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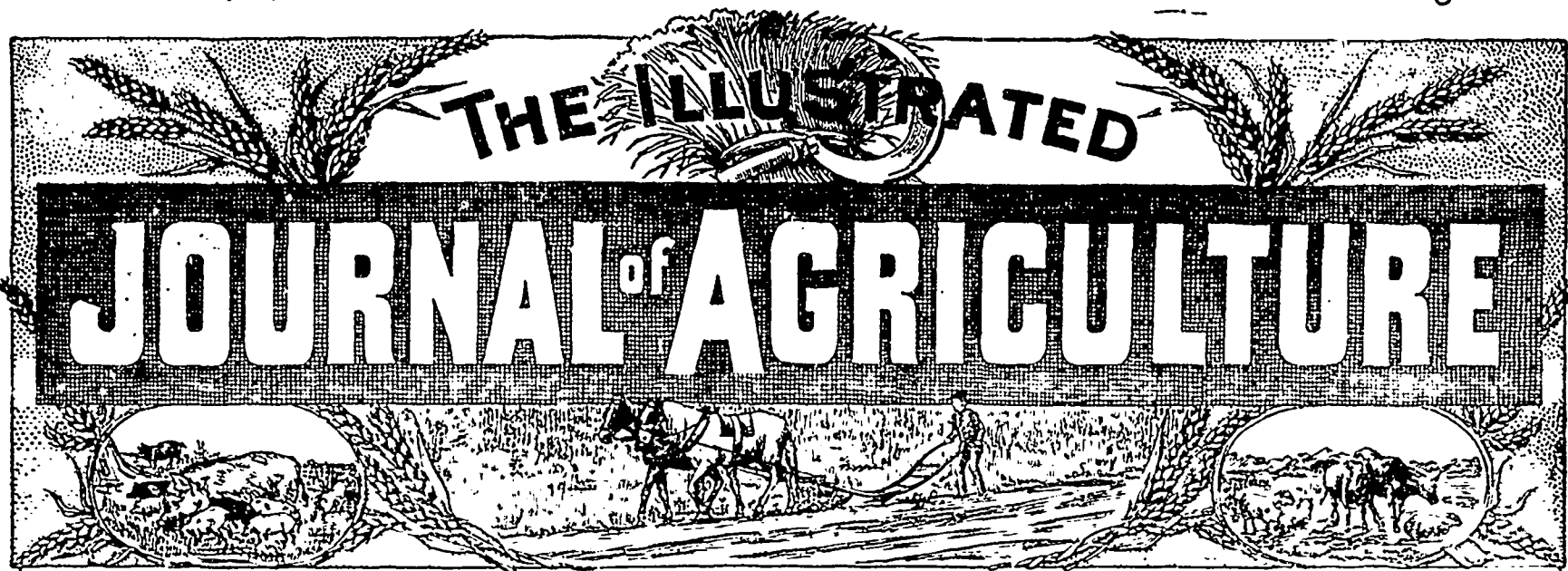
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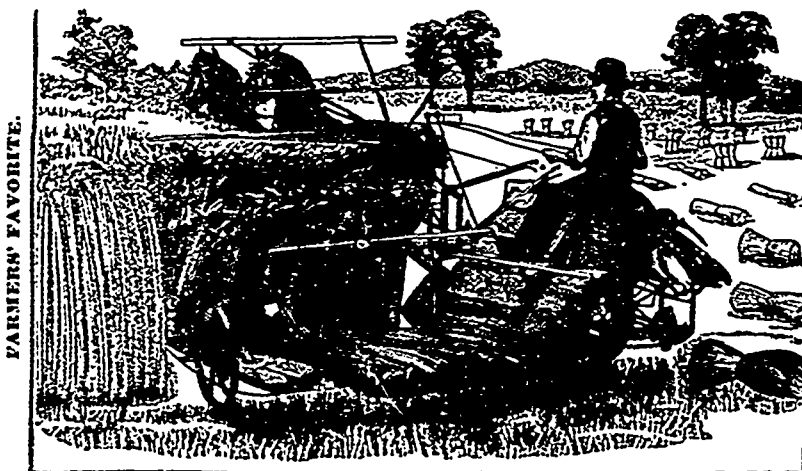
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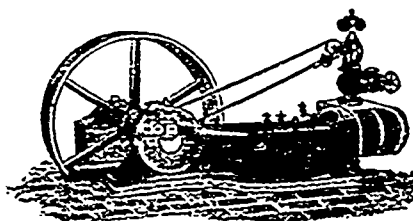
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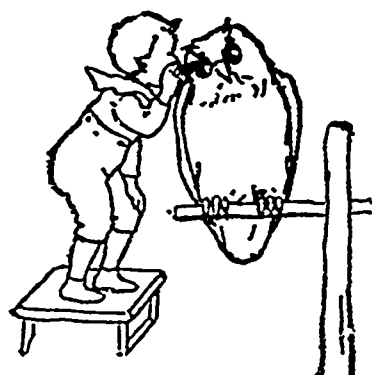
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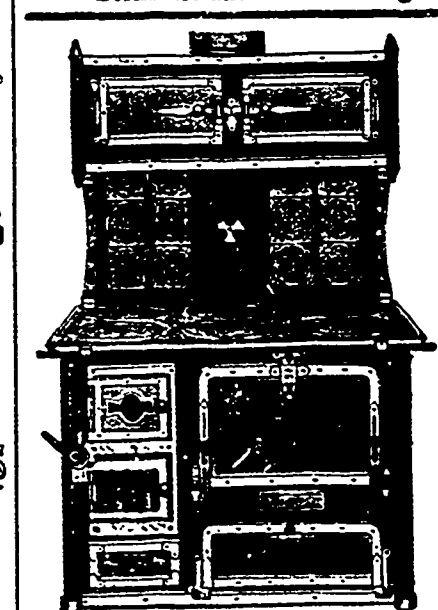
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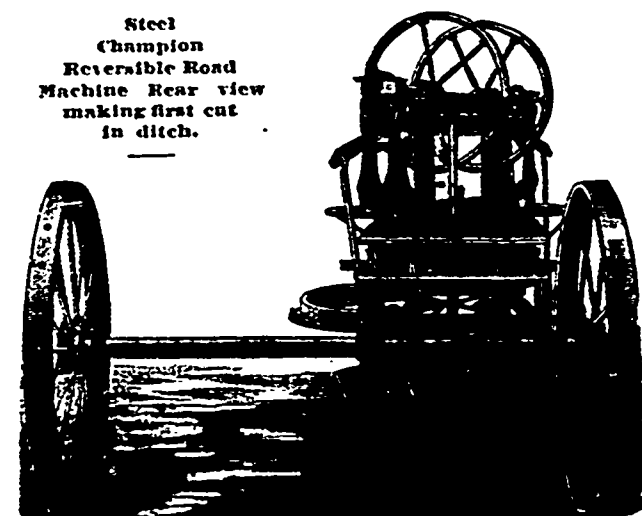
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THE ILLUSTRATED**Journal of Agriculture.**

Montreal, August 1, 1897.

The Farm.**FARM-WORK FOR AUGUST.****Harvest—Bands—Grain—Stubble—Cleaning—Stock.**

The work for this month on a farm is, and must be, governed almost entirely by the demands of the harvest. This year, the season is so backward that a good deal of the timothy will still remain to be cut, and the late sown oats will hardly be ready for the reaper till September. As for the root-crop, a good deal of singling and hoeing is finished in July, but the late white-turnips must not be neglected.

If the OATS are to be sheaved, we hope our friends at Sorel and other places have given up going into the bush to cut "des harts," or withes, to make "bands," as our Kentish folk call "bands." A couple of handfuls of the outstraw, neatly interwisted, will do perfectly, as the sheaves should not be made too large; the lateness of the season makes it almost certain that there will be plenty of moisture in harvest-time, and every one can see that a small sheaf will dry after rain sooner than a large sheaf.

BARLEY, as we have often said in this Journal, if intended for the brewer, must not be cut till it is dead ripe. No hope of good malting barley on narrow ridges high in the crowns, as the grain on the lean flanks cannot possibly grow as fast on the maltster's floor as the grain on the deeper soil of the crowns. Why should malting barley have three dewes on it after being cut? Such is the practice in the S. E. of England, but we never could see the reason for it. That it should sweat in the stack is easily understood, as the grain is thereby mellowed, and the conversion of the starch in the process of malting expedited.

As soon as the grain is in the barn or stack, set to work on the vacant STUBBLES in preparation for hoed-crops next year. If you have no grubber, use the plough; at all events break the stubbles up and get rid of the couch-grass, and other root-weeds, somehow or other. One day's work under the hot sun of August will do a world of good, and the following ploughing in October will set the work forward in a way that you will be glad of in the spring.

The STOCK will need about the same care and attention than they had in July. Look well after the sheep, and clip the wool round the fundament if the fly is troublesome. Smear the heads with grease and carbolic acid if the skin is broken by "box-eg." If you intend to breed a few lambs for the Montreal market, see that the ewes are in good condition; they will take the ram all

the earlier for it, and the number of twins will be increased.

The HOGS will be "shacking" in the stubbles towards the end of the month. Take care that they are well ringed, and that the fences are secure. Plenty of skim-milk and whey, we hope, after the wonderful rain-fall of the 12th and 13th of July.

Of course you will have plenty of green-fodder for your MILK-COWS this month. A rather curious instance of bad punctuation occurs in the last paragraph of our article on "Farm-work for July," in the last number of the Journal, whereby it would seem that we recommended sowing rape and Hungarian grass in October for cows. The sentence should read: We have sown a mixture of rape and Hungarian grass for our cows in October; but of course any one who chose to take the trouble to think a little would see that the mistake was accidental.

As we said in our last number, never take the trouble to earth up corn, or root-crops, except potatoes, and earth the last up as little as possible. We see that this was recommended by a lecturer at the last meeting of the Dairy-men's Association, but it is a great mistake. Why confine the roots of plants to 18 inches when they can utilise the whole 24 or 27 inches? It is a superstition derived from the days when the land in the dripping climate of Scotland was undrained. It never obtained in England South of Trent, where almost all roots are sown on the flat except here and there a few mangels.

LATHYRUS SYLVESTRIS.—The seed of this plant can be obtained at the leading seedsmen. M. Hamel, of Pont-rouge, writes to the "Journal d'Agriculture" to say that, though the alternate frosts and thaws of last winter destroyed almost the whole of his meadows and pastures, the *lathyrus sylvestris* (*gesse de bois*) survived, and had begun to grow again. Sorel sand would suit this vetch well, or rather the plant would suit that soil and its farmers. We hear wonders of it from England and France. A perennial plant that does well on the lightest sand should be a valuable acquisition, especially on such barren soils as the right bank of the Saint-Lawrence, a few miles before Sorel is reached, which we take to be the most hopeless bit of sterility we ever saw; we doubt if even the "Bad Lands" of some of the Western States can surpass it in undesirable qualities.

DRAINING.

(Continued.)

From what I have said as to the way in which water gets into the drains, it will be evident that to cover the conduit, whether it be of pipes, stones or bushes, with a mass of porous material, will be time and labour wasted. The more thoroughly the duct is closed above the less likely is it to admit extraneous matters, such as sand and mud. My own practice, copied from the example of Mr. Parkes, the best draining engineer of his day, has always been to use a reasonably small conduit (condensed or tightly packed streams always run faster than free, broad streams); and to have the first layer of earth over the duct as firmly trodden down as possible. I gave six inches by four inches as the size of the bush drain.—0 inches by six,

for broken stones—because the materials will become compressed, in the first case, by the superincumbent weight of earth; and in the second, the return of the soil into the drains, however well managed, will always, more or less fill up the interstices of the stones. In pipe drainage, we always used 1½ inch—Parkes used 1 inch, but at that size our clay would not stand drying without warping—and I hear from friends in England, that 1½ pipes I laid in 1849 are acting perfectly now. It may seem curious to some, how so small a duct can run off a heavy fall of rain in 24 hours, as it ought to do. I cannot carry in my head the exact figures, but I remember well that the conclusion arrived at by Morton, Inspector of drainage for the government loans, was, that a pipe the size of a lady's thimble, kept perfectly clear, is enough to carry off all the water that can fall on an acre of land during 24 hours. The object is, not to carry the water off with a rush, for that would, besides running the risk of choking the duct, draw along many of the most valuable parts of the soil; but to allow the water to sink gently and placidly through the ground, as the water acts in an ordinary domestic filter.

As to the fall to be observed in drains in ordinary fields in this province, any one who can make a ditch can be trusted to make a drain. I cannot help saying, that throughout the French-country the ditches are admirably made; and if the people in the Eastern Townships would take a lesson from our habitants in this art, they would be none the worse for it. In a loamy soil on gravel, and in a black peaty soil, I have often seen a field of 10 acres dried completely by a four feet ditch at each side.

Where, however, there is a doubt about the level of the bottom of a drain, a few pints of water thrown gently in will often decide the question—where springs exist, their own flow will settle the doubt. The uniformity of the fall can be tested, if though worth while, by three levelling staves, two of which should be about 2 feet high, and the other extending, with cross-heads 9 inches long. One staff is held perpendicularly at each end of the drain, and the extending one is adjusted and moved up the drain; the head drafter, or manager, can easily see from one end whether the fall has been equally followed or not. But in practice, these accurate measures will seldom be found necessary; besides, I object (in toto) to a foot being set in the bottom of a drain, unless it is absolutely necessary. Some people are of opinion that the whole length of each drain should be bottomed out before the pipes or other ducts are laid. This is, doubtless, a correct practice during summer, or in dry weather; but when the land is full of moisture, I prefer placing the ducts and filling in, bit by bit, as the drain is dug; and for this reason—the caving in of the earth may, and most likely will, displace the sides of the drain, and it will have to be re-battered out—always a troublesome and annoying job, and very likely to be carelessly executed, unless the supervision be much more efficient than it usually is.

"Stone drains" are so expensive, on account of their necessary width, and the quantity of material required, cartage, etc., that I do not suppose many people will make them. Pipes are, after all, the cheapest in the long run. The only awkward part of the matter is, that they have to be paid for with cash. The price here has always seemed to

me extravagantly high, considering that the principal makers were in the enjoyment of an annual "grant in aid" from the Quebec government. I allow that the pipes were well made, but they were twice as heavy as they need be, and that is a matter for consideration when the carriage by rail and road has to be paid for 40 or 50 miles. In Kent, England, within 15 miles of London, the price I used to pay for 1½ inch, of good quality, was \$4 per thousand; and a horse drew, in a cart, a thousand with ease; and good one inch pipes, in Essex, were only \$3 a thousand.

In bottoming-out stone drains, the width should be greater than for bushes, 9 inches, perhaps, would not be too much—and this on account of the difficulty of packing the material. The stones should be as round as possible, and the larger ones should be at the bottom. None more than 4 inches in diameter should be used; they should be rammed down firmly with a pavant's rammer, and some of the smallest should be reserved for the top, to be finished off at last, like the bush drains, with clay, and the firmest part of the sub-soil returned first, and well tramped down. A very costly job, and one that I should be sorry to recommend anyone to undertake. The same may be said of those ducts of built up stones that I have seen in one or two places in the Province. (1) They take an immense time to make, and, unless they are four square, i. e., with a bottom as well as sides and top, the earth soon rises into them from pressure at the sides, and they are closed for ever.

The drains for pipes are to be opened out as far as the fourth spit, about 36 inches, precisely as the bush-drains, but here advantage can be taken of the "semi-cylindrical tool," which, being fifteen inches long, enables us to take out a very deep draw for the last one. Generally speaking, the foot need not touch the tool; a side thrust by the hands will be sufficient, unless the ground be very hard and dry, in which case the tramp-pick should precede it. The bottom must be cleared of crumbs by the "semi-cylindrical draw-scoop," the drainer standing on the fourth spit, and clearing the bottom, as far as he can reach, of the remains of dirt, etc., left by the long spade; so that he never sets his foot on the cleared drain at all.



Fig. 1—Tramp-pick.



Fig. 2—Semi-cylindrical spade.

but works backwards with his face towards the mouth of the drain, yard by yard, and leaves himself only the pipes to lay and the earth to return. Should any small pebbles be found at the bot-

tom, they must be got out of the way, that the pipes may be well and truly laid, for the slightest crookedness in the conduit forms a dam in no time, and will very likely cause an accumulation of silt fatal to the continuity of the duct. Never allow a drain to be diverted from its straight course. If a rock or large boulder intervene, blow it up—get rid of it some how or other, and pay particular attention to laying the duct in its former site, as the earth is sure to be more tender there, and the pipes will very likely sink and become useless.

We now proceed to lay the pipes. If the draw-scoop has been properly handled, the bottom of the drain will form a semi-cylinder, and the job will be easy enough; the layer, who should be the honestest workman to be found; one who will refuse to place a single pipe in an unfit bottom, should have all the pipes laid ready for him along the side of the drain, straddling across it, with his face to the outfall, he threads a pipe on his "pipe-layer," places it gently in its site, and adjusts it with care as closely as possible to its neighbour; and so on, as far as the drain is bottomed out.

All this, difficult as it is to describe in words, is easy to understand when once it has been seen in operation; and with four men, the whole affair goes on like clock work, after the first few rods have been opened. It will answer no one's purpose to set a single hand at this work. The supervision must be constant, and the more rapidly the business is carried on the less likely is the superintendent to go sleep over it.

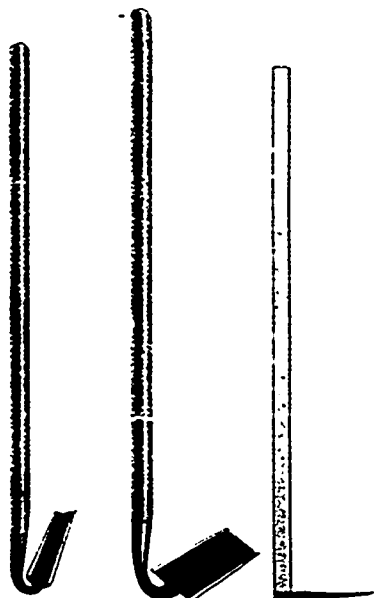


Fig. 3—Draw-scoop. Fig. 4—Broad-scoop. Fig. 5—Pipe-layer.

Up to the present time we have been sailing along with ease. We have met with no obstacles, except a stone or two, or a piece of hard-pan. The tramp-pick or the ordinary one, or perhaps a blast, have soon rid us of these enemies. But a danger now heaves in sight—a foe indeed; but convertible with care into a friend—I mean a "running sand." Its enmity is displayed in an overwhelming desire to choke the pipes; but, if properly treated, it may be hauled off its aim; and as its presence always denotes a vein of "shattery" soil, it will admit of the drains being placed at wider intervals than where the soil is of the usual homogeneous texture. I do not mean that I like quick-sands. By no means; but they are not so terrible as they are usually thought to be; and I would treat them, when met with, in some such manner as this:

Before laying the pipes, make the bottom a little wider, say two inches, than

usual, and lay on it narrow lengths of half-inch boards; place the pipes on the boards, which should be no longer than four feet, and fill up the interval between the pipes and the sides of the drain with the stiffest clay you can find, jamming it in with any handy tool as hard as possible, but taking all pains to keep the pipes straight. To do this well is a difficult job, for not a foot must be set in the drain. Two men will manage better than one; the first to hold the pipes steady, at the junction of each pair, with the pipe-layer; the other to drop the clay into its place. The pipes should be covered with a thick coat of the stiffest of the soil, the whole should be well trodden down, and when the drain is three parts filled, one wheel of a heavy laden cart might be run up and down it—if the wheels are too narrow, a sort of "shoe," or second tire, made of any plant material, such as bark, might be added—anything and everything should be tried to consolidate the earth. It is a troublesome, laborious job, is draining a running sand, but few things pay better when well done.

I am afraid this is a very desultory article; but the fact is, that as I am describing what I did years ago, I am obliged to jot down things as they occur to my mind, and I find that although my memory is a pretty good servant, it is rather irregular in its action.

Note—when a certain length of drain has been laid, before continuing work in the upper portion a strainer (a bunch of hay or straw) should be placed across the mouth of the last pipe, to prevent any silt from making its way into it; if the soil is quite dry at the time, this precaution will not be requisite, but it is as well to make a practice of it, and then it will never be forgotten when really necessary.

The most wonderful instance I ever saw of converting an enemy into a friend, from an agricultural point of view, was at Lord Hatherton's, Teddlisley Manor, Staffordshire. Above the farm-buildings lay about 70 acres of bog, full of reeds and other water-plants, and affording shelter to lots of wild ducks and snipe. This was drained, and the springs were so copious that, being led to the yards, they drove an overshot wheel (12 horse power), which did all the threshing, grinding, chaff-cutting, and sawing for 1200 acres of land; and having performed these duties, it ran off into the brook in the valley, irrigating, on its road, 15 acres of meadow, the yearly produce of which was worth at least £12 (\$60) an acre. Unfortunately, I forget the name of the planer of this great work. He deserved immortality.

(To be continued.)

STATE OF THE CROPS.

WHEAT.—Not a great deal sown the last few years in this province, but what has been sown is looking very well, it is now in what is known as the shot blade, that is, what was sown early.

OATS.—This cereal is grown very extensively, in fact too much so for those who grow it. Oats did not pay last year; the price even now is very low. The crop is looking well—late of course, the season is certainly between 2 to 3 weeks later than usual;—good color and growing very fast; the last 3 weeks, we have had good rainfalls and heat afterwards. A shower now would do a great deal of good.

BARLEY.—Is looking well; some places I have seen are too heavy. With the wind and rain we had a short time ago it is beginning to lodge, although many sections cannot boast of lodged grain.

RYE.—This grain is only grown in odd sections on light sandy soil, it is not doing well, the cold backward spring was very much against it. I see by the latest accounts that it is beginning to show itself in the wheat fields of Ontario, it is causing a good deal of anxiety. (1)

BUCKWHEAT.—A good deal of this grain has been and is even now being sown this year. What was sown the last days of June, is now up and a fine appearance; there is more to sow this week. A good steady rain now, would do a great amount of good. (2)

CORN.—"This is just the kind of weather for corn-heat, it is growing fine at present although some fields had to be replanted, being planted too soon for the season. I hardly think there is as much ensilage corn this year as last.

