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The Illustrated

JOURNAL OF AGRICULTURE

THE ILLUSTRATED JOURNAL OF AGRICULTURE is the official organ of the Council of agriculture of the Province of Quebec. It is issued Monthly and is designed to include not only in name, but in fact, anything concerned with agriculture, as Stock-Raising Horticulture, &c., &c.

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Table of Contents.

THE ILLUSTRATED

Journal of Agriculture.

Montreal, March 1, 1897.

The Farm.

SUPPLEMENTAL CATCH CROPS.

To be forewarned is to be forearmed—Certainty of poor grass this summer—Turnips, &c.—Fodder-crops Grain and pulse—Clovers—Rye—Maize,&c.—Not to graze meadows.

The advantage of planting forage crops, to supplement our pastures and meadows, cannot be too strongly or too frequently insisted upon. The peculiar state of the weather during the early part of this winter will make the practice the more necessary, the land remained until lately without its usual protective covering of snow, and the grass lands, especially where they have been closely grazed, must have suffered from exposure to the severe cold which occasionally prevailed: alternate freezing and thawing is a more destructive condition than long continued frost. (1) Short grass crops will necessarily be the result, and consequently a lack of sufficient forage for next Fall and winters supply. It is fortunate that we have the means within our power of overcoming this difficulty in a great measure, namely by planting some extra catch crops. We might also, in view of the situation, increase the area of our root crop. White turnips grow very quickly and certainly in friable, well tilled soils, and yield 6 per cent of albuminoids, so that they are by no means deficient in nutritive quality. Yellow Aberdeen and Tankards grow rapidly, keep longer, and are a little more nutritious.

These will be found very useful for stock in the late Summer, Fall, and early winter, while swedes, mangels, and carrots give us a good supply throughout the winter.

But now let us turn our attention more particularly to what are usually called green fodder crops, to be consumed either in a partially ripe state or made into hay—not ripened for seed—of these the following are the most important. Vetches, being of slow growth at first should be sown early and on a piece of well enriched land, and if a few oats are scattered amongst them, they will give a most valuable forage to cut a small portion of daily and feed to the stock, which will thrive on it famously, especially horses when busily working at the harvest. Field peas with a mixture of oats, barley or rye, also make an excellent forage crop to be cut and fed in a green state, while what have not been thus consumed can be cut just as the peas begin to harden in the pod, and cured as hay. It will however be necessary to take care that the haulms are well cured and quite free from moisture when stored, and a perfect dry place for storage should be chosen, otherwise they will mould quickly and will be useless as fodder. Clover not only improves poor land, by its wonderful property of accumulating nitrogen, but gives two and even three cuttings of excellent feed. The importance of growing clover in good quantity is sadly overlooked. All the leguminous plants, vetches, peas, beans, lucerne, sainfoin, the clovers, are all of the greatest consequence in the economic management of the farm.

Lucerne,or Alfalfa, is a valuable forage plant in localities where it will grow, the roots are perennial, and after the plants are well established it will give several crops during the year.

The cereal or grain crops can be made useful for forage purposes. Rye, if sown early, will give a good quantity of useful feed in the autumn, and the following spring it can be used when quite young, green, or if cut before its grain is ripe, and cured, will make dry forage, not much inferior to Timothy hay.(1) Barley and oats may be used in the same manner, except that they must be sown in the spring. Every farmer should notice and study which of those will best suit his soil and locality, and not sit idly down and miss his opportunity of growing stuff wherewith to feed his stock in a scarce season, instead of having to buy food for them or let them starve as some improvident and cruel ones have been known to do.

Indian corn is very useful as a forage crop, though there are some who have a prejudice against it, for the want of knowledge and experience, for the different kinds of ensilage corn can be grown in any part of the Province of Quebec. I saw some patches on the Gaspé coast last Autumn which, notwithstanding the shortness of their season, was fully grown and sufficiently matured for forage. The prejudice in the minds of some is no doubt caused by their not paying due attention to the cultivation of Indian corn.

Forgetting that it is a large-growing tropical plant, they sow it broadcast thickly and then it is not much better for fodder than reeds or rushes. Now, if it is to yield a satisfactory crop, it must be planted at such a distance apart as to allow each plant to get all the air, sunlight and moisture it requires for its proper development, and then it will produce an abundance of rich luxuriant leaves, succulent stems, and nutritious ears. Even if no ensilage is made, this will be found an excellent crop to cut and feed out to the cattle as soon as the pastures begin to fail and throughout the Autumn; by its use we can keep our cows thriving and milking well and in good condition to go into their winter quarters, and although its nutritive ratio is not so great as other crops, the abundance which will be produced on an acre of properly cultivated corn will compensate for this. I remember sometime since seeing an anecdote which is so appropriate to this subject that I intend to quote it although it may be "A chestnut" to some.

A farmer's son, who was not very industrious, conceived the idea that preaching would be easier than farming. There was a conference of the Presbyterian Church being held, so the young man went to the conference leader and told him he thought he had had a call to the ministry and sought his advice. The leader being rather doubtful of his real motives, asked him how he knew this? He replied after a little hesitation, that he had dreamed that he saw a large ring of fire in the sky in the centre of which were the letters "P C" he said he construed this to mean: Presbyterian Conference; hence his visit. The leader knowing his proclivities replied: "My dear young man, you never made a greater mistake, those letters meant. "Plant Corn". I have thought often that if some of our careless indifferent to their own interest, or prejudiced farmers could have the "P.C." vision and interpret it as did the Presbyterian Divine at a time like this, when scarcity threatens them, it would be a blessing to themselves and to the poor dumb animals in their care if they regarded the admonition.

P. S.—Another great advantage of having an abundance of forage during a scarce season is that it will save us the temptation of turning out our stock to graze our meadows after mowing; a most pernicious practice,especially in this climate, where the protection of the aftermath for the roots of the grass in winter is of such great importance.

GEORGE MOORE.

Then, how do the closely mown lawns in Sherbrooke street,Montreal, retain their verdure? Never graze timothy, on account of its bulbous habit of growth, but as to other grasses, clovers, etc., we do not think feeding them off in the fall is likely to do much harm. Orchard grass certainly does not suffer by it. —Ed.

(1) Doubtful.—Ed.

IN COMPETITION—MONTREAL EXHIBITION.

First prize, Exhibition, Montreal, 1896.

ON THE BEST METHOD FOR THE DESTRUCTION OF WEEDS.

The weeds of this Province are chiefly Wild vetches, Wild mustard, Wild Buckwheat, Nettles, Barngrass, Burdocks, Thistles and Daisies. These being the best known, I will confine myself to their consideration.

I advance upon the theory that the reason that weeds continue upon the land, is because they are allowed to seed. That the seed is ploughed into, or otherwise buried in the soil. That near the top of the ground the seeds grow. That underneath that certain depth, they germinate, but so feebly, that they cannot take root. Underneath that again they decay. But at a certain depth, they remain preserved intact, and ready for their duties, when brought sufficiently near the surface; these different results being caused by the different amounts of air, heat, etc., coming into contact with the seeds, at the different depths.

Every farmer of experience has seen a meadow clean of weeds, which when ploughed, was soon covered with a thick mass of nettles, barngrass, and other weeds, the only explanation being, that these being of early maturity, dropped their seeds before the field was harvested, the next ploughing buried the seed, deep in the ground, and the last ploughing brought them to the surface. Thus, if I am right? all the weeds would soon be destroyed if they were not allowed to seed. All the weeds I have mentioned except Burdock and weeds of that kind require the same treatment as the Daisy. I will treat of it, and that will include

the others, as they are easily destroyed in comparison.

In considering this weed, I may observe that I have heard much discussion as to its destruction, but I have not yet met the Farmer of experience, who has the hardihood to say that it is easily destroyed. I sowed it with some imported grass seed, and after an experience of over 40 years with it. I approach the question with a diffidence born of defeat.

For after having many times thought I had them completely mastered, another ploughing brought a fresh lot to contend with. And until the theory which I lay down, and a method persued, accepting that theory as a basis, I doubt the practicability of destroying weeds.

THE SMOTHERING METHOD.

I claim that the general idea that daisies (this includes the other weeds named) grow from the roots, that is, that an inverted daisy-root, covered up in the ground, will grow again, is erroneous. On trial it will be found, that a daisy inverted, and covered up, is destroyed. It will also be found that the new growths are competely on the surface of the ground, and not attached to the old root. This being a further proof that they do not proceed from the old root.

Proceeding on this basis, we will consider a meadow. The first object is, to prevent the weeds from seeding. To do this the grass must be cut about the middle of June, immediately ploughed, properly harrowed and seeded with long red clover, and orchard grass, harrowed in, and rolled, and until the next ploughing, all the weeds I have named except Burdock and Daisies, will be immediately smothered by the clover. For the purpose of preventing the seeding of the daisies, it will be necessary that the crop be cut before there is danger of shedding seed, or, of heads which may fall to the ground being able to ripen the seed in the head. It is very obvious, that after one year of complete work of this kind, or two years, the usual term of life of clover, that there will be no seed upon the surface of the ground, and that upon the ploughing of the field all the roots will be smothered, excepting those that may grow up between the furrows. Here again however, a complete seeding is turned up by the plough, which must be proceeded with as before, and, after another ploughing, if the work has been thoroughly done, the daisies will be completely destroyed. With this method there is no loss of the use of the land, and if the manure made from the crops, is made use of on the land it will be in better condition than before the effort to destroy the daisies commenced. But for those who desire a sudden and complete destruction of weeds, there is nothing equal to the

SUMMER FALLOW METHOD

Properly done, with this method they will be thoroughly eradicated in one season.

Another method is the

HOED-CROP METHOD.

With this method, two successive hoed crops thoroughly cultivated, will destroy weeds and seeds of all kinds. The use of the Harrow on potato lands, and on mellow land the horse rake for corn, are great helps in the early part of the season. And the drill harrow, and cultivator later on, will be found excellent, and with very little hoe work on the drills, the weeds will be effectually destroyed.

It will be observed, that in the different methods, there is a difference in length of time necessary to success.

The summer fallow requires one year, with loss of a season's crop. Hoed crops require two years, without loss of crop. And the Smothering Meadow Method, six years without loss of crop. The fallow and hoed crops are no doubt more efficient, but in this Province of dairy farms the smothering meadow method is more convenient, and if faithfully carried out, quite effective.

It will also be observed, that according to the theory advanced, it is impossible to destroy the weeds while cropping with grain, as the seeds of weeds fall before the earliest grain ripens. And the fact also, that weeds are often well advanced in growth, before the crop is sown, especially is this true in moist seasons, and when the ploughing has been done some months before.

BURDOCK.

No amount of cutting will destroy this weed unless the tap root is cut several inches below the surface. An old chisel of good size or speed, is a proper implement for this. And for weeds of all kinds among grain, a very light, and handy implement, is a Scotch reaping hook, fastened to a handle about six feet long, of spruce or other light wood. With this, a worker can by changing hands, trim a width of 5 or 6 feet on each side of him.

THISTLES.

Where the system of continuous grain growing is pursued, this is a troublesome weed, on account of its early maturity. But after the first cutting of them in a clover meadow, they will be lost sight of until the seeds are again ploughed out.

One more point and I have done, There is not the slightest doubt that the theory I advance is correct. Nor is there the least doubt that the methods I propose for the practice of that theory is successful. But it is also true, that one load of unrotted manure, made from ripe daisy hay, and scattered on a field, will wreck the hope of years. And don't forget to put that under your bonnet.

THE BEST METHOD OF IMPROVING PASTURE.

There are so many conditions connected with this matter, that a general rule cannot be laid down which would answer in all cases, even in the same field.

We will first consider the case of a field which is undergoing the system of a rotation of crops, or, which it is intended to pasture, after it has been in meadow for some time.

It is well known that there is not a sufficiency of grass roots in a meadow to make a good pasture. And the usual custom of simply turning the stock on the field, does not fulfil the term pasture. And in such a case, the first thing done by the stock, in its efforts to get a bite of grass, is to pull up the bulb of the root of the timothy, until some times they can be gathered by the handful.

WHAT ARE THE REQUISITES TO CONSTITUTE A GOOD PASTURE?

A thick coating of verdure. I am aware of the supposition that it is necessary to harrow in the seeds sown in a pasture. It is not so at any time, and more particularly on a meadow such as we are considering.

One year before it is intended placing the field in pasture, in the early spring on a light snow, broadcast one lb. each of short red clover, Alsike clover, Orchard grass or lucerne, and Red Top. I would also add White Clover, but as it takes a couple of years to be of much account, except for permanent pasture, it does'nt pay. In the following spring there will be a thick mass of feed, growing between the roots of the meadow grass. There will then be an excellent pasture, and a valuable mass of roots growing to make humus for the future crops.

IMPROVING PERMANENT PASTURE.

A permanent pasture in this Province generally means a field which cannot be utilised as a grain, and meadow field. That is, it is stony, rocky, swaley, in the edge of the wood, and amongst logs and brush.

It is true that stock can pick grass from amongst the stones, but as each stone occupies just as much surface upon which grass ought to be growing the necessity of them being picked off, is very evident.

The first thing to be done about the swales, is to get off the surface water. It is a fact, that stock do not reach much of the grass grown in swales. It is equally true, that grasses of other, and better kinds, will not grow until the surplus moisture is taken from the land. And even supposing that the stock is starved until it is glad to eat swale grass; when it is eaten, it is not so nourishing as the tame grasses, as it has not the qualities of grasses that abstract from the soil the minerals which are necessary to build up the system of an animal. But immediately the surplus water is taken out of the soil, the air obtains ingress, the natural process of solubilisation goes on, (call it rotting if you will) the root abstracts, and the plant appropriates those qualities which are necessary for the building up of the animal, and this continuous process goes on, when all the conditions are fulfilled.

Usually, the easiest way to take the water from a swale in a pasture, is to make a simple open ditch, with a plough, scraper, and shovels, with a sufficient width at top to prevent the edge being broken in by the stock. If the dirt from this, is scattered thinly, it will do no harm to the grass, but rather be a benefit.

Of course, underdraining with tile is better than what I propose, but I am suggesting the best method, considering the fact, that the majority of farmers cannot enter into the expense especially with pasture. But very generally, the making of a simple surface ditch, reclaims as much good land, as the making an equal quantity of new cleared land. To illustrate: one swale, angleways across the entire width of my farm, part of it in permanent pasture, grew a forest of willows, cattails, and rushes, over part of which cattle never passed, and a man could only do so by stepping on the bunches of the roots. About twenty-five years ago, I had a spade ditch made through it. This took the water from a spring near the upper end of the swale, and in two years after sowing with seeds, I had the best feed in the pasture, and it is the best still, it is irregular in shape, on a stony, broken field, else it would make as good a piece of meadow as there is on the farm.

There are also, sometimes, patches of bush, and by the edge of the woods, etc., in which there is grass, but for the want of sunlight it grows so tenderly that the roots do not abstract the proper nourishment from the soil, nor can the foliage derive from the atmosphere the moisture for the promotion of its growth, and it will be found that, like swale grass, stock do not relish grass grown in the shade.

The best month to cut brush is in July, but it will always be found that the best time to cut bushes in a pasture is when the axe is in hand, as the stock will crop the shoots.

The easiest way to get rid of the brush, is, to leave it where it is cut, the cattle will trim the leaves and during the next summer it will be dry and less than half the labour to pile it together. If it is scattering, the stock will get all the grass without its being piled at all. In early spring, sow about equal quantities of alsike, red top, and orchard grass on the swales, and low lying places, and on high land add one of the fescues and white clover, instead of alsike. The judgment of the sower will come into play as to how much is required on the different parts of the pasture, some parts of it may require only a small sprinkling of white clover, the other grasses being sufficiently represented. And just here, in concluding, let me emphasize, that there is no pasture feed, to make beef or butter, and of the best quality, like White Clover. (1)

As the improvement of pasture includes anything that can be done, not only to improve the feed, but also anything that can be done to ameliorate the condition of the stock, and make the most of the feed,

I INCLUDE SHADE, AND FENCES.

As to shade, even on some of otherwise well managed farms, it is the usual method to allow trees and bushes to grow in pasture for the purpose of shade. Shade is required, but in that way, year after, year, a great amount of droppings are left there and around the fences, being entirely wasted. And something ought to be done to make use of the droppings to improve the pasture. This can easily be done by a shed made with crotches, planted in the ground, and upon these place poles and brush, open on three sides. The South side being brushed up to prevent a draught, else the stock will not use it. Make it long, rather than wide, and on the poorest spot in the field. Scrape up the droppings, and scatter around away from the shed. And change the situation of the shed as required.

FENCES.

If there is any one thing outside of good feed which tends to the improvement of the stock, and to a certain extent the improvement of the pasture, it is a good fence. A herd of uneasy cattle working towards a weak part of the fence, and a dog sending them back on the scamper, does the pasture a great deal of harm, and also certainly the cattle. It is a well known fact, that an animal with a quiet, amiable, disposition makes more milk or meat, on the same amount of food, than one otherwise disposed.

And also, that for the time, bad fences will ruin the amiability, and destroy the quiet of an otherwise tranquil herd.

There is nothing simpler, or more secure, than to stretch a barbed wire on the top of the fence, between the pickets, several inches above the fence, driving a staple into every second or third picket. This is better than an extra

(1) A trifling dressing of lime will bring up white-clover almost anywhere.—Ed.

rail, and does not add weight to the top of the fence. That also is the simplest way of increasing the effectiveness of fences in the woods. A shed will prevent a waste of manure, and a Good Fence is worth acres of pasture. Good grass cannot be had, without good seeds. Sow an early grass for an early bite. Good grass will not grow in water. Nor will bad grass grow under stones. Grass under bushes has not the "salt of the earth" in it. Good butter cannot be made without good grass, and, don't forget White Clover.

JAMES DICKSON.
Trennolmville,
Quebec.

MONTREAL EXHIBITION, 1896.

(First-Prize)

Different soils Clover and grasses - Harrowing — Wet meadows — Drainage - Red-top.

ON THE BEST METHOD OF IMPROVING MEADOWS.

There are so many different kinds of soil, also different conditions of different fields, that it is difficult to lay down a rule, which under all circumstances is the best. To illustrate, a field may be rich enough so far as the manurial qualities are concerned, but which cannot yield a return equal to its ability, perhaps for the want of drainage, or for the want of reseeding with seed naturally suited to the soil and situation.

Thus, a black mucky soil, requires entirely different treatment, and different seed, from a high upland field. An upland field which has natural drainage is always suitable for the growth of the clovers and timothy hay. Such a meadow in good heart, plough early in the fall, and plough again in the spring, and early in the season before the sun becomes too hot, and the moisture gone from the soil, harrow in not more than three bushels of oats or proper quantities of other grain, and six lbs. of timothy seed, four lbs. of long red clover, and one lb. of red top, per acre.

During the succeeding two or three years, the clover will crowd and overshadow the grasses, but they will thicken the crop, and as the clover runs out, which it generally does in two or three years, the grasses will take its place. Retarding the growth of the grasses in this way allows the roots to get a firm hold, and which finally cover the ground deeper than the land has been ploughed, with a thick mass of roots. This mass of whitened roots can be seen after a heavy rain on a newly ploughed grass field. We have here then a certain amount of the best food for the growth of a new grass field or meadow. It is a well known and incontrovertible fact, that the roots of clover penetrate further into the ground than other plants of the kind, and bring from the subsoil food for itself; and upon the death of the plant, the decomposed roots serve as food for the grasses, and also create channels in the soil, into which air permeates, solubilising the minerals for the growth of plants.

