to work, the drag-harrow is indispensable. We can honestly recommend it. Messrs. R. and W. Kerr, 57, 59 and 61, St. Joseph St., Montreal, whose advertisement appears elsewhere, offer these implements for \$16: cheap enough, as they are made of the best steel and iron, and must therefore be very durable.

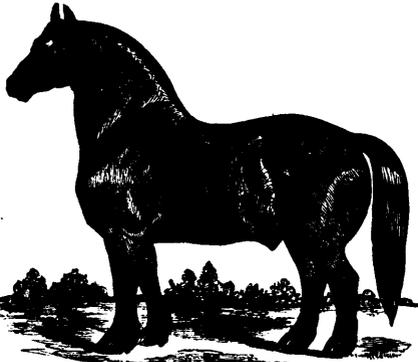
NOTICE.

The Honorable M. H. COCHRANE begs to inform the Agricultural Societies that, about the last of June, he will receive 10 or 12 Young Hereford Bulls, from 10 to 13 months old, which he will be disposed to sell at \$200 each, a price which barely covers the cost of purchase and importation. Also two valuable Clydesdale Stallions, just arrived; a bay, 3 years old, and a black, seven years old, each weighing about 1900 lbs. They will be sold at reasonable prices to Agricultural Societies.

For particulars apply to

JAMES A. COCHRANE, Comptroller, or
D. McEACHRAN, Montreal.

FOR SALE—ONE TWO-YEAR OLD BULL, one yearling bull, and a number of bull calves, from the best milking strains.
PURE-BRED BERKSHIRES.
A number of this spring's pigs, ready for delivery in May and June next. Price: \$5 each.



The imported Clydesdale Sauton "**Premier**" will be sold by auction, at the farm of the subscribers, on the 30th April instant. For particulars, apply to **DAWES & CO.,** Lachine, P. Q.

FOR SALE.—A THROUGH BRED JERSEY Bull Calf, from an imported cow and a good milker. On reasonable terms. Apply to **H. STEPHENS, JR.,** St. Lambert, Q.

GRAPE VINES.

In order to encourage the planting and testing the best of grape vines for this province, we have been enabled, by one of the best grape vine growers in the United States, to make the following very liberal offer. **ON RECEIPT OF ONE DOLLAR,** we shall send by mail, carefully packed and post paid, any three of the following well grown 2 year old vines, viz:

White grapes—Allen's Hybrid, early; Martha, early, sweet, hardy; **Red grapes**—Agawam, early, large; Brighton, early, best quality, new; Delaware, early, best quality, hardy; Northern Muscadine, early; Perkins, foxy, hardy, productive; Salem, early first quality, good keeper. **Black grapes**—Adirondack, early, sweet, tender; Barry, early, large, good; Creveling, early; Concord, early, large, good; Cottage, early, healthy and hardy; Eumelan, early, hardy, best quality; Herbert, early, good, valuable; Hartford, early, good, valuable; Isabella, early, sweet, compact clusters; Jamesville, early, very hardy and productive; Talman or Champion, extra early and hardy; Telegraph, early, hardy; Wilder, early, large, good. Or one of such at the following prices: **Moores Early,** new black, very early, \$1.25. **Prentiss,** new white, early hardy, \$2.00. Apply to **ED. A. BARNARD,** 10, St-Vincent, Montreal.

THOROUGH BRED SHORT-HORNS, AYRSHIRE CATTLE, and **Berkshire Pigs,** all from imported stock, and entered in Canadian and American herd books. For sale, cheap, by **JOHN L. GIBB,** Compton, P. Q.

MONTREAL HORTICULTURAL SOCIETY and Fruit Growers' Association of the Province of Quebec.—All persons desirous of becoming members of this Association (not resident on the Island of Montreal) may do so on payment of an annual fee of **One Dollar.** The payment of this sum entitles the member to a copy of the Illustrated Annual Report issued by the Society; a ticket of admission to the Annual Exhibition, and he is also entitled to compete for any prizes offered by the Society without any further charge for entry. All persons subscribing for the present year will receive a copy of the Illustrated Report just issued **gratis.** **HENRY S. EVANS,** Sec.-Treas. P. O. Box, 1976, Montreal.

WE CONTINUE TO GROW YOUNG APPLE- trees for sale. We shall have nearly ten thousand trees for sale in spring, amongst which are 30 varieties, and we hope to be able to satisfy the taste of our customers. **P. SIMON LACOMBE,** Côte des Neiges, Montréal.

FOR SALE THROUGH BRED AYRSHIRE Stock, and Berkshire Pigs. Address: **MR. LOUIS BEAUBIEN,** No. 16, St. James Street, MONTREAL.

G. M. COSSITT & BRO.—MAKE THE BEST MOWER, and SINGLE REAPER.—Try them and see Illustrated catalogues, free.
Address **R. J. LATIMER,** COSSITT'S OFFICE 81 MCGILL ST. Montreal

ABBOTTSFORD NURSERIES.—A LARGE Stock for spring planting of First class Fruit Trees and Vines. Suited to our various soils and climate. Orders filled at Nursery Prices and forwarded by express. Purchaser paying express and packing charges. Catalogues free on application.
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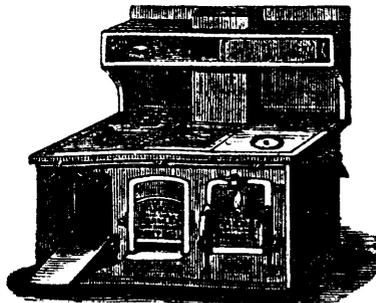
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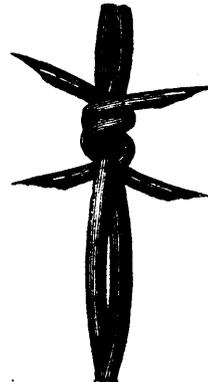
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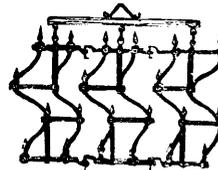


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