POTATOES.—Are doing grand; quite a few of my neighbours have had new potatoes, not so bad for the 1st of July with the late year. The potato bugs have been rather scarce this year, whether the damp cold spring had anything to do with this state of things deponent saith not, at all events the farmers have not been to any expenses, or true in fighting them so far, although they have made their appearance within the last few days, but they seem weakly and few of them.

ROOTS.—Other roots such as turnips, mangels, carrots and onions, seem to be doing well for the season. In olden times, when I used to sow turnips by the acre, we used to, some years, be bothered with a fly that ate them up as they came through the ground, and for a remedy sowed our carrots and turnips together, whether it was the flavor of the carrots that prevented the fly from eating the turnips, at all events we were always sure of a crop. Turnips and mangels can be transplanted, (3) if there are any blank spots, with advantage, while carrots will not grow if transplanted.

CABBAGE.—Hereabouts cabbage are grown very extensively, but I see the island of Montreal has its full quota as usual and they are growing well.

SMALL FRUITS.—Such as currants (red and black), gooseberries and raspberries are just coming in season; apart from a small worm that attacked the gooseberries about a month ago—we gave them a good dose of Bordeaux mixture, it settled them completely—they have borne well.

Garden stuff of all kinds, such as radishes, lettuce, etc., is good.

HAY.—This crop had rather a poor outlook, being badly winter killed, nevertheless by the recent rains and seasonable weather the bottom has thickened up and in some sections, especially in the Eastern Townships, a very fair crop of hay will be the result, but on low lying land, with cold sandy soil, it will be a great failure, take for instance both

(1) But it is not degenerated wheat, as some suppose.—Ed.

(2) And 4 inches fell from 11th to the 14th July.—Ed.

(3) True, but does it ever pay to do so?—Ed.

(1) At St-Hugues for instance.—Ed.

sides of the St. Lawrence, as far as Quebec, at all events, and the hay crop will be a poor one.

I paid the people of Compton, a short time ago, a compliment. I said that they had the best hay I had seen this year and the most caterpillars I had ever seen in my life. The latter had eaten all the leaves on the apple and fruit trees, and were then beginning on the forest and shade trees. There should be a law passed by the Legislature to oblige people to destroy this pest. I think they could do this as well as for noxious weeds. Haying has hardly commenced yet.

GRASS.—About the same rule applies to grass as to the hay.

BUTTER.—There is not nearly as much butter made in Canada as last year, the price of cheese has been rather more remunerative and as a consequence there is perhaps one hundred factories less than last year making butter, and with the increased shipments to date I should not be surprised at the price improving and that before long. Take for instance also the small receipts compared with former years, and the output of butter must be far short of last year. Cheese: many people imagine that the make of cheese must be short of last year. I will admit that cows are not milking as they did last year, or as they should this year, but the 100 factories (or more) that were making butter last year are now making cheese, and with the increased output of Ontario, I believe that this will be a record breaker in production, unless the price of butter goes ahead of cheese, in which case many would turn on to butter at once. But, farmers; butter and cheese are selling ahead of last year, and your grain, oats and barley, at about 3-4 of a cent a lb. would make cheap provender; sell your spare grain to your cows, you will, I am sure, get as much if not more per lb. and your cows will be much better than if not fed on grain at all; but it takes lots of advice, to get some people to even make a trial. How many are now feeding their cows oats and vetches? They say example is better than precept, at all events we are feeding our cow night and morning on them, and she eats with such avidity!

APPLES.—The small and useless apples are still falling on the ground, but there are plenty left to mature, of course there will not be the crop we had last year; we may never have it again; but in my opinion we shall have more than we had two years ago. I feel assured we shall have more than an average crop, except in some parts of Compton.

Châteauguay, 6th July, 1897.

PETER MACFARLANE.

Notes by the Way.

CLOVER-HAY.—A nice idea our neighbours in the States seem to have a propos of making clover-hay. Last week, we saw, in one of their farming papers, the advice given that, for hay, clover should not be cut "until the majority of the heads had turned brown"!!! Fact, we can assure our readers, incredible as it may seem. The crop was to be cut the afternoon of the day on which it was mown, and carried, from the cock, the next day after dinner. This might be done, for of course there would be no part of the plant left but the stem and brown head, and the land would benefit, doubtless,

by the plentiful sprinkling of the fallen leaves it would have received; but what would the hay be worth a ton? Seeing such statements as the above, we do not much wonder at the advice so freely given about ploughing in clover as green manure; for, even in this province, where clover, if not sown too repeatedly, in the same land, yields heavier crops than we ever saw in England, it is a most uncommon thing to see a decent load of clover-hay. The very hay that fetches £5.00 a ton, or rather load (London load—2016 lbs.), in our great London town, more than the very, as it is called, meadow-hay, is considered so far inferior to timothy-hay that, in places like Sorel, the farmers grow no clover for lack of a market. Indeed, even our friend, Monsieur Séraphin Guévremont, had never grown an arpent of clover on his farm till last year.

No; cut clover when the majority of the heads are in full bloom, let it lie till the next day, then, take it, get it into cock on the third day, and carry it after it has had a good sweat in the cock. That is how we make clover-hay for the London market, and it comes out of the stack as fresh and as fragrant as it went in.

And will any one tell us the good of "shutting up a barn as close as possible" after the hay is in it? No matter how close you shut it up, you cannot keep the air out; and if you could exclude the external air, what good would that do? There must always be any amount of air in the vacant spaces between the stems of the clover, however tightly it may be tramped, and when, as in England, the hay is in a stack, exposed on all sides to every breath of air, it suffers no damage from its unprotected position. Ask Mr. Robert Ness, you who know him, what is his opinion of the clover-hay he saw in England! We have long been of the opinion that this idea of "shutting up the barn as close as possible" is nothing more or less than a superstition.

And how about the second crop of clover if the cutting of the first crop is to be deferred until "the majority of the heads have turned brown"? This state of the crop is not likely to occur, even in our forwarder districts, until the month of July is pretty nearly over, in which case the second crop will just be ready when the autumnal rains and the morning and evening dews of September delay the making of the hay, and, three years out of five, upon the crop, turning it mowly in the barn or stack. Cut, in the last week of June, in ordinary years, the second crop should be fit for the mower by the end of August, and can either be made into hay with something like a chance of being sound and sweet, or, if a dripping time should set in, be ensiled.

GREEN-FODDER.—We observe that the "New-England Homestead" recommends sowing a bushel of pease with two bushels of oats, to the acre, at the beginning of August. Sown so late as that, our experience teaches us that the pease would infallibly mildew long before they attained any length, and not only would they be short in yield but also very unwholesome for any animals fed upon them.

RAPE may be sown, with some prospects of a decent yield, up to the last week in August; that is, if the land is properly prepared. How many farmers will be short of food for their stock this coming October. Day after day, we receive accounts of the really terrible

state of the meadows and pastures throughout the province. Rape will help the "disette," by affording food for sheep, and, if cows are not allowed to eat too much of it at once, it is a safe food for them; though, if there are many dead leaves on the plants, their flavour may be imparted to the milk.

WHITE TURNIPS may be sown on well prepared, well manured land, up to the 15th of this month, and a very useful crop drawn for stock in October, and early November. Sow in rows 24 inches apart, single at 8 inches, and keep the horse-hoe going. The best sorts for late sowing are: the stone and the white-globe. If, in the fall, frost seem likely to be severe, pull the turnips and set them close together with their tops on.

THE MONTH OF MAY.—A pleasant month, truly, was the month of May, 1897! The report of the Quebec Observatory gives the following figures:—

	1896.	1897.
Average temperature.	54.74	59.15
Maximum do.	81.00	72.02
Minimum do.	33.00	30.02
Rain, inches.	2.14	4.36

So that the average temperature of 1897 fell short of the average temperature of 1896, by more than 5 degrees, and the rainfall of 1897 was more than twice as great as the rainfall of 1896; which things are worth consideration.

JUNE.—And if May was not a propitious month to the farmer, June was even less beneficent. On the 2nd, there was a sharp frost, that even in sheltered spots played havoc with the potatoes and French beans. Rain fell, in Montreal, 17 days out of the 30; the thermometer rose to 82°F. on the 23rd; one or two thunder-storms cleared the air a little, but, generally speaking, the atmospheric influence on nervous people was most depressing. A terrible number of acres, intended for grain, must have been either left unsown, or else sown after the middle of June, with what prospect of a crop our readers can judge; it is devoutly to be hoped that some late sowers were mindful of our reiterated advice: if you sow 3 bushels of oats an acre in April, sow 4 bushels in June; but, when we read of a farmer, in a prize-competition, sowing only one bushel of wheat to the arpent (1) on very poor land, we begin to fear that all common sense has vanished from part of the province. Because thin-seeding of fall-wheat answers well, provided there is no disease in the crop, it by no means follows that thin-seeding late in May, will turn out well. Fall-wheat has plenty of time to tiller; spring-sown grain throws up its culms at once, and the later the sowing, the more rapid will be the ascent of the plant. Once, we may say the principal, cause of the poor yield of grain in the province is the extreme paucity of seed sown. If Scotch farmers sow—as they do—at least 4 bushels of oats to the acre in February and March, is there any reason to believe that 2½ bushels to the arpent (1-6 less in superfines) is enough in May and June in this country? The land is not full of manure here, and the weather after seeding is not such as to allow of tillering; whereas the opposite conditions obtain in Scotland. In the S. E. of England, spring-wheat is rarely sown, but when

(1). See Journal for 1897, p. 178.

it is sown, 3 bushels an acre (2½ to the arpent) is the common allowance. Of oats, 4 bushels, of barley 2½ to 3, and we really do know how to farm in Britain.

PLANNING ROOTS.—We see by the "Fiftieth Annual Report of the Dairymen's Association of the Province of Quebec," that M. Marsan, of the Agricultural Department of the College of l'Assomption, strongly recommends the farmers of the province to grow roots. In this we are heartily on his side, but M. Marsan will, perhaps, pardon us if we, equally heartily disagree with his account of the cost of growing an arpent of carrots and mangels. The following is M. Marsan's calculation, translated from the French.

Dung.—1-6 of 50 cart loads at 25 cents.	\$2.00
Spreading dung.	0.50
Ploughing 2 fall and spring—1½ days.	3.00
Harrowing 1½ hours.	0.30
Drawing out drills, ¼ day.	0.50
Rolling, 1 hour.	0.15
Seed, 6 lbs. at 25 cents.	1.50
Sowing, 1 man and his "mate" ¼ day.	1.25
Hand hoeing, slug-hag 15 days of a man, at 80 cts.	12.00
Horse-hoeing, 1 day.	1.50
Pulling, topping and tailing, cellar-ing, etc.	5.80
Rent.	3.00
Total.	\$31.58

To which M. Marsan adds: "We do not assert that these figures are indisputably exact in every point and under all conditions"; in other words, we presume he invites criticism, more particularly since his concluding words are: I leave these details to your consideration.

Why, in the first place, is the crop of roots debited with only 8 1-3 loads of dung, equal, probably, to about 6 tons? Surely M. Marsan cannot intend to say that 30 tons of carrots, which is the crop said to be grown in this case, can be produced by 6 tons of dung; for that is what it comes to; or that, after a tremendous crop of roots, 5-6 of the dung applied remains available for the succeeding crops of the rotation! A much more reasonable allowance is that made by the land-agents, in England, of four-sixths of the dressing of dung to the roots, leaving two-sixths chargeable to the remainder of the course, the whole cost of cartage, spreading, etc., being debited to the roots. Thus, the charge would read:

Dung.—1-6 of 50 cartloads, at 25 cents.	\$8.32
Spreading, etc.	3.00
Total.	\$11.32

Instead of, as in M. Marsan's statement, \$2.58, a difference of \$8.74 an arpent, equal to \$10.27 the Imperial acre! And as regards the preparation of the land, though, presupposing that the l'Assomption land is a light soil, one ploughing in the fall and a cross-furrow in the spring, may be sufficient, does any farmer dream of such a paralytical state of things that the cleaning, pulverising, general working of an arpent of land for roots can be done on the most available soil, for 30 cents? (Does no couch-grass, do no docks grow on the College Farm? If so, the tritest of all trite quotations: O fortunator, etc.: may well be applied to the owners

of that "Isle of the blest.") However, that may be, other farmers are not so lucky, and have to expend at least three dollars worth of labour, in addition to that of ploughing, before the land is fit to be drilled up for the reception of the seed, for, from only one drilling up being charged, we conclude that the dung was applied in the autumn.

The sowing, by the "semoir-à-bras" or hand-drill, took a man and his "mate," $\frac{3}{4}$ of a day, for which the charge made is \$1.25. Any man who knows his business ought, without a "mate," to sow an arpent and a half in four hours, or five at the outside—say half a day,—and thus the charge for rolling and sowing would be 95 cents instead of \$1.40! But M. Marsan admits that "some of the figures may be found too high," wherein, as we said before, we agree with him, particularly as to the next items, the "hoeing and singling by hand," for which operations the enormous sum of \$12.00, an arpent (equal to \$14.20 the imperial acre), i. e., the work of a man for 15 days on an arpent (equal to all but 18 days on an imperial acre). We are afraid that if this statement makes the tour of the province uncontradicted, a very great discouragement will be cast over all attempts at root-growing here.

What does it cost, i. e., how long does it take A MAN WHO UNDERSTANDS HIS WORK, TO SINGLE AND TO HOE AN ARPENT OF MANGELS OR SWEDES?

At Sorel, our pet pupil, M. Séraphin Guevremont, (1) states that, after horse-hoeing properly, i. e., with the side-hoes cutting close to the rows of the plants on the drill, it costs him \$2.40 to single, and, perhaps, another dollar to edge-hoe afterwards. In our own experience, at the same place, four women, at 60 cents each, chopped out and singled an arpent a day, i. e., the cost of singling was \$2.40 an arpent, and a dollar for edge-hoeing, makes the total \$3.40, but then the women were wonderfully handy. Carrots, white Belgians, cost perhaps, 75 cents more.

Mr. James Drummond, of Petite Côte, Montreal, wrote me word, in answer to an enquiry, that, hoeing and singling the root-crop cost him \$3.40 cents an acre, but then he farms in a high-waged district.

What reply did M. Ewing, the well known seedsman of Montreal, make, when, (March 4th, 1889), we asked him about the cost of singling roots in Scotland? "I remember that, in Forfarshire, a woman used to single half an acre of roots in a day, and I see no reason on earth why the same should not be done here." (See Journal 1889, p. 59)

What says M. Walter Vernon, of Tunshingham, Waterville, the breeder of Herefords? "One of the main things is the thinning. I cannot get any one but an Englishman to do that (Come Mr. Vernon, a Scot can): a good man, such as I have, will single 4 rows to a Frenchman's one. A good man will single 2 acres in three days, or rather, my man and I can do 4 acres in 6 days"; and he gives the spring-work cost as follows:

Cultivating.	\$1 00
Rolling.	.25
Drilling.	.75
Sowing.	.25
Singling.	17 at most
Seed, 3 lbs.	.70
2 horse-hoelings.	.50
	\$5.20

(1). See Journal for 1889, pp. 101, 102

And as to the work of singling in Kent, Surrey, and the other S. E. counties of England, listen to what the Editor of the English Agricultural Gazette said, in a reply to a letter from us in 1888:

"The person you mention (1) as taking 6 days of 13 hours each to single an acre of mangels no doubt had a way of his own! We know that in Scotland two women will single an acre of swedes a day. In England, the usual price for singling swedes or turnips would be 6s. 6d. -- \$1.32 an acre (11 acres make 13 arpents), and 8s. (\$1.92) for doing the work twice over." We ourselves used to pay 5s. an acre for singling and 2s. 6d. for edge-hoeing, in Kent, the men taking about $1\frac{1}{4}$ days for the singling and 1 day for the edge-hoeing.

M. Guevremont's account for singling and horse-hoeing runs thus:

Two horse-hoelings.	\$1.00
Two women chopping-out, 1 day at 60 cents.	1.20
Two women singling by hand after the chopping-out.	1.20
Total.	\$3.40

To which M. Guevremont adds: "I think this is the extreme possible cost." Well, that is evidence enough, is it not?

Cold Storage.

HOW PERISHABLE GOODS ARE EXPORTED.

One of the most important steps that the Dominion Government has ever taken to advance the agricultural interest of the country, is the providing this year of cold storage service for perishable food products, such as butter, cheese, poultry, eggs and fruit, between Canada and Great Britain. It is a well recognized fact that the market value of such products is determined not so much by their composition as their condition; indeed, so important is this latter factor that the production of these foods can never be made profitable unless means are adopted for their preservation, so that they can be placed before the consumer in as good a condition as when they left the hands of the producer. In the home market, where the goods are never sent any great distance, and the time occupied in transit is consequently limited, this is a comparatively simple matter; but in the case of goods that have to stand a voyage across the Atlantic great difficulty has hitherto been experienced in preventing their deterioration.

With the help of the refrigerator accommodation now provided by the Government, these difficulties seem in a fair way to be overcome, and it is quite within the limits of probability that, wonderful as has been the development in the export trade in Canadian dairy produce in the past, it will be still more marked in the future. That there is room for it is plainly seen by a reference to the British trade returns. In the case of butter, for example, Great Britain imported last year \$74,674,537 worth, of which Canada supplied only \$1,653,421 worth. Even if it should be impossible for Canada to capture the share of the business that other countries at present enjoy, there is every year a large in-

crease in the demand for butter in the British market, and this Canada has as good a chance of securing as any other country. In 1891 the value of British imports of butter amounted to \$65,489,268, whereas in 1890 the value was \$74,674,537, a gain of \$9,000,000 in two years. This increased demand must be supplied from some source, and it is partly to enable the Canadian dairyman to secure his share of this business that the Government has inaugurated the cold storage service. Prof. Robertson, whose opinion in such matters is worthy of consideration, believes that there is a good chance of Canada more than doubling her butter exports annually for years to come.

COLD STORAGE NOT NEW IN CANADA.

The utilization of cold storage for the preservation of perishable food products while in transit is not new in Canada. Since 1895, some of the steamships sailing from Montreal have been provided with cold storage accommodation and for several years past the railway companies have been running refrigerator cars. Until now, however, there has been no regular system, and the accommodation being provided by individual concerns it was incomplete and disjointed, somewhat resembling a chain with one or two of the links broken or missing. Moreover the method of cooling the refrigerator chambers in the steamships—by means of ice cylinders—was by no means satisfactory. The temperature of the different parts of the chamber varied considerably, according to their distance from the cylinders, and it was found impossible to maintain the same temperature throughout the voyage. In consequence the produce was frequently in a partly spoiled condition when it was put on board or else it deteriorated during the voyage, the ultimate result being the same in both cases, viz., it was in poor condition when it reached the English market. By the arrangement now in force all this is changed. Improved methods of refrigeration are used both in the cars and the steamships, the system is under Government supervision, and the chain of cold storage is practically unbroken, so that the goods are landed in England in as good condition as when first produced.

The service provided this season may be considered as consisting of four principal links—cold storage at creameries, refrigerator cars on the railways, and cold storage at the port of shipment and on the ocean steamships. All of these are equally important. It is essential that the creameries should have conveniences for protecting the butter against injury by heat from the time it is made, otherwise the butter would start on its journey to any market in a rather bad condition. To encourage creamery men to provide cold storage accommodation, the Department of Agriculture arranged, after Parliament had voted the necessary funds last session, to offer a bonus to the owner of any creamery who would erect a suitable building. The announcement was made that the Government would grant a bonus of \$50 to every creamery that provided and kept in use a refrigerator room, according to specified plans and regulations, during the season of 1897; \$25 for the season of 1898, and \$25 for the season of 1899. The owner of a creamery who provides the necessary accommodation for the three years thus receives a bonus of \$100. The regulations for the payment of a bonus require that every

applicant must fill up a form, stating the nature of the insulation of his cold storage room, and showing a record of the daily temperature of it. The quantity of butter is to be not less than 15,000 lbs. from the 1st April to the 1st of December at each creamery.

BUTTER FOR EXPORT.

Even when the butter is preserved in cold storage there are other points to be attended to in order to ensure success, such as suitability of the packages in shape, size and quality. The Department of Agriculture recommends that butter for export should be put up in square boxes 56 lbs. net,—the British half hundred weight. The square box is a neat cheap package, gets the preference in the English market, is stronger, and takes up less space than the tub, and leaves the butter in convenient shape when it is taken off. The boxes should be made of spruce, five-eighths of an inch thick, with the corners dovetailed, all joints tongued and grooved. The inside should be covered with paraffine wax, and in addition the box should be lined with thick paraffine or parchment paper. Every box should be put into a coarse canvas or jute bag, which need not cost more than 4½ or 5½ cents each. This prevents soiling of the boxes, and enables the butter to be sold at a higher price than would be obtained were the boxes not so covered. The butter should be conveyed from the creamery to the station at night if possible; if, in the day time it should be covered, and for this there is nothing better than green grass.

Once the butter is at the station the next thing is to get it to the port of shipment. For this purpose refrigerator cars will be run regularly during the season on the main lines leading into the shipping ports of Montreal, Quebec, St. John, Halifax and Charlottetown. Each car will take up lots of butter and other products requiring cold storage at stations between starting point and destination. Shippers making use of these refrigerator cars will be charged the regular "less than carload rate" from the shipping point to the destination. No extra charge will be made to them for the cold storage service, the Government indemnifying the railway companies for the additional cost of this. Exact particulars as to the time when the cars will leave the various stations can be obtained on enquiry of the local station agent. The cold storage service on the various railways when in full operation will be as follows:

THE RAILWAY SERVICE.