I am here considering a meadow in good heart, that only requires reseeding, and that there is no manure to enrich the land with. If it can be manured, there is no benefit on the extra labour of ploughing in the spring, if it is well cut up with the harrow. The objection in reploughing in the spring, is to get to the top the mould and humus of the rotten sod (there is of course more roots and humus at the top than at the bottom of the sod) for the purpose of making a seed bed that will stimulate a strong growth of the young plants, and drive the roots down in search of food.

If manure is to be used, it is not so necessary to have the sod well rotted in the spring, and consequently it can be ploughed later in the fall, the manure being worked into the soil in the spring with a disc or spring harrow. Thus the manure starts the plants, and they will soon reach and make use of the sod as it rots, will make a stronger growth, corresponding with the amount of manure, and last longer without reseeding.

A meadow, when the method of rotation of crops is pursued, is supposed to be outside of consideration. Neither do I propose to consider one so barren as not to be able of itself to grow a sod of grass roots, and when there is not a supply of manure to create a sod.

Such a field, under such circumstances, I consider irreclaimable. There is, "It won't pay," as in an animal, so also in a soil, there must be a live body to recuperate. Neither do I occupy space in considering the use of artificial manures in the improvement of meadows. I am considering from the point of view of the vast majority of the farmers of the Province: the improving a meadow from its own resources.

A SWALE MEADOW.

Is generally much easier to get into good condition than an upland meadow, for the reason that it is not "run out." The plants which have been produced upon it, require much less, and abstract much less from the soil, of those substances which deteriorate the soil, and which serve as a whole food for animals. For although animals will eat rushes and wild grasses, they are not so complete food in the same way as timothy and clover. The soil is wet, the air cannot penetrate, it is consequently cold, sour, and the continuous solubilisation (call it rotting, if you will) of the soil has not been—going on—consequently much of the original qualities of the soil are intact, requiring only that the superfluous moisture be got rid of.

In considering the surroundings of a swale meadow, it will always be found that an embankment has in some way been created, which prevents the natural drainage from taking place. Sometimes these embankments may have been caused by animals, perhaps ages ago, or, by obstacles, which during freshets have been washed there, and soil washed against them, became perfect dams, and often the water wears its way underneath the embankment to the lower level. Sometimes, however, these swales are caused by the drainage being obstructed originally by a ledge. And very often inspection will discover a bog hole, over which a team cannot be driven. This being the outlet of the drainage of the higher land, and though there is not force sufficient to create a living spring, yet enough water oozes out to spoil a good deal of soft, mucky land. Often these swales are acres in extent, and when reclaimed are very valuable as meadows.

If a ledge is in the way, enough of it to form a ditch must be removed.

If the swale can be ploughed, and few cannot at some time of the year, plant pickets in the lowest places, or runs in the field, not necessarily straight, plough, and with a sharp spade cut the sods, and handle with a fork into a cart, and dump into holes in the field. Plough of the necessary width to correspond with the depth of the intended ditch, and after the sod is off, plough the necessary depth for the ditch, and scrape into holes to level the ground. A complete and easy made surface ditch can thus be made, that can be mowed over, or ploughed crosswise with no inconveniences. Many a good swale could be thoroughly drained with a surface ditch, six feet wide at the top and a foot deep in the centre; and in some instances even a plough furrow, or a single spade ditch, would make a great improvement. (I have over half a mile of such ditches on my farm. I found them easily made and several bogholes are now good plough land). There is no use seeding or trying to improve a meadow of this kind until the water is got rid of.

Some may say they cannot underdrain and put in tiles, but in this way of making ditches it is a small undertaking.

After it is dry, in the early spring, sow timothy, alsike in place of clover and red top. Timothy and red top can be sown in August or later, but clovers of any kind rarely grow when sown in autumn on account of the first winter's frost.

It will be observed that I lay great weight on the fact that the clover roots aid in nourishing the succeeding grass roots, and that a good growth of grass roots is as good as a light coating of manure, and that this principle, if often and properly applied, will of itself improve a meadow. It is a fact proven by long experience, that a meadow ploughed and reseeded every six or seven years, not fed in the spring, and not too close in the fall, and a share of manure equal to the hay taken from the field will improve it very fast. But, if the grass roots are pulled up by the stock, if the manure is washed before it reaches the field, if it is bleached by the sun and wind while being applied or if the urine is lost, the result will not be satisfactory.

I also am in favor of sowing some red top grass upon both upland and lowland meadows; this is an excellent grass, which thickens the crops wonderfully, and with either a wet season or a dry one, it is there.

I cannot too forcibly emphasize the *necessity and benefit, of sowing* clover on the upland meadows and alsike on the lowlands. Alsike lasts longer and will grow well in muckey land, where red clover cannot exist, but not on upland. I am not in favor of sowing the coarser grasses, or fine grasses on meadows. Neither ripen at the same time as timothy and clover, which are, and will continue to be, the meadow grasses of America.

JAMES DICKSON.

STORING POTATOES.

Strictly speaking, no one ought ever to store potatoes in the house cellar. But as hundreds of thousands do it every year, and will continue to do so, a word may not prove amiss. And, first, potatoes should be sorted while in the field. It saves the house-wife some work, and it saves storage room and the later work of extra handling. Potatoes for the cellar are best barreled, as they are then movable when the accidents of time bring frost or water into the cellar supposed to be proof against both. Above all, potatoes in the cellar should be "kept dark." Canvas sacks make good curtains to set off a portion of the cellar and good covers for the barrels. Light will ruin the flavor of all potatoes, and half-light will cause them to sprout far in advance of the season.

THE RAPE FIELD AGAIN.

Questions for Mr. Gibson.

To the Editor FARMER'S ADVOCATE:

SIR,—In your issue of Nov. 2nd, Mr. R. Gibson, in writing on sheep mentioned cabbage as being better than rape for feed. Does he pasture the cabbage or is he speaking of winter feed? I would not think of rape as of any service for winter feeding. Would Mr. Gibson explain how he cultvates cabbage in all its stages of growth and how he feeds them in winter time.

I will give your readers my experience with rape. Three years ago we "ganged" four acres of fall wheat stubble and sowed three pounds of rape seed per acre the first week of August, but we had no rain for six weeks and it came too late to amount to anything. Next year I sowed rape on a field of oats. The season being very dry, it did not do much on the high part of the field, and in the lower portions it grew almost too well, for at harvest a good deal of it was cut with the binder. We had no trouble in curing the oats, owing to good dry weather, but had it turned out a wet season it would have been almost impossible to have got them dry. This season (1896) I sowed 4S pounds on a twelve-acre field of fall wheat just after we had done with the spring seeding. We gave it one run of the harrow. It did splendidly. We always cut fall wheat higher than oats; very little of it reached the knife. In the course of a week or ten days we had the field cleared and I turned on the milk cows. There was a good bite and the milk came freely, but the taste of rape came too; so I put the cows in just after milking in the evening and let them remain on the rape all night. We milked early in the morning, then let them run on the pasture all day. That seemed to work all right; only the faintest taste could be noticed. We had some steers, two and three years old, and put them in along with the cows and they did well. We never had such fall feed. So much for profit. But now comes the loss. One night there was just a faint touch of frost, and one of the three-year-olds turned up his heels. I could hardly believe that it was the rape. Afterwards came a very heavy frost, but cows and steers were all right. The next night just a light rind of frost and my best three-year- old was gone too. That made me look blue, for it took the profit out of the rape pretty well. I then turned all our cattle on in the morning, let them remain until they were well filled, then turned them off until next morning. I have had them on when the plants were nearly covered with snow, and in rain, too. I put them on without any injurious results. I kept the calves and lambs on all the time, but they had the run of a grass field at will and have done splendidly. I intend to see if it will stand the winter (1) and try it next summer for pasture. How would a crop of rape do to plow in on clay land? (2)

Bruce Co., Ont. "ANTRIM FARM."

(1) We have tried it, and it would not stand.—Ed.

(2) Far better feed it off with sheep.—Ed.

DRAINING.

An anonymous correspondent wishing to know. 1. If any great interest is being shown, in this province, in the matter of thorough draining; 2. In what county the greatest extent of drainage has been carried out; 3. What are the price, of 3, 4, and 5 inch drain-pipes, and by whom are they manufactured; we referred his questions to our friend, Mr. Peter Macfarlane for a reply, and that gentleman, very kindly, sends us the following:

Chateauguay, 15th Feb. 1897.

MY DEAR SIR,

Your favor of the 12nd inst. to hand and noted. I would hasten to reply to your questions in the order named.

Question No. 1.—None.

Question No. 2.—Huntingdon, Chateauguay, and perhaps a few sections of the Eastern Townships.

No. 3, At St. John's, Que.

Also address Chas. Sheppard, 102 Parthenais St., City, who will give you the prices of those sizes, as I am not very sure.

I assisted my father 35 to 40 years ago, to put in under-drains; but he was thought, by many, to be a little off, something wrong in his upper storey, as only a fool would do such needless work. I suppose it is over 50 years since he put in the first ones, and although he has now been dead more than 26 years, some of those drains are in working order to this day. An occasional neighbor would put in a drain perhaps, where they could hardly help it; but now they are getting their eyes opened. Of course, tiles are too dear for practical purposes.

I remain yours very truly.
PETER MACFARLANE.

Mr. Sheppard, mentioned above, charges

for pipes of 2 in. bore. $12. a thousand;
" " 3 in. do.. $18. a " ;
" " 4 in. do.. $27. a " :

The 2 inch pipe weighs all but 3 lbs., making the weight of a thousand pipes 3,000 lbs., which shows that they are made much too stout. In the South of England, our light horses used to draw from the kiln, in a hilly country, a thousand pipes at a load, in one-horse carts, but then we only used 1¼ inch bore pipes for the sides and 2 inch for the mains.

Now, as we have often stated in this paper, an acre of land in Kent cost to drain, with the above sized pipes:

Pipes at 16s. ($4.00)...	$ 5.20
Labour 80 rods at (15 cts)....	12.00
	$17.20

or there about; exclusive of cartage, laying down the pipes alongside the drains, a trifle extra for the mains, and a few other things.

At all events the cost of the whole, even where the pick was needed, or where quicksands bothered us, never exceeded four pounds sterling—$20.00. Men earned an average of 90 cents a day in winter. As for the good done to land by drainage, that needs no repetition.

In the year 1880 we published in this periodical a full excursus on this subject, which, if any one cares to read it, can easily be reproduced.

HINTS ON MAPLE-SUGAR MAKING.

Tapping—Gathering—Pan Syrup.

(From "The Country Gentleman.")

The following article will be read with benefit by any one interested in the making of maple sugar. Now that the bush is easily accessible to teams is the time to build the sugar house, to fill up the wood shed, and prepare generally for the action of spring:

The maple sugar industry is a growing one, not so much in the quantity as in the quality of the product. It is not probable that the sugar will compete largely with cane sugars for table use on fruit, etc., or in tea and coffee, or for culinary purpose, where a simple, unflavored sweet is desired. But the "syrup," if it is properly made, and its flavor properly retained by sealing hot, like fruit, in jugs or cans, has no possible competator, as an article of luxury, on buckwheat cakes at breakfast. And, even as a substitute for honey, the flavor of No. 1 syrup is preferred by many, and it does not cloy the taste as honey does. But poorly-made, maple syrup is little better than cane molasses, and will not bring a remunerative price. There is as much difference in flavor as between "gilt-edged butter," and that which is only fair to middling; and when that difference is fully understood, the prices of the two grades of syrup will differ as much as that of the two (or half dozen) grades of butter.

Hence, our profits will come mostly from our syrup, and from our best quality too, and any suggestions as to the mode of securing the best results will, I am sure, be welcomed. I wish to call attention to some of the essentials to success, and if I omit any, or fall into error in any respect, I hope some of your ever-watchful readers will call attention to it.

Following the order of the work involved, and noticing the tools, implements, etc., as they are required for use in their order, we have:

1. "The tapping" should be prompt and rapid, as soon as suitable weather really comes; not till then. A drizzling rain, that freezes before the sap can be gathered, never makes the best syrup, and buckets, spouts, and trees, are injured for the rest of th season, if the bush is tapped several days before the season really opens. The Cook bit, half-inch size, is best, and the galvanized iron Eureka spout. By repeated and continued trials of it side by side with various wooden and tin spouts, I am fully convinced that it sours the sap least of any, and gives the largest yield. The first merit is more important than the other, for sour sap will never make good syrup. The buckets should always be tin, soldered, inside and out, at every seam. They will rust inside in many years, and should never be painted there, as that makes them more rough and more liable to sour. Painting the outside, however, willl help to preserve the bucket. For our Ohio climate (and I am inclined to think it true anywhere), the buckets should invariably be covered tight. A hole just below the wire rim splits over the notch of the spout, and a board a foot square is laid on top, and excludes rain, snow, dirt, or insects, and prevents the sap from freezing, except in extreme cold; or souring by the sun's heat, except in very warm weather. I know of no one thing more essential to the production of the best grade of syrup than covers. They should be planed and painted, and it is a great help in gathering to have one side painted, say, red, and the other white. All are placed red side up, for instance, in tapping, and then, all are reversed at each gathering. If a tree is missed the color of the cover shows it at a long distance. So, none need be missed, and *two trips need never be* taken to the same tree in doubt whether its sap as been gathered. This was mentioned more fully last year, but I find it so great an advantage, that I feel like repeating it every time I have the attention of sugar-makers.

2. The gathering should begin as soon as the tapping is done, the former should be finished by noon if possible. Otherwise, one force of hands should continue this, and another force should begin soon enough to overtake, before dark, the force that is tapping. Sap should never stand over night in the buckets if it can be avoided, but should be gathered as late as possible before dark, and boiled as soon and as rapidly as possible. It begins to deteriorate almost as soon as it leaves the tree, especially if it is very warm, or on the other hand, if it freezes and thaws.

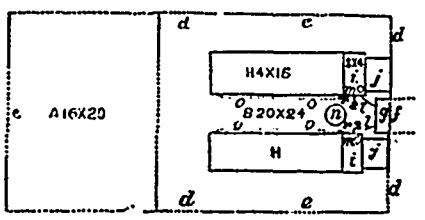


Fig. 2.

The gathering cask, figured and described last year, and shown again in fig. 1, seems best adapted of anything for the work to be done. It is simply a cask 5 feet long and about two feet in diameter, fastened firmly to a "boat sled," large end behind, the front end a little the higher, so that when the sled stands level, the sap will all flow from a faucet in the rear, through a tin conductor with a funnel-shaped "head" down the slope, into the store trough below, as shown in fig. 1. The sap need never be lifted but once, or dipped or rolled up skids in barrels at all. It is poured down into the gathering pail from the bucket which hangs at the tree, and is not removed from the spout in emptying. It must be lifted a little and poured into the funnel of the gathering cask, and that is all. After that, by taking advantage of a slope, it will run into the store trough, and thence into the boiler without further labor.

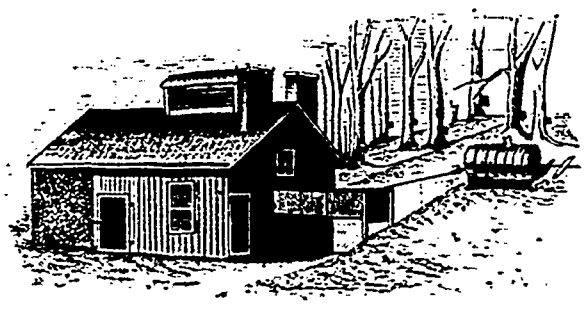


Fig. 1.

3. The sugar-house, its location and its arrangement. The former is indicated in fig. 1. The sugar-maple seldom grows spontaneously except on ground that is somewhat rolling; and in almost every sugar camp can be found side-hill advantages in a sufficiently central location. If the slope is not as steep as that represented in the cut, a longer conducting tube must of course be used, so that the gathering cask can stand far enough off up in the slope to bring it to the required level. In hilly New-England there is usually no trouble on this point; but even there, I have seen sugar-houses on level ground near a fine slope of which they took no advantage. And in Ohio, until within a few years ago, such was the common custom. The store trough stood on a level with the "arch," the barrels were laboriously rolled up two skids and emptied *into the trough, and then the sap was* lifted, pailful after pailful, and poured into the kettles or pans. Men are strangely slow in learning to take advantage of gravitation and the other forces of nature, even when she seems daily to thrust them before our very eyes. Fig. 2 gives the ground plan of the sugar-house seen in perspective in fig. 1. It is planned for two arches, so that one man can boil the from 2,000 or 2,500 buckets. It will be understood from a brief description, if figs. 1 and 2 are both kept before the eyes. A, is the woodshed; B, the boiling-room; H H, the evaporators, set on *brick arches; i i, heaters running a foot* below the level of the evaporators, and perforated like the tubular boiler of a steam engine, so as to send the flame through these tubes (horizontal cylinders), which are surrounded with cool sap, and thus economise heat that would otherwise waste up the chimney; j j, are the chimneys; g f, store-trough (compare fig. 1); l l (curved dotted lines), flexible rubber tubes, conveying sap from store-trough to heaters; m m, self-regulating sap-feeders; n, tall receiving can for syrup; r r, stopcocks for drawing off syrup; s s, siphon stopcocks for draining hot sap from heaters when desired. The *tops of the siphons pass* through the sides of the heaters (watertight) on a level with the bottom of the store-trough, and run outside below the bottom of the heater, so that when the sap is above that level the siphons will start when the stopcock is open, and flow till the heaters are drained dry. o o are the tubes feeding hot sap from the heaters into the front end of the evaporators; c d d d d are doors, and e e are windows. The self-regulating sap feeders are Guild's patent, and are usually furnished with the evaporators.

The working of them, in brief, is this: A float rises and falls with the sap in the pan or heater, and works a pair of jaws which bite the flexible tube when it gives sap too fast, and relax their old and admit more sap when it is needed. When the boilling is uniform, they admit a uniform stream just fast enough. If the man goes away over night, and leaves a big fire, these watchful sentinels supply sap while the fire lasts, and then stop the stream lest it *should overflow the boilers.*

4. The patent sorghum evaporator, is, in my opinion, the only pan that will make the very best grade of syrup uniformly, rapidly, and in large quantities. Kettles were long since abandoned, and flat sheet-iron pans introduced; and now the latter are fast being supplanted among the best suger-makers, by the patent evaporator. The principle is that of the rapid evaporation of a very shallow body of sap moving slowly and transversely over alternating hot and cool spaces. This result is secured by a succession of ledges or "crimps," running crosswise of the pan, one every *six inches of the pan's length, the first* meeting the side on the right, the next on the left, and so on (see fig. 3). The cool spaces are secured by letting the pan project beyond the fire on each side. The pan stands perfectly level,

(i e, 15 foot one should,) and the sap enters at a, passes slowly along the channels, around the points b, c, d, e, f, etc., till it reaches the stopcock, s, in 30 or 40 minutes, finished syrup. In starting, just enough sap is admitted to cover the bottom and make it safe to boil. A few pailfuls must be at first drawn off at s and turned back near the middle of the pan, until it comes to syrup in the spaces, u and v, after which it will remain syrup there, and may be drawn off in a small continuous stream (which, I believe, is the rule for sorghum), or a gallon at a time every twenty minutes or so, which is perhaps preferable for maple syrup. At o and r are partitions with tight gates to check the flow of sap, if it is necessary.