On the Canadian Pacific railway:—Weekly from Windsor, Ont., to Montreal, via Toronto; on alternate weeks from Teeswater and Owen Sound, Ont. to Montreal, via Toronto; weekly from Pembroke, Ont., to Montreal, via Ottawa; weekly from Labelle, Que., to Montreal; weekly from Quebec to Montreal; weekly from Scotstown, Que., to Montreal; weekly from Warden, Que., to Montreal; weekly from Mansonville, Que., to Montreal; weekly from Edmundston, N.B., to St. John, N.B.

In the North-West the service will be as follows: Weekly from Winnipeg and intermediate stations east of Brandon, for main and branch line stations west of Dumas, the West Kootenay and the Pacific coast; weekly from Brandon and intermediate stations to and including Moose Jaw, for main and branch line stations west of Dumas, the West Kootenay, and the Pacific coast; on

(1) i. e., M. l'abbé Chartier's man.—Ed.

alternate weeks from Edmonton and intermediate stations to and including Calgary, for main and branch line stations west thereof, the West Kootenay and Pacific coast; on alternate weeks from Nanika and intermediate Pembina branch stations to Winnipeg and all points covered by routes Nos. 1 and 5; on alternate weeks from Broadview and intermediate stations to Winnipeg and all points east thereof to and including Port Arthur; on alternate weeks from Alameda and intermediate Souris and Southwestern branch stations to Winnipeg and all points covered by route No. 1, and all points east of Winnipeg route No. 5; on alternate weeks from Emerson and intermediate stations to Winnipeg and all points covered by routes Nos. 1, 2 and 5.

On the Grand Trunk Railway the service will be on alternate weeks from Wharton and Goderich, via Stratford, Guelph and Toronto, to Montreal; and weekly on the other routes, namely, from Sarala, via London, Hamilton and Toronto to Montreal; from Meaford, via Allandale and Toronto, to Montreal; from Orillia, via Belleville, to Montreal; from Chaudiere Junction, to Montreal; from Massena Springs to Montreal; from Coaticook to Montreal. On the Canada Atlantic Railway there will be, if required, a weekly service from Eganville, via Ottawa, to Montreal; on the Quebec and Lake St. John Railway, weekly from Chicoutimi to Quebec; on the Richelieu and Ontario Company's steamer, weekly from Chicoutimi to Quebec; on the Intercolonial Railway, weekly from Rimouski to Quebec and Montreal, and weekly from Moncton, N.B., to St. John, N.B., and Halifax, N.S.; on the Dominion Atlantic Railway, if required, weekly from Yarmouth, N.S., to Halifax, N.S. On Prince Edward Island there will be a cold storage service such as may be required, from Tignish, Souris and Georgetown, to Charlottetown.

THE REFRIGERATOR CARS.

The companies mentioned have agreed to provide refrigerator cars properly insulated for the protection of the perishable freight which they are intended to carry. These cars are cooled by means of a mixture of ice and salt, which is replenished when ever necessary at various points on the route. The cars are painted white for the sake of increased coolness—white radiating the sun's rays better than any other color—and also for the purpose of making them distinctive, and bear in large letters the inscription, "Government Cold Storage Line." The cars are attached to ordinary freight trains, which stop at each station, but as soon as a car is full, or when two or more cars arrive at any junction with enough produce to fill one car, this is made up and rushed through as fast freight in order to save time. Arrived at Montreal, the cars run right down to the wharf alongside the steamship on which the goods are to be shipped. Both the Canadian Pacific Railway and the Grand Trunk Railway have tracks on the wharf running the full length of the harbor, so that there is no cartage along hot, dusty roads. The cars on their arrival at the wharf are re-iced if necessary, and the transfer of their contents to the steamer is made either in the morning or late in the afternoon, so as to avoid the heat of the mid-day sun.

With regard to cold storage warehouses at the ports of shipment, there are such buildings now in existence in Montreal, and a grant has been offered

to those who will provide suitable and necessary cold storage buildings at Quebec, Halifax, St. John and Charlottetown. Assistance has been offered towards providing a cold storage building at Toronto. Though not a shipping port, Toronto is a great railway centre, and instead of running all the cold storage cars, starting from places in western Ontario, through to Montreal, the shipments will be consolidated into carload lots at Toronto. At Revelstoke, B. C., another cold storage building has been provided by the Government and though not a part of the general cold storage scheme, it is none the less important in this way. Throughout the whole mining region south of Revelstoke there is a large demand for butter, eggs, poultry, and meats. Merchants can buy these perishable products at Spokane Falls, Wash., and other places in the United States, and have them delivered within twenty-four hours after they are ordered, while to get them from the Calgary district in the North-West Territories, they had to wait four or five days. With cold storage at Revelstoke, however, car lots can be sent there, and the products distributed to the mining towns in less time than from the United States and at as low rates of freight.

(To be continued)

Farmers' Clubs.

PORTNEUF.—Dr. Grignon, the well known agricultural lecturer, having completed his tour through the County of Portneuf, sends the following general remarks to the Hon. Commissioner of Agriculture of the Province of Quebec:

I found that great progress had been made in the county of Portneuf particularly as regards:

1. Keeping the cowhouses clean;
2. Proper management of the milk;
3. Winter and summer feeding of stock;
4. A greatly increased acreage of roots grown;
5. The lung is better cared for;
6. Artificial manures more employed, and with better judgment;
7. Drainage better understood and more of it done;
8. Stock greatly improved;
9. Seed-grain better selected;
10. Increased purchases of clover and timothy seed to the extent of 500 per cent.

In addition to these striking improvements, there still remain many demanding attention, such as:

1. Tobacco growing;
2. Cultivation of fruit-trees;
3. Destruction of weeds;
4. Improvement of meadows and pastures;
5. Growing maize, etc., etc.

The POINTS THAT CHIEFLY ATTRACTED MY ATTENTION AT FIRST: were the great number of manure-sheds and cellars, particularly of the former. There are parishes in which there are hardly ten farmers who do not possess a manure-shed. Many make a bed of rubbish to put their dung on, to save the urine and increase the bulk of the heap, an excellent practice, one that I have recommended and followed for years. Every autumn, I prepare a bed of potato-haulm, four feet thick, for the winter's dung, and if there is not enough of the haulm, I add straw or leaves. In this way, I save all the urine and increase the quantity of manure.

In order to HAVE GOOD DUNG, MUST WE HAVE DUNG PITS, OR SHEDS, OR WILL AN EXTERNAL MANURE ANSWER?

This is a question I am often asked. I am not afraid to answer, at once, that, with deference to the opinion of the patrons of dung-pits, good dung can be made without sheds or pits, provided it is used when fresh, i. e., in spring, and ploughed in.

For a man who can afford it, a 12-foot deep dung pit, with pigs constantly routing the dung about, is all very well; but this costs money. And if a lecturer lays it down as an invariable rule that good dung cannot be made without dung-pits, how many farmers there are who, not being able to afford such an outlay, will not take the trouble to employ the ordinary means of improving their manure, simply because they are under the impression, from the lecturer's instruction, that good dung cannot be turned out without a pit.

Besides, I have, in support of my argument, my own experience, and the practice that now obtains in Denmark, where the farmer is satisfied with ploughing all his dung on a space 25 or 30 feet in front of the cowhouse, etc.; all the urine that exudes from the litter is led thither by under-ground drains. Five years ago I had a box-pit with a shed over it. As the arrangement of my buildings did not admit of my sending hogs thither to work the dung over, I was obliged to send my man, twice a week, to turn it and water it to prevent it from getting fire-fanged. The following year, finding that my man neglected the job, particularly the watering, I took away the shed, trusting to the rain and snow for sufficient moisture, but I still retained the box-pit; it measures 28 by 21 feet. The dung is capital. It is true, I have no liquid manure tank, but I shall make one next year, not so much because I lose much urine, but for the sake of having some with which to water my meadows. The best means I have found to save the urine is to litter the cattle with sawdust. This I have done for twelve years, and I find it answer. With sawdust, I can purify a cowhouse in five minutes, and I do not lose a drop of urine. Had I no sawdust, I should use dried bog-earth, and falling that, a handful of plaster behind each cow in the place where the defections fall. Two or three times a week I level my mizen, never leaving it in the form of a cone, but keeping it as flat as a table. And, I say again, my manure is capital; MM. Buchanan and Casgrain, judges of the "Agricultural Merit Competition," gave me full marks for it.

2. THAT WHICH STRUCK ME MOST WAS, to find that in some parishes, for instance, St-Augustin, Pointe-aux-Trembles, les Beureuils, Cap Santé, etc., the farmers were draining their land in an economical manner, i. e., using stones and wood, which costs them nothing (1).

3. THAT WHICH STRUCK ME MOST was to find so many boilers in the cowhouses. In almost every set of farm-buildings hot water is used to scald chaff, husks, and meal. The cows, as a rule, are well fed, but, unfortunately, they do not get salt regularly,

(1). The extra amount of earth to be moved in the wide drains, when wood or stone is used, makes it much more expensive work than pipe-drains, to say nothing of the relative durability of the drains. See articles on this subject in the Journal for May, June, and July. —Ed.

and the use of the curry-comb and brush is neglected. (1) All the cow-houses are white-washed outside, which gives them a bright look, but, to my great surprise, I found that too many of them were not so treated inside.

Manures.

NOTES ON FARMING.

(Continued.)

KEEPING THE SOIL COVERED.—Land is not cleaned and tilled with the object of being left bare. Let, therefore, the stubble cleaning and autumn tillage be done early enough to admit of a catch-crop, (2) not a regular winter crop being sown. The Rothamsted experiments have clearly demonstrated the desirableness of this course.

When there is no vegetation, or even when there is vegetation, during excessive drainage, nitric acid is lost in large quantity through the drains. The remedy for this is to sow the newly cleaned stubbles with winter rye. The catch-crop will pay well for growing, and the land will be clean after its removal in spring.

ARTIFICIAL MANURES.—Farm-yard manure is a "general" manure: whereas all artificial manures are more or less "special" manures some of the most successful of them being deficient in a great many of the most important elements of plant growth. In addition to the special food-supply yielded by them, they are, as a rule, more active and give quicker returns than farm-yard manures; so that however rich the latter may be in the constituents of crops, it is impossible in the present condition of agriculture, to do without large supplies of artificial manures.

The late Mr. Pusey experimented with a view to discovering the extent to which farm-yard manure could be profitably used. One acre of land, without manure, yielded 15½ tons of mangels; a second acre, with 13 tons of farm-yard manure, yielded 27½ tons of mangels; a third acre, with 26 tons of farm-yard manure, yielded 28½ tons of mangels; and a fourth acre with 13 tons of farm-yard manure and 3 cwt. of guano yielded 36 tons of mangels. So that while 13 tons of farm-yard manure gave an increase of 12 tons in the crop, 26 tons of farm-yard manure gave an increase of 13 tons in the 13 tons of farm-yard manure and 3 cwt. of guano gave an increase in the crop of 20½ tons per acre. (The guano of those days contained 17 p. c. of ammonia! Ed.)

The artificial manure in this case is shown to have acted as a powerful and economical supplement to farm-yard manure when the latter was in moderate quantity. But there are many cases in which artificial manures must be solely relied on. Where land is very steep and hilly and outlying, it is often cheaper to purchase light and portable manures; and to supplement their use in such cases, not with the dung-cart but by feeding sheep on the field on the roots or other green crop grown on the land. (Excellent! This is what we have

(1). Brush, and wisp of straw, all right; but the curry-comb is a horror.—Ed.

(2) Very good in England, but, except fall wheat and rye, what crop have we here that will stand—20c F.?—Ed.

been trying to bring about for more than thirty years in this country. Ed.)

FARM-YARD MANURE is a mixture of the dung and urine of farm animals with the straw and other matters used as litter. It is regarded as the typical manure, both because it is a "general" manure, and on account of its influence on the texture and general character of the soil to which it is applied. Still it is not a perfect manure. It contains, no doubt, all the elements of plant-growth; but these are not always present in the best proportions. To prevent a deficiency of one element, it has to be employed in such large quantities as to furnish other elements more or less in excess of what is actually required by the crop. Its great bulk also makes it extremely expensive to handle. It is, moreover, exceptionally liable to waste, and it yields its results very slowly.

In a ton of ordinary farm-yard manure there is contained about 13 lbs. of nitrogen, 10½ lbs. of phosphoric acid, and 10½ lbs. of potash. The percentages are, of course, variable. Mr. Warrington, in the "Chemistry of the farm," puts the amount at 9 to 15 lbs. of nitrogen, 9 to 15 lbs. of potash, and 4 to 9 lbs. of phosphoric acid. The conditions affecting the composition and quality of the manure are (1) the kind and condition of animal producing it; (2) the food of the animal; (3) the kind and quantity of litter used; and (4) the care bestowed upon its after-management.

An adult animal takes comparatively little of the nitrogenous and ash elements from the food, because what it chiefly requires is the carbonaceous matter to keep up respiration and to form fat. (Quite right. Ed.)

Oil-cakes yield the richest manure; then come beans, peas, malt-dust, bran, clover hay, cereal grain, meadow hay, roots, and straw, in the order named.

The litter is an important part of farm-yard manure, not only on account of the manure matters contained in it, which are considerable, but also as affecting the texture and consequent fermentation of the manure. The quantity of litter should be sufficient to absorb and retain the greater part of the liquid manure and the surplus, if any, should be pumped up at intervals and distributed over the manure so as to keep the whole in a proper state of moisture. If the litter is deficient, the dung becomes too moist, and the most valuable part drains off, unless means are taken to collect it in liquid tanks. Whether the manure is too moist or too dry, fermentation is equally checked; in the former case by the exclusion of air, and, in the latter case, by the want of moisture.

MANAGEMENT OF FARM MANURE.—Air and moisture are both essential to the proper fermentation of manure. If it is too dry, it burns, gets "fire-fanged," white, and mildewed; and the high temperature of the manure promotes the formation of carbonate of ammonia, which is volatile and easily escapes into the air. This occurs when the temperature exceeds 90° F. But when the manure is kept moist and the temperature low, fermentation stops with the formation of organic acids which take up ammonia. The salts thus formed are present in the black decomposed dung, and the ammonia in them is in a soluble form, but not volatile. A strong smell arising from the manure makes it evident that a wasteful fermentation is going on.

Bees.

MICHIGAN STATE CONVENTION.

The Michigan bee-keepers' held their annual convention Jan. 1st, and 2nd, at Mt. Pleasant. There is probably no part of Michigan better adapted to bee-keeping. That grandest of all honey plants, the basswood, is fast passing away in that locality, but this loss is more than compensated by the "Epilobium angustifolium," or the great willow herb, as it is usually called. This plant springs up after the ground has been burned over in the newer, northern portions of the State. It commences blooming in July and continues to bloom until the frost kills it. It furnishes large quantities of the whitest and clearest of nectar. Naturally, bee-keeping is in a flourishing condition around Mt. Pleasant, many apiarists reporting a yield of more than 100 pounds of comb honey per colony. Had not the weather been unfavorable (rainy) and the roads bad, there would have been a large crowd of local bee-keepers present, as it was, the attendance was the largest that the Michigan convention has enjoyed in several years.

Wintering.—President Aspinwall of Jackson read a paper on this subject. He said that hive construction, including thickness of walls—packing—ventilation and entrance protection against drafts of cold air, also quantity and arrangement of the food supply, and strength of colony, are requisites tending towards one end—successful wintering. To exclude any one of these requisites will detract from uniformly successful results. With hives of the proper construction, containing sufficient stores, bees may be wintered in the most exposed situations, and it matters not whether the hives face the north, south, east, or west.

The unrestricted flight secured by outdoor wintering has no compensation with in-door methods, even when the winters are very severe. With outdoor wintering there is complaint of the excess of moisture, and upward ventilation is recommended as a means of carrying off the moisture. This current of air carries off not only the moisture but the heat. With single-wall hives this ventilation is necessary, as the moisture condenses the moment it comes in contact with a cold surface, but with thick walls of chaff or sawdust or some non-conducting material, there is no condensation, the moisture being held in suspension. If there is sufficient honey in all of the combs there is no necessity for winter passages through the combs, or above them. No colony should have less than 30 or 35 pounds of honey. When breeding is over for the season, the central combs are often deficient in stores, and feeding should be resorted to. Thick syrup should be used. There is nothing gained by causing the bees to evaporate a large quantity of water. One quart of water to 14 pounds of confectioner's A. sugar will make a syrup so thick that no harm will result if it is not sealed over.

"L. F. Bingham."—Why have so much honey for winter?

"L. A. Aspinwall."—The bees often eat out the stores from the central combs and long-continued cold keeps them from reaching honey in other combs. There should be sufficient in all of the combs to last the bees that are clustered between them. Then in the

spring the bees breed up much faster if they have an abundance of stores.

"T. F. Bingham."—If 20 pounds will bring a colony through the winter, why put in more honey for the bees to keep warm?

"L. A. Aspinwall."—I don't know that they do keep it all warm.

"T. F. Bingham."—I am putting up my bees for winter with only 20 pounds to the colony. I have an idea that putting too much honey in a hive for winter is objectionable.

"T. J. Fordyce."—I winter my bees with the hives packed in planer shavings. I put on the shavings 18 inches thick on top. The hives with a large entrance give the best results.

"H. S. Wheeler."—My experience is the same.

"T. F. Bingham."—The entrance to my hive small, but I put a rim 7-8 of an inch deep under each of my hives, and this prevents all clogging of the entrances and allows me to use a small entrance.

INFERIOR EXTRACTED HONEY.—Mr. Bingham called attention to the advice given by Dr. C. C. Miller, in a recent meeting of the Illinois bee-keepers, to the effect that, by pouring off the thin, watery honey that had arisen on the top of candied honey, a very superior article might be secured by melting the solid portion that remained. Mr. Bingham thought that giving the impression that thin, watery honey "usually" arose upon the top of candied honey was mischievous. Only honey that had been extracted before fully ripened, or that had been improperly treated after it was extracted, would thus have a lot of water rise to the top when it had candied. Well-ripened honey never exhibited any such symptoms.—"Country Gentleman."

The Flock

FEEDING LAMBS FOR MARKET. SHEEP-FEEDING (continued).

In feeding sheep for market the important consideration is the profit, and that depends on many circumstances. The feeding value of different foods, their cost, and the time occupied in fattening and marketing the sheep, are perhaps the most influential. It will be advisable to consider (1) the feeding of lambs that are to be sold to an early market some time during the interval from birth to weaning, (2) lambs intended for the fall market, and (3) those fed until they reach the period of their fullest development, which is usually when they are about 1 year old.

FATTENING LAMBS FOR THE EARLY MARKETS.

In preparing lambs for the early markets the best gain, to my knowledge, is that made by 3 lambs at the New York Cornell Station, which made a weekly gain per head of 5.36 pounds, extending over a period of nine weeks. Another lot of 3 made an average weekly gain of 4.47 pounds per head, extending over a period of twelve weeks. In neither case, however, is the composition of the ration or the amount of grain reported. The best gain in the writer's experience at the Wisconsin Station has been made by 4 lambs that were fed a mixture by weight of 4 parts of bran, 4 parts of corn meal, 1 part of linseed meal. When the experiment started, the lambs were about 3 weeks old, and they were fed for ten weeks on this grain ration, receiving in addition the milk of their

mothers. The average weight of each lamb at the beginning of the experiment was 18.6 pounds, and at the end, 62.5 pounds, an average weekly gain per head of 4.48 pounds. They each ate 26.6 pounds of the grain mixture during the ten weeks, costing 18 cents per head.

The results that come next to these in profit were obtained from feeding a grain mixture consisting of 2 parts of ground wheat and 1 part of ground corn by weight. The lambs were about four and one-half weeks old when the experiment started, and averaged 26.1 pounds in weight. When the experiment ended, fourteen weeks later, they averaged 77 pounds in weight, having made an average weekly gain per head of 3.63 pounds. They each ate 40.5 pounds of the grain mixture in the fourteen weeks, costing 33.3 cents.

Another lot of 8 lambs, about six weeks old at the beginning, fed a mixture of equal parts of bran and linseed meal before weaning, made an average gain of 40.0 pounds in twelve weeks, or a weekly gain of 3.4 pounds, per head. They ate 50 pounds of the grain mixture per head, which cost 37 cents.

In another trial with 14 lambs a mixture of bran, corn meal, and linseed meal gave an average weekly gain of 3.1 pounds, extending over a period of twelve weeks. During the three weeks the mixture was 3 parts of bran and 1 part of lin-

seed meal, and during the remaining nine weeks it was 2 parts of bran, 1 part of corn meal, and 1 part of linseed meal. The lambs each ate 42.7 pounds of the mixture during the twelve weeks, which cost 34 cents.

Considering these results, it is clear that corn meal is the leading food to feed young lambs for quick and profitable fattening. Bran probably ranks next, and with these linseed meal may usually be fed in small quantities to advantage.

FATTENING LAMBS FOR THE FALL MARKETS.

Under some conditions it may not be profitable to put the lambs on the market early or to carry them over winter, but it may be better to sell them in November, before housing is required. The best weights that we have obtained at the Wisconsin Station with lambs fed until November have been made by the lambs previously mentioned as receiving bran, corn meal, and linseed meal before weaning. After weaning they were fed 2 parts of ground corn and 1 part of linseed meal by weight. On November 19 each lamb averaged 102.7 pounds in live weight, and in the nineteen weeks that elapsed since weaning they had made an average weekly gain of 2.66 pounds per head. They each ate 183 pounds of the grain mixture, in addition to pasturage, at a cost of \$1.47 per head for the grain.

(Linseed meal and cotton-seed meal).—In a comparison of these, in addition to corn meal for fattening lambs after weaning, a weekly gain of 3.3 pounds per head was obtained from the mixture of 2 parts of corn meal and 1 part of cotton-seed meal, with pasturage. In the ten weeks' feeding the 5 lambs on the linseed-meal mixture had eaten 432.5 pounds of grain, while those receiving the cotton-seed-meal ration ate 346.5 pounds of grain. In the last five weeks there were only 4 lambs in the latter lot. The cost of gain, exclusive of pasturage, would be at the rate of \$2.00 per 100 pounds for the linseed-meal ration and \$2.25 for the cotton-seed-meal ration.