The lodges that divide the channels are formed by "crimping" the broad sheet of heavy galvanized iron that form the bottom as represented in fig. 4. The bottom is crimped clear across, of course, and then each alternate crimp is cut down vertically, six inches from the edge of the pan, split horizontally from its end to this point, lapped, countersunk, riveted and soldered, and a cap soldered, over the open vertical end of the crimp. The crimps not only serve as ledges, but greatly increase the heating surface of the pan, for they are all open to the fire from beneath, as seen in fig. 4. These hints of construction are simply to explain the principles involved, and not to enable any one to make a pan. Every valuable feature is covered by patents which have been extended and do not expire again for several years. Expensive machinery is required in their manufacture. They are made by the Blymyer Co., Cincinnati, the original owners of the patents, and under licence (with royalty) from them, by firms in St-Louis, Bellows Falls, Vt., and a few other places. They make better syrup, and do it much faster and easier than any other pan. Decent sorghum syrup cannot be made without their use, and to that fact are we indebted for the invention and the improvement they render possible in the quality of maple syrup. They secure an enormous saving of fuel and of labor too. All the man has to do is to fire up, skim, and draw off the syrup ready for market. With the fixtures in fig. 2, one man can boil into finished (11 lbs.) to the gallon) syrup, 75 barrels of sap in 12 hours, and even more; and by boiling nights, during flush runs, the apparatus has a capacity for 2,500 average trees (buckets.) But in order to do this, we must have the next essential.

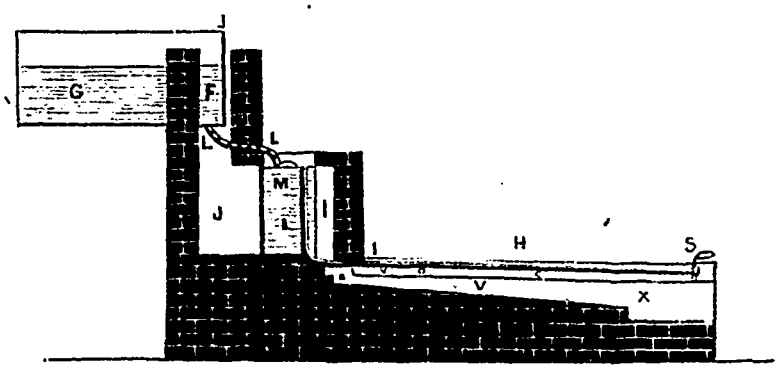


Fig. 3.—Side view of the whole apparatus. (Drawn and engraved for the Journal of Agriculture.)

5. This is fine, dry wood. The flame does the work. The wood is three feet long, the pan and heater are 17 feet, and yet the pan (evaporator) is in a perfect form the whole length, and the sap in the heater usually scalding hot. But if the wood is green or very coarse, the pan will not boil the whole length, the steady flow of sap is not maintained, and the best quality of syrup cannot be made. The wood-shed should be filled for next season "as soon as one season is over," or it is apt to be neglected At least half of the wood should be split quite fine. The man who runs two evaporators has no time to split it.

6. Perfect cleanliness and sweetness of vessels and sap, is another essential. The Vermont climate is better, but in Ohio, as a rule, I find I must scald all the buckets about once a week, and store-troughs, evaporators etc., much oftener. It costs a good deal, but pays in product. With a cask of hot water and a team two men will scald well 1,200 buckets at the trees in a day, and there is almost always a rest between "runs" as long as that each week. Our climate, too, requires that the sap be stored out-doors (see figs. 5, 1 and 2). The trough runs into the house just far enough to feed the sap in the store-trough by the heat of the fire. The store-trough, or troughs, should have close fitting covers, to protect them from rain, sun, and freezing by night. In Vermont, the cold is so great at night that it is common to store the sap in the sugar-house.

I wish to give special emphasis to the fact that the most rapid and best work is secured by keeping the sap as shallow

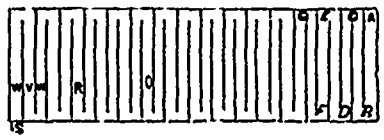


Fig. 4.

as is safe in the pan. A careful man can boil safely with the regular set for an inch deep at the arch end of the pan. If the pan be perfectly level, this will make it about half an inch deep at the syrup end. Many suppose the sap must cover the crimps to prevent burning. But the heat of this metal, partly submerged in water, can never be above boiling point, and that is not burning point.

The full heat of the fire under and in the crimps is utilized too (even if they

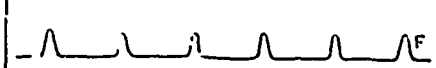


Fig. 5.

are not covered) by the sap at their bases. And, if the crimps are covered, the transverse current is broken up, and sap and syrup mix more or less the whole length of the pan unless prevented by the two gates. Such a use of the pan uses the extra heating surfaces of the crimps it is true, but it throws away all the other benefits of the evaporator. It is a thoroughly established law, too, of evaporation by heat from below, that the shallower the water (sap), the more rapid the evaporation.

The flavor of syrup is best retained by canning, or jugging, hot, like fruit, and setting in a cool, dry part of the cellar. Jugs of syrup should never be set on a damp cellar bottom. The moisture sometimes moulds the syrups.

At the close of the season, every vessel should be washed, scalded, and wiped with scrupulous care, and the buckets stored bottom-side up, ready at a moment's notice for next year's tapping.

W. J. CHAMBERLAIN,
Summit County O.

The Grazier and Breeder.

DAIRY-SHORTHORNS.

Origin—Booth's cows—Durham herds—Hill Court tenants—Hyde-Park herd.

The origin of the great tribe of Shorthorn cattle lies buried in no mysterious lurking place. The breed comes as naturally as possible from a long line of ancestors, and the "souche" is to be found in the old "Teeswater," long bred on the banks of that river in the county of Durham, England. The most favourable specimens of the breed were wide-backed, well framed cows, deep in their fore-quarters, soft and mellow in their hair and "handling" and possessing great powers of milk-production with a good disposition to fatten. There is not the slightest doubt but that Mr. Thomas Booth, one of the earliest of the improvers of North-country cattle, sought for and found his rudimentary stock in these Teeswater Shorthorns. A dairy-farmer, Mr Broader, of Fairholme, Ainderby, a tenant of Lord Harewood, having shown Booth several fine looking cows of this stamp, the latter bought some of their calves, and more than one family of Shorthorns claims descent from this source.

Many of Mr. Booth's cows were great milkers, but the production of milk was not the object of that breeder; what he aimed at was the production of beef. The remark made by a neighbouring farmer, questioning the milking capacity of some of these original Shorthorns, was "countered" by Mr. Booth thus: pointing to their broad backs, he exclaimed, "Look there! that is worth a few pints of milk, isn't it?"

Among the Bates' cattle, several tribes turned out cows that gave a fair "mess" of milk, notably the Duchess line. Others, unfortunately, could not even nurse their own calves, not even the heifer-calves; as for the bull-calves, they often luxuriated in the milk of two foster-mothers in addition to the yield of their own dam. And this is no marvel; for, as the cows were dried off as soon as it was safe to do so, for the sake of the better nourishment of the foetus, the habit of giving milk was put a stop to, and generation after generation being treated in the same way, the pedigree-shorthorns gave up trying to make milk, and laid the surplus of their food on their backs instead.

It was just the same, with a difference, with the Herefords. When a Hereford cow calved, she, with her calf, was turned out to grass, the calf took from his dam just as much milk as he cared for, and left the rest. The cow was never milked dry from one calving to another, and the calf was, generally speaking, not weaned till it was six or seven months old. Can any one wonder that, with such treatment, the Herefords are, in England at least, the worst milch-cows we have?

The cows that almost always win the prizes at the great Dairy-Shows in England are not pedigree-shorthorns. They are descendants of the old Teeswater cattle that have been carefully bred for milk-production for many a generation. Starting from the neighbourhood of Darlington, in which town the best fair for this breed is held, they have gradually permeated the whole of England, and are the "par excellence" farmer's cow in every district, except where the Devon, the Hereford, and, on a small scale, the Sussex, infringe on their territory.

The Yorkshire, Lincolnshire Shorthorns, are all of the same family, as are the Glo'stershire, of which the editor's brother, Mr. Jenner Fust, writes thus:

Hill Court, Glo'stershire.

"You ask about the breed of my tenants' cows. All are Shorthorns, but they are not much like the pedigree-Shorthorns at Berkeley Castle (Lord Fitzhardinge's), Tortworth (Lord Ducie's), or Col. Kingscote's; but they are supposed to yield more milk than the pure-breds. Some of my tenants give £30 to £40 ($150 to $200) for a well-bred yearling Shorthorn bull, but they do not keep a separate stock—they buy and introduce into their herds any good cow they meet with of the Shorthorn type." These country bred Shorthorns prevailing in a country contiguous to Herefordshire, show plainly what the Glo'stershire farmer finds his profit in.

As long ago as September, 1882, we wrote in this periodical:

"Shorthorns don't give any milk, eh! If so, why does every dairyman in English towns keep them? Of course, there are Shorthorns and Shorthorns. If you keep on drying your cows off, generation after generation, as soon as possible after calving, in order to perfect the growth of the foetus, how can you expect cows to give large yields of milk? The real "Dairy-Shorthorn" is the universal favourite in all London dairies. They may be seen in perfection any market-day at Darlington, Durham, and in our time, the keeper of Hyde-Park, London, a former gamekeeper of the Ranger, Lord Sydney, had liberty of pasture for twelve. Fine large cows they were, with immense udders, giving from 25 to 30 quarts a day, and weighing from 1,000 to 1,200 pounds the carcase when done with. They were milked up to the last day of their lives, and as their cream sold for $1.50 a quart, they must have paid "Long Jem", their owner, pretty well.

Any one who will take the trouble to study the portrait of the cow, "Dairy-Model," (1) in the December number, will see at once how very unlike the pure-bred pedigreed Shorthorns she is; but she is really and emphatically an almost perfect representative of the true Dairy-Shorthorn cow, a herd of which with a couple of bulls, we hope that, sooner or later, Mr. Greensmhields, or some other patriotic "agronome," will make up his mind to import from their chief habitat, the old county of Durham.

PRACTICAL FARMING.

(By James Dickson).

LOOKING BACK—WINTERING CALVES.

Some of the older farmers can remember fifty years ago, when the treatment

(1) V. p. 116.—Ed.

of calves, and indeed all other animals, was quite different from that of the present day. Some of the best farmers at that time expected to lose two or three every winter, their predictions in that line were generally fulfilled, and, stranger than all, they generally made no very special efforts to prevent its occurrence. It spoiled calves and colts to pet them, and the method usually in vogue was to harden these young animals the first year, so that they would thrive better in the future years of their life—that is, that they would know later on, how well they were being cared for. I remember an old Yankee of whom it was said he preferred to harden his calves well. Said he, "I allus like to toughen my calves well in the fall. I leave 'em out jist as long as they kin stan it, an a leetle mite longer, an them they come in as tough as Indians." And he expressed the general idea.

I well remember the little, bony, pot-bellied creatures shivering in the corner of the barn yard, into which they were turned before the boys went to school, and where they remained in all weathers until their return. Yes! I am lookin, back—a way back. It is not lost time this looking back to see if we have progressed as other countries are progressing. Civilization has advanced; our wants have increased; competition is close. Our profits are small: and the farmer that looks back, and has not gained wisdom from his experience, and the experience of those around him, must in these days get into some other vocation in life, where thought is unecessary, and become a hewver of wood and a drawer of water for others.

WINTERING CALVES.

We will suppose the calves are well bred, with well rounded quarters, near to the ground; only those from the best progenitors having been kept to raise. We will also suppose that they were well summered, and had the run of a field of good aftermath from August. But to winter calves well, it also was necessary to put aside specially for their use (and the sheep) a sufficiency of good, bright, fine hay. Good swale hay alsike and clover cut early, is preferable for calves to timothy hay. In feeding either, it is proper that they be not overfed at a time. And this season especially, when the conditions are that hay is in some districts scarce, and comparatively high priced, it is not well to expect to winter calves without some more concentrated food than hay. Corn is cheap, (1) one cent worth per day of finely ground corn meal fed to each calf, and that much less value in hay given, is good economy. It makes a straighter, brighter, better fed animal, and during their after life, in their thrift and form, they never forget the little grain fed them the first winter. The little extra feed ought to commence with the winter. At the present price of corn about one and a quarter pounds of corn meal cost one cent. This quantity is a good feed for a calf, and for the entire season would cost about one dollar and seventy five cents. Assuredly, the yearling will be worth more than that extra. And you will at least be sure of a clear profit of the pleasure of seeing them thrive.

Oats are good feed for calves if commenced before digestion fails. The stomach of a strong calf can digest whole oats, but for a puny one, they ought to be ground. It is an unfavo rable sign to see a calf's stomach continually distended. In that case roots are the best feed, and potatoes the best of those. Begin with a few at a time to beware of diarrhoea, and continue until the digestion is strengthened, after which oats, or corn meal can be fed to advantage. I am advocating corn feed, because at present it is very cheap, and knowing it is of little use for the present season to advocate the use of turnips, of which too few are grown. And I must not omit to say, that if the calves have been toughened until almost like an (dead) Indian, weak, and discouraged, look for vermin. If there is an unprofitable thing on a farm it is a lousy calf. We read that an emulsion of soap and coal-oil is a good remedy.

The old-fashioned wash was tobacco water. But in winter, the simpless method I know, is to wet a rag with coal oil, and damped the hair with it. It is only a few minutes work when taken in hand. Do not put on enough to wet the skin, only the hair to the roots. They seem to die from want of pure air. And if properly done, a second application is not necessary. But remember, that good food put into a lousy skin is buried care.

(1) But pease are better. Ed.

LINSEED FOR CALVES. — The "Agricultural Gazette," the best agricultural paper published in England, advises a correspondent to mix a small quantity of crushed and boiled flax-seed with separated milk for calves.

IMPROVEMENT of LIVE-STOCK, &c.

Improvement of domestic animals—Selection—Crossing—Feeding raw meat to Poultry in Winter useful for egg production.

In a state of nature, all wild animals of the same species and under the same environment breed true to type, and the type is perfectly suited to the environment. They are all like each other, and they go on reproducing offspring similar in all respects to themselves. In their case, the process of selection has been effected by the operation of the survival of the fittest, which nature carries out everywhere and always. In a herd of American buffalo (bison properly so called) one buffalo is exactly like another, same size, same peculiarities of structure, etc, etc. There is never any deterioration, and no improvement is possible, because, under their conditions of life they are perfect. They give the best results under their conditions of life. You cannot improve a buffalo, as a buffalo.

The mere alteration in various respects, or adaptation to a state of domesticity, is not always, strictly speaking, an improvement. You might domesticate the buffalo, increase size, milk production, etc., but you could not improve him, you could only change him. Under anything like domestication on a farm, buffalo meat would lose its gamey flavour, and the texture of the robe he carries on his back through the prairie snows would be destroyed.

These wild animals are, in the strictest sense of the word, thoroughbreds, much more so than the most carefully bred of our so-called thoroughbred animals, and they breed truer to type.

Our domestic animals breed pretty true to type, when carefully bred under the same conditions of life, and general treatment, but are exposed to continual alterations of type under different conditions of food, climate, etc., and the continual risk of fortuitous crossing.

The art of the breeder consists in improving the different breeds of domestic animals in the relation of their usefulness to man.

This is done by selection, by crossing with a superior breed in point of merit, or by a complicated process of more than one crossing together of different breeds and continued selection afterwards. It is clear, that whatever reputation, a well-established breed may possess, selection for breeding from the best specimens must be continued, if that reputation is to be kept up.

There are probably few breeds of animals which have been, from the very first period of their domestication, of such intrinsic value to man, that they have been improved solely by selection, without the admixture of some cross or other. The Jersey cow is probably a good instance of a breed, brought up to the highest standard by selection alone, and, where no crossing has ever been resorted to. The principal factor in the improvement of the Jersey cow, besides naturally favorable conditions of environment, was the legislative enactment, by which, for a long time back, the importation of any kind of cattle whatsoever in to the Islands, has been strictly prohibited. The long continual in-breeding, has not been productive of any deterioration, in the way of constitution, etc., as, in their own home, the Island cattle are the healthiest in the world. The result, of a very careful enquiry, has shown that neither tuberculosis nor any other contagious disease, have ever been known there.

There is no other breed of cows in the world, at the present date, that gives richer milk, from which a larger proportion of butter to the quantity of milk can be made, and this trait is so firmly inbred, in Jerseys and Guernseys, that when you cross them upon any other breed, there is one result that you will always be sure of obtaining: the richness of the quality of the milk will be increased. Even a bad bull will communicate this trait to the cross got by him. The cross may be a worthless cow as a milker, may give a very small quantity of milk, and that for a very short time, but the quality of that milk will be perceptibly increased in richness.

The English thoroughbred horse, is a remarkable instance of wonderful improvement in every respect except perhaps those of docility of temper and soundness of constitution obtained by much and extensive crossing. This result could never have been obtained by selection alone. The results obtained by complicated crossing and selections in Poultry are well-known, and although many of them quite useless as improvements, properly so called, they are curious and interesting as specimens of the breeders art.

Selection is sufficient where a more intensifying of the same good qualities is desired, but crossing is indispensable wherever characteristic of an opposite kind are sought to be united in the same breed.

The complicated crossing, necessary to the successful blending together of two or three different breeds comes more within the province of the extensive and scientific breeder, than the ordinary farmer. To any one at all acquainted with the class of animals to be found on our farms here, it is very evident that our most judicious attempts to improve them should be to cross on simple lines of affinity, and keep on in the same lines crossing with a thoroughbred male, and selecting from the best female produce.

But while crossing of this simple kind, is the most expeditious and valuable means of improving breeds, if judiciously carried out, and strictly persevered in, indiscrimate and reckless crossing has proved, elsewhere as well as here, the most potent factor in ruining once useful and valuable breeds.

While comparatively anybody may be supposed to understand breeding by selection, which consists simply in being able to recognise the best specimens of each sex, mating them together, breeding from them persistently and carefully in the same manner, avoiding incestuous breeding for, at any rate, anything beyond one or two generations, the science of judicious crossing is not so well understood, or if understood, it is not carried out with anything like perseverance.

The axiom, that the art of breeding successfully and crossing judiciously consists in being able to see the fitness of similarities, and the unfitness of dessimilarities, cannot be repeated too often.

This also applies to things unseen as well as seen, and requires some knowledge beyond mere external inspection; still, the matter is very simple, and care and perseverance are the only other things required.

One of the things to be remembered most, perhaps, is to avoid the bringing together of extremes. These can never meet in equal proportions, and the results are never equal combinations of two different things, nor can any approximation to this result be obtained, except by a gradual process of amalgamation.

Horses, for instance, can be divided, into: horses of speed; horses of power; horses of power and speed; with many gradation of course of each class. The horse of power and speed, the high class weight carrying hunter or steeple-chaser, is not obtained by putting a Derby winner to a champion Shire mare, nor will you get a carriage horse that will trot as fast as his sire and look like his dam, by putting a hackney mare to an American racing trotter, with the eccentricity of contour, which distinguishes most of them. The gentlemen on the ranches in the North West, who put Clyde stallions to Bronco mares did not succeed in getting anything in the shape of a horse to which you could assign a name or breed.

BUTTER.

We have had creameries established and have been taught how to make good butter. Some of our scientific friends would almost try to make us believe that science will soon enable us to make good butter out of bad milk, although they do ask us to keep it clean if we can. A kind Government is providing a system of cold storage transportation, which will deposit that butter in neat little shops in London, where it will be known as Canadian butter, and where Canadian butter will shortly, let us hope, be known as the best of all butters, better than the butter of Normandy and the butter of Denmark. But let us not forget, that, however productive of benefit and advantage to our butter trade, the careful feeding and housing of cows, the most scientific methods of butter making, and the most convenient system of transportation to market, these things of themselves will not directly of themselves effect any improvement in our breeds

of cows. That, crossing and selection, combined with weeding out, will effect, and that alone.

POULTRY.

In obedience to a recommendation in the Journal, I hung up cabbages in my hen house for my hens to peck, and combine exercise with the acquisition of green food in winter. They never took the slightest notice of them. Last year from December to March, I had hardly any eggs. This year, other conditions being quite similar I have had about a dozen a day, from same proportion of spring pullets.

I attribute the improvement to my having fed scraps of raw beef, obtained in the saving and cutting up of frozen meat. At least I know of no other difference in treatment between this year and last.

C. F. BOUTHILLIER.

The Dairy.

COLD STORAGE for CREAMERIES.

(By Prof. Robertson).

THE STORAGE OF ICE.

In the storage of ice, particular care is required to prevent waste by melting.

Ice is melted only when the temperature is above 32o Fahr. The increase in temperature comes from some source external to the ice. When a lump of ice is left lying on the ground in warm weather, it is melted by the heat from the ground on which it lies, and by the heat from the air which surrounds it. To prevent ice from being melted by the heat of the ground or the atmosphere, insulating materials of different sorts have been used. An insulating material for this purpose is any substance which prevents, or almost wholly prevents, the passage through itself of the form of energy known as heat. Different substances conduct heat more or less rapidly, and are spoken of as being good conductors or poor conductors of heat. Whatever is a good conductor of heat would be a very poor insulating material; and a substance is a good insulator in proportion as it is a poor conductor, or non-conductor, of heat.

For the preservation of ice during the summer, the requirements are that the ice shall be separated from the ground by some insulating substance, such as dry sawdust, dry shavings, or air in hollow spaces formed by wood and paper, or by some other insulating material. If the sawdust or other material becomes saturated with water, it loses its insulating qualities. It becomes then practically a heat conducting material, like a body of water. The ice should also be protected from the heat of the atmosphere when the temperature is higher than 30o Fahr.

An efficient form of a cheap floor for an ice-house is made by using 12 inches of cobble or broken stones, covered with coarse gravel or sand. The top of that should be covered with 6 inches of dry sawdust. The sawdust becomes an insulating layer, preventing the warmth of the ground from melting the ice. Where dry sawdust is not available, a layer of dry straw, chaff, or hay 12 inches thick before the ice is put on it, may be used instead. The floor should prevent air from getting in or out, and yet should permit ready drainage of any water from melting ice.

To prevent the sides of the mass of ice stored, from being melted by the influence of the atmosphere, it is sufficient to use a building of simple balloon frame, covered by one thickness of clapboards outside, to keep any rain from wetting the insulating material which surrounds the ice. The outside wall of an ice house is more effective to protect the contents of the building from the heat of the rays of the sun, when it is whitewashed, or painted almost white. If the inside of the studs of the balloon frame be sheeted with one thickness of inch lumber, the hollow space between the clapboards and the inside sheeting will be a flue for the circulation of air, and will prevent the sun's rays, where the building is exposed to them, from warming the inside of the walls enough to make an appreciable difference in the temperature of the insulating material which lies between the walls and the ice. Dry hay and straw when packed fairly close between the ice and the walls make excellent insulators. They do not conduct water by capiliary movement as readily as sawdust. When a layer of sawdust, between the ice and the sides of the building in which it is kept, becomes wet on the side next to the ice, the water or dampness is likely to permeate the whole of the sawdust, and thus to destroy its non-conducting properties. Fine hay and straw are preferable; but when they are used, care should be taken to have them thoroughly dry. A serious risk in the use of hay or straw is that they may contain small particles of ice, or snow. When hay or straw are used in such a way, with small particles of ice, hail or snow mixed with them, these melt and make the whole of the insulating material damp. To that extent they lessen its efficiency.

For the covering of the top of the ice a layer of sawdust, one foot thick, is sufficient, "if it be put on dry and left undisturbed." When sawdust has to be moved frequently for the taking out of ice from time to time, the warmer portion of the sawdust laying near the surface becomes mixed with the other portions and may be put back close to the ice. That causes a slight melting of the ice; and the dampness thus caused makes the layer of sawdust wet, and to that extent destroys its insulating properties. For that and other reasons, notably convenience in removing and replacing, it is desirable to use a layer of clean dry fine straw or hay 18 inches thick as a covering on the top of the ice. When the hay or straw is removed from a part of the surface, to permit ice to be taken out, it may be put back again with little waste of ice and almost no loss of the non-conducting qualities of the covering.

Where ice is covered with a layer of sawdust, or hay, or straw, to preserve it from melting, provision should be made for ventilation over the top. The covering layer might become heated otherwise; and if the rays of the sun beat on the roof of the ice-house, and there be not sufficient ventilation in the gable ends or on the roof to allow the heated air to escape, that part becomes practically a mild-tempered oven for melting the contents of the building.

Drawing No. 1 shows a simple form of construction which can be used for an ice-house. It can be made of any size required for the holding of ice for a creamery refrigerator, or other purpose. Fifty pounds of ice, when packed, may be taken to occupy one cubic foot of space. Therefore, every 40 cubic feet of capacity in a building is equal to the holding of one ton of ice. Where the wall of the ice-house is not insulated, the ice should be packed in the building 12 inches from the inside of the walls, and that space, as well as the space between the studs, should be packed full of thoroughly dry, fine hay or straw, entirely free from ice chips and snow.

For the filling of the ice-house a slide of strong planks may be made, and a rope passing through a pulley inside the ice-house can be used for pulling up the blocks of ice. It is important that th ice should be packed as closely as possible. Any spaces between the blocks should be packed full of broken ice in order to prevent the presence or circulation of air around the several blocks.

Drawing No. 2 shows a form of ice-house and refrigerator which may be attached to any ordinary creamery. In this plan the ice-house is insulated by the use of building paper and hollow spaces in the wall. The hollow space underneath the clapboards may have a small opening at the lower clapboard and another around under the eaves.

This forms a flue for the circulation of air and prevents the rays of the sun, where the building is exposed to them from warming the inside of the walls enough to make an appreciable difference in the temperature of the insulating material which lies between them and the ice.

(To be continued)

TURNIP FLAVOUR IN BUTTER, may be avoided, as we have often mentioned, by making the butter Devonshire fashion, and we see, in the English papers, that Mr. James Davies, of Shewsbury cures turnip-fed separator cream on the same principle by raising its temperature to from 150o F. to 160o F. The process is conducted on the "bain-marie" plan; two vessels are used; one is in direct contact with the fire and contains boiling water, the vessel containing the cream being placed within it. It is only necessary to keep up the heat for a few minutes, when the high temperature drives out all the unpleasant flavour, however strongly the cream may have been flavoured by the use of turnips or swedes. After the operation is finished, the cream should be cooled as rapidly as possible. To this we would simply add that turnips should be fed as soon after milking as possible, to give the digestion powers an opportunity of doing their share of the work of freeing the milk from the nauseous flavour.

COWS, fed on hay with a moderate allowance of either crushed linseed, 1 lb., or linseed cake, 3 lbs., have seldom been attacked with "milk-fever." A noted Yorkshire grazier always gives his down-calvers seven pounds of molasses, dissolved in warm water, daily, for three or four days before parturition. Said Prof. Arnold, of New-York, some years ago:

"The use of milk by milk-giving animals is perfectly adapted to reconstruct milk. It is decidedly an albuminous product, and consequently contributes to swelling the flow. It contributes to making milk rich in butter. Like other foods rich in albumen, it does this in an indirect way. One source of fat in animal bodies lies in the destruction of bodily structure. The more structure there is built up, the more there is to be dissolved for the evolution of fat. Milk, like other albuminous matters, is active in building up the structure, and hence also in the production of fat, of which the newly-formed milk gets a share. When fed back, cows utilise every atom of the fat. Milk is a highly nitrogenous food, and should be fed with those that abound in unctuous (oily) matters and starch and sugar."

We tried it, in 1870, and found it answer well. Mix it up with a little corn or barley-meal and a pound or so of crushed flaxseed.

THE LAST DROP.—A correspondent wishes to know the reason "why the last drainings from a cow's udder are richer in fat than the preceding milk." In reply, we beg to say that, in some experiments made to test this, it was found that, in the first drawn milk, there was only 1. 2 per cent of butter-fat, while in the strippings there was 10 per cent: As for the "reason why," we can only give the unsatisfactory answer that, up to the present time, "nobody knows."

FARMER'S INSTITUTE.

This association met at Lancaster, on the afternoon of December, 28th, and was highly successful. The government deputation was composed of Prof. Dean and Capt. Sheppard, of Lincoln, Ont.

Prof. Dean lectured on "The by-products of the dairy," skim-milk, whey, and butter-milk.

Skim-milk is often richer in butter-fat than it ought to be. Shallow pans as well as deep-setting pans cause waste, especially when the temperature is low and the skimming imperfect. For hogs, barley or pea-meal, and shorts, should be added to the milk, with clover in the summer. Better to cut the clover green and cart it to the pigs than turn them into the field; this is what the Danes do. (And the English too.—Ed.) Calves need oilcake (Linseed, not cottonseed cake.—*Ed*) with whey or buttermilk.

Mr. D. M. Macpherson, M.P.P., spoke of the "Dairy-cow." A balanced ration for her in winter would be: 60 lbs. of corn-silage, 15 lbs of hay, and 8 lbs. of bran and pease-meal, half and half. When the best summer food, namely, grass, runs short, give tares, corn and bran.

Capt. Sheppard gave an address on "Country Roads."

In the evening, Prof. Dean spoke on "Domestic economy," mentioning particularly the general waste of food in cooking.

The deputation held meetings at Alexandria on Saturday afternoon and evening. Mr. R. R. Sangster presided. Prof. Dean gave in the afternoon his address on the "Dairy cow, how to know her and how to get her." The profitable dairy cow, he said, is one which is a great eater with strong digestion, strong constitution and large milk production. The indications of vitality or constitution are depth of heart and lung region, easy and regular breathing, mellow skin and oily hair. A cow must also have nerve force to drive her complex machinery. This is indicated by a large full eye, prominent backbone and a large forehead. Good digestion is indicated by large mouth, strong lips, spinal processes sharp at the withers, large space between hipbone and ribs, and depth from hip downwards. Ability to secrete milk is indicated by a large udder covered with soft mellow skin and hair, large milk veins and milk wells, teats of good size and well placed, and the fore ribs

pitched sharply. Incidentally, she should be fine in the horn, neck, legs and tail, and be broad across the loin and pin bones. To get her buy or breed. The latter is recommended. Breed the best native cows to pure-bred males of one of the milking breeds and of a good milking family. The heifer calves should be kept in good thrifty condition and be bred to drop their first calves at from two and a half to three years of age. They should drop the second calf at from a year to sixteen months later. This will develop the milking habit in the heifer which is likely to remain fixed in the cow.

The discussion was continued by Messrs. P. Chisholm and J. L. Wilson. Mr. Wilson also gave a practical address on ensilage.

In the evening Prof. Dean dealt with "Dairying in Europe." The homes of the leading dairy breeds of Canada are found in Europe. The Ayrshire is a native of Scotland, the Holstein of North Holland, the Jersey of the Island of Jersey, and the Guernsey of the Channel Island of the same name. The first-named breed has been bred and fed especially for the production of milk suited to the manufacture of Cheddar cheese. The second for the giving of a large quantity of milk and the two latter breeds for butter-making. In selecting a breed for Canadian dairy practice these natural tendencies of the breed should be considered.

FODDER-CHEESE.

Not made last year—Proper time to make cheese - To make butter all winter—To look to quality.

By to night's issue of the Daily Witness, I see there are several factories starting to make hay or "fodder cheese on account of the high price of the real article at present. This is a great mistake. By concerted action, last winter and spring, on the part of most factories in Ontario and Quebec, there where few fodder cheeses made, so that our market was not long in getting into a healthy shape, and it has remanded so until now; but it will not take a great many poor cheeses to derange (as it were) the stomach of the market.

The proper time to make cheese is in warm weather, or moderately warm, at all events. Make butter in winter in all factories wherever there is milk enough, even though you may not make just as much money at first; study what will injure the market later and strive to obviate it if possible, and it is quite possible to do so. Last year, the season opened later on account of the recommendation of the Cheese and Butter Association of Montreal and other parties advising as well not to make any purchase. Still, the shipments during the season of navigation were the largest on record, and our butter exports were nearly up to our old time shipments. Many hold the opinion that those in authority, such as our dairy associations, the cheese and butter association, have no right to interfere or dictate what should or should not be made. Certainly, those who make it a special study and have an idea what is best for all concerned are in a better position to know than individual factorymen or farmers. The Cheese and Butter Association of Montreal, is certainly in the best position of any to recommend what line to follow, although many say it is from selfish motives they do so; but my opinion is quite the reverse, as when cheese is low, so low, in fact, that it does not pay the farmers, the buyers are not making any profit either; but, when prices are high they have some chance of making money. During the first three months of last season, say up to the end of July, I doubt very much if there were any exporters who had made any money in cheese; at least, put them all together, and feel sure they had not made a dollar. But the moment cheese began to move upwards, they started to make a little profit, and the season on the whole was a fairly good one at the close.

I would urge all the makers of this province not to make "fodder cheese" at all or as little as possible, if they want a fair price for their cheese. Later on, you may possibly get a fair price for a few fodders, but, as surely as night follows day, will prices fall if there is any quantity made; and just in proportion to the number made, will the low prices last. If each one would work for the public good, instead of for self, the results would be far different.

Let those that are in a position to make butter do so, and let those that are not delay making cheese as long as possible. I feel satisfied that, if this advice is followed, cheese will be all right. We are making enough cheese now; and we have plenty of chance to augment our butter exports; let us continue to improve in quality, and there is no doubt we shall overcome all the objections and prejudices of the Englishmen, or perhaps I should use the word Britishers, as I see my countrymen are getting up petitions to use only Britain instead of England. Be that as it may, I shall here repeat it over again, "let us continue to improve in quality", and there is no danger but what our exports will be all on the right side. Delay making cheese as long as possible, even should you not get half value for your milk, and if you do, you will get a better value later on.

Chateauguay, Feb. 10th 1897.

PETER McFARLANE.

MILK FEVER.

February 12th, 1897.

Mr. EDITOR;

Dear Sir:

Seeing a recipe from A and G Rice, in your February number, for milk fever, for it I am very much obliged for the good of the back-woods farmer like myself. I will give my experience; I have had four cases of milk fever in my herd; the first cow I went for a veterinary surgeon; I had to go six miles to get one. I did all he ordered for cow, but she died in spite of us. The next one was taken on a very stormy night and I did not get a Vet. on that account, but doctored her myself. I took one pint linseed oil, made it very warm, so it would be thin to mix, put in two large spoonfuls of turpentine, one large spoonful of Cayenne pepper, two spoons of ground ginger, and mixed them in a bottle. Shook them well and gave it to the cow. Then I covered cow up with two buffalo robes, put horse blankets over it, waited one hour, repeated the dose in fifteen minutes after, put my hand under the robes and found the cow beginning to sweat: a sure sign she was coming out all right. I have had two cases since; never gave but one dose in these cases and cows came out all right. I have tried the turpentine in case of stoppage in cow after nothing passed her for several days; in six hours cow was all right. I gave five spoonfuls in a pint of new milk. I give this recipe because it is more simple and almost all farmers have it on hand. If you wish to put it in the journal, all right; if not, it will do for waste paper.

Yours,
T. W. PAIGE, Bolton Glen,
P. Q.

THE INFLUENCE OF THE COMPOSITION OF MILK ON THE CHEESE YIELD

Lloyd on cheese—Pasture — Experiments on milk Curd and fat.

Recent interviews with well-known Cheddar cheese-makers have shown a great diversity of opinion to exist upon this important point. Some makers believe that the higher the percentage of fat present in the milk the greater will be the yield of cheese from a given quantity of the milk. Others contend that there is a limit to this, and that the percentage of fat must properly balance that of casein, in order to obtain the greatest yield. No doubt much depends on the composition of milk in cheese-making, and it stands to reason that all the different proportions cannot be alike calculated to produce the best article, or the most of it.

In looking over the records of some of the more recent investigations on cheese-making, we find that the experiments conducted last year at the Cheese School of the Bath and West of England Society by Professor Lloyd, and recorded in detail in the recent issue of the Journal of that Society, throw considerable light on the subject. As a rule, from beginning to end of the cheese-making season cows are out on the pastures and receive nothing in the way of artificial feeding. Now, in that case the milk naturally becomes more and more rich, not only in fat, but also in casein and other solids, as the season advances, at the same time a corresponding and proportional increase in the yield of curd taking place. In such a case it is impossible to determine the individual effects of the increasing percentages of fat and of casein upon the curd yield. But, by special feeding during part of the season the composition of the milk at the Bath and West School was, as we shall see, affected in such a manner as to make the result there obtained peculiarly adapted to illustrate the points in question.

At the beginning of the season the cows which supplied the milk used in the experiments were out on the pastures, and each animal received, in addition, 4 lb. of decorticated cotton cake, and 2 lb. of a mixture of bran, ground cottonseed (containing 23 per cent oil), and barley meal. The use of this artificial food was continued for a period of six weeks, after which the cows received nothing but their regular summer pasturage, but towards the end of the season artificial food was again supplied. During the whole period a complete record of observations and analyses was kept, and the following extracts are taken therefrom. The figures are averages for each month:—

It will be seen that the effect of the high feeding with artificial foods was to produce milk exceedingly rich in fat, containing in April no less than 3.70 per cent. With the cessation of the supply of concentrated food in May, the quality of the milk fell, so that the average percentage of fat was only 3.39. As the season advanced the composition of the milk gradually improved, as it invariably does, until in October the percentage of fat was 4.55. Now, it is a popular belief, and one which has been supported by the results of certain experiments in America, that the quantity of casein in milk bears a uniform relationship to the quantity of fat. But, if we compare the percentages of these two constituents given in the above table, we shall see that in this case at least no such relationship exists, for while in the month of April the percentage of fat was 3.70, and that of casein 2.43, in May the casein had risen to 2.60 with a simultaneous fall in the fat percentage to 3.39. And towards the end of the season, when artificial food was again given, it will be noticed that fat production again received a stimulus, the casein suffering little or no change. These figures clearly prove that rich feeding, while increasing the percentage of fat, has little, if any, effect upon the casein of the milk.

	Fat in milk Per cent.	Casein in Milk Per cent.	Lb. of fat to 1 lb casein in milk	Lb. curd from 1 gallon milk.	Fat in curd per cent.
April	3.70	2.43	1.52	1.06	32.27
May	3.39	2.60	1.30	1.10	29.78
June	3.51	2.58	1.36	1.01	29.70
July	3.60	2.67	1.34	1.10	31.10
August	3.80	2.68	1.41	1.12	31.17
September	3.94	2.91	1.3	1.25	29.91
October	4.55	2.92	1.55	1.25	31.05

Now let us see to what extent the actual yield of curd per gallon of milk is influenced by the fluctuating percentage of these two constituents of the milk the fat and casein respectively. Beginning with April, we find 3.70 of fat in the milk opposite a curd yield of 1.06 lb. to the gallon. In May we find a reduced percentage of fat, viz., 3.39, to give an increased yield of curd—1.1 lb., whilst in June much less curd is obtained, although the milk has become richer in fat. Again, the curd yields for September and October are identical, although the milk in the former month showed 3.94 of fat as compared with 4.55 in the latter. Evidently, then, the yield of curd bears no relation to the percentage of fat which the milk contains.