(Oats with pasturage).—The feeding of oats to lambs being fattened on pasture after weaning has given us returns that are close to the foregoing ones. In one trial 5 lambs attained an average weight of 99.8 pounds in sixteen weeks after weaning, making an average weekly gain of 2.1 pounds per head. Before weaning they had been fed a grain mixture of bran, ground corn, and linseed meal, of which they ate 42.7 pounds, costing 34 cents per head, and after weaning they ate 6.9 pounds of the same mixture and 120.0 pounds of whole oats, costing \$1.13 per head.

In another trial, 5 lambs being fattened on pasture after weaning were made to weigh an average of 97.6 pounds by November 8. In the twelve weeks before weaning they had gained an average of 3.4 pounds weekly by eating 56 pounds of equal parts of linseed meal and bran, costing 47 cents, and after weaning they received whole oats and pasture. During the fourteen weeks so fed they made an average weekly gain of 1.4 pounds, and they ate 52.7 pounds of oats per head, costing 56 cents.

More economical results were obtained by restricting the amount of oats to 0.5 pound per head daily while the lambs were on good pasturage. In the trial in which this amount was fed the 5 lambs gained during the twelve weeks 1.35 pounds per head weekly. They each ate 42 pounds of oats, costing 36 cents. These lambs were made to average 93.3 pounds by November 9. They were the same lambs previously described as being fed ground wheat and ground corn before weaning.

(Cotton-seed cake and corn meal with pasturage).—In experiments at Woburn, England, conducted in behalf of the Royal Agricultural Society of England, trials extending over seven years have been made in fattening lambs with these foods in addition to pasturage on clover that had been seeded the previous year. Each year three or four lots of sheep in groups of 10 were annually fed off the acre of pasturage, with the following average results:

	Pounds.
680 pounds of undecorticated cotton-seed cake fed with 1 acre of pasturage gave an average increase of	376.5
728 pounds of corn meal fed with 1 acre pasturage gave an average increase of	377.1
No additional food with 1 acre of pasturage gave an average increase of	264.1

These results indicate that the feeding of these foods in addition to pasture would be profitable, and that the rate of gain, being 55.3 pounds per 100 pounds of cotton-seed cake and 51.7 per 100 pounds of corn meal is slightly in favor of the former, while the cost of gain is favorable to the corn meal.

(Fattening lambs on rape).—There are exceptional possibilities in well-grown rape for fattening lambs, if it is fed with proper judgment and care. It may be fed to best advantage in the early fall, and hence is of valuable assistance in fattening lambs for the fall or early winter market. It supplies a vast amount of food that the lambs are very fond of, and as it withstands drought and early frost better than most succulent fodders it is a crop that may be relied upon with at least common certainty. The first trials reported with rape for fattening lambs were made in England about 1845. Ten wethers fed on rape alone from August 10 to September 21 made an average increase in the six

weeks of 20 pounds, or 2 pounds per head weekly.

The most extensive trials in feeding lambs on rape have been carried on at the Ontario Experimental Farm. In 1890, 54 acres of rape pastured 17 head of steers and 337 sheep, and 1 acre of the rape sustained 12 lambs for two months. It is estimated that the food provided by an acre of rape was worth \$16.80. In another trial, rape alone was fed to 60 lambs, and they were kept on 2.18 acres for twenty-five days, during which time they increased in weight 390 pounds, or an average weekly increase per head of 1.82 pounds. Again, in an experiment on one-sixth of an acre, 6 lambs were kept for forty-two days, and from this it is concluded that 1 acre would have pastured 36 lambs two months and have made 762 pounds of mutton.

At the Michigan Station 15 acres of rape pastured 128 lambs for seven and a half weeks, with a total gain of 2,890 pounds. At this rate it is estimated that 1 acre would pasture 9 lambs seven weeks, and they would produce 202.5 pounds of increase. It is stated that the field would unquestionably have pastured 10 lambs for the period of ten weeks.

(Rape and pasture).—At the Ontario Station an experiment was tried in feeding rape alone against rape and pasturage. Thirty lambs comprised the two lots, the one being put on an acre of rape and the other given a similar amount with pasture. In fifty-eight days both lots had eaten their respective acres, but the 15 on rape alone gained an average of 22.93 pounds per head, and those receiving rape and pasture 28 pounds per head, thus showing the advantage of having pasturage for the sheep to graze when being fed on rape (1).

(Rape and oats).—At the same place 15 wethers were fed on an acre of rape, with 0.5 pound of oats in addition. Besides eating almost the whole of the crop from an acre in fifty-eight days, they also consumed 345 pounds of oats, and gained 23.67 pounds per head, or a weekly increase of 2.8 pounds per head.

(Rape with corn and oats).—At the Wisconsin Station 16 wethers were fed on 0.7 of an acre of rape for twenty-five days, and also ate 153.5 pounds of oats and 97.5 pounds of whole corn. They gained a total of 149 pounds, or a weekly average of 2.6 pounds. Valuing the foods and the wethers at cost, and the selling price of the latter at 4 cents per pound, the rape would be worth \$14.48 per acre.

(Rape, wheat, oats, and linseed meal).—At the Wisconsin Station 21 wether lambs were fed on 0.5 acre of rape for ten weeks. They ate in addition a total of 1,439 pounds of the grain mixture, and made a total gain of 4,135 pounds, or a weekly gain slightly less than 2 pounds per head. Valuing the food at current prices, and estimating the lambs to be worth 3 cents per pound when they were put on the rape and 3.5 cents when taken away, the 0.5 acre would be worth \$10.12, or an acre \$20.24.

When these wethers had eaten the crop on 0.5 acre they were put on another piece that had been sown broadcast. One-tenth of an acre was eaten in two weeks, with 160 pounds of ground wheat, 160 pounds of linseed meal, and 160 pounds of ground oats, and the 21 wethers gained 142 pounds, or a weekly gain of 3.3 pounds per head.

(1) Clover-chaff would be better, as the sheep should be always on the rape-land to manure it.—Ed

(Precautions necessary in feeding rape).—When sheep are being hurried on rape there is danger of bloating or diarrhoea from excessive eating. Pasturing the sheep for a few hours previous to turning them on the rape, or allowing them to have the range of a small piece of pasture at all times, will assist in preventing these troubles. The use of the trocar and cannula is the most efficient method of relieving bloat in urgent cases, while in mild attacks the giving of ammonia, a teaspoonful in three times as much water, will usually bring relief.

Orchard and Garden.

THE PLANTING AND CARE OF SHADE TREES.

There is nothing probably, which gives the genuine horticulturist so much satisfaction, as a beautiful, and well developed shade tree, and yet how few people seem to appreciate the sight of such, and how often we see them, in their ignorance, cutting down large trees by the wayside, or mutilating them by topping off the branches indiscriminately, until one can scarcely recognize them as works of nature.

To grow shade trees successfully, it is necessary that they should have proper soil, and proper treatment, and should not be stuck into the ground anywhere and anyhow, and then expected to thrive: and by proper soil, is meant, that the different varieties of trees should be planted in that kind of soil, to which they are best suited by nature; for instance, no practical man knowing anything of the nature of trees, would plant a sugar-maple in a swamp, and then expect a perfect tree any more than he would plant a willow on a rocky hillside and expect it to thrive; but still there are theorists doubtless, who would even do this, and not recognize their mistake.

When one wishes to form a tree to a perfect shape, the time to commence is when the tree is young, and the wounds made will heal over in a short time, rather than after the tree has grown to a considerable size, and the wounds caused by cutting off large branches, are left to breed fungi, which eventually, causes the tree to decay and die. But if through negligence the tree has grown to a large size, and is misshapen, there is still a possibility of making a fair specimen of it, if one proceeds in the proper manner, and not as if one had determined to see how much could be cut away, without entirely destroying the tree.

In the first place it is necessary to procure a very sharp pruning saw, with fine teeth, made of as thin metal as possible, so that it will not injure the bark in any way, whilst in use, in fact as much care should be employed in the selection of tools for pruning trees, as a surgeon would take in choosing his instruments for performing an operation. Having procured the above named instrument, saw off a number of the worst shaped branches, and carefully smooth off, with a very sharp knife, any rough edges of bark, which may have been left by the saw. When the wounds have partially healed, remove a few more limbs always employing the same great care; and in this gradual and systematic manner—rather than by wholesale butchery—or your trees into symmetrical shape.

In planting trees, care should be taken that one has well rooted specimens, and not a lot of stumps, with one tap-root each, and one or two small fibrous roots adhering: all who have had practical experience will concur in the statement that it is better to spend a trifle more and procure good stock, than to plant poor specimens, which will develop into sickly, stunted trees. Having secured good trees, with the heads not too large or too spreading, in proportion to their roots, the next care should be to see that the soil is in proper condition for planting them in. If they are to be planted in sod land, a fair sized hole should be dug the previous fall, in order that the earth may be mellowed by the action of the frost; but if they are to be planted in cultivated land, which is preferable, it is not so important, whether these resting places are dug in the fall or spring. After the tree is planted and the earth properly covered in, a forkful of barnyard manure, no matter if it is a trifle strawy, should be carefully placed on the surface around each tree. This serves a three-fold service, namely keeps the land mellow, acts as a fertilizer, and prevents the drought from affecting the growth of the tree; it also keeps the weeds in check.

Whilst planting the trees, particular attention should be paid, so that the roots may be properly set; that is, spread out carefully in the way in which nature intended that they should grow, and not be left in a bunch, which is frequently done, and which in a great many cases results in the tree being blown over, before it has got a fair hold of the earth.

It is also a good plan, if the tree has a slight natural curve in the stem, to place it so that its crown may be slightly inclined towards the prevailing wind, in order that the latter's force may tend to straighten it. Particular care should be taken that well pulverized earth is placed directly about the roots, and when there is a depth of four or five inches of mould in the hole, the tree should be grasped firmly by the stem and gently shaken up and down a few times, so that the soil may sift in about the roots and leave no room for the drought to work havoc. After this is done, fill in more earth until the trench is about three parts full, when it should be packed firmly down, and the remainder of the earth shovelled in. It is always good policy when transplanting trees, to cut a liberal amount of wood off the tip of each branch—as a rule nearly all the growth of the previous year; this has the effect of allowing the tree to get a firm hold of the earth, and results in a more vigorous and sturdy growth the following year.

There is no reason why in this Province of ours, and in fact throughout the greater part of the Dominion, each farmer should not have his own avenue of shade trees, and in most cases it is either ignorance or simple laziness which prevents him from having one, for surely no one could be so lacking in taste as not to appreciate the advantages of such.

Therefore it would seem to be the duty of Agricultural Journals generally to take up the subject of Ornamental Shade Trees, and by representing it in all its lights and shades to the farmer, and pointing out the advantages to be gained by a small expenditure of labour, see if we cannot have less of those farm-houses in this country which look so much like sand-dunes in a desert, all for the lack of a few shade-trees.

M. JACK.

THE CHARM OF THE COUNTRY.

This is the season of the year, when the dwellers in towns hear the voice of the country calling to them. Not only is the holiday spirit upon us, but the mind runs continually on the charms of a country cottage over a town house. Never does civilization wear a more repellent look, or clothe itself in a more monstrous garb than when the thermometer, steadily mounting, begins to record a mean temperature of about 80 or 90 in the shade, and the almost vertical sun-rays remind the townsman, that kindly nature has planted natural sun-shades elsewhere, where he cannot benefit from them. Instinctively a child of nature, he keenly recalls his sonship, and bemoans the chain of circumstances that keeps him so long out of his birthright. The handmaidens of civilization—theatres, concert halls, and lecture rooms—which at times he woos so assiduously, cannot now so much as win a smile from him, with all their wiles. The chirping of a sparrow in the solitary tree in the back-yard, speaks to him of haunts remote from man, where the birds sing from their hearts, and his mind, if not his tongue, babbles of green fields with all the fervour of a poet.

Truly the country is never more beneficent than it is at this season of the year. For those who have eyes to see and ears to hear, it is always grand or delicate, majestic or soothing; but for the moment the townsman's love of it, depends rather upon his escapes than his gains. He revels in the natural canopy that shelters him from the burning sun. Although he may have no eye for the stately shape of the green tent or for the colour of the surrounding landscape, he welcomes the river-banks, or the brook-side because he has an instinctive knowledge that it imparts cool comfort, but his mind perhaps does not turn to the "looks in the running brooks" which every student who will read with never falling satisfaction.

In what lies the attraction of the country for the average man or woman, must always be a debatable point. It is not a reasoning love of nature for the average being does not possess it. Of the town populations a vast majority live together by preference, as well as necessity. The crowd loves the crowd, as may be seen by their choice of holiday resorts. They look for their pleasures in the product of civilization. They seem incapable of taking their pleasures alone, which is, the exact opposite of the nature-lover. It is then a merely animal instinct which leads them to revel in their occasional incursions into the country. Is it simply that the ozone fills them with physical strength, that the grass is simply a bed to recline on the trees merely a shelter from the sun. It cannot be this alone! There are none so poor in the higher attributes of humanity, as to fail to drink in some inspirations from natural beauty. The majority may be incapable of expressing their sensations in words, many may be even unable to compare critically or to peer closely into the surrounding beauties, but at the lowest reckoning there must be some human instinct by means of which, nature's beauty fills the soul as well as the lungs, and fires the imagination while it soothes the body. We must, however, leave it a matter of conjecture why this person or that or why mankind in general, loves the country, contenting ourselves with the assurance that with a few exceptions the fact is a true one. But for

most of us it is not primarily a desire to revel in grand scenery, or to commune with nature which leads us, especially at this time of the year, to long for the delight of a country life. We are unsoberable and desirous of withdrawing altogether from the company of our fellow-men. Indeed we should select our resting place, if for a long stay, in a spot where we should look for agreeable companionship as one of the attractions of the place. Yet we do want some degree of freedom. We want moral as well as physical breathing space. Never more than in summer heat does one recognize the stifling feeling of having humanity pressing on one from all sides. It is a time for partial solitude at least, but how can one obtain this in a great city? The world seems so full at this point. You cannot stretch out your arms without striking your neighbours. Doubtless they feel the same of you. One seems at such times to wish that the world were broken up into allotments railed about, so that each one should have his little square or be visited by permission.

This is but a mood, and a transient one, but it is nevertheless a dominating one while it lasts. Your more modest, and more legitimate desire is perhaps nothing more than a country cottage. You want the country—a village with a few friends, and not too many neighbours—a handy river for fishing and boating, and some quiet varied scenery to add impressiveness to your evening walks. And as you stand for half an hour at night, at the open door or window, gazing out into immensity, your happiness, so far as your immediate surroundings are concerned, ought to be complete. There are few pleasures so real, as to stand, let us say, on a balcony outside a brightly lighted room, alone on a still night, with laughter, and perhaps music, behind you, and a starlit sky above you—to look out over an expanse of meadow land, well wooded with old oaks and elms, whose leaves makes the faintest rustling in the almost imperceptible breeze—to peer out into the darkness, to gaze into the mysterious depths of the sky—to stand, as it were, between active, joyous, human life on the one side, and the unfathomable on the other. This, to experience an emotion which is a priceless gift of humanity. You have no room for sordid thoughts. You cannot think them. Alas this is only an emotion, and it vanishes with the turning of the head.

Truly the country has no richer benefit for us, no better medicine than the varying moods it engenders. Effective contrasts no doubt renders one more impressionable, and the simple bucolic will draw less inspiration from meadows, trees, and sky, than will the citizen from the neighbouring town.

Let us listen with an attentive ear to the call of the country while its life is lusty and year is in the fulness of its strength.

W. R. GILBERT.

PRUNING.

Season for—Prof. Craig on—Neglected orchards.

The object of pruning is to cause the tree to grow in such a shape as to allow every branch to make use of the light and air necessary to its development and fruitfulness.

Pruning should not be neglected until the tree has become mis-shaped, but attention should be given to its proper

formation from the commencement of its growth, and thenceforth, annually.

In many old orchards the trees have been planted too thickly in the first instance, and give evidence that they have been carelessly or ignorantly treated, interlacing branches, and dying or dead trunks take the place of good ones, the trunks are covered with scars, dead stumps of limbs improperly cut off, or ugly excrescences all testifying to the fact that pruning has been badly done or entirely neglected, and the idea of improving the productive capacity of the orchard, to say nothing of the symmetrical proportions of the trees, has been entirely lost sight of.

A tree, left to itself, often develops more vigorously in one direction than another, some of the lower branches absorb the sap to the detriment of the others, and being long and heavy are



Fig. 1—Effect of checking descent of cambium.

in greater danger of being split off by the weight of snow, or by tempests, and this leaves wounds which it is impossible to heal, hence holes are made in the trunk which form repositories for death-dealing insects or fungi, and lead, in various ways, to premature decay.

Without proper and careful pruning, fruit trees will be unpleasant objects to look upon, unproductive, and short lived; with it, they are a source of pleasure and profit for many years.

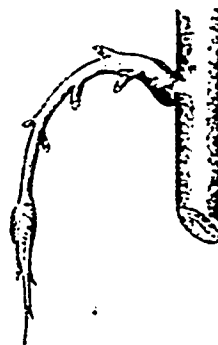


Fig. 2—Effect upon branch of weeping elm. Cambium checked on its return from extremity of branch.

SEASON FOR PRUNING.—On this point there is a great diversity of opinion, some claiming one season of the year to be the best, and some another.

MM. de Courssol and A. DesCais, (accepted authorities on the subject of pruning), say, "a tree can be pruned at any season of the year, and the best time for pruning is that which is most convenient, and when it can be the most cheaply performed."

At the same time they say, in effect, that "when pruning is done in the fall there is danger of the severe frost causing decay in the newly made wounds."

In winter the days are too short, and often, too stormy to allow the work to be continued profitably. The loss of sap which occurs when pruning is done in the spring is injurious, and in the summer there is danger of the workmen inflicting an injury upon the growth of

the young and tender shoots of the adjacent trees."

This, to say the least, is vague and unsatisfactory.

Professor Craig, of Ottawa, has put the mark more definitely, he says, "I think the best time to do pruning is when the wound would be likely to heal over quickly, and that is when the leaves are falling."

This opinion will stand the light of practical experience and scientific research.

By a natural law of vegetation, the sap rises freely from the roots, passes through the cellular tissue of the tree into the leaves, where it is elaborated and converted into a thick viscous fluid called cambium. This elaboration is completed by the evaporation of the superfluous hydrogen and oxygen contained in the sap and by the fixation of carbon and, sometimes, of ammonia, this now becomes the natural aliment of the plant and begins its descent towards the roots. But, while the ascent of the sap is free and uninterrupted, the descent of the cambium is fixational, that is to say, it gradually assimilates with the organism of the tree, visiting every part, forming new parts or repairing injury to existing ones, and diminishing its own bulk, until at the lower extremity of the plant it is entirely expended. To make it more clear we may say that sap can be compared to the chyle of animals (the first fluid into which food is converted), and cambium to their blood, and as the latter supplies the material necessary for the production of bone, muscle, hair, etc., in the animal, so the former supplies that which produces bark, wood, leaves, flowers and fruit—in vegetables.

Endeavours have been made to account for this movement of the sap from chemical and mechanical stand points, but not satisfactorily, and it can only be attributed to the vital energy which exists in all organic nature and which is the mystery of life.

The fact of the circulation of these fluids in plants can be demonstrated as seen in the figures 1 and 2.

During the season of growth, tie a piece of cord or wire, tightly round a branch, and, after a short time, an accumulation of vegetable growth will appear above the ligature, showing that the descent of the cambium has been interrupted at that point, and if further proof is required, the same operation, being applied to the branch of a weeping tree, that is to say, one with a pendulous habit of growth, the effect will be to cause the excrescence to be formed before the interruption, thus showing that the cambium is returning from the leaves.

Again if a tree is girdled, and the ring of bark removed is not too wide, and there is sufficient cambium left in the tree above the part girdled, new bark will be formed to cover the space and the tree will survive; again trees have been saved by placing pieces of living bark from another tree in the place where the bark has been removed, and, this having healed, the tree has been saved.

Plants, unlike animals, have a short season of growth and a long season of rest,—and it is during the former that the vital energy is active. The copious ascent of the sap and descent of the cambium take place, therefore the healing process is immediate, and it follows that then is the season when all important amputations can successfully be performed, as there would be less dan-

ger of destruction of parts, either from frost, or any other cause.

It may be objected that pruning, at this period, has the effect of stunting growth, and this is no doubt the case when the pruning is very severe, but the question is whether it is advisable to prune by wholesale at any time, or whether it is not better to bring a neglected tree into proper shape by removing a few branches each year until the desired end is attained.

These seem some of the theoretical reasons why trees can be safely pruned in the summer, and now for practical results.

A neglected orchard was pruned during the last half of the month of June and the first half of July, and the rapidity with which wounds healed was remarkable. Cuts $1\frac{1}{2}$ inch in diameter, were nearly covered with new bark by the end of August, and the following spring the smaller cuts were completely healed and not a single tree suffered by the operation, but all were improved.

(to be continued).

GEO. MOORE.

HORTICULTURAL QUERIES.

Answered by
John Craig,
Horticulturist, Central Experimental
Farm, Ottawa.

AMERICAN AND EUROPEAN PLUMS SOUTHERN GROWN TREES.

(1) How do Early Red and Hawkeye plums compare in regard to hardiness.

(2) Are southern grown trees as good as northern grown, for planting in this locality.

Iron Bridge, (Algoma), Ont.

Answer:—

Regarding the relative hardiness of the Early Red and Hawkeye plums, in our experience we have found the Early Red to be quite hardy in tree in this locality, but tender in fruit bud; that is to say, with this variety like the peach, the fruit buds are often killed, while the wood buds remain uninjured. This characteristic applies to most of the European varieties of plums and is of course a serious defect.

The Hawkeye (*Prunus Americana*), is perfectly hardy in this vicinity and when not allowed to bear too heavily is an exceedingly satisfactory variety. I regard it as one of the most valuable of that class of plums. I am often asked the question regarding the relative value of Northern and Southern grown trees. I usually say, and I believe this to be correct, that Southern grown nursery stock is as good as Northern grown stock if the trees have not been forced in nursery and if they have not been dug before the wood has become well ripened. In the hurry of nursery work, nurserymen frequently dig the trees before the leaves have fallen—as early as the middle of August. It is then necessary to strip them in order to prevent evaporation. Treated in this way the wood of the trees is frequently in a partially ripened condition, and when planted in our Northern localities the first result is the killing back of the terminal wood. Whenever possible, therefore, I prefer to purchase trees, and see that they are thrifty and well grown from Northern nurserymen, preferably those situated the nearest to the site of the future orchard.

J. C.

DRY ROT OF APPLES.

S. T., Nenagh, Ont.:—Asks for information regarding a dry rot affecting apples.

Answer:—

I have investigated during the last season the disease you speak of causing the dry brown spots on apples. I regret that I am unable to give you very much definite information regarding the cause of or the remedy for this disease. It is undoubtedly a fungous disease, and may in this way, spread rapidly from apple to apple while packed in the barrel. It is, therefore, a wise precaution in packing apples to reject all those that appeared to be affected with the disease. Its presence will be noticed by small depressions appearing on the surface of the apple. A careful and persevering adherence to the best practices of spraying with good cultivation will no doubt lessen the number and prevalence of these injurious fungous diseases.

J. C.

CHERRIES FOR P.E.I. SOUTHERN GROWN TREES.

F. B., Charlottetown, P.E.I.:—What are the best cherries for this locality? Are Rochester, N.Y. trees as good for this section as those grown in Canada.

Answer:—

It is not likely that any class of cherries will be more profitable in Prince Edward Island than those belonging to the Morella type. These are commonly known as the sour cherries. Some of them, however, approach very closely in quality those belonging to the class, known as the Dukes; that is, the class intermediate between the sweet cherries—the Bigarreaux and the sour cherries—the Morellas.—Among the most profitable of the latter class are May Duke, Montmorency, Carnation and Early Richmond. Already on Prince Edward Island, there are many variations of Early Richmond or Early Kentish, as this variety is known in England. (1) I would by all means advise Island growers to cultivate the best types of this fruit, which now may properly be considered as a native. I think it always advisable to purchase trees as near home as possible, provided they are healthy and well grown. The danger in connection with purchasing trees from Rochester, or nurseries further South, lies in the fact that nurserymen sometimes dig their trees in the autumn before the wood is well ripened. When these are planted out in a colder climate the annual growth is apt to be killed or injured for one or two years. A tree of a given variety, well grown at Rochester, is just as good as the same tree well grown further North. We have, however, in Canada, a large number of reliable nurserymen who are doing business on an extensive scale and, therefore, are in a position to furnish trees at reasonable rates. The addresses of these men can be found in the leading Agricultural Journals of Canada, particularly the Canadian Horticulturist.

Trees should not be imported from the United States unless guaranteed as examined and found free of San José Scale and accompanied by a certificate.

PEARS AND PEACHES AND STRAWBERRIES.

J. N. C., Berwick, N.S.:—What is the best winter pear, what peaches do you

(1) Only fit for preserving.—Ed.

recommend for this locality? Is the Woodruff strawberry a desirable variety?

Answer:—

It is difficult, and often misleading, to say which is the best variety of winter pear, or in fact any class of fruit. It depends upon soil and climate. The principal varieties of winter pears are:—Beurré d'Angou, Joséphine de Malines and Winter Nellis. They ripen about in the order in which they are named. The first one I regard as the most valuable from a commercial standpoint. The last named is the best keeper of the three. I would not advise the planting of dwarf pears in a large way. It would be wiser to ascertain the suitability of your soil before going into it extensively.

Regarding peaches, I would advise planting only the earliest varieties at Berwick. I do not think that the late ripening kinds would in that locality attain perfect maturity. In planting in the vicinity of Berwick it would be requisite to secure warm, sandy, and what I might term, an "early" location, that is, a situation which would tend to ripen the wood early in the autumn and tend to hasten the maturity of the fruit. The climate in many parts of the Annapolis Valley, I believe to be quite suitable for peach culture, so far as injury from cold in the winter is concerned. The greatest difficulty, so far as I have observed, will be in the matter of summer heat on account of east influence; and lack of summer heat would prevent the later varieties of peaches ripening perfectly. I would plant Alexander, Early Rivers, Mountain Rose and, perhaps, Early St. John and Early Crawford.

The Woodruff strawberry is a strong grower, but the foliage has been more or less affected with rust. This variety is now being dropped from the catalogues. The Crescent and Wilson for market are certainly very desirable, though I think we can improve on the latter named variety in regard to size by planting the Williams or, if we wish to extend the season, Parker Earle.

PEANUTS IN CARLETON CO., ONT.

W. H. B., Aylmer East, Que.:—Can peanuts be grown successfully in this locality?

Answer:—

My attention has been called several times lately to an article which appeared last winter in a number of our agricultural periodicals. This article referred to the successful cultivation of the peanut in Carleton County in 1896. It is possible that a few plants were successfully grown and that they produced edible nuts. That this success could be repeated on a commercial scale or even in a small way I very much doubt. The peanut is at home in the Southern corn-growing region of the middle states. I do not think it could be grown successfully on a commercial scale in Canada where the peach does not succeed. To bring it to its highest state of perfect development five months free from frost are required. We have tried it for three years at the Central Experimental Farm, in each case starting a few plants in pots in the greenhouse in addition to those grown entirely out of doors and setting them out in a most favourable situation about the last week in May. Each year the greenhouse grown plants matured a small percentage of nuts. Of the plants which were grown

from seed out of doors a very small yield of matured nuts was secured. While it is quite interesting to grow this plant, I would not advise any farmer or gardener to risk much money, labour or time upon the experiment.

J. C.

KILMARNOCK WEEPING WILLOW.

J. D., McDonalds Corners, Ont.:—Is the Kilmarnock Willow hardy? How is it propagated? What kind of twine is used in binding root grafts.

Answer:—

Kilmarnock weeping willow has proved quite hardy at Ottawa, much harder in fact than the widely advertised American weeping willow. Weeping willows are usually grafted upon ordinary upright stocks principally "Salix alba," white willow. Almost any of the native willows make suitable stocks. Of course, it is desirable to get those of upright growth with a tendency to produce single stems. Personally I am not favorably disposed towards "weepers" particularly weeping willows. They are, to my mind, most undesirable kinds of ornamental trees. They are curious, but certainly not beautiful, and there are few locations on the lawn where one feels that a tree of this kind can be planted without appearing odd rather than beautiful and often obtrusive and out of place.

About cord for root grafting, we use No. 18 knitting cotton. This is strong enough to bind the union, but at the same time can be easily snapped with the fingers in wrapping the graft. Raffia, a West Indian grass, is much more enduring than the cotton and therefore is not so suitable, to my mind, as the knitting cotton.

J. C.

DAMAGES CAUSED TO TREES

In the Districts of Montmagny and Temiscouata, winter 1896-1897.

Last winter was extremely disastrous to fruit and ornamental trees from Quebec to Gaspé.

Even old strong bearing apple trees were killed, some being more than 150 years old (seedling-trees, Jos. Ant. Caron.)

Damson plum-orchards of all ages from one to two years plantation to those of seventy-five years and more are destroyed. Even the suckers are winter killed.

European plums and American varieties of this species have suffered much on cultivated land. The plum trees have less damage where grown in sod, and they have not lost so much roots as the others, only their fruit buds were winter killed. My loss in large trees not protected is considerable.

On land where water stood in April (effect of a prolonged high temperature) and was frozen hard after a sudden cold 120 to 150 below zero, the roots of cherries, plums and apples were frozen, even those of poplars, maples, elms, limes, etc. Noble oaks 70 to 80 years old at the Manor, Fraserville, are dead.

Only some Richmond cherries and wild plums of the woods of the Saguenay resisted the effect of water and ice. Sugar maple orchards seem weak. Maple leaves are small and look dry. Thousands of large maples are dead or dying.

In my nursery, fruit trees look well. Heavy MULCHING in October, mutual protection by the different kinds of trees, protection by the numerous rows of currants, have helped the pear, apple, plum, cherry trees, etc. to resist a cold of 28° to 32° below zero which great cold succeeded a temperature of 36° to 40° above in January. The change was so sudden!! At noon, the thermometer stood at 40° above zero; it was 15° below at about 9 p. m. and 28° to 32° according to exposure at about 7 in the morning. There was no snow on the ground then, and we had none until the 23d of January. All the strawberry beds are dead. Much of the raspberries have not grown. Currants have little fruit. There is no fruit here, and very few apples.

Apple trees were in bloom (very little though) from the 18th to 24th of June, a month later than usual.

The loss is immense to farmers and to all orchard owners. It is even greater than in 1876 and 57. Every one of them is discouraged. Who will help them?

A. DUPUIS.

July, 13th 1897.

CEMENTS, MORTARS, PAINTS AND GLUES.

I.—CEMENT AND MORTAR.

CEMENTS FOR IRON.—1. Sal ammoniac, 2 ounces; sulphur, 1 ounce; clean ironborings or filings reduced to powder, 12 pounds; water enough to form a thin paste.

2.—Sal ammoniac, 2 ounces; iron-filings, 8 pounds; sufficient water.

3.—1 or 2 parts of sal ammoniac to 100 of iron-filings. When the work is required to set quickly, increase the sal ammoniac slightly and add a small amount of sulphur.

4.—Iron-filings, 4 pounds; pipe-clay, 2 pounds; powder, 1 potsherd, 11 pounds; make into a paste with moderately strong brine.

5.—Equal parts of red and white lead, mixed into a paste with boiled linseed oil. Used for making metallic joints of all kinds.

6.—To 4 or 5 parts of clay, thoroughly dried and pulverised, add 2 parts of iron-filings, free from oxide, 1 part of peroxide of manganese, $\frac{1}{2}$ of sea salt, and $\frac{1}{2}$ of borax; mix well, and reduce to a thick paste with water. Use immediately. Expose to warmth, gradually increasing almost to white heat.

7.—Sifted coal ashes, 2 parts, and common salt, 1 part. Add water enough to make a paste and apply at once. This is also good for stoves and boilers, as it stands heat.

ROILER CEMENTS.

8.—Chalk, 60 parts; lime and salt; of each, 20 parts; sharp sand, 10 parts; blue or red clay and clean iron-filings, of each, 5 parts. Grind together and calcine or heat.

9.—Powdered clay, 6 pounds; iron-filings, 1 pound. Make into a paste with linseed oil.

10.—Powdered litharge, 2 parts; silver sand and slaked lime, of each, 1 part; boiled oil enough to form a paste.

These cements are used for stopping leaks and cracks in boilers, iron pipes, stoves, etc. They should be applied as soon as made.

TAR CEMENT.

11.—Coal-tar, 1 part; powdered slate (slate flour) 3 or 4 parts; mix by stirring until thoroughly incorporated. Very useful for mending watering-pots, barrels, leaky sash, etc. It remains somewhat elastic. It does not adhere to greasy surfaces. It will keep for a long time before using.

COPPER CEMENT.

12.—Beef blood thickened with sufficient finely powdered quick lime to make it into a paste is used to secure the edges and rivets of copper boilers, kettles, etc. Use immediately.

FIREPROOF OR STONE CEMENT

13.—Fine river sand, 20 parts; litharge, 2 parts; quick lime, 1 part; linseed oil enough to form a thick paste. Used for walls and broken stonework.

EARTHENWARE CEMENT.

14.—Grated cheese, 2 parts; powdered quick lime, 1 part; fresh white of egg enough to form a paste. Use as soon as possible.

For fine earthenware, liquid glue may be used.

CEMENT FOR GLASS.

15.—Methylated spirit (wood alcohol) to render liquid a half dozen pieces of gum-mastic the size of a large pea; in another bottle, dissolve the same quantity of isinglass, which has been soaked in water and allowed to get surface dry, in 2 ounces of methylated spirit; when the first is dissolved and 2 pieces of gummabarium of gum-ammoniac; apply gentle heat and stir, add the solution of isinglass, heat again and stir. Keep in a tightly stoppered bottle, and when used set in boiling water.

SEALING CEMENTS.

16.—Rosin, 1 pound; resin, 5 pounds. Stir in sufficient red ochre and Brunswick green, or lampblack, to give the desired color.

17.—Black pitch, 6 pounds; ivory-black and whitening, of each, 1 pound. Less attractive than the former.

These are used for sealing up bottles, barrels, etc.

MORTAR FOR HEAVY RUBBLE-WORK OR BRICKWORK.

18.—1 part of slaked lime, 2 parts of sand, and $\frac{1}{2}$ part of blacksmith's ashes; for brickwork, 1 part of lime, 1 of sand and one of blacksmith's ashes.

GARDEN OF THE FARM.

GREENHOUSE.—The best season for repotting different plants is just as new growth is forming in spring; therefore no time should be lost in getting a good heap of compost ready, as well as having all spare pots washed, and crocks broken into different sizes for drainage. The following is a compost which will suit all kinds of greenhouse plants, ferns included: To each barrowful of loam add one-eighth of half-decayed leaves and one-eighth of sharp road grit, or sharp sand, about a 7-inch potful of bone dust, and a good dusting of wood-ashes or fine charcoal. The loam, if possible, should be obtained from old

pasture land, containing plenty of fibre, which should be pulked to pieces, and the fine soil shaken out, and, by using the crushed bones, manure is dispensed with, which, if not properly selected and prepared, is not always suitable for potting purposes. Many are of the opinion that ferns, especially the favorite maidenhair, will not succeed unless potted in the best peat and silver sand, and, as these are not always obtainable, the plants often remain unpotted until they die. The finest maidenhair ferns I ever saw were grown in nothing but rich loam and sharp sand. (1) The advantage of loam for these plants, especially when grown in small pots is that it contains more holding properties than peat, and will therefore produce stouter fronds and sustain the plants for a longer period if fed with liquid manure during the growing season. This will be one of the first plants to receive attention, and must be potted as soon as it is observed that the young fronds are on the move, and before they have pushed through the old ones, which often causes them to come ill-formed, with weak stems, which eventually fall over the side of the pots instead of standing erect. To secure well-shaped, handsome plants all the old fronds should be cut off at once to allow the young ones room to develop properly and to grow evenly. In repotting turn the plants out of their pots, and with a steep-pointed stick carefully disturb the roots and shake out a good portion of the old soil. Remove all the old crocks that are matted with roots, and gradually reduce the size of the ball to nearly one-half, afterwards trimming off the longest roots with a sharp knife. If the soil is dry in the centre of the ball, steep them in water for half-an-hour, and allow them to drain well before they are potted. The plants then can either be potted in the same size pots they were previously in, or, if larger plants are required, more room must be given. Small plants growing in 2 and 3 inch pots are very useful for table decoration, and, although seedlings make the most compact plants, where these are not obtainable larger plants can be cut into small pieces and potted in small pots singly. The soil should be fairly moist at the time of potting, and should be made quite firm about the roots, and by keeping the stage well damp where the pots are standing little watering will be required until new roots form in the fresh soil. Fuchsias that have been kept dry during the winter should have their longest shoots shortened back in readiness for starting them into growth any time after the end of the present month. Begonias (tuberous-rooted varieties) should be looked over; all the old soil should be shaken from their roots, and the bulbs, if early blooms are not required, should be kept cool and dry for another month before they are started into growth. A few of the strongest bulbs might be started now, however, with every chance of the plants proving useful during the early summer months. Plunge the bulbs in shallow pans or boxes filled with sandy soil, and keep them at the warm end of the greenhouse. As new roots and leaves appear they should be potted, using small pots at first, giving the plants a shift into larger ones as they require it.

"Montreal Witness."

(1) With lots of water; you should see the ferns in the dripping Devonshire lanes!—Ed.

SAN JOSE SCALE IN CANADA.

Grimsby, Ont., June 12.—The deputation sent by the Dominion and Provincial Ministers of Agriculture to investigate the presence of the San Jose scale in an orchard near Niagara, report that they have found the scale in large numbers. They say that unless prompt measures are taken for the immediate destruction of this terrible pest it will spread throughout the whole of southern and western Ontario and utterly ruin the prospects of Ontario fruit-growers. They advise vigorous action being taken against the importation of nursery stock from the United States, excepting under the most rigorous inspection, and at one or two points only. They further advise that the importation of fruit from states where the orchards are known to be infested be also prohibited.

GROW BERRIES NEXT YEAR!

The farmer's berry garden should be decided upon now. Let the following months be given to reading good papers, be prepared to adopt the valuable practical advice they are sure to give you. Mature plans for the season; select your plants; order them early; and let this be your first work in the spring.

One-quarter acre of good land, set with proper varieties and well cultivated, should produce from 20 to 40 bushels of berries every season. This would give an ordinary family fresh berries every day in season and a liberal supply, canned, preserved or dried during the entire year.

Plants for such a garden may be purchased direct from a reliable grower, for \$10 or \$15, and should include the following:

- 300 strawberry plants, early, medium and late.
- 100 blackberry plants, early and late.
- 50 black raspberry plants, early and late.
- 50 red raspberry plants, early and late.
- 75 currants, red and white, early and late.
- 25 gooseberry, early and late.
- 18 grapes, three varieties, early.

Multiply this list by four for one acre, or by twenty for five acres, and you have the right proportion for a continuous supply of different varieties for market purposes.

Good berries may be grown in any soil—sand, clay, muck, loam, gravel, or a combination of each—provided the same be highly fertilized, well drained and thoroughly cultivated.

Early fruits are usually most desirable, and light soils with southern exposure are best adapted for that purpose. Light soil, however, require heavy fertilizing, more muck in summer, are more liable to injury by drought, and produce lighter crops. Clay soil must be well drained, is more difficult to prepare, matures later crops and is not so favorable for winter protection. The ideal berry ground would be, first, a rich sandy loam with clay subsoil. Second, a dark loam or gravelly loam mixed slightly with clay, and a clay subsoil, all having a southerly or easterly slope.

Any of these mixed soils will make good berry gardens by applying good farmyard manure, which contains all the essential elements required. When such manure cannot be obtained, com-

mercal fertilizers rich in nitrogen and potash should be applied.

Avoid low, flat land unless under-drained; it is usually cold, late and more subject to frosts.

Avoid steep hillsides as being more subject to drouth and wash of soil by severe rains.

Very few farms are without suitable soil and location for a good berry garden, and that farmer who simply "exists" year after year, without a good garden, has not learned the first principles of good living.

M. A. THAYER.
"Country Gentleman."

TO PREPARE PAPER AND CLOTH FOR HOTBED SASH.

TO PREVENT PAPER AND CLOTH FOR HOTBED SASH.—Use a sash without bars, and stretch wires or strings across it to serve as a rest for the paper. Procure stout but thin manila wrapping paper, and paste it firmly on the sash with fresh flour paste. Dry in a warm place and then wipe the paper with a damp sponge to cause it to stretch evenly. Dry again and then apply boiled linseed oil to both sides of the paper, and dry again in a warm place.

2.—Saturate cloth or tough, thin manila paper with pure, raw linseed oil.

3.—Dissolve 1½ pound white soap in 1 quart water; in another quart dissolve 1½ ounce gum arabic and 5 ounces glue. Mix the two liquids, warm, and soak the paper, hanging it up to dry. Used mostly for paper.

4.—3 parts pale linseed oil, 1 ounce sugar of lead; 4 ounces white resin. Grind and mix the sugar of lead in a little oil, then add the other materials and heat in an iron kettle. Apply hot with a brush. Used for muslin.

LIQUID PUTTY FOR GLAZING.

Take equal parts, by measure, of boiled oil, putty, and white lead. Mix the putty and oil, then add the white lead. If the mixture becomes too thick, add turpentine. Apply with a putty-knife.

LABELS.

TREE LABELS may be made of various kinds of material. The commonest and cheapest label is made of clean white pine, primed with thin white lead. These can be purchased of dealers in nurserymen's supplies. The ordinary nursery tree label is 3½ inches long.

TO PRESERVE WOODEN LABELS.—Thoroughly soak the pieces of wood in a strong solution of copperas (sulphate of iron); then lay them, after they are dry, in lime-water. This causes the formation of sulphate of lime, a very insoluble salt, in the wood.

TO PRESERVE POSTS IN THE GROUND.

Dip them in hot coal-tar.
Char them.

Use the copperas solution mentioned above for labels.

Into boiled linseed oil stir pulverized coal until the mixture is the thickness of paint. Apply a heavy coat to the post.

Posts may be kyanized by soaking them in a liquid made by dissolving 1 pound of blue vitriol in 20 pounds of water.

TO PROTECT PLANTED CORN FROM CROWS.—Dip the kernels in coal-tar and then dust them with plaster.

SELF-BLANCHING CELERY UNSATISFACTORY.

JOHN G. NORTH, IOWA.

In the Dec. 13th issue of this journal I noticed an article on celery, and the opinion of different experts concerning the self-blanching kinds. The agricultural world is under overlasting obligations to the seedhouse of Henderson & Co., for many valuable novelties introduced, but the White Plume self-blanching celery, or any other kind of self-blanching celery, falls much short of perfection. Celery which grows white, and celery that becomes white by blanching, are two distinct products.

Celery blanching by excluding the light dissolves on one's tongue, after mastication, like a peach or pear. While the kind that grows white leaves in one's mouth a wad of strings and eating it is like chewing a piece of rope. Blanching celery has that very desirable, peculiar, nutty flavor so pleasing to the palate, while celery that grows white has that bitter, unpleasant taste of the green, unbleached celery. Messrs. Ferry & Co. well describe it in their catalogue as a showy celery and for that purpose it has no equal, but it is of little or no use for table purposes. Some ten years or so ago, it was nothing unusual for our merchants to order forty of fifty one-dozen bunches and clean it all up every Saturday night, and when they order eight or ten dozen bunches now they get stuck with half of it. Ask the reason and the answer is hard times—people have no money to pay for luxuries—but if I am correct in my opinion, it is the introduction of that worthless self-blanching celery. If celery could crawl under the ground like a ground hawk, and thereby bleach itself, it would be all right, but celery that grows white, and celery that becomes white by bleaching, are two distinct agricultural products and one is as worthless as the other is valuable.