But, if we compare the percentage of casein in the milk with the yield of curd, a pretty uniform relationship between the two will be found to obtain. Thus, in May an increase in weight of curd takes place, corresponding with an increased percentage of casein, while in June less curd corresponds with less casein. Again, in July and August the percentage of casein in the milk is practically the same, and so also is the weight of curd, and in September and October 2.91 and 2.92 respectively of fat give an identical yield of curd.

As regards the quality of the curd (i. e., the amount of butter fat which it contains) it would seem that the richest curd is produced when the milk contains a relatively high proportion of fat to casein.

It would appear, therefore, from the results of these experiments, that feeding with concentrated artificial foods produces milk rich in butter-fat; that the proportion of casein in the milk is but very slightly, if at all, affected by such feeding; that the percentage of casein in the milk bears no fixed rela-

tionship to that of fat; that the weight of curd produced from a given quantity of milk is not dependent upon the richness of the milk in fat alone; but that an increase or decrease in the casein of the milk is followed by an increased or decreased curd yield; and that the best quality of curd is produced when the proportion of fat to casein in the milk is highest.

Every cheese-maker knows that he gets more curd from the milk at the end than at the beginning of the season. Do not those makers who contend that this is owing chiefly to the high proportion of fat or cream in the milk do so for want of the knowledge that the milk is, also, at the same time, rich in casein, which, however, owing to the condition in which it is present in the milk, does not admit of its proportion being determined by the eye as does the cream?

J. McCREATH, F.C.S.

The Orchard and Garden.

HORTICULTURE.

Special Attention to be Paid to the Juvenile Department.

The Montreal Horticultural Society held its annual meeting January 27th and elected officers for the ensuing year. In addition, a number of questions of interest to the members were taken up, and an excellent and encouraging address was delivered by the president, Mr. D. Williamson. They had so interested the children that 1013 members now belonged to the juvenile department, and there was every prospect of still more coming in. The principals of most of the Protestant schools had taken up the question, and already the Roman Catholic board was taking a great interest in regard to it. The directors would do well to give this department particular attention. The competition between the owners of city and suburban gardens for the prizes offered by Messrs. Evans and Johnson had been exceptionally keen, and these gentlemen deserved the thanks of the society for their kindness in tendering prizes.

The annual show, which had taken place during the year, had been held in conjunction with the Provincial Exhibition, and the entries had been more numerous than ever, the fruit exhibit being especially large and fine. The incoming directors would do well to consider the suggestion of holding a small exhibition every month, and members should learn that prize money was not the only thing to be sought by exhibitors, but that the advancement of the objects of the society should be sought.

The incoming directors will be asked to decide as to the advisability of issuing a regular monthly periodical.

The choice of the members with regard to the election of new officers resulted as follows; Hon. president, Mr. W. ''. Ogilvie; hon. vice-president, Mr. Rob. t Mackay; directors, Messrs. W. Ramsay, F. Roy, Robert Reid, J. A. Hardisty, John Doyle, Newman, Jules Betrix and D. Williamson; auditors, Messrs, Riddell and Common.

It is pleasing to note that the financial statement of the society shows a balance on hand, whereas last year there was a deficit.

SPRAYING.

Uniform formula needed—Bordeaux mixture—Formula now in use in Canada—Formula for potato-rot—1897 probably a bad fruit year.

Central Experimental Farm,
Ottawa, February 10 1897.

To A. R. Jenner Fust.

Dear Sir,—I am pleased to see in your issue of February 1, an article by Mr. Geo. Moore calling attention to the necessity of spraying if we would preserve our fruit plants from injury by insects and disease. Bordeaux mixture is undoubtedly the best, though not a perfect agent, with which to combat fungous diseases. It has been recommended by this division of the Central Farm during the past five years, and these recommendations have been based upon results obtained by careful experimentation. What I wish to emphasize at the present time is the necessity of recommending for adoption uniform formulae not only of fungicides but of insecticides. Confusion and mistakes arise even in the exercise of the greatest care, and we hear of disappointments and failures occuring here and there, many of which are due to confusion of formulae. The Bordeaux mixture, as first used in France and tried in America, was copper sulphate 6 lbs, lime 4 lbs. water 22 gallons. This formula was used during 1888 and the two following years. It has since been modified by doubling the quantity of water. A disavantage of this formula is, that unless the lime is strictly fresh, the mixture will not be a safe one to use. It is therefore advisable to test it each time. The greater the number of difficulties which appear on the surface, the less a new departure is likely to be practiced.

THE FORMULA NOW IN GENERAL USE IN CANADA.—After carefully testing various strengths of Bordeaux mixture I recommended, in 1892, the following formula, copper sulphate 4 lbs. lime 4 lbs. water 50 gallons.—To prevent leaf eating insects add 4 oz. of Paris green. This formula was, I believe, recommended by Prof. Green of Ohio in 1891. It is now used in Ohio, by the New-York Experiment Station, Geneva, and by the Ontario Government Experimenters throughout the Province. I have found it quite as effective in preventing apple spot, pear cracking, plum and cherry rot, grape and gooseberry mildew, as the formula containing 2 lbs. more of copper sulphate. It does not cause the russetting of apples and pears to the same extent as is seen when the stronger mixture is employed. In preventing potato rot, Dr Fletcher recommends the 6-4 formula, as does also Prof. Jones of the Vermont Experiment Station.

In using the 4-4 formula, having the lime somewhat in excess, if it is reasonably fresh there is no necessity to test the mixture when prepared to ascertain if there is any free sulphuric acid (the corrosive substance) present. This formula is also an easy one to remember. Let us adopt it and put it into practice. In conclusion, I think it well to remind fruit growers that, in all probability, we may look for a year of comparative scarcity of fruits succeeding the year of plenty which has just visited us. A large crop of fruit one year usually means a large crop of insects for the next year, when a small fruit yield will make their depredations all the more apparent. It behoves the Fruit Grower to prepare then for the enemy.

JOHN CRAIG,
Ottawa.

FRUIT-GROWERS MEETING.

On January 28th, a meeting of the fruit-grower's Association was held at Howick. The Minister of Agriculture, the Hon. Sydney Fisher, stated that the Dominion Government was considering the advisability of sending over to England a Canadian, whose duty it would be to watch over the interest of Canadian producers in the English markets. Without making any positive promise, he thought is highly probable that, if the Canada fruit growers would be benefited by such an appointment, it would be made before long.

This seemed to suit the views of the audience, as fruit-growers have long felt that great losses have been incurred by their having had no one in England to attend to their interests.

Mr. Jack, of Châteauguay, spoke of birds and the many instances in which they aided in the preservation of fruit, by devouring the insects and worms that infest the orchards. (Pray do not protect the sparrow! Ed.)

Mr. R. W. Sheppard read a paper on "The Fameuse, and the apple-crop of 1896". This apple is very popular in England. If Canadians wished to keep their hold on the English market, they must send only the best qualities of fruit thither. At present, Canada apples commanded better prices than U.-S., apples, and we ought to maintain this supremacy.

At Howick, on January 29th, the Huntingdon Dairymen's Association held its annual meeting, under the presidency of Mr. Robert Ness. The Chairman, in his address, stated that there were 12 creameries and 77 cheeseries at work in the district of Beauharnois, producing a return of $610,000, $123,000 of which was for butter, and $487,000 for cheese. It was a matter for congratulation that the political leaders of the day had placed at the head of agriculture affairs a gentlemen who thoroughly understands the needs of the farmer.

The Hon. Sydney Fisher, in replying to an address congratulating him on his appointment, said that he occupied his present position mainly because he was a farmer.

With reference to the removal of the quarantine restrictions, he had no doubt, but that the change would be benecial to the farmers of Canada. While speaking on this subject, Mr. Fisher said that he looked for the co-operation of every dairyman in the Dominion in order that any disease which might be found among cattle in different parts of the country might be immediately reported to the proper authorities. In conclusion, the speaker alluded to the benefits which cold storage system would confer upon the agricultural interests of the Dominion, and said that if once Canadian products could be placed upon the English market in first class condition, such great demand would be created for them that the export trade would become a profitable investment for the agriculturalist. At the conclusion of Mr. Fisher's address, letters of regret at the inability to be present were read from the Hon. Louis Beaubien and others. The treasurer's report showed a balance to the good of $217.16.

Hon J. C. Chapais then addressed the meeting at some length on the necessity of cleanliness in dairying if the best results and the greatest profits were to be realised by the dairymen.

CHERRIES; FROZEN TREE-ROOTS; CIDER; FERTILISERS FOR ORCHARD, etc.—Mr. J. C. Chapais read a paper on "The cultivation of cherries in the province of Quebec." A light sandy loam was the best for the purpose (the great cherry-orchard in Kent-England, are almost all on the "Greensand" of the chalk-formation. Ed.) The land should be properly drained (naturally drained, for the roots would soon choke pipes however deeply sunk, and open ditches do not "draw" water like pipe-drains. Ed.)

Prof. Craig spoke of the freezing of the roots of fruit-trees in such snowless winters as the present. He expected a great loss of trees in consequence. As a means of preventing a recurrence of *this condition of things, he advocated* the planting of clover in the orchard. This would serve two objects. Firstly, it would provide nitrogen for the soil, and, secondly, serve to protect the roots of the trees from the frost. The variety of clover recommended was the Mammoth Red, a species which was at once hardy and prolific.

During the afternoon, Mr. Dunlop, of Outremont, briefly described the manner in which the surplus apple-crop was disposed of in the States. The apples were evaporated or canned, and paid fairly.

As for turning the early apples into cider, Prof. Craig very sensibly warned farmers against it, as they by no means suited to the purpose (the best cider-apples of Gloucestershire, Herefordshire, and Devonshire, are almost uneatable in their natural state; hard and bitter; and so are the pears from which the best "perry" is made. Ed.)

Prof. Shutt addressed the meeting on a most interesting subject: "Fertilisers for the orchard." Canada hardwood ashes he considered to be the best and cheapest means of supplying potash, while the extra phosphoric acid could be furnished by bone-meal or plain super phosphate, and nitrogen by sowing clover and ploughing it in; though, as the professor sensibly remarked, there would be additional profit where the crop of clover could be utilised by feeding it to the farm animals, the manure from which would contain about seventy-five percent of the plant food constituents extracted from the soil. If wood ashes were not obtainable, potash could be purchased in the form of muriate of potash.

Mr. Jack does not love the sparrow, and no wonder. They do enormous damage to the grain-crop when ripening; in fact, Mr. Irving, of Logan's Farm, told us, some years ago, that he had given up sowing fall-wheat, because as it ripened earlier than other grain, the sparrows from the whole district collected and attacked it as soon as it began to turn. What a cloud of the destructive wretches did we see on a fine piece of oats on the Seminary Farm, Sherbrooke Street! There could not have been fewer than 500 of them, and what they ate bore no proportion to the quantity they destroyed by breaking down the h s and straw.

UTILISATION of SURPL S FRUIT.

(By E. Dunlop.)

Variety of apples—Evaporators—Kilns Steam driers—Process of manufacture.

Outremont, December 20th 1896.

The Honorable Louis Beaubien,
Commissioner of Agriculture,
Quebec.

SIR:

In accordance with instructions received from you, to visit the Western portion of New-York State for the pur-

pose of observing the methods there employed to utilize to the best advantage their surplus fruits, more particularly apples, I have traveled through the Countries of Wayne, Monroe, Orleans, Niagara, etc., and beg to submit the following report of my observations.

APPLES.

The varieties grown are chiefly late keeping apples, consisting largely of Baldwin, Golden Russet, Rhode Island, Greening, King, Northern Spy, etc., the choice fruit of which is usually barreled and stored in ordinary and cold storage warehouses, in proximity to the various railway lines, enabling the fruit to be transported to distant markets at any time during the winter, without danger from frosts, the railways companies providing suitable cars for its transport. The second quality of fruit is used for the evaporataor and for canning, although, in seasons of abundant crops, it is often more profitable to the grower to dispose of the whole product of his orchards for canning or evaporating purposes, sorting out only the small and inferior fruit; as those will not do for canning or for making good evaporated stock. In this way, he saves the cost of barrels, hand picking and packing, as contracts are made for the product; to be shaken from the trees and delivered in waggons." The small and inferior apples are largely used in the manufacture of cider, vinegar and chops, the latter being the apples simply sliced and evaporated, without being either peeled or cored.

EVAPORATORS.

The county of Wayne is the home of the evaporating industry in this State. Some 25 to 30 years ago a small commencement was made, and the development has been so rapid that there are now some 2,500 evaporating plants in operation.

In 1894, there were shipped from Wayne County 22,500,000 lbs. of evaporated apples, and it is estimated that the product of the present year will be about 36,000,000 lbs., to produce which will require 6,000,000 bushels of apples.

In most of the evaporators, the machinery is run by hand and foot power, but in some of the larger plants, it is run partially or wholly by steam power, and the appliances are very complete for the economical handling of the fruit. The driers most generally used may be divided into four classes, viz., hot air, upright tower, the portable, hop kiln and steam drier.

All of those styles do good work, the hop kiln is the cheapest to construct and to run, but the hot-hair upright tower makes the finest fruit, as a rule.

PORTABLE EVAPORATORS.

These are not now used to the same extent as formerly, but for family use are still popular. A machine, made at Marion, Wayne Co., New-York, by R. Tapping, is much used. These machines are made in four sizes No. 1 capacity 3 to 5 bushels per day, price $15.00, without furnace; No. 2, 10 bushels per day, $28.00; No. 3, 15 bushels, $40.00; No. 4, 25 to 30 bushels, $50.00; No. 2, 3 and 4, with furnace complete. The Trescott M'f,g. Co. of Fairport, N.-Y., also manufacture portable evaporators varying in capacity from 15 to 150 bushels per day.

THE KILN DRIER.

The kiln is simply a chamber with a slatted floor heated from underneath with hot air or smoke pipes, or steam pipes. The floor is made of hard wood, sawed about seven eighths of an inch wide on top and half an inch at bottom, and laid one fourth of an inch apart on floor; the slats, being narrower at bottom, do not clog or fill up but allow the free ascent of the heat from below.

The smoke stack from the furnace runs through the room, and suitable apertures are provided for the escape of the moistened air created by the evaporation.

The kiln is generally used for drying the skins and cores of apples and for chops, sometimes for the making of "white stock", that is, the commercial grade of sliced evaporated apples, but is generally less efficient in the production of a first quantity of fruit than the other styles of evaporators, because the fruit is not so completely under the control of the operator. The fruit must be shovelled over from time to time to ensure a good product. The handling is in itself a menace to good fruit, and where there is any quantity on the floor, it cannot all be dried equally. That which is dried enough is generally obliged to wait until the least dried portion is perfected. Yet there are instances in which the operator exercises sufficient care to turn out a product which is indistinguishable from the tower-dried fruit.

The particular merit of the kiln-evaporator is its cheapness.

THE TOWER DRIER.

This is the form of evaporator most generally in use. In the smaller establishments, the stock or tower is usually constructed of wood, with a foundation of brick in the portion which contains the furnace.

There is a great liability to fire however, when constructed in this way, and as insurance rates on these buildings are very high, the stacks of the larger evaporators are built entirely of brick.

The stacks are from 35 to 40 feet in height, the walls 4 inches thick, plastered on the inside and of a size to admit the trays generally used, which are 49 inches square. One or several stacks are placed in the same building according to the capacity of the establishment. The stacks start from the basement, and under each is built a furnace, two openings are provided for the admission of air from the basement, which, passing over the heated furnace, dries the fruit as it ascends to the outlet carrying with it the vapors of the fruit.

Above the first floor of the building through which the shaft rises, a small door covers an aperture in the shaft sufficiently large for the entrance of a man, in case cleaning or repairs are needed. The lower section of this door is hinged, enabling it to be raised for the insertion of the trays of fruit, each shaft containing about 25. Those trays are raised by a lifting apparatus, so that the fresh fruit is always inserted at the point nearest the furnace, and the time of lifting is so arranged that when the tray first inserted reaches the top of the lift, on the second story of the building, it is ready for removal.

There are many styles of apparatus in use for the lifting of the trays, some working by an endless chain of a shaft moved by a crank, while others work directly by means of a lever. The most popular device is the Culver-Cassidy, a combination of two patents.

The following description of this apparatus is taken from the Bulletin of the Cornell University Agricultural experimental Station by Profesor L. H. Baily, Horticulturist, to whom I am indebted for many of the descriptions of this report.

The lifting apparatus consists of two double runs or columns of dogs on each side of the stack, and a head block above. One line of dogs in each column is stationary and holds the tray, and the other line is movable and lifts the tray. The dog is a piece of cast-iron hung on a pivot, there are two of those dogs, side by side. The side of the tray rests on the projecting portion above. One line of the dogs is raised by the head block and the tray is lifted with it, the side of the tray as it rises forcing in the dog above it. As the tray passes the dog, the latter falls out by its own weight and the tray rests upon it, whilst the head block is let go, and the moveable line of dogs falls back to its place.

The moveable or lifting line of dogs is raised by the head block. This device is secured to a timber let into the brickwork and through which the head plays.

The apparatus is moved upwards by means of a lever which works on a chain fastened below. A rope drops from the end of the lever to the operators hand on the first floor. The operator therefore pulls down on the rope, moving all the trays up one notch, thus leaving the lowest notch free for the insertion of another tray.

THE STEAM DRIER.

Steam is sometimes used and, for operations on a very large scale, probably furnishes the most efficient and economical heat. Coils of steam pipe are laid in horizontal tiers, the space between each two tiers being just sufficient to allow of the easy insertion of one or two trays. Each tray is therefore independent of all others above or below, so it may be allowed to remain in its original position until the fruit is finished. A narrow horizontal door is provided for each space. These tiers of steam-pipes may reach a total height of five or eight feet, and several stands of them are placed alongside and the whole is usually boxed in with lumber. It is estimated that 4,000 feet of one inch pipe gives a capacity of 300 bushels of apples per day.

As previously stated, the greater number of the evaporators in use are the tower or stack form, and are only moderate capacity, turning out from 75 to 200 bushels per day. These are, in general, owned and operated by the proprietors of orchards, and family labor, is employed to a great extent.

Evaporators of this capacity, where only hand power is used, can be constructed very cheaply, the cost of plants, having a capacity of 100 to 200 bushels per day, ranging from $800.00 to $1,400.-00. To turn out 100 bushels a day, eight hands are usually employed, four of whom may be women. The buildings are usually of two stories, and a basement constructed of wood. The basement serves for the furnaces and the fuel supply, anthracite coal being generally used. The first floor is the receiving room for the fruit, which is here prepared and placed in the shaft of the evaporator. The second or top floor is used for the storing and packing of the prepared fruit, which is removed from the stack at this elevation.

PROCESS OF MANUFACTURE.

The apples are first pared and cored, which is done by a machine worked by either steam or hand power, the capacity of one of these machines, worked by hand, is from 65 to 75 bushels per day and the substitution of steam power does not appear to materially increase the product, as in many large establishments using steam power, they prefer the hand worked parer and corer. After passing through the machine, the pared and cored apples are then trimmed, that is, any small portions of skin remaining and any unsound portion of the fruit is removed.

Women are employed for this labor, two for each parer. The trimmed apples are now ready for bleaching, which is accomplished by subjecting them to the fumes of burning sulphur.

This is an important operation, as too long an exposure would spoil the flavor of the fruit and too little would not prevent the air from acting on the acids of the apple, depriving it of that snowy whiteness which is so much prized. There are many different forms of bleachers in use, performing their work more or less rapidly, the time of exposure varying from 12 to 15 minutes to half an hour or more.

After bleaching, the apples are then conveyed to the slicer, a small machine having a capacity of 40 to 50 bushels an hour and which is operated by a boy. The apples are fed to the slicer in such a way that they are cut into rings, the space taken out with the score forming the centre, and are then in shape for the evaporator. They are then spread thinly on trays and placed in the evaporator, each tray being raised at suitable intervals to be replaced by a tray of fresh fruit from below, until the finished product is taken out at the top and deposited in the storage room on the second floor.