"N. Eng. Homestead." (1)

AN ENGLISH KITCHEN GARDEN.

Eds. Country Gentleman—The kitchen-garden in England is a far more important domestic institution than the vegetable-garden in this country; there, the former is the pride of the household, labor and loving attention being freely spent on it; here, the latter is often regarded merely as a necessary and bothersome help toward the maintenance of the family, upon which no more thought or exertion is bestowed than is absolutely requisite for a scanty supply of vegetables. In the suburbs of the cities in England, attached to the houses of professional men, tradesmen and the higher classes of mechanics, may be found the most carefully cherished kitchen-gardens, one of which the writer, who helped to cultivate it in his youthful days, considering it a high privilege, will attempt to describe.

It was, as far as recollection goes, about 250 feet long and 60 feet wide, and surrounded by a brick wall six or seven feet high as is the case with many gardens there, ensuring privacy as well as being admirably adapted for fruit-growing. Next the wall a border, three feet wide, ran round the garden, except at the two ends. In this border

(1) Very true. It is hard enough to get good celery here.—Ed.

was planted a variety of things; sage and thyme used in stuffing of veal and ducks; mint used in sauce for roast lamb; mustard (an excellent substitute for capers) in sauce for boiled mutton; fennel in sauce for boiled fish, especially mackerel; parsley in sauce for baked fowl as well as for trimming dishes and horseshoe white, when scraped, was placed in the dish, with roast beef and hot gravy poured over it. There were clusters of blue and white violets, both deliciously fragrant, crocuses, snowdrops and jonquills; hyacinths, purchased every autumn and which had bloomed in glasses in the house during the winter were transferred to this border where they flourished for years afterwards. Then there were gooseberry and red, white and black currant bushes, the fruit being twice the size of any generally seen in this country; the fruit of one variety of plum, the yellow Magnum Bonum was as large as Bantams' eggs. Between the border and the garden proper was a walk of bright yellow gravel, kept clean by hand-weeding on the part of all the family; occasionally it was grubbed up, raked over, and then made firm again with the garden roller.

In the northwest corner of the garden was a small, lean-to greenhouse, the wall being built higher at that point for its construction; in it were grown Black Hamburg and Canon Hall Muscat grapes; hot water pipes were used for heating it when necessary, but heat was only applied during very cold weather in winter, in early spring, and again in the autumn for the safety and proper maturing of the grapes. In front of the greenhouse was an open border in which ran the roots of the vines, and which annually received a heavy coating of well-rotted manure put on before winter set in; in the spring it was spaded in, and later the bed was planted with scarlet verbenas, showing, when in bloom, a glowing mass of color. Every few years a trench was dug across the bed, into which was put a cartload or two of garbage from the slaughter-house, when the trench was filled up again. In one corner at the south end of the garden was a toolhouse built of bricks with slate roof; in the other a pit, the sides built up with brick two feet above the ground, into which was dumped all the garden refuse, as well as the swill, &c., from the house, all of which combined made a good compost.

A lawn, about forty-five feet square, occupied the upper or north end of the garden. On it were five flower-beds, the center one star shaped, the other four circular. Geraniums, heliotropes, petunias and mignonette, were popular bedding plants at that time, and were the principal flowers planted in these beds. Running across from walk to walk next came a row of filbert bushes planted rather close and forming a screen to hide the vegetable department. I think they were called hazune, but the upper part of the leaf was a deep, shining purple, while underneath was red; the nuts were particularly toothsome. In the vegetable division stood a cucumber or melon frame about twenty feet long, five feet wide and five feet high at back, sloping gently to the south in front. Cucumbers brought a shilling (25c.) each, and melons half a crown in those days in market, though the owners of private gardens never sold anything—in fact bought a great deal, such as main stock of potatoes, carrots, parsnips, turn-

ips and swedes (here called rutabagas). They cared rather to grow vegetables not easily raised and purchasable in market only at high prices. In the garden being described only a few early potatoes were planted; the Ash Leaf Kidney was then a prime favorite. Early Wakefield, Savoy and pickling cabbages, broccoli (cauliflower), borecole and Brussels sprouts were the brassicas raised. Of peas, Daniel O'Rourke and Champion of England—the latter then, as now, the champion of peas; peas were all staked, and every spring wagons went round carrying bundles of hazel brush for sale of lengths suitable for the different varieties; Champion of England required the longest, those of six feet. The wagons also carried bean sticks for polling the Scarlet Runner bean, grown here more for ornament than use; eaten either as a string bean or shelled, it is very palatable. A popular way of raising it across the water is planting the seed in circles, say four feet in diameter, seed five or six inches apart; the sticks or poles are set three or four inches inside the ring, nine inches or so apart, slanting inward so that they can be tied together at the top. When the vines are in full bloom, these large, scarlet cones are very handsome and ornamental, afterwards becoming very useful by furnishing abundance of delicious beans, which can be conveniently picked. The "broad" bean (also called Windsor, I believe) was also grown; the shelled bean is, in size and shape, like the Large Lima, turning a light brown when boiled; the stalk is square, about three feet high, and the pods grow in bunches of two or three out of it. The flavor of the bean is excellent, and why it is not grown here I do not know, but no seedsmen's catalogue that I have seen mentions it.

At the extreme south end of the garden were permanent beds of asparagus, rhubarb and sea kale. No mention has been made of lettuce and radishes, as no garden is without them, though I must say a good word for a variety of the former, the Paris White Cos, which excels in flavor any other kind. The head grows tall (eight or nine inches), is conically shaped, of large size, and when nearly full-grown, should be tied near the top with bass matting, which promotes blanching. A little side-dish, or rather salad, was mustard and cress, cut when about three inches high; chopped up, with dressing to taste, they are very appetizing. They are offered for sale in English markets growing in circular straw baskets, nine or ten inches in diameter and three inches deep, finding a ready sale; sometimes both kinds are mixed in one basket, but more often each is in a separate basket. Only enough of each vegetable was grown in this garden for a family supply.

J. H. C.

Household Matters.

A DRESS.—This very pretty costume is the work of an amateur in dress-making, and well illustrates what can be done by those who make up their mind to try. It is made in green, the skirt is of pale green dress goods, and has no trimming, a darker shade of summer velvet for Eton coat, pink figured silk for front, and a belt of the same.

The design is good and looks and fits well.

In making up the waist the first thing to be done is to make a waist lining to fasten up the back.

The silk front is made full from the neck, where it is gathered and tacked to the lining. The neck band, also of silk, which forms the finishing to the neck, can be made plain, or a little flattened with or without the bow where it fastens at the back, after being fastened well to the waist lining; no sleeves are needed as the coat covers all. Round the neck a frill of narrow lace sewn on in double box pleats makes a pretty and becoming finish. If you have enough silk, make your belt on the bias



and without lining. For a 20 inch waist you must have a strip of silk at least 24 inches in length and 12 inches in depth. Hem by hand top and bottom. Two rows of shirring down the middle of the silk, with a steel sewn on under forms the back; the front where the belt fastens is made in the same way, only that the lines of shirring must be curved in slightly towards the waist line. A little passementerie down the front and back hides any stitches and makes a very nice finish.

HOUSEKEEPER.

LET THE SUNLIGHT IN.—Sunlight is a great disinfectant. In the very early morning allow a stream of it to pass through every room, but as soon as the heat of the day begins, say nine o'clock, you should always close down the windows, or close in the blinds, that the hot air may not condense on the cool walls.

TAKING CARE OF THE KITCHEN.

—A comfortable kitchen is of first consideration during these hot months. A well-regulated kitchen, of course, to be of easy service, must be small. A coal fire should not be allowed to mar the comfort of the occupants of the kitchen. Place a small oil or gas stove where it will be in the light and out of the draught. The floor of the kitchen should be either plain softwood, painted, or hardwood, polished. The windows and doors should be covered with screens, and protected from the sun by summer awnings. Have the kitchen table placed before the open window on the west or north side, the refrigerator in the darkest, coolest corner. Of great importance is the rapid clearing away of all substances upon which flies may feed. The life, health and happiness of every family come from the kitchen, so clean it first and keep it very clean. Drop all fancy and fussy cookery. Live simply and daintily but easily prepared food. Fruits are plentiful and do not

require cooking. Use them freely. Green vegetables are everywhere, are cheap, and are easily cooked. Do not serve December meals in midsummer. "L. Journal."

THE SELECTION OF FOOD.—Any deviation from Nature's path will bring disease, particularly during the summer months, consequently great care must be exercised in choosing food. Do not dissipate in the way of ices or cold drinks. They create thirst, suddenly lower the temperature of the stomach, induce digestive disorders, and are extremely injurious. Water may be comfortably cooled in porous earthen jugs, or the water bottle may be filled and placed in the ice-chest, having first, of course, been plugged with a little raw cotton. The skin should be kept in a good, soft condition so that the perspiration may flow easily and freely.

USE OF CAMPHOR IN THE HOUSE

—Put into the closet a tin or granite pan containing a few live coals; sprinkle over about two tablespoonfuls of powdered gum camphor, close the door and allow the fumes of the camphor to thoroughly saturate the closet. Camphor fumigation will drive mosquitoes from sleeping-rooms.

KEEPING THE FLIES OUT OF THE HOUSE.

—As flies are very fruitful conveyors of disease, try very hard to keep them out of the house. Cover all windows and doors with netting. If you cannot afford frames, tack the netting over the windows outside. This is a very good way. It allows one to lower the window from the top as well as to lift it from the bottom, making better ventilation. If door-frames are out of the question, tack netting very full to the top of the door casings. In the broad hem at the bottom sew sufficient good-sized pebbles to give weight, that the netting may fall quickly into place. If by chance the children hold the doors open for a moment, allowing flies to enter, place a little sticky fly paper here and there, or when you darken the room leave a crack of sunshine at any open window or door; the flies will in a moment follow the light and may then be easily brushed out of the room.

MAKING PUNCH FROM CURRANT JELLY.

—Whip to a froth half a tumbler of currant jelly, adding gradually half a pint of boiling water; add the juice of a lemon, half a cup of sugar, and then pour in slowly one quart of cold water. This is more wholesome served without ice, but as warm water was used for melting the jelly a palatable temperature may be gained by adding half a pint of finely-shaved ice when you are ready to serve it.

AN EXCELLENT TENNIS PUNCH.

Tennis punch is made by peeling and cutting one good sized pineapple. Pour one quart of freshly-boiled water over four tablespoonfuls of the best tea; cover and let it stand for fifteen minutes; stir and strain. Add to the pineapple a pint of strawberries cut into halves, and four bananas sliced thin, then add a pint of unfermented grape juice, and set it aside for at least one hour. Boil together one quart of water and two pounds of sugar, having added the grated yellow rind of an orange and lemon; strain and stand aside also to cool. At serving time add first to the syrup the juice of six lemons and four

oranges; then add the tea and the fruit mixture, with sufficient cold water to make a pleasant and refreshing drink.

A DELICIOUS FRUIT PUNCH.

—Put one pint of water and one pound of sugar and the chopped yellow rind of a lemon on to boil. Boil five minutes; strain, and while hot slice into it two bananas; add one grated pineapple and a quarter of a pound of stoned cherries. When ready to serve add the juice of six lemons. Put in the centre of your punch-bowl a square block of ice; pour over it two quarts of Apollinaris, add the fruit mixture, and at the last moment a dozen sliced strawberries, and mix all together. Serve the punch in thin tumblers.

HOW TO MAKE SALAD-DRESSING FOR COLD POTATOES.

—For the dressing, mash one potato fine, then rub it with a limber knife until perfectly smooth. Now, add gradually two tablespoonfuls of butter, work in the uncooked yolks of two eggs, season with a half teaspoonful of salt, a saltspoonful of white or red pepper, and then add gradually a tablespoonful of vinegar or lemon juice. At the last, give a thorough rubbing until the dressing has the consistency of a good mayonnaise.

Cucumbers sliced, lettuces, sliced tomatoes, make a very nice salad, with any of the usual sauces.

FRUIT.—Sliced bananas, oranges also sliced, a few very ripe strawberries, form a delicious mixture, with a sprinkling of white sugar.

A cold rice pudding, custard or a shape of blanc mange, with salad and fruit is far preferable in hot weather to meat for luncheon.

The Dairy.

EXPULSION OF BAD FLAVORS FROM CREAM.

We see, in one of our exchanges, that, when milk has acquired bad flavor from the consumption of wild garlic by the cows, the best cure is to wash the cream with water in which saltpetre has been dissolved, and then to pasteurise it, i. e., heat it up to 160° F. or thereabouts. This is given as a new discovery, but there is nothing new about it, as it is the same plan as the one we have so often recommended for the expulsion of the turnip flavor; only, we advise treating the whole milk, not the cream alone.

JUDGING DAIRY COWS.

In the stable of the writer stands a cow that may be said to combine, to a greater degree, the excellences of a milch cow, than any previously, or now, owned by him, both in form and milk-fitz qualities. A stranger once seeing her, remarked, "She's a slicker!" and Slicker she has been called ever since. I do not know her origin or breeding beyond the fact of her every-way look of good dairy blood and every-way exhibit of dairy temperament. Her intelligence is fully portrayed by the look of her eye, and by its prominent setting. While it is not our intention to describe this cow, point by point, we wish to note a few of them, and ask the reader to measure up some of the

best cows of his herd and see how far they agree.

The writer of this is so placed that he is the "looker-on in Venice" of many cow sales, and even in a dairy country, where dairying is the chief occupation of the inhabitants, it is rare that a man buys a cow, or forms his judgment about her, by any scale of points. There is just a huddle over a few dollars' difference in the price asked and offered, leaving the impression that the buyer's desire in the premises was simply to buy a cow, to keep the number of his dairy herd good, and to trust to the fates about her being of any dairy value. These men usually say, "Oh, she looks like a good cow," but never judge by anything like a scale of points, such as a horseman would enumerate if he was called upon to buy a trotting horse, but was denied the privilege of speeding him. We are more than ever convinced of the value of form, in judging the worth of a cow, and when a man purchases a cow, basing his choice on dairy form and indicated temperament, he will not go far astray, and failure will, nine times out of ten—should it result—come from the side of neglect and mismanagement of the man who raised the heifer, rather than from a weak point in the scale of signs that go to make up indicated performances.

Four signs, or points, are notably conspicuous in the cow referred to—the eye; a strong, well-defined backbone, with prominent spine processes; an udder of fine proportions, and covering a large area of abdominal surface, and unusually wide apart forward legs, denoting large room for the vital organs and unrestricted heart action. So far as our observation goes, the best cows are those with the most pronounced eyes, not of the protruding kind, with a wild stare, but bright and expressive, with an intelligent gleam that tells of brain power. To get this well-placed eye, there must be the dishing face, lean of flesh, and not unlike in type what is seen in the running horse of great nerve and speed. The eye and brain have not a little to do in the make-up of a great producing cow, and her eyes and ankles have an important bearing on milk yield, especially in that which relates to the person who milks and cares for her. The cows that have the highest-wrought organisms, are the strongest in their affections and attachments to home, food and the person with whom they come in most frequent contact. If this association is one of agreeable import to the cow, she is far more likely to respond generously and willingly, than if she stood in fear, or oft-disappointed expectancy. Of the backbone, with its spines protruding well above the shoulder blades, little need be said, more than that this indicates a greater nerve force, or organism, than the straighter backbone, and its accompaniment of tall, lanky tissue. If the backbone rises well over the hips, so to make it conspicuously prominent, all the better, as we are more sure of finding the long hip and spread thigh, giving increased room for the well balanced udder we must have in the great milker. I do not recall a single cow of mine, of large producing power, that did not have this high pelvic arch, and far from a straight back. All this means enlarged organs and open organism. Milk giving is a matter of commercial importance to the fryman, and is a distinct function, in beef and fat

formation, and their attachment to the body, for milk is something that comes from a mother cow's beneficence, something that was intended for something else than the giver, while the beef making is stinginess supreme, keeping all, and only giving back on the block of slaughter.

The fourth consideration is the vital organization, shown in part by well developed basket, yet not prominent forward of the front legs, but indicated by width. This gives the cow a wide heart girth, still maintaining the wedge form from lower to top line. Just how milk is generated, or formed, is not known, but it is a fact that in some way it is formed out of the blood, and large milk producer means large blood-supplying power, a large heart to propel it, and well developed lungs to carry on the work assigned to them. All of this demands plenty of room for the vital organs, so that they are not confined to restricted space, or hampered in their action. One point should not be overlooked. In insisting upon the wedge form, it should not be at the expense of shoulders, narrow at the base, for vitality should be maintained, and can be only with strongly developed vital organs. One rare sign in the cow portrayed, is three well developed milk veins, large and tortuous, the third one of full size and extending along the center of the abdomen, and entering the body through a well defined milk hole. Just back of the forward legs, a "sign" possessed by no other cow in the herd.

We might here refer also to what is known as "touch," a quality of hide and hair, a soft, oily and elastic condition. The higher the quality, if that expresses it, the more sure the judge is that the cow is well wrought throughout, and has a fine organism. Here is a great field for research and observation. Do signs and forms have anything to do with milk yield, or is it a fact that milk goes in any and all forms, with a somewhat close relation to uniformity? The experience and observation of a thousand dairymen, collected and tabulated, from cows actually at work, would be of great value, especially if brought before the dairymen, and their attention fastened upon it. Dairy knowledge is all-essential, and in these days of re-construction and readjustment of our affairs to make them accord with the times that are demanding it, no dairyman can know too much about his dairy; for, as it is, thousands of unthinking men are actually keeping their dairies instead of their dairies keeping them.

—J. G. in "N. Y. Tribune."

THE DAIRY COST OF PRODUCTION.

VALUABLE RESUME OF PROF.
HAECKER'S EXPERIMENTS
FOR 5 YEARS.

Report of an Investigation that every Farmer and Dairyman should study carefully—How to choose the Dairy Type of Cows.

At our Experiment Station, said Prof. T. L. Haecker, in addressing the United States National Butter and Cheese Makers' Convention in February of this year, at Owatonna, Minn., during the past four or five years, I have devoted nearly all of my time to one subject, and that is cost of production. I started out in this work, in a sort of general way,

thinking perhaps we could get some information that would show the farmer what it would cost to make a pound of butter. Fortunately, we had a very mixed herd at St. Anthony Park. It was composed of various breeds of cattle and various types. The work was carried on for one year, weighing every ration before it was given to the cow, and then making a record of that ration. When the cow was milked, the milk was weighed and tested for fat, which you see involved a great deal of work. After this work had been carried on for one year, some very curious facts began to make their appearance. We compared the Holsteins with the Jerseys, the Short-horns with the Guernseys and the natives, and tried in that way to get some results as to what was the best breed; and what was the result? Simply this: The figures show that certain cows of any one breed would produce much better results than others of the same breed under exactly the same conditions; so nothing satisfactory resulted from this comparison. After the year's work was completed, and I noted this peculiar variation between the different cows, the question arose, why does this cow produce butter for 8 cents while that one charges us 16 cents? Why does this Holstein produce butter for 9 cents, while the other Holstein charges 17 1/2 cents? Why does this Short-horn produce butter for 12.2 cents, while another Short-horn charges us 18.2 cents?

Instead of pursuing this course further, we adopted another plan, making two divisions of the herd, putting the cows that charged the most for butter on the one side, and those that charged least for butter on the other. On the one side were Short-horns, Jerseys, Guernseys, Holsteins and natives; and the same was the case on the other side. We found that the cows that had a tendency to lay on flesh gave on an average 267 pounds of butter fat per annum at a cost of 13.8 cents per pound, while the spare cows in the other group gave on an average 337 pounds of butter fat at a cost of 11.6 cents per pound.



TYPES OF DAIRY CATTLE—
JERSEY.

I also observed that some in the group of spare cows did not do as well as others as to the amount of both butter yield and the cost of production. Examining the beefy group, I noticed similar variations, and, after carefully comparing the record of each animal in the herd with the annual yield and cost of feed, I noticed that the greater the inclination to lay on flesh, the greater was the cost of butter production.

To further carry on investigation in this line and have it cover a period when an exact record could be kept of all feed consumed by each cow, an accurate record was kept during the winter of the amount and kind of food consumed by each cow and the amount of milk and butter fat produced. In summing up the winter's work, variations similar to those observed in the yearly record were noticed; this is, that, as a general result,

the cow with a beefy tendency was shown to be less profitable than the spare cow, but there were variations in each group, and the next point to be solved was why this variation. I found that the dairy value of a cow was not in every instance measured by her tendency, or lack of tendency, to lay on flesh, but that there were other conditions bearing on the problem. By this time we had lost all interest in breeds and breed tests, for we began to see that the question of economical butter production involved fundamental principles underlying and governing animal nutrition.

The herd was carefully divided into four groups based upon conformation.

In the first group we placed the cows having a strong tendency to grow meat; of these, Fanny and Dido were almost typical beef cows, while Sully was not formed quite so strong along beef lines; in fact, she came very near being a specimen of the combination cow, and her performance is in harmony with her type.

Group one charged us for feed on an average 17.5 cents for a pound of butter fat.

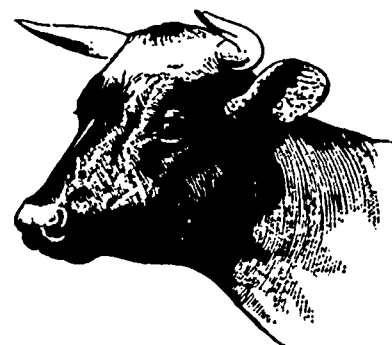
The second group was composed of cows that had less tendency to lay on flesh, yet were quite plump and smooth at the close of the winter's work, and charged us for feed on an average 15 cents for a pound of butter fat.

Group three was composed of all the cows that were square and angular in conformation, but lacked in depth through the middle of the body; and they charged us on an average 14.0 cents a pound for butter fat.

All the other cows in the herd were assigned to the fourth group, which is fairly represented by Dora, and comprised about half the herd. They charged on an average 12.1 cents to produce a pound of butter fat; and what seemed the most remarkable feature in that winter's work was the fact that all the cows in the herd corresponding to this type charged less for butter fat than did any cow in the other groups, and the more spare and deeper they were through the middle of the body the less they charged for butter fat.

The next work taken up was to ascertain the value of wheat for feeding to dairy cows. This was carried on in the early part of the winter with quite varied results. Some cows returned us only 77 cents worth of butter per bushel of wheat consumed. Some returned us 90 cents. One cow gave us \$1.26, another \$1.31 and the fourth \$1.57 for every bushel of wheat consumed, when butter was 20 cents per pound. Again, comparing the record made by each cow with the amount of wheat consumed, we found that the cow that gave the least return, carried the most flesh; those making best returns belonged to the fourth group; the more spare the cow and the deeper the body, the greater the return for wheat consumed. We also carried on two other experiments, including last winter and the winter before, and I now call your attention to part of this work. First, let me refer to the cow Dora, the representative of group IV., and Olive, of group III. They have been at our station for several years; Olive, I think, since 1890. Every ration they took during that time has been weighed and charged up to them at market prices. Here we have the two shapes of spare cows, both having been under the same treatment. Now, I wish to call your attention to just one point, and that is this, an animal having great depth through the middle of the

body has large digestive capacity. In other words, the measure of the middle of the body is an index of the amount of food that an animal can digest. These two cows have about the same



TYPES OF DAIRY CATTLE—AYR-
SHIRE.

weight; and one of them, Dora, can take 16 pounds of digestible food per day, Olive only 12 pounds, and knowing that neither of them has a tendency to convert food into flesh, the cow that can eat 16 pounds of digestible nutrients per day will give a larger return than the one which can eat only 12 pounds per day.

The next problem is the amount of food that a cow needs for food of support; that is, the amount of food that she will need to maintain her own body, for she never will convert any of her own food into milk until she has had enough for her individual need. Taking our three winters' work, we find that it takes nearly one pound of digestible food to support 100 pounds of cow per day. Each of these cows weigh 800 pounds, but one of them eats 16 pounds of digestible food and uses eight pounds for herself, so she gives us just one-half the benefit of her food. The other one eats 12 pounds and uses eight for herself, so she gives us only one-third the benefit; the other two-thirds she uses for herself. Or in other words, with one we are an equal partner, while with the other we have only a third interest in the business.

Now, we will take up another type of cow; one that converts part of her food into milk and part into beef. Every Monday morning we cast a ledger balance with every animal in the dairy herd. We figure up how much each one has cost us that week for board, and how much has been returned to us. Ethel is a beauty, and I am afraid that this is the style of cow that nine-tenths of the farmers would buy.

Prof. Haecker here exhibited a chart by way of illustration of the cost of producing a pound of butter from the cows during the winter. Take two cows Houston came in the 30th of November and Ethel the 20th of December, so they were under fairly similar conditions. We found that the first week Ethel gave 12.2 pounds of butter at a cost, for feed, of three cents and 97-100 of a cow, while Houston gave 13 pounds of butter at a cost of four cents and 1-100 of a cent being, practically, four cents per pound in both cases. Of course, just now, the food stuffs are very low, and it makes an extra good showing; but the point I am getting at, is the comparative cost. Here we have weekly reports of the two cows, beginning the first of the year, and continuing until the third day of May, when they were turned out to pasture, at which time Ethel was charging me 11.7 cents for feed, for a pound of butter, while Houston was charging me only 4.8 cents.

It should be observed that, at the beginning of their period of lactation, the

two cows were pretty evenly matched, so far as it relates to their weekly butter yield; but at the close of the winter's work there was a marked difference in their yield. Houston was still giving 1.6 pounds per week, while Ethel was giving only 1.1 pounds. During the period covered by this chart, Ethel gave 12.7 pounds of butter at a cost of 7.8 cents per pound, while Houston gave 210.5 pounds at a cost of 4.6 cents.

How are we going to tell the kind of a cow a calf will be? There is one point in a cow to look at first, and the same point in the calf, which is this. With the eye I measure the distance from the tail, about half way down from the rump, as it drops straight down to the rear line of the thigh, and the greater the distance between those points and the more curving the thigh the better the cow.

Lately we had a delegation of some eighty farmers, from Meeker County, to visit the Experiment Station. They went down into the live stock room and we brought in six cows, and as they had some doubts about our ability to discover the kind of a calf that would make the best dairy cow, we sent for the calves, and they were simply miniatures of the cows. Now, there are also many other points to be considered in the judging of a cow, but we always try to do away with the little details, laying more stress on fundamental principles, so that anyone with an eye can see for himself. When we have decided as to the disposition an animal makes of food, the next thing is,



TYPES OF DAIRY CATTLE--GUERNSEY.

how much work will the cow do from day to day, and that is measured by the depth from the middle of the body, the grist-mill that the animal carries, and the larger the mill, the greater the grist.

We hear a great deal about selecting cows by the Babcock test. I would rather trust my eye than the test; for this reason, the test will tell you what the cow will do for this day, or this week; but it will not tell you what the cow can do from year to year. (1) The Babcock test told me that Ethel was just as good as Houston, but it was not so. The Babcock test simply tells you what the cow did for that particular period, but it is silent as to the relative cost for the period of lactation, or as to the cow's staying qualities.

I don't want it to be understood that I am making any criticism on the Babcock test. I mean only to say this: That it is not good for everything, and not a reliable thing to select cows by. I am aware that few people have given this subject the attention that I have, and, of course, do not size up a cow as readily as I do, but the real foundation principles are just as plain as A B C, and by paying attention to them farm-

ers can soon be good judges of dairy cows.

I want to say just a few words on another point, and that is in regard to the wonderful opportunity which lies, at the present time, in the dairy business. Farmers do not understand the advantages they have in dairy work. If they did, I am sure they would pay a great deal more attention to it. Nine-tenths of the farmers seem to think that the dairy cow is a good deal of a nuisance, and yet there is not a single animal that returns to the farmer nearly as large a percentage of profit as the little dairy cow, and I am astonished that farmers spend so much time with other matters, and give so little to the cow.

I want to raise a warning voice on another point. I have never yet purchased a fine cow and removed her from her former surroundings, and had her do good work the first year. If she is an old plug, and has no fine nerves in her make up, she will not care where she is, and will be just as poor a cow the second year as the first year she was at the station, but as she became accustomed to her surroundings, and had good care and generous feeding, her digestive organs were developed, and got in good working order, she became contented, and produced 150 to 500 pounds of butter per year.

There were two cows in our herd that had been together all their lives, and had become very much attached to each other; but it became necessary to remove Fortune, one of them, and place her in another barn. As soon as Duchess found her mate gone, she began to hunt from stall to stall for her lost companion. She would go all over the pasture, looking through the clusters of trees, trying to find her. She suffered so much because of that separation, that she rapidly fell off in her flow of milk, in spite of all we could do. I went down to the other barn to see Fortune. She was glad to see me, but kept looking out of the window for Duchess, and she, too, had fallen off in her flow of milk. When these cows were together they would pass the whole winter without any perceptible change in their flow of milk. How careful we should be, not only to feed our cows properly, but to do everything in our power to make them contented and happy. Then only can we hope to get the maximum return.

I have here a little memorandum of the cows at the experiment station, covering the work done since about the fifth of last October.

Here is a cow that gave 14 1-2 pounds of butter at a cost for feed of 2.37 cents per pound. The last week in October she charged 45 cents per week for board, and gave 15 1-2 pounds of butter.



TYPES OF DAIRY CATTLE--HOLSTEIN-FRIESIAN. (1).

She gave me, the week before, 10 pounds of butter, charging 3 cents per pound.

(1) Why not say "Dutch" at once?—Ed.

Here is another cow, a little runt of a native. When I bought her, with other cows, the farmer thought she was not worth the space she would occupy in the car. She charged me, when she was fresh, only 2.6 cents worth of feed per pound of butter, and in January, only 5.2 cents per pound, and she is the poorest kind of a little scrub.

Here is a cow I was told would beat them all, weighing 1350 pounds. She gave ten pounds of butter when fresh, and six pounds at the end of January, at a cost of 4.13 cents per pound—a poorer showing than any of the other cows.—Report in Hoard's Dairyman.

Prof. HAECKER'S CHARTS.

Two of the charts used by Professor Haecker in his lecture on the cost of production are given below in the one table and a study of them on the lines indicated by the lecturer will put the reader in possession of much valuable dairy information. Here are groups I. and IV. of the experiments:

GROUP I.—BEEF TYPE, BLOCKY AND PLUMP.

Cow.	Weight.	Breed.	Lbs dry mat p. day p 1000 lbs. liveweight	Lbs. dry mat. p. 1 lb butter fat.	Lbs. of butter fat fr. 100 lbs dry mat.	Cent 1 lb. butter fat.
Fancy.....	1,256	Polled Angus	15.41	32.47	3.08	18.1
Dijo.....	1,215	Short-horn	14.61	32.36	3.09	18.2
Sully.....	1,219	Short-horn	19.96	28.94	3.45	16.4
Average.....	1,210		16.66	31.25	3.20	17.5

GROUP IV.—COWS SPARE AND ANGULAR WITH DEEP BODIES.

Annie.....	—	Jersey	25.80	21.68	4.61	12.8
Bess.....	—	Holstein	22.04	21.29	4.69	12.3
Jera.....	—	Jersey	22.33	18.11	5.42	11.1
Gertie.....	—	Grade Jersey	23.20	21.53	4.61	12.3
Houston.....	—	Jersey Guernsey	28.24	20.16	4.96	10.8
Patsey.....	—	Grade Jersey	22.20	22.27	4.49	12.6
Pride.....	—	Jersey	24.82	21.18	4.72	12.6
Rose.....	—	Short-horn	17.87	21.37	4.67	12.9
Roxy.....	—	Grade Jersey	23.52	21.91	4.56	12.4
West briar.....	—	Guernsey	25.65	23.06	4.33	12.8
Topsy.....	—	Holstein	20.91	20.04	4.99	12.0
Tricksy.....	—	Guernsey	26.46	20.88	4.78	11.4
Average.....			23.58	21.15	4.73	12.1

QUEBEC COLD STORAGE AND WAREHOUSE COMPANY COMMISSIONER'S WHARF.

This company has now insulated space of 100,000 cubic feet; to cool it, they are putting in the most modern refrigerating machinery (that of the Lund British Refrigeration Coy). They will now be able in midsummer or any other time to keep the temperature down to 15o in any part, or the whole of their building. But it is the Company's intention to have the different rooms kept at different degrees of cold, in order to have everything in that temperature which is best suited to it, as butter at about 15o, and cheese at about 42o. The company is, however, also prepared to receive eggs, fruit, fish, dead meats and all other kinds of goods and merchandise: as their facilities are the best, and great care will be taken of all goods sent them.

There is no danger of anything being tainted, as the system is that of the circulation of purified and cold air, thus the air is always pure when entering the chambers, and is being constantly changed: gases and dust are also done away with, and the danger of fire is greatly lessened, for no coal or steam is used on the premises, the elevator and all the machinery being worked by electricity, the buildings are also lit with electric light.

The warehouses for cold, ordinary

and bonded goods are all situated on the Commissioner's Wharf, Quebec, where there are two lines of railway coming to the stores' doors, steamers and barges can land at three sides of the wharf, the roadway is also very good.

Butter and other goods intended for shipment to England are put into large chambers in the outer end of the building, from whence they are carried directly to the refrigerator steamers, which call every week, by means of a shoot specially adapted for the purpose.

The Company also has several small rooms, of different sizes, most conveniently situated, and kept at a temperature of 15o and lit with electric light. These rooms can be had at a low rent by persons wishing to keep dead meats, or for any other purpose.

The Company's charges are 12 1-2 cents per 100 lbs. of butter per month, and 5 cts. a box of cheese per month; insurance is made on goods, when requested, at the lowest cost as the Company carries large open policies.

Persons visiting Quebec are requested

to call and look over the works of the Company.

People who wish advances on their goods can obtain them as soon as they are placed in our stores.

BAD FLAVORS TRACED TO THEIR SOURCES.

Among the many excellent papers presented at the late meeting of the Wisconsin Dairymen's Association there was one of more every day, practical importance and help to the butter maker—especially the creamery butter maker—than the one prepared and read by Mr. Geo. D. Mansfield, of Edgerton.

The topic assigned him was the "Effect of milk upon the finished product," but modestly disclaiming any knowledge upon the relation of bad flavors in milk to the resulting cheese, he narrowed his subject and read as follows:

THE EFFECT OF MILK FLAVOR ON BUTTER.

It is a well known fact that the flavor of the milk, furnished for butter making, has much influence on the flavor of butter. In my capacity as a buyer of butter and judge of butter manufactured at our company's creameries, extending over the last six years, I have discovered to my satisfaction that with few exceptions the foreign flavors found in butter are caused from

off flavored milk. The exceptions are, viz.:

1. From leaky cream vats, which allow foul water to pollute the cream.
2. From an unclean churn.
3. From tainted salt.
4. From improperly prepared butter color.
5. From foul well water used for soaking tubs and washing butter.

In some instances the milk has become tainted from the food consumed by the cows. However, I have concluded from careful comparison of my many discoveries of foreign flavor of butter, that by far the larger number of foreign flavors found in fresh made butter is due to the milk becoming tainted after it has been drawn from the cow, from numerous causes with a few of which I am very familiar.

However, allow me to explain before proceeding farther, that my term, foreign flavor, does not include any off flavor brought about by over ripe cream, cream insufficiently ripened or from stripper milk.

Case 1—Off flavored milk caused from feeding turnips:

I handle the product of a certain creamery outside of our own line, and several times last summer I noticed a rather sickish, sweet flavor to the butter. I drove out to the creamery and examined for cleanliness the separator, the churn, the milk pump, the cream vat, the well water and the steam from the boiler. All were clean flavored. I then questioned the maker about the flavor of the patrons' milk. He seemed to think one or more of his patrons brought milk the flavor of which did not compare with the balance, so that I requested that he take particular pains in examining the milk in question. He did so the next day and found that he could very readily detect the flavor that he had mentioned to me as not comparing with the balance of the milk. On questioning the patron who furnished the milk, as to the possible cause, he could not explain further than the fact that he was feeding turnips freely which might cause the flavor. The maker requested that he discontinue feeding turnips, which he did and immediately the sickish-sweet flavor disappeared from the butter.

Case 2—Happened at the same factory and upon investigation we found several patrons were again feeding turnips freely. In a paper written by Mr. O. J. Vine, of Canton, Ohio, I noticed he claimed turnips, cabbage, onions and cotton seed meal would always show their effect in the flavor of the milk if fed in liberal quantities before milking. Some claim that by feeding these flavor imparting foods herein mentioned just after milking that no objectionable flavor is imparted to the milk.

However, this maker tells me that his patrons tried this idea, but the off flavor showed in the milk just as marked as otherwise fed.

Case 3—Off flavored milk caused from weedy pastures. This flavor is rather hard to describe to one not familiar with it. However, it is detected in the milk by the sense of smell as readily as the turnip flavor. The flavor imparted to butter made from such milk is of a coarse, weedy smell, such as is sometimes encountered in the hayfield when weeds are plenty in the cured hay. This flavor

(1). Turnips, as all our readers know, indisputably give a bad flavour to the milk of cows fed upon them; but, as our readers also know, the cure is very simple.—Ed.

is quite frequently found in ladle butter from northern Minnesota and from the Dakotas and western Iowa. Some creameries from these localities show the same flavor, presumably due to so much wild pasture.

Case 4—Off flavored milk caused from free use of boiler compound, used one-half pint of compound daily.

This case happened and in one of our own creameries and very recently. In examining the butter for three weeks I discovered a coarse, brackish flavor, which seemed to have killed that rich sweet which goes to make up what is known to the commercial butter trade as "extra creamery," or in other terms, an Elgin. I made several examinations of the well water, churn, cream vat, milk pump and milk pipes at the creamery, always finding them clean and sweet. However, the flavor above described was still noticeable in the butter. Butter maker had also examined each patron's milk for foreign flavor, failing to find any which might cause the taint in the butter. Finally it occurred to me—as after all this investigation we were still in the dark as to the origin of the coarse, brackish flavor in the butter—that there was one source from which the flavor might originate which we had not examined, i. e., the steam which we used direct for heating the milk. By smelling of the steam as it escaped slowly from a half inch pipe through which it was conducted to a tempering vat for heating milk, I could plainly detect a similarity to the brackish flavor in the butter. Questioning our butter maker regarding the use of the boiler compound, he stated that he had for three weeks past been using about one-half pint of the compound daily, as he had discovered that the flues of the boiler were heavily coated and he determined to loosen it and to that end had used an extra quantity of the compound. We at once concluded that the off flavor was due to the flavor imparted to the milk by heating same with live steam direct from the boiler. The butter maker emptied his boiler the same day and discontinued the use of the compound and by the third churning after the cleaning of the boiler, the brackish flavor had disappeared from the butter. I wish to state that this compound has been used for three years, and never before caused us any trouble with off flavored butter. However, in this instance, an extra quantity was used every day consecutively for three weeks, which I think accounts for the bad results we experienced. I would state for the benefit of any one who might ask the question—"Are you in favor of heating milk with steam direct into the milk?"—No, I am not, and calculate another season to put in heaters which avoid bringing the steam in direct contact with the milk.

Case 5—Off flavored milk caused from unclean milk pump and gas pipe conducting milk from receiving vat to separator.

I will first endeavor to describe this flavor, so that if any of you ever notice it in the butter, my description of it may assist you in locating the cause of it. The flavor of a very foul dish rag is a very close resemblance, also the flavor of putrid milk, as you sometimes find it in gas pipes used for conducting milk from the receiving vats to the separators. This flavor just described is the exact flavor found in the butter, only that you find it somewhat milder in the butter when fresh made. However, it develops very rapidly in the butter and where it stands in a temperature of 55

to 60 degrees, it will show the flavor before described very prominently. I have had no less than ten practical cases of this flavor come under my personal observation, and several of them at our own creameries. I was at the time judging and scoring the make of each factory weekly. I discovered this flavor at first in a very mild form, but it gradually became more prominent, and at the expiration of the third week, I determined to go to the factory and make a personal investigation, since the regular maker at this factory and one from another of our creameries, were unable to locate the cause of the off flavor. My first objects for inspection were the well water and the churn, and they being sweet, I raised the end of a gas pipe, which conducted the milk from the receiving vat to the tempering vat through a rotary pump. I assure you I was very quickly and positively convinced that I had located the direct cause of the dish rag flavor in the butter. In questioning the maker as to how he had pretended to clean this pipe and pump, he explained that he had pumped a pailful of hot water through the pump every day when washing up and supposed that it was thoroughly cleaned by so doing. However, let me state for a positive fact, simply pumping water through a milk pump and pipe in hot weather will not keep them clean. You must add some strong grease eradicating agent, such as sal soda or washing powder, and in addition use live steam every day. I have always been able to locate this above described flavor in the milk pump and pipes since my first experience. In fact, I have found this same flavor in our own butter several times since the occasion above mentioned, and have hitched up my horse and driven as far as fifteen miles to one of our creameries to steam out the milk pump and pipes, so as to avoid tainting another day's milk, which would be the case was I to get word to them by letter. I located this same trouble for a neighboring creamery man last summer. He had me examine his butter on the depot platform, explaining that his customers were complaining bitterly about the flavor, and that his maker was handling the cream the same as when the flavor was right. As soon as I smelt of the tryer sample from the tub, I promised him that if he would drive me to his creamery, which was three miles distant, I would agree to locate the cause to his positive satisfaction and place my hand where the trouble was originating as soon as I got inside of his creamery. He immediately drove me to the creamery and true to my word, I located the source of the trouble to be in the first things I examined, viz., the milk pump and the pipes. Notwithstanding that the maker had pumped hot water through the pipes and pump daily, there was a gathering of putrid milk on the inside of the pipes and pump fully one-fourth of an inch thick and it was villainously foul, so much so that when I stepped up to the cream vat and invited the proprietor to taste the cream, he could readily detect the flavor in the cream. We immediately took the pipes and pump apart, steamed them thoroughly and then pumped several pailfuls of scalding sal soda through them and the butter was O. K. from then on. I find that most butter makers are honest in their attention toward cleanliness, but are not careful enough to use their nose where they cannot see. You cannot look very far into a gas pipe 15 or 20

feet long, but you can by putting your nose to it smell its whole length.

I am thoroughly satisfied that there are hundreds of tubs of butter spoiled to a more or less degree every summer from this particular cause of off flavored milk and I would especially caution every creamery man and butter maker who hears or reads this paper, to engrave on the tablets of his memory, this particular cause of off flavored milk and finally off flavored butter, which always means a loss of three, five and possibly seven cents per pound.—Hoard.

GRAIN FOR MILCH COWS.

It is possible in the laudation of the silo, and especially of corn ensilage, as the cheapest feed for cows, that the subject has been discussed on too narrow a basis. It is true that more weight of corn fodder can be grown per acre than of anything else. It is also true that this fodder is so largely carbonaceous that in itself it is not a complete ration, and needs to be supplemented with food that contains a larger proportion of the kinds of nutrition required to build up muscle and bodily strength. This is especially true of cows, whose product, milk, always contains even when richest, nearly four times as much of caseine as of butter fats. Rich corn ensilage which is made from corn when it is in the earing stage supplies the carbohydrates in succulent form. But if a due proportion of nitrogenous food is not supplied to furnish material for the caseine, the yield of milk is lessened and the carbohydrates that cannot be used for milk only fatten the animal and unfit her for milk production.

All milkmen understand that to get the most from corn fodder fed any way, something else must go with it. Wherever clover can be given it makes the best and cheapest accompaniment with corn fodder. But with the milking breeds that have little tendency to fatten, some more concentrated nutrition may be often fed with advantage. This is especially true of some of the deepest milkers, whose product is naturally not so rich in butter fats. Such cows are always thin in flesh after milking a few months, no matter how sleek they have been at calving time. They give all to the milk, even including the fat of their own bodies. If they are fed more concentrated food they can eat more and give more and we believe richer milk.