Here it is allowed to remain for some days, being turned over at intervals in order that the product may become more uniform by the absorption or exhalation of moisture, the thinner or drier portions absorbing from the thicker or least dried a portion of their moisture.

The drying is the slowest part of the operation and the kilns are kept going night and day.

WASTE.

The parings and cores are evaporated separately, owing to the cores requiring a greater time to dry.

They are afterwards mixed and sold as "Waste." The demand is principally from Europe and the price realized about one fourth the price of good commercial stock.

(To be continued).

Ottawa, Feb., 15th 1897.

DEAR SIR,

I enclose a synopsis of a bulletin shortly to be published by the Department of Agriculture. Growers about Montreal will, I know, be much interested in this matter. The readers of the Journal, I trust, will obtain some hints of value.

Yours truly,
JOHN CRAIG.

BRIEF HINTS ON TOMATO CULTURE.

— by —

John Craig, Horticulturist
Central Experimental Farm,
Ottawa

The possibility of marketing Canadian tomatoes profitably in England has aroused a spirit of enquiry among market-gardeners and fruit-growers, relative to the best methods of growing the plants, and the best varieties to cul-

tivate for this special purpose. The following notes are prepared with a view of briefly answering these questions.

RAISING PLANTS.—The summer season of Ontario and Quebec is not long enough, to admit of the profitable cultivation of tomatoes without the aid of a greenhouse, hot bed or window box in starting the plants in spring.

SOIL FOR SEED BOXES :—The soil should not be too rich. A mellow loam of good quality, with sand added to the extent of one-fifth of its volume, will produce stronger and healthier plants than will the leaf mould one frequently meets with in window boxes. If a greenhouse is available, the seed may be sown about the middle of March, or a month earlier if the plants are intended to serve the needs of the home market. A high temperature, 65 degrees to 70 degrees at night and 80 degrees to 85 degrees in the day time, will produce large, succulent, but tender plants. A too low temperature will produce stunted weaklings. Neither class are desirable. It is better to have it slightly too warm than too cold, in consideration of the nature of the plant. Sow the seed thinly in rows six inches apart, pressing the soil firmly over the rows. The seedlings should be transplanted at least twice before setting them in the field. This treatment gives strong, stocky plants. If grown in the greenhouse, the seedlings should be pricked, after the true leaves appear, into "flats," shallow boxes, setting them two to three inches apart each way. From these "flats" they are again removed when they begin to crowd each other, to the cold frames or hot bed, setting them six to eight inches, apart each way, or further if the plants are large. By the middle or in a backward season, the last week in May (in this district) they will have made large, stocky plants and are ready for the field. The sashes, or other covers used to protect the frames, should be kept off the frames for some time previous to setting them out, in order to harden the plants.

When the seed is sown directly in the hot-bed, this should be done early in April. A strong, even heat is desirable, such as may be secured from a two foot bed of horse manure. Sow the seed after the heat has subsided to 75 degrees. Other frames should be provided for the reception of the plants when they are removed from the seed rows. Transplant twice, if possible, before setting in the field.

IN WINDOW BOXES; Fairly good plants may be grown in boxes of soil or flower pots placed in well lighted rooms, but owing to the fluctuations of the temperature of dwelling houses and the lack of light, they are often stunted and injured. When any considerable number is required, a hotbed should be employed. The remarks made above on transplanting apply, with equal force, whether plants are grown in the greenhouse, in the hot-bed or in the dwelling house.

FIELD CULTURE.

SOIL :—It is a mistake to plant tomatoes on poor soil. It is true that a warm and somewhat light soil will produce better plants and earlier fruit than will a heavy clay, but a large crop of smooth, well grown tomatoes cannot be ensured unless the soil is fairly well enriched. Poor soils produce small, early and badly wrinkled tomatoes. Sandy or light clay loams, well drained, will give the best returns.

PREPARING THE GROUND :—Plough deeply in the fall. In the spring apply barnyard manure, 20 tons to 30 tons to the acre, and harrow smooth two or three weeks before planting time. Harrow again just before marking out the rows, to destroy the first crop of weeds.

SETTING THE PLANTS :—It is better to set the plants in rows 5 x 3 feet apart, rather than 4 x 4 feet apart, each way, as the wider space facilitates the work of picking the fruit. Planting will be expedited if a light furrow is opened in the line of each row.

PLANTING :—Before lifting the plants out of the boxes or frames the soil in which they are growing should be thoroughly watered, so that it will be saturated to the depth of the lower extremities of the roots of the plants. A few hours after this is done the plants may be taken up with a ball of earth about the roots of each by using a sharp trowel or spade, if they are far enough apart to allow of the use of the latter implement. The plants should then be placed in carrying boxes, and be transported to the field in a cart or wheelbarrow, and set in the freshly opened furrows. When planted, the ball of earth should be about an inch below the surface, and the soil should be firmly pressed about the lower roots. About three thousand plants are required to set each acre, when planted approximately 5 x 3 feet apart. If by any mishap the plants are tall and spindling, they should be set in a slanting posture, with a view of covering the procumbent stem with soil so that it may strike root. (1)

CULTIVATION.

Shallow and level cultivation should be given for a month after setting. It is advisable to attach the moulding wings to the cultivator and with these throw soil to the plants, the operation is finished by making with a hoe, about each plant, a broad, sloping mound two or three inches in height. This will tend to distribute the fruiting branches and will, by shedding rain, to some extent lessen the tendency to rot. After hilling, the level surface should be cultivated as long as possible without injury to the plants. If growth is unsatisfactory, it may be stimulated by a light application to each plant of muriate of potash, or wood ashes and nitrate of soda. Muriate of potash, 100 pounds, and nitrate of soda, 200 pounds, or wood ashes, 1000 pounds per acre, if scattered around each plant before hilling, will undoubtedly prove beneficial.

TRAINING :—Under field culture, it does not pay to train tomato plants to stakes or trellises. These systems belong to the garden of the amateur, and may there be practised with economy as to space, and satisfaction as to general results. In the field, some attention should be given towards securing a proper disposition of the naturally sprawling branches, to prevent too much interlacing and to secure their proper distribution.

PICKING AND PACKING FOR THE HOME MARKET :—Pick the fruit when fully coloured, being careful to avoid bruising it. Discard all ill-shapen or blemished specimens. The fruit should be carried to the sorting shed and carefully packed in the shipping baskets or packages. Place the fruit stem end downwards, wiping such specimens as are soiled; finish the package with a smooth face. Strong baskets—veneer is better than the splint—should be used, and those covered with a stout frame—like cover made of the veneer trimming material, but centered with lino.

PACKING FOR FOREIGN SHIPMENT :—If the fruit is intended for the European market, it should be picked when full grown and just beginning to change colour—if it is to be forwarded in thoroughly refrigerated compartments. Specimens partly coloured sent last year, arrived in England in an over-ripe condition with imperfect ice refrigeration. If shipped by ordinary freight, which may be successfully done with good ventilation, the fruit should be packed when fully developed, but "yet green in colour." The fruit should be carefully graded as to size and with regard to its characteristic colour when mature. Scarlet and purplish red varieties should not be packed together in the same case.

PACKAGES :—Light, strong wooden ventilated cases are recommended. A case of the following dimensions will hold 20 lbs. of medium sized tomatoes, two rows or layers deep. The two layers should be separated by a sheet of stiff cardboard, unless each fruit is wrapped in tissue or light printers paper. To prevent the fruit shaking, place a layer of clean excelsior on top before nailing down the cover.

The words "Canadian Tomatoes" should be branded upon the ends of each case. The name and address of the grower should appear on a printed sheet within.

DIMENSIONS OF CASE OUTSIDE.—Length 22 inches, width 10 inches, depth 5½ inches. It should be provided with a partition cross-wise in the middle. The boxes should be made of planed lumber and ventilated by holes or open slits at the sides. Such a case will hold about four dozen medium size tomatoes and weigh 20 to 25 pounds. Thickness of lumber, ends and partition ⅝ inches sides, top and bottom ⅜. Ventilation could be provided for by using slightly narrower side pieces than called for by the depth of the box. The top and bottom pieces should come flush to the corners. This would leave a slit the length of the case without weakening it to any extent.

VARIETIES :—If it is intended to ship the fruit to distant points, medium sized, smooth, solid bright colored varieties should be mainly grown. Most extra early kinds are inclined to be rough or wrinkled. Among those that seem best suited for export purposes, as tested here, are :—Longkeeper (Thorburn), Stone (Livingston), Favourite (Livingston), Liberty Bell, Cook's Favourite.

(1) Very good advice.—Ed.

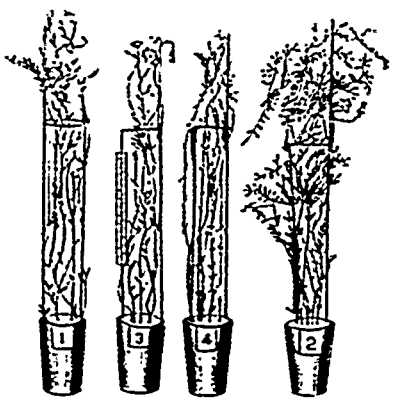
Notes by the Way.

ROTHAMSTED EXPERIMENTS.—If any one of our readers will take the trouble to examine the reports of the careful experiments conducted by Sir John Lawes and Sir Joseph Henry Gilbert, which were begun in 1843, and still continue, he will find that the application of superphosphate, without potash, to the wheat-crops, enabled that crop to take up an increased amount of potash compared with that in the unmanured crops. In certain experiments, now being carried on at the Ohio experiment station, potash seems to have no effect on the wheat-crop, whether used alone or in combination with any other manures. In Kentucky, though potash has largely increased the crops of corn, hemp, tobacco, and potatoes, it has utterly failed to exert any influence on wheat, whether used alone or in combination.

NODULE-BACTERIA.

The following two examples of the proper use of "nodule-bacteria" will, we hope interest our readers. The four pots are supposed to be sown with the ordinary pea, and inoculated with nodule-bacteria from the French-bean (phaseolus), trifolium (clover of some sort), Robinia, (a pod-bearing tree like the acacia) and from the pea itself. The plants of the pea, as given in the cut, when treated with its own private nodule-bacteria, is seen to have grown luxuriantly while the others did not take to the addition of the same dose at all, though the whole four plants belong to the same order, the "leguminosæ."

In the 2nd cut, it will be noticed the "False-acacia" does not at all approve of the provision made for it of the nodule-bacteria of the pea, but flourishes amazingly on its own kind.



Pea Plants (Pisum sativum) inoculated (1) with nodule bacteria from Phaseolus, (3) from Trifolium, (4) from Robinia, (2) from Pea.

We now really may hope that the novel fertiliser we mentioned in the December number of the Journal under the name "Nitragen," will turn out to be practically useful, in spite of the apparent absurdity of the statement that

Robinia Plants (Robinia pseudacacia) inoculated with (1) nodule bacteria from Pea plant (Pisum sativum), (2) nodule bacteria from Robinia pseudacacia.

for 60 cents enough may be bought to dress an acre of land. We remember too well how all English farmers looked askant, when they were first told that 3 cwt. of Peruvian guano was a full dressing for an acre of wheat, to have much incredulity left when matters of scientific investigation are concerned.

ROOTS AND CORN.

Sir John Lawes and Sir Henry Gilbert agree with Mr. Wm. Ewing, of Montreal, in the opinion that, although the soil and climate of this part of the

Dominion are highly favourable to the growth of maize, still, some cultivation of the root-crop is decidedly advisable. Gilbert, in his lecture was struck with the absence of those crops in the Eastern States, and asked how it was they were not brought in as elements of the rotation. I was told that one potent reason was that no American would bend his back to hand-hoe!" If this was the case in this province as well, the following, from the seed Catalogue for 1897, will show how rapidly the growth of roots is increasing:

"In the last four years, our sales of Agricultural Root Seeds such as Mangel, Turnip and Carrot, have doubled, and this is one of the most hopeful signs in the Agriculture of the Dominion, more especially of the Province of Quebec, where we thank a great percentage of that increase has occurred. While strongly advocating an extension of the Silo system, we know that many sections are better adapted for growing roots than Corn, and even where Corn can be successfully grown, we advise the sowing of roots as well. Both are best. The sowing of the "best quality" of seeds is of the utmost importance, but the Farmer has to do his part also, and success with root crops need not be expected, unless the land be thoroughly and deeply cultivated, and from twenty to thirty loads of stable manure (or its equivalent of artificial manure) applied per acre."

At Sorel, Dr Silvestre, the principal seedsman in that city told us, not long ago, that his sales of turnip and other root-seeds had increased tenfold since we had introduced their cultivation in 1884. M. Séraphin Guévremont, who used to send his carrots and swedes, of which he has generally from 8 to 10 arpents, to Montreal, now consumes the whole of them with his milch-cows.

As for some parts of the province being "better adapted for growing roots than corn," we can testify that at Métis, where it is hopeless to attempt growing corn, swedes flourish amazingly, and the fly is unknown. Indeed, we never saw finer or more luxuriant swedes in all our experience than an acre or so we inspected at Little Métis some years ago. Badly cultivated, if you will, but soil and climate must have suited them, or they would not have grown so exuberantly.

Instead of "from 20 to 30 loads of stable-manure (or its equivalent of artificial manure) being applied to the acre," suppose we say 10 to 15 loads of dung and half a dressing of artificials: that would be better we think, as the use of 250 lbs of plain superphosphate would start the swede plant into vigorous life, leaving the dung to perfect its work later on. Mangels, of course, would need a dose of either nitrate of soda or sulphate of ammonia, as that plant is particularly avid of nitrogen.

A Sorel man and a couple of women or small boys single an arpent of swedes or mangels a day easily, at a cost of, at most, $2.50; carrots would perhaps require 50 cents a day more, as they are left pretty close together; but an acre of White Belgians are well worth the outlay for horses and cows. The day has long gone by, in that neighbourhood, for such extravagant calculations as we have heard of in the past. If a woman in Scotland can—and does—single half a Scotch acre a day; the Scotch acre equalling 53,700 square feet, why should it take a Canadian man a week to single an arpent that contains only 36,000 square feet? And yet such a statement has been made:

TEMPERATURE. At the beginning of February, we were called, on June business, to the office of the Sheriff of Montreal. To say it was warm there, does not express half the really frightful heat that impressed itself on our frame. We asked one of the officers of the Sheriff if he could tell us what the temperature of the room really was. Looking at a thermometer, he replied. 82o F.! Can we wonder at the number of white faces we see about, when people, who ought to know better, pass their working hours, they and their subordinates; in such a temperature as that?

EREMACAUSIS.—This term, derived from two Greek words signifying "self-burning" or, in better English, "slow combustion," is the action that diminishes the bulk of organic matter in dung-heaps, etc. Baron Liebig invented the term.

ENGLISH IMPORTS OF FOOD. The increase of the value of food imports into England from the year 1876 to the year 1896, despite the fall in prices, was very great:

	1876 £	1886 £	1896 £
Grain and flour	31,812,438	43,548,179	52,792697
Live meat	7,260,119	7,142,397	10,438,699
Dead meat	11,851,531	14,339,375	25,358,460
Dairy produce	13,955,989	11,975,061	23,915,368
Eggs	2,620,596	2,884,063	4,184,567
Lard	1,579,721	1,511,652	2,268,029
Hops, fruit, and vegetables	3,042,484	5,149,226	5,354,485
Total	£72,102,678	£89,782,933	£124,912,305

A difference of about $174,050,000 between the highest import value (1896) and the value of the import for 1896.

The total of wheat and flour in 1886 was greater than in 1876, although the former was a year of comparatively small imports; but the total of other grain was a little less in the later year, while the prices of the three principal cereals had fallen from 46s. 2d., 35s. 2d., and 26s. 3d. to 31s., 26s. 7d., and 19s. per qr. The number of cattle increased from 217,576 in 1876 to 319,622 in 1886, and yet the value rose by only about £200,000; and whereas the sheep were practically equal in number in the two years, the value fell by over £210,000 Pigs declined in number and still more in value. Dead meat increased by about 50 per cent. between 1876 and 1886, while the value rose barely 25 per cent., thus showing a great fall in prices. In dairy produce, again, the increase in quantity, especially in that of butter and margarine, was out of all proportion to the rise in value. Imports of eggs rose nearly 50 per cent in number, and only a trifle in value; while the other kinds of food included in the table increased in both respects

MERRY MILKMAIDS.

Out of our ten thousand subscribers, how many have ever read "The Complete Angler," by that illustrious poet—in prose—Isaak Walton? There are passages in it, particularly in the conversations between "Piscator" and his pupil, "Venator," that, in melody of language, purity of thought, and delicacy of expression, make one wonder how such exquisite word-pictures could have had their origin in the dissolute, debased times of Charles the second. We make no apology to our readers for the following extract from Mr. Clarke's poetical amendment to Mr. Woods' unpoetical disparagement of the "Merrie Milkmaid."

At the last meeting of the Musical Association, a paper was read by Mr F. Cunningham Woods, Mus. Bac., on the Popular Music of the Eighteenth Century, In the course of which he referred to milkmaids, amongst other trades, as being "unpoetical" subjects for some of the songs. In the course of the subsequent discussion, Mr. Ernest Clarke, Secretary of the Royal Agricultural Society, said he must take exception to Mr. Woods' reference to milkmaids as "unpoetical" people. Had he forgotten the milkmaid in Walton's "Compleat Angler," when Piscator described her as "singing like a nightingale? Her voice was good, and the ditty fitted for it; it was that smooth song which was made by Kit Marlow, now at least fifty years ago" the reference being made to the famous, "Come, live with me and be my love." When the milkmaid was asked to oblige with the air she sang before, she said, "What song was it, I pray? Was it 'Come Shepherds deck your heads," or "Phillida Flouts Me," or "Chevy Chase," or "Johnny Armstrong," or "Troy Town?" thus showing that she had an extensive répertoire. But she was not singular in these accomplishments A very famous passage in Pepys' Diary, under date May 8th, 1667, described how he went "to Westminster, on the way meeting many milkmaids with their garlands upon their pails, dancing with a fiddler before them; and saw pretty Nelly (Nell Gwynne) standing at her lodgings' door in Drury Lane in her smock sleeves and bodice, looking upon one: she seemed a mighty pretty creature." The references to milkmaids and their singing and dancing were indeed endless. In Sir Thomas Overbury's "Character of a Milkmaid" he said: "She is never alone; she is still accompanied with old songs, honest thoughts, and prayers." In a book called "Whimzies," 1631, stale ballad news were said "at last to grow so common as every poor milkmaid can chant and chirp it under her cows." A song of nine long verses in the Roxburgh collection, entitled "The Milkmaide's Life—to a curious new tune, called "The Milksmaid's Dumps," had, in one verse, "They pleasantly sing, to welcome the spring," and in another, "They dance away sorrow, and all the day thorow, Their legs do never fail." There was a brisk and lively tune, called "The Merry Milkmaids in Green" (also sung by Isaak Walton's Milkmaid) which had a peculiar interest, inasmuch as it was the same air which, when played slowly in the minor key, was the music traditionally sung on the stage by the mad Ophelia in her pathetic lament, "And will he not come again?" Milkmaids were, indeed, universally recognised as a merry and tuneful class, and Mr. Woods might not be aware that one of the paintings by Hayman, in the Saloon or Picture Room at Vauxhall Gardens, depicted "The Milkmaids' Dance on May Day," which, as would have been gathered from the quotation from Pepys, was a great festival with them, and of which, indeed, they were an integral part.

Science.

ECONOMIC ORNITHOLOGY.

Birds in their relation to the Farm and Garden.

(By J. F. Hausen)

Within recent years more and more attention has been given by scientific investigators, especially ornithologists and entomologists, to the manner in which birds affect the farm and garden.

Realizing the importance of this subject, and the want of better knowledge as well as more discrimination in dealing with birds, the Department of Agriculture of the United States established the Division of Economic Ornithology at Washington, D. C.

By means of a large staff of collectors and naturalists, and aided by numerous correspondents in various parts of the country, many different kinds of birds were obtained, and the contents of their crops submitted to a careful analysis, for the purpose of finding out their food habits. It was deemed that only by this method could a just estimate of their food be formed, in view of spreading better ideas among agriculturists, and thus preventing the destruction, through ignorance, of many kinds of birds that are of real benefit to the farm.

In the course of these studies many insects and a large collection of seeds have been made, which will be of great use for reference in the future.

The results of these labours industriously carried on by the ornithologists in conjunction with several prominent members of the Division of Entomology, have been embodied in the various reports and monographs issued by the Department up to the present time.

Those who are specially interested and may wish to pursue this subject further, will find in these reports a vast fund of information on the economy of birds which is nowhere else obtainable.

Among these bulletins may be cited: The English Sparrow, by Walter B. Barrows, forming bulletin No. 1.; The Hawks and Owls, by Dr A. K. Fisher, bulletin No. 3; Preliminary Report on the Food of Woodpeckers, by F. E. L. Beal, bulletin No. 7; Four Common Birds of the Farm and Garden, by Sylvester D. Judd; The Food Habits of the Kingbird, by Walter B. Barrows; and others.

Comparatively few people are aware of the enormous losses caused to the agricultural products of every country by the annual ravages of insects—a loss which has been estimated by entomologists at one-tenth of the whole output. Even a conservative estimate will place the waste caused by these little pests at several million dollars.

Now, were it not that nature, in order to maintain her balance, imposes, in the course of the struggle for existence, checks on insects, the farmer, the gardener, and the fruit-grower would find it almost impossible to get any return for their labour.

As this bane of the agriculturist is essential to, and forms a large part of, the food of insectivorous birds, it is easy to see how much good birds do to agriculture. It is calculated that any ordinary insect-eating bird consumes, on an average, 3000 insects every year.

From these considerations, it may be readily imagined how important it is that our birds should be protected and encouraged; for, in but comparatively

few instances do they eat any cultivated crop to such an extent as not to compensate for this waste by their habits of eating insects at some other period of the year.

Even in the case of the so-called seed-eaters which are ordinarily classed as injurious, the food of the young consists in great part of insects. Moreover, this latter class of birds destroys a vast quantity of the seeds of noxious weeds, thus further lessening whatever harm they may otherwise do; and so this habit is not an unmixed evil.

Although as a rule birds are encouraged about the farm, still, it is to be regretted that many birds are sacrificed which, with a better knowledge of their habits, the farmer would be led to protect and class among his benefactors.

As a result of the examination of the stomach contents of over forty different species of birds, the only one actually condemned on all hands is the English sparrow. Only the other day, I read an account in which the same sentence had been passed upon this bird in various parts of England, even a bounty being offered for its destruction. Owing to its pugnacious habits it often drives away our song birds and other useful native species.

Of the hawks only three species are condemned, namely, the sharp-shinned hawk, Cooper's hawk and the American Goshawk—while the rest are to be classed as highly beneficial to the farmer and horticulturist. The majority of the woodpeckers play a very useful part, except the redhead and sapsucker, which may be injurious or beneficial, according to circumstances.

In the case of the remaining birds, the testimony is greatly in their favor. The cedar, the crow, and the crow blackbird (1) are held to do far more good than harm. The kingbird, the phoebe, swallow, catbird house-wren, oriole, loggerhead shrike, vireos, cuckoo, rose-breasted grosbeak, shore lark, meadow lark and brown thrasher, all deserve to be especially protected by the agriculturist.

In short it may be laid down as a general rule that insectivorous birds are to be encouraged about the farm. Among the insect eating birds are the following: flycatchers, nuthatches, orioles, woodpeckers, warblers, wax wings, hummingbirds, gnatcatchers, goatsuckers, tanagers, vireos, titmice, kinglets, thrushes, swallows, wrens, thrashers, cuckoos, bluebirds, shrikes, and creepers

BIRDS OF PREY.

Of the hawks and owls fully two-thirds may be considered as directly beneficial. As above stated, only three species were sentenced as injurious—the sharp-shinned hawk, Cooper's hawk, and the goshawk. Cooper's hawk is fortunately rather scarce in the neighbourhood of Montreal.

They are all three very destructive to small birds, an examination of the stomach of the sharp-shinned hawk revealing the fact that fully 90 per cent of its contents consists of the remains of birds. As the large majority of the birds of this class are highly beneficial, it is lamentable that the farmer so often sacrifices these most useful allies which may be said to labour incessantly for his benefit. As illustating the destructiveness of the sharp-shinned hawk, Mr. E. D. Wintle, in his recent book The Birds of Montreal, says: "I shot two specimens August 28, 1886, on the mountain at Côte St. Antoine, and at the time observed them imitating the call of the American goldfinch, and chasing the latter birds in the trees evidently with the intention of devouring them." These being the only ones which are injurious, they ought to be carefully distinguished from the rest.

(1) The starling?—Ed.

RED-TAILED HAWK, HEN HAWK.

The food-habits of this hawk lead it to feed principally on rats and mice, ground squirrels, rabbits, etc.

Dr. A. K. Fisher, speaking of this bird, observes: "While fully 66 per cent. of the red-tail's food consists of mammals, not more than 7 per cent. consists of poultry, and it is possible that a large proportion of the poultry and game captured by it and the other buzzard hawks is made up of old, diseased or otherwise disabled fowls, so preventing their interbreeding with the sound stock and hindering the spread of fatal epidemics." The disfavour with which it is commonly regarded is probably in great part due to its name.

RED-SHOULDERED HAWK.

It was found that ninety per cent of the food of this bird consists of injurious mammals and noxious insects. Our most common hawk.

MARSH HAWK, HEN-HARRIER

The food of this most valuable bird consists of meadow mice, squirrels and rabbits.

SWAINSON'S HAWK.

The habitat of this species is Western North America, and it is therefore only a casual visitant here.

These birds, which go in large flocks, are the great grasshopper destroyers of the West, and it is calculated that in one month 300 of these birds save some sixty tons of produce that the grasshopper would otherwise have destroyed.

SPARROW-HAWK

Not common here. During the warmer months, its food consists of various insects, and of mice during the remainder of the year. It is a summer resident.

AMERICAN LONG-EARED OWL

This owl consumes mice mostly and attacks but few birds.

BARRED OWL

This owl consumes mice mostly and is common. Much false opinion prevails regarding this bird, as only 4½ per cent. of its food is poultry. But even this small loss is preventable by shutting up the chickens at night. It also consumes injurious insects and small mammals—and among the latter some of our worst enemies.

SCREECH OWL.

This bird (which is also known as the Mottled Owl or Red Owl) is a winter visitant here, and is rather scarce. Injurious mammals and insects form nearly three-fourths of its food.

BARN OWL.

Dr. Fisher found that mice constituted 93 per cent. of the food of this owl. It also lives on rats, gophers, shrews, and other small mammals. The remains of no less than 1821 mammals, birds and batrachians were obtained from six hundred and seventy-five rejetes or "pellets" taken from one of the towers of the Smithsonian Institution.

(To be continued).

AGRICULTURE IN COMMON SCHOOLS.

Natural science—Applied Science—Educate away from the farm—What to teach — Ignorance of common things—Fallacies about the Moon, &c.—Text-book.

"Eds. Country Gentleman."—Mr. Keach, p. 759, very pertinently opens the subject of agriculture in common schools, without taking any decisive ground for or against. Perhaps it is well to be conservative in new propositions of the magnitude of this, and to observe the trend of affairs, so that when one alights he will stand firmly on the right side of the fence. But a goodly number of educated, experienced and capable agriculturists have studied this question thoroughly, and are nearly unanimous in the opinion that "something ought to be done" to give the farming youth a better start in their own vocation than the common schools now furnish. Some would have more time devoted to the natural sciences, without naming the questionable word "agriculture," or showing any connection between the two. Science alone does a farmer little good, unless he is taught how to apply it. "Applied science" is what he needs; and in this case if this is not agriculture, then what is it? And if agriculture, then why not call it so?

Mr. Keach incidentally refers to the charge brought against the agricultural colleges that some of them educate away from the farm and not towards it. This is a point well taken, else so many graduates now in the service of public teaching would not be so chary of mentioning agriculture in the common schools. An agricultural college president, who has devoted much thought to the subject, in speaking of this feature recently, said: "It seems rather curious to me that any such should hesitate to come out strongly on this question, which, I am sure, they cannot but believe of primary importance in the development of our agricultural industry; yet in many cases I can see how they might object on the ground of expediency, and that "they are not in entire touch with the farming community"—or in other words, they have been educated away from the farm.

On the other hand, these educators who are nearest the farm and the mass of farmers, so far as their public utterances on the topic are known to me, are in favor of adding the study of practical elementary scientific agriculture to the curriculum of the common schools in country districts, and calling the study by its right name.

If I understand this movement correctly, the originators do not desire to burden the curriculum with any full or complete course in agriculture, but only to give the pupils "a start in the direction"—to set them to thinking about their own vocation, to arouse a spirit of inquiry in them that will be lasting—so that they will continue their investigations through life. What little science they do acquire they should be taught how to apply, else it is of no economic use to them. Some of the natural sciences are taught in the schools now, but how many farms show any good results from this?

All reference to agriculture has been kept out of the schools from the time of the landing of the Pilgrims, and what class of farmers have we? Go anywhere, in any part of the country, and evidences can be seen in abundance that the common schools have failed to make good farmers of the large majority who attend them. Is it not high time to adopt a better system of education, since the present system has proved a disastrous failure, so far as agriculture is concerned?

Many still plant, sow, kill hogs, and do some other things, "in the moon";(1) and their cattle sometimes "lose their cuds", which must be supplied with a piece of raw fat pork. Would it do any harm for the school-teacher to show the pupils the fallacy of these and other similar follies? Fully one-half of the diseases of animals are caused by improper feeding or care. Should not the scholars be taught correct feeding and care? If they do not learn these at the district school, nine-tenths of them never will know them; for their parents cannot teach them, nor are they able to send them away to an agricultural school.

Several in my own neighborhood will not cut timothy hay until the seeds will shell, "because it spends better," or lasts longer. They cannot be made to understand that it spends better because the stalks are more woody, and it takes stock longer to masticate it. I have told this to several, but they "know better." They declare there is no fertility in liquid evacuations of live-stock, because they "can't see it." and let all go to waste. Horse manure piled under cover, heating, and gases escaping for months, loses nothing, for no fertility can be seen escaping.

The facts are, they have all been to school, but the system of instruction was so lame they learned literally nothing about affairs which should most interest them. They are too old now to learn. Their habits and methods are fixed. They are in ruts, and there they will remain. The only hope of better farming rests with the young. Give them just a little start now in the right direction, impress upon their minds the evils of wrong ways and the benefits of correct methods, get them to thinking about it; the impressions will be lasting, and they will continue their investigations for life, and will supply themselves with the aid of books and papers bearing upon their every-day practices. Science alone leads from the farm; applied science keeps the boy upon the farm. But, he must be shown how to apply when young, or he will never know.

Mr. Keach says there is no suitable text-book. If he will look about a little, he will find one lately issued from the press for this special purpose, and admirably adapted to it, whose author is a farmer and a scientist. It is "simplified for use in primary schools." It is not "dry, prosy or pedantic," nor is it loaded down with unexplained scientific terms. Few such are used, any way. Any teacher, male or female, who is capable of teaching reading and arithmetic, can understand and teach it.

GALEN WILSON.

"Tompkins County, N. Y."

(1) Alas! Many a farmer in this province still asks his wife what "the Almanal says the weathers will be to-morrow, and won't kill his hogs in the decrease of the moon lest," the meat should not take the salt."—Ed.

Household Matters,

FASHIONS IN DRESS.—It will rejoice the hearts of many people to know that the great, big sleeve is no longer fashionable. Still, they can be cut into the very modern style as there

is ample material for doing so, which is a matter to please the economical.

INTRODUCTION OF SMALL SLEEVES.—With the change to small sleeves must follow the tighter fitting skirt; very pretty for slender people, but most unbecoming to stout or elderly persons, let us hope that the good sense of the latter will keep to a skirt not too pronounced in any way.

THE FAVOURITE SKIRT AT PRESENT.—It is one cut with a wide gored, front, with two gores on either side, two straight widths for back, this I think will be the favourite for many years for those who cannot afford to follow up the fashions.

CARE IN PICKING OUT.—It is just as well to do a thing properly when it has to be done. Some people think that, as long as a garment is torn to pieces it does not matter; there never was a greater mistake, and th's they will find out to their cost if they have to put it together again. The way is to snip the threads and let the seam fall open, thus avoiding the least stretching, and every seam that is picked out (if you are turning the garment) turn and tack together before going on to another tack on the old seam; then, the final sewing will be outside the old, and thus shew a new surface, adding to the appearance of the garment turned. This may be a little troublesome, but will well repay the worker in the end.

JAPANESE WOMEN

THEIR OWN DRESSMAKERS.—No matter what is the station of a woman in Japan—high or low, rich or poor—she must be able to make her own dresses. This is an inexorable rule that applies to the Empress of the Kingdom of the Rising Sun as well as it does to the daughter of the most humble artisan in the land.

The present Empress has assumed the European style of dressing, but she may be seen any afternoon with a needle in her hand doing some kind of fancy work. Previous to her marriage with the Emperor, she used to make her dresses just the same as any other girl.

The home commands the whole of the Japanese woman's attention. There and there only does she reign. As every Japanese home is thrown open after the family are up, the women may be seen in the afternoon busily at work sewing. The mother who would not teach her girl dress-making deprives her daughter of the possibility of marriage.

GIRLS WHO MAKE BAD WIVES.—I never see a petted, pampered girl who is yielded to in every whim by servants and parents, that I do not sigh with pity for the man, who will some day be her husband. It is the worshipped daughter, who has been taught that her whims and wishes are supreme in a household, who makes marriage a failure all her life. She has had her way in things great and small: and when she desires dresses, pleasures or journeys which were beyond the family purse, she carried the day with tears and sulks, or posing as a martyr. The parents sacrificed and suffered for her sake, hoping finally to see her well married. They carefully hide her faults from her suitors who seek her hand, and she is ever ready with smiles and allurements to win the hearts of men, and the average man is an blind to the faults of a pretty girl as a newly hat hed bird is blind to the worms upon the trees about him.

He thinks her little pettish ways are merely girlish moods, but when she becomes his wife and reveals her selfish nature, he is grieved and hurt to think fate has been so unkind to him.

N. W. FARMER.

ITEMS WORTH KNOWING

Bent whalebones may be straightened and made fit for use again by soaking in hot water, and then straightening under a press till dry.

Black silk may be renovated by a thorough sponging with stale beer, placed between newspapers, and pressed with a hot iron.

Green tea will revive rusty black lace, and make it look as good as new.

Always fold a dress skirt right side out for packing, and it will not so easily wrinkle.

To clean white veils, make a solution of white Castile soap and let the veil soak in it fifteen minutes. Then, press it between the hands in warm water and soap until clean. Rinse in clear water, then pour boiling water on a teaspoonful of starch, soak the veil in it for a few minutes, and then clap it between the hands until nearly dry. Spread a towel over a pillow and pin the lace smoothly over it, and let it remain till perfectly dry.

Alum water will restore almost all faded colors. Brush the faded article thoroughly to free it from dust, cover it with a layer of castile soap, rinse with clear water and then alum water, and the color will usually be much brighter than before.

It pays well to do the mending before the article goes into the wash, since the processes to which it is there subjected materially enlarge the holes, and it is better and more agreeable to wear if the washing follows the mending.

Not Extraordinary Things.—The true calling of a Christian is not to do extraordinary things, but to do ordinary things in an extraordinary way. The most trivial tasks can be accomplished in a noble, gentle, regal spirit, which over-rides and puts aside all petty, paltry feelings, and which elevates all things.—Dean Stanley.

HOUSEKEEPER.

The Horse.

By CHAS. S. MOORE.

(Introduction)

Chap. I. MODIFICATIONS OF THE HORSE BY ENVIRONMENT.

"The development of breeds," says Herbert Spencer, "is due to selection (conscious or unconscious), physical environment, education, training and nourishment." Careful "conscious" selection has undoubtedly been a great factor in the improvement of all our modern breeds of domestic animals; but "unconscious" selection, by a longer and slower process, has acted through all ages and the influence it has exerted is beyond computation. The term "environment" includes climatic surroundings, nourishment, education and training. Mr. Spencer does not minimize the power of heredity, for he says. The actions of each generation help to mould the character of its posterity," but, he adds, "organisms do not become what they are in their adult form by a simple unfolding of innate energy. Their development is dependent upon and caused by the never-ceasing action of the powers of their environment. If the forces of environment change, the growth of the organism must also change. Hence the effets of domestication on animals and plants."

The horse adapts himself to his conditions and is influenced by his surroundings, perhaps more than any other domestic animal. When bred and reared for a few generations on low rich pasture lands he becomes large and sluggish, but when taken to dry upland pastures, where food is scanty, he soon loses weight and developes in muscle swiftness and endurance. Nothing but the cold climate and scanty fare, has reduced the Shetland horse to his present pigmy proportions. In the same way, the climate of Quebec and, in many cases, the coarse and scanty fodder, reduced the Norman horse to the lighter, hardier French Canadian.

The coach horses of Germany, like their masters, are inclined to be slow and easy-going, while those of France show the vivacity and spirit of the Frenchman. This condition is brought about by selection. The German likes a quiet horse, and consequently breeds for that end: the Frenchman, on the contrary, is too impatient to go slow, so he selects for speed and endurance. This characteristic temperament of the Norman and Breton has done much in Quebec to develope quickness and hardiness in their horses. In Montreal to-day many of the hackmen and carters are furious drivers, but their horses have enough of that old Norman-Canadian blood in their veins to enable them to stand the paces to which they are put. We may safely say that one of the chief environments in moulding the character of the French horse of Quebec was the temperament of his master.

THE PREHISTORIC HORSE.

Evolution of the horse—Five Orlginal varieties—The Black Horse.

Professor Marsh traces the development of the horse from a little animal of the Eocene period, no bigger than a fox. From this small beginning, the solliped (an animal without a cloven hoof) has passed through many different forms, constantly increasing in size, and changing in limbs, feet, teeth and many other organs. This early ancestor of the modern horse evidently lived on low and marshy land, for he had five distinct spreading toes. A complete series of fossils has been found in America, showing the transformation of our present one-toed horse from this five-toed animal. The fact that seventeen species of fossil horse have been found in North America, and that only in America is the series from a five-toed to a one-toed animal complete, seem to point to this continent as the cradle of the horse family.

It is impossible for naturalists to account for the entire absence of horses in America at the time of its discovery. That they were very numerous at one time is certain, from the number of fossils which have been found. But whether they were driven out by glaciers, disease, or savage animals will never be known.

Many fossil remains of the horse are found in the less ancient geological formations, in both the Old and New World, together with the mastodon and other gigantic animals. The horses of this time (known to geologists as the Post pliocene period) were about equal in size to our present undomesticated breeds.

In the Tertiary, or third geological period, two or three species are found in both hemispheres. This was long before man came upon the scene. Many of these prehistoric races became extinct, while others survived.

Darwin thinks that the immediate progenitor of all the members of the horse family was a dun-colored animal with black stripes on his back, shoulders and hips, and black bars on his legs. This theory is held from the fact, that in all breeds of horses and asses, there is, occasionally, an individual born with these black bars and stripes. This he considers a reversion, or taking back, to the "single dun-colored, more or less striped, primitive stock."

Wild horses are found in America on the pampas of Brazil and Buenos Ayres, and on our western prairies. These are all descended from stock brought over from Europe by the Spaniards. Several varieties of wild horse inhabit the steppes of Europe and Asia. Some of these may be descended from escaped domesticated individuals, but, in all probability, most of these vast herds belong to the original wild stock. At any rate they show what the original character of our primitive horse was like. They are much smaller than most domestic breeds (from ten to thirteen hands) more muscular; with stronger limbs, larger head, longer and less erect ears, more bushy mane and tail, longer coat, smaller and more pointed hoofs. They are intelligent and sly, swift, sure-footed and enduring. They live in troops, and are led by an old male whom they follow as faithfully as brave soldiers do a captain. Their sight and hearing are very acute, as well as their sense of small, hence they are hard to approach.

All our domestic horses have descended from five varieties of the original stock inhabiting Europe and Asia, and possibly northern Africa. These five races are the "Pie-bald," "Bay," "Dun," "White and Black."

The plateau of Thibet is the home of the Piebald. Even to this day they are found there in large numbers. They are about eleven hands high, fairly made and strong. Probably they were first domesticated near Thibet, and then brought west. In Zachariah, chapter I. verse eight, we read: "I saw by night, and behold a man riding upon a red horse, and he stood among the myrtle trees that were in the bottom; and behind him were three red horses, "speckled and white." This passage shows that Zachariah was familiar with the Piebald horse. This horse was taken to Rome and from thence to Spain. In Virgil's Aeneid occurs this sentence:

"The fiery Turnus fled before the rest, a pie-bald steed of Thracian strain he pressed." (1)

From Spain, the blood was carried to America where it often shows itself in the mustang and Indian pony.

The Bay inhabits the plains east of the Caspian sea. He is small and well made, and varies somewhat in color,

(1) "Maculatus" in the original, i.e., spotted or speckled. In English, "pie-bald" means black and white; any other colour with white is called "skew-bald."—Ed.

to he is probably not unmixed with other tribes. Some of these horses were left in Egypt by the Hyksos who captured Memphis in 2080 B. C., and formed the original stock of the country. Others were taken to Arabia, but were there mixed to some extent with the White and Piebald races. They were probably bred large, in very early times, for war horses. The blood of this horse, through the Arabian and other Eastern breeds, has been scattered all over the civilized world.

The Dun horse is found in large numbers throughout northern Europe, and north-east of the Caspian s.a. The Shetland and Norwegian ponies are probably the most familiar examples of this type. The color, as may be inferred from the name, is dun, or brown, with usually a black stripe running from the mane to the roots of the tail. According to Darwin, this variety must be a more direct descendant of the old progenitor of the horse family, than are the other types. He is small and tough, and is said to be the most intelligent and docile of all the wild breeds. In Greek sculpture he is shown to be about fourteen hands high. This blood was also scattered over the whole of Europe, and from thence to America.

The White horse was the most honored and the most beautiful of antiquity. His original home was in Europe, north of the Black sea; and in part of Asia, near the rivers Jaxartes and Oxus. Excepting the Black horse of Europe, he was the largest of all the wild races. He was massive in all parts, head large, tail long, and color grizzly white. After he came under the controll of man, those specimen purest in color were most desired, so it was not long before pure white steeds were common. This horse is first seen in history about 1700 B. C. He was the court horse of Cyrus, Xerxes, Darius and other eastern monarchs. He was worshipped as a representative of the sun in Europe, as well as in northern Asia. He was taken to Rome and from thence spread over the civilized world.

By far the largest of the five primary races, was the great Black horse of Europe. He lived in the rich valleys of the Weser, Rhine, Meuse, Sheldt, Seine, upper Danube and in fact all the fertile valleys of Germany and France. His numerous fossils show that he was hugely proportioned. His head was large, neck short and thick, mane and tail long and heavy, hips and shoulders heavy, legs large and with knotty joints, feet large and flat; and legs, from knee and hock down, very hairy. In spite of the superstition of the ancients that he represented the evil one, and that sparks of fire flew from his tail when he ran, he was one of the first horses to be domesticated. This was largely on account of the ease with which he could be tamed. This blood spread into Spain, Italy, eastern Europe and northern Asia. All of our present breeds of draft horses have more or less of the blood of this great Black horse of Europe.

By all sorts of crosses and various methods of feeding, through thousands of years, all our modern breeds of horses have been derived from these five wild races.

Agricultural Societies and Farmers' Clubs.

PROCEEDINGS OF THE FARMERS' CLUB OF THE AGRICULTURAL SCHOOL AT OKA.

Meeting of the 26th of May 1896.

Production of milk—Mineral matters Preparation of food—Stables—Care of cows—Milking.

(Continued).

M. A. Lachance is acting president.

M. G. Mirallès addresses the meeting.

M. G. Mirallès. In comparing the figures which have just have been given for the composition of food, I find that the feed for milch cows requires the same quantity of fat, half as much carbo-hydrates, and two and a half times more albuminoids than the ordinary feed.

In order to explain this large proportion of nitrogenous substances, destined to the production of the milk, one only has to remember the way in which milk is formed.

Milk is not a mere excretion of the blood, like the urine, for example, which is expelled by the kidneys. Elaborated in the udder it results in great part from the breaking up of cellular tissue: it is merely the secreting organ in a state of dissolution, and the fatty constituents of milk are only the product of the fatty, degeneration of the mammary glands.

The quantity of milk elaborated is the result of the more or less prompt regeneration of the cellular tissue; the more quickly the cells are built up again the greater is the quantity of the secretion. It is easy therefore to conceive of the important part played by albuminoid compounds in the formation of milk, as these very substances are, par excellence, the creators of tissue. If we wish to draw a conclusion from what precedes, we may even go so far as to say that a good milch cow is one whose mammary glands have the property of being dissolved, and then of being immediately restored to their former condition under the influence of the albuminoids in the food.

We might, just here, speak of the various breeds of milch cows and of the special fitness of each breed for some particular purpose, but this would take us too far from our original intention. Confining ourselves strictly to our subject, we might ask M. R. Duclos, why he has not given, in the composition of feed, the quantity of mineral matters (phosphoric acid, lime and potash) indispensable to the milch cow.

M. R. Duclos asks to be heard.—In referring to the composition of feed. I did not speak of these mineral substances because usually ordinary foods contain enough of these elements—so that they may practically be left out of consideration. We find potassium in all foods. In the case of hay, however poor, we are almost sure that calcium and phosphoric acid will not be lacking. It is only in the case of foods which I may term defective that there is reason to provide for the insufficiency of these mineral elements. In such a case, recourse should be had to foods which are known to be rich in these mineral substances.

However, the remarks of M. Mirallès make we aware that I have said nothing about another mineral substance, namely, salt the use of which is most important. It makes all fodder more tasteful by stimulating the appetite, makes even poor feed more agreeable to animals, and is favourable to assimilation.

M. G. Mirallès.—I am glad I have called forth the explanations we have just heard. The second part of my task relates to the preparation of feed and the care to be given cows in order that the feeding may be as profitable as possible.

The preparation of the various kinds feed plays an important part in relation to lactation. Thus, in certain cases, cows will derive much more benefit from potatoes if they be given cooked or steamed: hay and straw, according to some, will be far preferable if they be first chopped up and left to soak for 10 or 12 hours. Concentrated foods, such aos oil-cake or cracked and ground grain, ought only to be used in connection with more bulky fodder, having due regard to the capacity of the stomach and thus favouring rumination.

(Translated from the French by J.F. Hausen.)

M. CORNELIUS DEROME ADDRESSED THE MEETING ON THE FEEDING OF MILCH-COWS.

We know, of course, that the fodder-crops, grain, roots, etc., that constitute the basis of food, contain fundamental nutritive matters in very variable proportions. None of them, taken separately, is in general, capable of forming a complete food.

So, if we propose to form a ration containing a proper quantity of nutritive matter, several kinds of food must be mixed together.

But it by no means follows that it is sufficient to make our calculations on the chemical composition of the foods and to compound the ration in accordance with their richness in albuminoids, carbo-hydrates, and fat; for we must take into consideration not the proportion contained of raw albuminoids, etc., but the quantity of "digestible" albuminoids, etc., contained in the food.

And, observe, that in a "mixed" ration, and rations are generally given in a mixed form, the digestibility of one kind of food may be materially modified by the presence of another kind.

A few words on the different kinds of food and their relative value as regards the production of milk.

MEADOWS AND PASTURES.—The young and tender grass of good pastures, with sound green fodder-crops mown before flowering, are incontestably the best food for milch-cows.

Grass-meadows are excellent for pasture, as they supply the maximum amount of digestible albuminoids.

The various kinds of clovers are very rich in albuminoids, which remain in a digestible state up to the period of flowering. So it is clear that clover should be consumed before that epoch. Red clover is the least rich in nutritious matter of all the kinds of "trifolia". Lucerne is also very rich in albuminoids, before flowering. Its value in August may be reduced by 2-3 from what it was in June.

MIXED FODDER-PLANTS.—A very useful fodder or green-meat for milk, is a mixture of oats and tares, or pease and barley. (We prefer oats 2 bushels, pease 1 bushel, tares 1 bushel, to the imperial acre.—Ed.)

GREEN-CORN.—This fodder is liked by the cows on account of its richness in sugar; it is poor in nitrogen matter. Used alone, it makes the milk poor (And yet some are bold enough to say that food has no influence on the richness of milk! Ed.) but with substances rich in nitrogen it is very productive of milk.

STRAW.—Straw is but poor food for milch-cows, especially as regards the albuminoids.

CAVINGS.—The husks of grain are little more nourishing than their straw.

HAY AND ENSILAGE.—If, in making hay, the grass or clover is kept constantly turned, and then stored away under shelter, it would seem, theoretically, to contain the same amount of nutriment that it contained before being cut. But, practically, it is not so, since the turning cocking, carrying to stack or barn, deprive it of many of its leaves, wherein lies much of its nutritive value.

2. Silage, properly made, is a favourite food of cattle. Still, if a milch-cow in good order receives, for several weeks, a ration containing too large a proportion of silage, she will fall off in condition. Therefore, too much silage should not be given, but the ration must be completed by albuminoid-containing foods.

ROOTS AND TUBERS.—The chief roots for dairy-cows are parsnips, carrots, and mangels.

CARROTS increase the quantity of milk, "parsnips" increase the quantity and improve the quality. (What, again! We are glad to see that we are not alone in holding that milk can be enriched by food.—Ed.)

Mangels, given in too great quantity affect the digestibility of the albuminoids, by the too great amount of sugar they contain. Potatoes, in a raw state, give a bad flavour to milk if they are fed to the cows in too great plenty.

CONCENTRATED FOOD.—Grain and oil-cake furnish a great quantity of nutritive matter in a very small compass. Of the different sorts of grain I would specially mention oats and maize; of the cakes, cotton-seed, on account of its richness in albuminoids.

FARMERS' CLUBS, etc.

There were ploughing matches in several districts of the province in the past autumn, one of the most important of which was held at St-Hubert, for the county of Chambly, on the farm of M. Napoléon Deslières.

ST. PAUL L'ERMITE FARMERS' CLUB.

Liming competition—Cultivation of grain.

M. Jos. Archambault was the judge of the competition. The following were the results.

1st prize, Delphis Turenne;
2nd " Félix Lebeau;
3rd " Omer Lachapelle;

The experiment lot of "Delphis Turenne" was loam and clay; an arpent divided into two equal plots; one plot had been limed in 1895 with thoroughly slaked lime at the rate of 18 bushels to the arpent (80 would be better on "terre grise et glaiseuse."—Ed.), well spread over the land. This was ploughed in at once with a furrow 8 x 6 inches, and sown, May 6th, 1896, with oats: 3 bushels on the whole arpent. (As the sowing was pretty early, and the plant

had therefore time to tiller, the seed was fairly enough, though half a bushel more would been better. Our friend, who on an arpent of experiment lot sowed one bushel of wheat and harvested four bushels, would have succeeded better if he had sown two bushels.—Ed.)

The limed plot gave 19 bushels, the other 17½ to the arpent. The oats from the limed plot were a better sample than those from the unlimed lot, and less damaged by the rust.

M. FELIX LEBEAU, the two plots as above; one plot got 600 lbs of lime, i. e. about 9 bushels; this was slaked with water, spread with a shovel, and ploughed in at once. The limed plot gave 9 bushels, the other 8 bushels of oats, but the grain from the limed plot weighed 1¾ lb. to the bushel more than the other.

M. OMER LACHAPELLE: An arpent and a half in two equal plots, one of which was treated in 1895 with 300 lbs. of lime that had been slaked 6 months previously. Mr. Lachapelle grew 22 bushels of barley on the unlimed plot and 23 on the other, but the limed plot grain weighed 44 lbs. a bushel, the unlimed only 41 lbs.—(Nothing said about the quantity of barley sown.—Ed.)

AT SAINTE MONIQUE—Lac des Deux-Montagnes—the cultivation of mangels and other roots seems to be increasing, as does the growing of green fodder-crops and roots at "St-Joachim," Shefford, in spite of its rocky soil. Mr. Bélanger vice-president of the club, grew 125 bushels of mangels on the eighth (1-8) of an arpent, (equal to 1112 bushels to the imperial acre—a splendid crop any where.—Ed.)

M. Jos Hébert harvested 150 bushels of carrots on the same sized piece of land—1440 to the imperial acre!

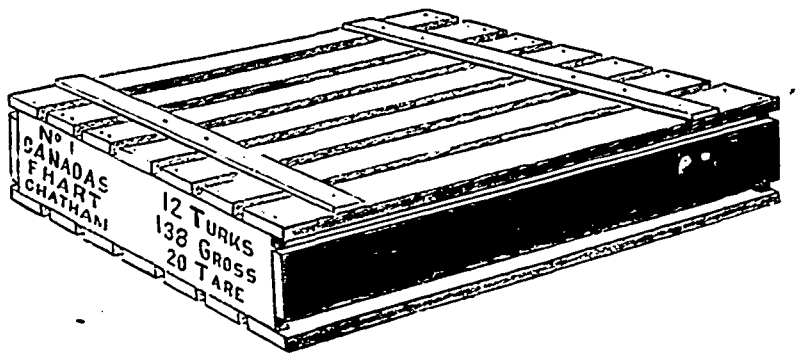
WEST WICKHAM (Drummond). Very great improvements are visible here in consequence of the competitions held of maize, both for home-use and silage, potatoes, hoed-crops in general green-fodder crops, pigs, and calves. Almost every member of the club has increased the head of stock he used to keep.

(From the French).

The Poultry-Yard.

PACKING EXPORT POULTRY.

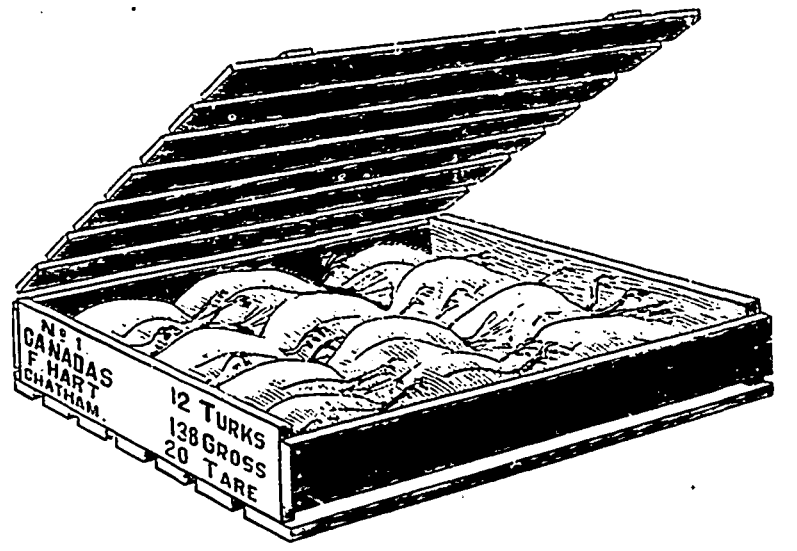
I have obtained information from reliable sources to the effect that Russia annually sends "immense quantities" of poultry to the English market, "rough dressed," i. e., "dry plucked, with wings and legs on, entrails left in, heads wrapped in paper, the birds being frozen in the open air, and then packed in cases. Canada should certainly have a portion of this trade, and might easily secure it if the proper steps were taken to do so.



Model Poultry Package (closed), Recommended by Mr. Thomas Fraser, Montreal.

Australia, on the other hand, has made some trial shipments, with satisfactory returns to shippers, with the birds "plucked and pulled" (i. e., prepared ready for the pan). The birds are frozen and shipped in crates, "one bird high," each bird being wrapped in cheap tissue paper.

Our Government should ascertain which of these two methods of packing and shipping it is most advantageous for us to follow; and should then endeavor to put our poultry-raisers and shippers in the way of getting this trade.



Model Poultry Package (open), Recommended by Mr. Thomas Fraser, Montreal.

The package which my experience leads me to recommend is as follows: A box or crate three feet three inches long, by two feet three inches wide, by six inches high, inside measurement. This will hold twelve birds, one tier high, of ten to twelve pounds each. The same number of birds weighing from fourteen to sixteen pounds each will pack in a case or crate three feet five inches long, by two feet five inches wide, by eight inches high, inside measurement.

FARMING.

Notices.

COMPETITION OF AGRICULTURAL MERIT.

The Competition of Agricultural Merit will be held, in 1897, in the Counties of:

Arthabaska, Bellechasse, Bonaventure, Dorchester, Gaspé, Kamouraska, Lévis, Lotbinière, L'Islet, Mégantic, Montmagny, Nicolet, Rimouski, Témiscouata, Wolfe.

In accordance with the regulations of the Council of Agriculture, all those who intend to take part in this competition must enter their names in the Department of Agriculture, on or before the 1st May, on blank forms that will be sent to them, on request, by that department.

We must repeat the statement that was published last year concerning delays to be granted for the entries of competitors: No request for entries sent in after the above date will be granted by the department.

The prize-winners, who obtained the silver-medal and the diploma of the greatest Merit, in 1892, must not forget that they are entitled, this year, to compete anew to decide which of them shall be entitled to receive the gold medal and the diploma of the Exceptional Greatest Merit. Those who, at the same time, did not obtain sufficient marks to entitle them to the bronze-medal and the diploma of Grand Merit, or to the Diploma of Merit, are at liberty to take part in the competition of this year.

FARMERS' SYNDICATE

of the

PROVINCE OF QUEBEC.

Office: 23 St. Louis St., Quebec.

President: His Grace Mgr. L. N. Bégin.

General Secretary: Ferd. Audet, N.P.

Treasurer: P. G. Lafrance, Cashier of the National Bank.

Farmers, Agricultural Clubs and Societies can be supplied with every thing they want, viz:

Pigs: Chester, Berkshire, Yorkshires, &c., &c.

Cattle: Canadian, Ayrshire, Jersey, Durham, &c., &c.

Sheep: Shropshire, Lincoln, Oxford, Cotswold, South-down, &c., &c.

Fertilizers and agricultural implements of every kind. Send in your order at once for feed-cutters. Farm products of all kind sold for our members. Information of all kind given to members.