The great majority of milkmen buy more or less oats, wheat bran, brewers' grains and gluten meal as feed for their cows. They buy because they mostly live where land is too high priced to grow anything except fodder corn, which is too bulky to be brought to the farm, and must, therefore, be grown on it if it is to be had at all. But there are millions of farmers who keep cows for making milk, butter and cheese, and who also grow grain, which, instead of feeding on the farm, they sell. In our opinion, this is nearly always a mistake. It may be that a farmer can better afford to buy grain than to raise it. That will depend on his nearness to a railroad station where he need not carry it far to put it in his barns. But in every case if he has grown the grain in any Eastern State he can better afford to feed it to his cows on the farm where it was grown than to sell it. It is probable that not even the Western farmer can grow oats or corn to sell at present prices. Corn is so cheap in

many parts of the West that it is nearly or quite as economical as coal for fuel. Oats are about as cheap, but they are more nitrogenous and worth much less as fuel than is corn.

Corn as grain and oats mixed together and ground make an excellent grain ration for cows whose main feed is silaged corn. But wherever corn is advanced to the earling stage, there will probably be enough carbonaceous nutrition in the silage. Ground oats with some wheat bran will make a better ration with such silage than will more corn. On farms too far from the station to make it easy to buy Western corn, oats ought to be grown more than they are, not, of course, to be sold in the market, but to be fed to milk cows and thus increase every product of the dairy.

The Poultry-Yard.

Get the hens to moult early—How to do so—Farmers well situated so to do—Summer margins of profit.

(A. G. Gilbert).

Every effort should now be made to get the laying stock over their moult so as to be in good laying shape by end of October, or, sooner if possible. By that time the price of eggs is upward in tendency, until by middle of November, the figures will be twenty-five and thirty cents per dozen, in the cities, for the new laid article. How can an early moult be secured? First, the hens must not be over three years of age. It has been stated in previous articles that the older the hen the later she moults. Experience has shown that some old hens take the most part of the early winter to get rid of the old feathers and don their new coats. It is not an infrequent sight, in barn yards, to see old hens dragging through the winter in a half naked condition. The question is often asked, "Why are old hens unprofitable?" One reason is that they take so long to moult that they eat a great deal of the profit to be made in the winter season of high prices, before they begin to lay. It has been noticed in past seasons that the one and two year old hens were the first to moult and as a consequence the first to lay in the fall.

HOW TO SECURE AN EARLY MOULT.

The practice at the Experimental Farm for some years past has been to break up the breeding pens at the end of June, remove the male birds to a separate building and let the layers run in a field where they have clover, grass and insect life to a limited extent. By the beginning of July, the demand for eggs for hatching purposes is over and here is nothing to be gained by keeping the fowls penned up in their comparatively limited runs. Indeed, the eggs are then sold for eating purposes, and as fertilised eggs are not sold for such, it is imperative that the cock birds should be removed. The hens enjoy the run in the grass and having laid well since November previous, they are deserving of extended liberty. They are allowed to enjoy the run with an occasional feed of meat, or, cut bone if insect life is not abundant. At the beginning of August more meat—cooked if possible—or cut bone is fed almost every

morning in quantity of one ounce to each hen. Sometimes a mash composed of unmarketable potatoes, shorts and bran, with blood meal in proportion of one ounce to every ten hens is given. The blood meal costs four cents per pound and is only used when is difficult to get either cooked meat, or cut bone. It is a cheap and convenient form of giving blood to the laying stock. It must be borne in mind that the poultry on the Experimental Farm are at all times confined to a comparatively limited run. No noon ration is given, but an afternoon or evening ration of grain is fed in liberal quantity so as to send the fowls to roost with their crops well filled.

A FARMER WELL SITUATED.

A farmer who has an unlimited run with abundance of insect life for his hens in the shape of grass-hoppers, &c., will not require so much meat, perhaps it may not be at all necessary. In such a case, the age of the laying stock will be all important and the amount of the grain ration must be measured according to circumstances. If the hens are confined to a limited run then meat in some shape, or cut bone, will have to be supplied. Of course, it is understood that we are dealing with farmers who make it an object to have their hens laying in winter when their product is worth most. Sheep-heads boiled and broken to pieces with an axe, have been recommended as a splendid ration at any time. Beef heads, livers, lights, &c. are also all good. Indeed, much of the animal waste can be utilised. If a farmer is in the neighborhood of a good market and receives the highest price for his eggs and poultry he can afford to get much for his revenue producers that a farmer at a distance from such market will not think himself justified in procuring. The farmer in the neighborhood of a large town or city can also procure green bones from the butchers. At a cent a pound it is a cheap investment. It just amounts to this, that if a farmer is as anxious to make money out of his poultry as he is out of his cows, or other department of his farm, he will find a way to do so. At any rate a farmer who has unmarketable vegetables, grain, or clover hay, is better situated to obtain eggs in winter at cheap cost than the city or town poultry keeper who has to pay first cost for what he buys.

SUMMER MARGIN OF PROFIT.

Time will not permit me, on this occasion, to take into consideration the case of the farmer who has his hens non-producers in winter to begin to lay when warm spring weather sets in and they are running abroad. In such a case, the cost of production is very little, and if prices are low the margin of profit is correspondingly great. It would be interesting to know exactly how much it costs the farmer who has his fowls running at large, in Spring and Summer, per dozen for his eggs. Not as much as is thought. Taking the low price of grain into consideration, and the fact that the hens supply themselves with insect life, green stuff and grit while running at large, there is a satisfactory profit in eggs at the lowest summer prices. The farmer, however, is not recommended to keep his hens idle in winter. It is better for him to have them lay in winter and early spring when prices are good, and breed a superior class of poultry in early sum-

mer to sell at ten cents per lb. It will be interesting to take up the subjects again.

Meanwhile by feeding meat in some shape, cut bone or the waste of the house; giving his hens a little attention and having them of the proper age; the farmer can have his hens moult much earlier than they usually do.

Science.

PURE WATER ON THE FARM.

— by —

Frank T. Shutt, M.A., F.C.S.,
Chemist, Dom. Exp. Farms.

Probably one of the most directly useful investigations carried on in the laboratories of the Experimental Farm at Ottawa, has been the examination of well waters from farmers' homesteads. During the past nine years several hundred samples have been analysed and reported upon, and in this way a very large amount of valuable data has been amassed.

The results of these analyses have been anything but flattering, for they have conclusively shown that a large proportion of the waters sent in for examination have been seriously polluted and unfit to use for drinking or domestic purposes. We shall not be far astray in making the statement that in the neighbourhood of fifty per cent of the samples, as judged by the accepted standards of purity, have been condemned and that a further twenty-five per cent have been returned as suspicious and probably dangerous. This condition of affairs demands the earnest and serious consideration of our farmers, for the question of pure water is not only an important but a vital one.

We would preface our discussion of this matter by stating that the natural waters of Canada, as found in her lakes, streams and springs (speaking particularly of Ontario, Quebec and the Maritime provinces) are unexcelled for purity in the world. To prove this there are ample analytical data. How is it then that so many wells in rural parts are polluted, and what is the nature of their contamination?

Let us answer the latter part of this question first. There is no doubt in the writer's mind that, in the majority of instances, the pollution, as shown by the chemical data, is of the nature of drainage from the barnyard, farm buildings, privy and similar sources. Many samples examined have proved to be nothing less than diluted sewage—samples which really had an agricultural value as fertilizers. It needs no lengthy argument now—days to prove that water charged with excrementitious matter is decidedly injurious to man and beast. This is admitted by all. We are fully aware that such contaminated water is the frequent, nay the chief cause of spreading typhoid fever and other serious and often fatal infectious disorders—for we know that in such water are to be found all the conditions of food and environment most favorable for the growth and rapid reproduction of disease germs.

We, however, as a people, are perhaps not so well aware that the constant and continued use of water containing the decomposing dejecta of animals has a

peculiarly baneful and at the same time be it noted, insidious effect on the general health. I do not hesitate to say that the origin of many diseases of the intestinal tract—diarrhoea, indigestion and their attendant troubles, such as sick headache, lassitude and the like, might frequently be traced to the use of polluted water. This is not a matter to be treated lightly, for is not the health of the farmer and that of his family of paramount importance? Let us always remember that the use of polluted water and good health are incompatible. Moreover, the health and thrift of the stock and the production of pure milk and first class butter are dependant upon an ample supply of unpolluted water. For these reasons which might easily be enlarged upon, the farm water supply should be beyond suspicion, and it should be most carefully guarded against the infiltration of drainage matter.

Secondly, as to the cause of well pollution. It is very largely, if not chiefly due to the pernicious habit of sinking the well in the barnyard or under one of the farm buildings in which stock is kept. Under such circumstances it is only a matter of time before the well acts as a cesspit. Liquid manure sooner or later finds its way into such wells, unless most careful provision is made to prevent it soaking into the ground. The wells so located that escape pollution are the exceptions. Heavy clay soils may postpone contamination, but it is only a postponement, for they have shown themselves previous when manure is allowed to accumulate in the near neighbourhood of the well.

Further, we wish to point out that there is much need of reform and improvement in keeping the buildings and barnyard clean. Many wells might have been kept free of impurity if greater care had been exercised in this matter. In this article it is not our purpose to dwell upon the large amount of valuable plant food that is annually lost by carelessness in the preservation of manure, nor to emphasize how much easier milking, harnessing up and many other farm jobs would be if the yard and buildings were kept clean and tidy. But we would point out that by a more liberal use of bedding and absorbent litters and the regular removal of the manure, much could be done towards improving the appearance of the surroundings and in preserving the well from contamination.

In conclusion, let me say to those about to sink a well, locate it at a safe distance from all possible sources of contamination. Line the brick and stone work to the ground water level with a cement impervious to water. Further, protect the well from infiltration of surface water by furnishing it with a tight-fitting top, placed at some little height above the surface of the surrounding ground. From time to time thoroughly clean out the well, for therein mice, rats and frogs not infrequently find a watery grave. Household slops, garbage, etc., should never be thrown on the soil in the neighbourhood of the well; preserve their elements of fertility in the compost heap. Finally, do not use the well as a cold storage—an accident will assuredly some day happen and the water will be charged with material that will readily decompose. Washing the dairy and other vessels at the well should not be practised unless there is ample and careful provision by a well constructed drain to carry off the wash water.

Swine.

THE BREEDING AND MANAGEMENT OF SWINE.

(From Farming)

By W. J. Haycraft, Agincourt.

Our methods of breeding and managing swine have undergone a great change in the last fifty years. In former times it was the custom to breed from a sow of any kind, color, or type; and the requirements of the market were never taken into consideration at all. Anything would do, so long as it would make pork. The housing, too, was usually of as slovenly a nature as could possibly be. As a general rule, a few boards thrown across some fence corner near the house constituted the pig-pen, and in wet weather the hogs would be wallowing in mud and muck up to their bellies. The feeding trough was never in a fit condition to put wholesome food into with any expectation of receiving a profitable return. And the marketing, in keeping with the breeding, the housing, and the feeding, was done in the most slovenly manner. But prices were good, and buyers seldom found fault.

But now see, at our annual exhibitions, what fine pens of swine there are; well bred, well kept, well fed. What a contrast they present to the swine of half a century ago. But this change has been brought about by years of careful breeding and selection, and by a steady improvement in the methods of housing, managing, and feeding. Great credit is due to those who have toiled unceasingly to bring our swine-breeding to the high standard which it now occupies as one of the leading industries of our noble province.

A CLEAR AIM NECESSARY.

In any pursuit of life there must be a clear perception of what is desired in order that the best results may be accomplished. A builder would have very poor success in erecting a building if he did not have a definite plan decided upon before he began. The same thought holds with respect to every other tradesman. So it is with the swine-breeder. If you intend to breed pure-bred swine you must first decide definitely which breed will be your choice, and what one will be best suited to your locality; or, if you wish to breed only for pork, you must first decide which breed or cross will best suit the market that is most convenient to you. When you have selected your breed and type, breed to that type only, and success will surely crown your efforts.

THE SOW AND THE SIRE.

The first thing necessary to success in swine-breeding is a good brood sow. She should possess good length and depth of side, a good shoulder, and a fine, deep ham. These characteristics she should have inherited from her dam, so that if we use with her a sire of the proper type we may expect her to transmit these same characteristics to her offspring. She should have at least twelve teats, and as many more as possible, for the reason that if it ever happen, as occasionally it will, that you get a large litter, some of your little ones will die if there are not enough teats for all of them.

By strict attention to your breeding stock you will soon be able to tell which of them have the best digestive powers and respond most quickly to liberal feeding, from these select your young breeders.

Always use a purebred sire, so that your stock may be improving instead of degenerating. No matter whether your dam be purebred or not, if you use a mongrel sire your stock will continually degenerate.

THE BREED.

Now, as to the best breed, it is enough to say that there is no "best" breed for all purposes, and for all people. Breeders of purebred swine all claim they have the best, and each strives to win the coveted prize when they compete for "the best hog of any breed." One thing is certain, namely, that some breeds of hogs conform more closely to the pork packers' views than do others; but whether such breeds will return as much pork for the food consumed by them as will others that are not so much desired by the packer, is a matter for our experiment stations to decide. But hogs that will grow to weigh 200 pounds live weight at six or seven months old, and that possess length and depth of side, together with a good, deep ham and shoulder, are the ones that suit the packers' idea at the present time.

HOUSING.

Having selected your breeding stock, you must now provide a comfortable house for them, for if your swine are not properly cared for your labor as a breeder will be lost. I prefer a frame pen, made frost-proof. My objection to stone pens is that on account of their being damp they are not so healthy as wooden ones are. Every swine-breeder knows about how many hogs he intends to keep, so he must build his pen to suit his requirements. At one end should be a boiling house, which should be large enough for killing also; and there should be a passage along in front of the pens for convenience in feeding. There should also be a yard to each pen, and it should face the south, if possible. Good ventilation is necessary, and it can be had for very little extra expense.

If convenient, build your pen so that it will adjoin the orchard, as then your pigs will have a shady run in the hot days of summer, and be able also to pick up all wormy apples, thereby destroying numbers of insects that would give you trouble in the next year. It is also claimed by some that sowing peas in the orchard and letting the hogs harvest them is very beneficial to the orchard.

FEEDING.

The feeding of swine is, to my mind, the most difficult part of their management. The feeding should begin with the sow as soon as she has been served, or shortly after. In winter her food should consist of roots and a little grain, and in summer she will do very well if she has the run of the pasture field and the refuse from the house. A few days before farrowing time she should be put in a pen with a scuffling nailed about eight inches from the floor and ten inches from the sides, so as to keep her from crushing the little ones against the wall. If possible, do not disturb her while

farrowing, and do not give her anything to eat till she looks for it, and then only a little slop for the first two or three days. After that give her all she will eat clean of barley and oats chopped, and occasionally a little oil-cake added.

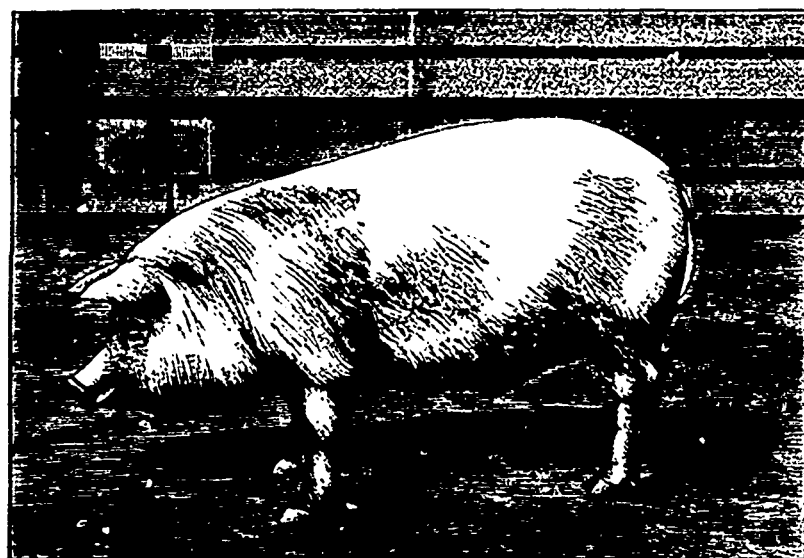
When the little pigs are about three weeks old, castrate them, and partition off a part of the pen for them to run in. Place where they can get at it a little sweet milk, and they will soon learn to eat. After they get accustomed to eat, you may add a little meal. I prefer shorts; if convenient, add a few boiled potatoes, which will be greatly relished by the youngsters.

I usually wean at six or seven weeks. At weaning, the pigs should be fed very carefully so as not to stunt them with overfeeding or underfeeding, as a stunted pig is dear at any price. Until fattening time comes the pigs should be fed with bone and muscle-forming food, so as to insure good growth. Oat and barley meal is good

strict attention is paid to bedding and cleaning; especially so if it had to be purchased with hard cash.

We do not advise the use of too highly concentrated foods. For instance, some feeders, knowing the highly nutritious nature of cotton-seed meal, are tempted to feed it to swine in hope that its abundant nitrogen (1) may add to the fleshy part of the animal, and thus produce the much sought for pork composed of alternate streaks of fat and lean. But we must remember that in feeding animals we cannot produce as certain effects as we can in mixing paints or metals. We must consider the health and vital functions of the animals we feed. This especially applies to swine, whose internal organs are similar to those of man, and every one knows with what care man's food has to be selected, consumed, and digested in order that serious trouble may be avoided.

Thus every feeder of farm animals must make a study of the science of



PRIZE BACON CURERS' PIG.

At the Montreal Exhibition last autumn a prize of \$20 was offered by the Laing Packing and Provision Company of Montreal, "for the best bunch of hogs of any kind, ten or more in number, suitable for the export bacon trade, weight to be 140 lbs. to 190 lbs., live weight. Hogs to be in good condition, and not too fat." There were three entries. The hog shown in the illustration was picked out by the judges as being the best and most typical animal of the lot for the bacon trade. Of the bunch of ten hogs winning the prize, two were Tamworth and Berkshire crossed, three were Yorkshire and Berkshire crossed; two were Poland-China and Berkshire crossed; and three were Berkshire. The animal represented in the engraving was from a Yorkshire boar and a Berkshire sow.

food for growing hogs. It should be mixed with pure water, or, what is better (if dairying is carried on in connection with hog-raising), with good, sweet skimmed milk.

Give your hogs plenty of exercise, for that is very essential to the formation of the coveted bacon that is composed of alternate streaks of fat and lean. A little trough with salt and ashes should be kept where the pigs may have free access to it at will both in growing time and also in fattening time.

FATTENING.

As fattening time comes on a more fattening food should be fed. This may consist of peas or corn, mixed with barley and oats. We should consider two things, the wholesomeness of the food, and its capacity to make a large return in flesh and fat. By strict attention to feed and a proper mode of feeding it, we ensure a greater freedom from disease. Some prefer boiled food, but the extra expense for fire and labor will not be balanced by the increased gain. We have fed shorts mixed with pure water, and have been well paid for our labor. Besides there is the manure, which is no small item where a number of pigs are kept, and

feeding, and then apply it to his own practice, experimenting with different foods and with different manners of preparing them, in order to find out for himself what will be the best methods for him to pursue in his own practice.

PIG RAISING PAYS.

The pig has been from time immemorial the despised and neglected inhabitant of the barn-yard, but he has often been the most profitable domestic animal kept about the farm. But neglect and bad treatment have often prevented him from rendering to his owner the return in profit of which he was capable.

Of course, in the economical fattening of swine, some attention must be paid to the market end of the business. But in this, as in other matters pertaining to the farm, the home end of the business is the most important one. The reduction of cost and the improvement of quality are two objects toward which the swine breeder must give his most strenuous attention. While the individual farmer

(1) Pease will answer for the nitrogen.—Ed.

er can scarcely bring any appreciable influence to bear upon the market price which he can realize at any stated period, he can so regulate his programme of breeding and feeding as to able to market the most of his hogs at a time of the year when the market price is the highest.

Some years ago I was a great advocate of every farmer dressing his own hogs, but now my opinion is somewhat different, for the English market seems to be our outlet for our surplus bacon, and that market demands a uniform article. Such an article can better be produced when the hogs are handled in the way in which our packers handle them, and this can be done by the packers to much better advantage than by the farmers. Then, too, the time that would be occupied in killing is sufficient to deliver them alive to the packer or buyer, and thus one day's work in the transaction is saved. But we must be governed by our situation, and by the market prices that rule for "dressed" and "alive" respectively. I claim that it will not pay to dress our hogs unless we can get 1½ cents per pound for them dressed more than for them alive. One thing is certain in marketing hogs as well as in marketing everything else, we must conform to the requirements of the market, and make our produce catch the eye of the buyer, if we expect to get the top price, and that is what we are all after in these times of small margins.

THE UP-TO-DATE LEAN MEAT HOG.

A Manitoba breeder sends the following article, contributed by N. H. Gentry, a capable Berkshire breeder in Missouri, to the "American Swine-herd," asking space for it here. We are always delighted to hear from any one in support of his opinions, but would like to point out that in this case Mr. Gentry rather caricatures than criticizes. There can be no doubt that under a mistaken idea about the advantages of crossing, too many people are breeding mongrels, the most detestable of all kinds of breeding. An Ayrshire - Galloway - Shorthorn - Jersey cow is pretty certain to have as many defects as a scrub, without possessing half her usefulness, and a mongrel beef or pork animal, with a little of the "hunger-to-day and burst-to-morrow" style of management thrown in, will no doubt make a kind of beast that Mr. Gentry's remarks will fairly apply to.

In this issue will be found "Among the Farmers" something bearing on this very question which we commend to the critical notice of our present correspondent. The dumpling Berkshire bred by the last generation of pork men is out of date, and it may be freely conceded that our present type of the breed is nearer a great deal to the cures' ideal, while still a good layer on of flesh. Mr. Gentry says:

In your February issue I read from the pen of Professor Curtis an article on the lean or bacon hog, and am surprised to find him championing the Tamworth and Yorkshire as the most perfect types of such. If this is sound doctrine it is perfectly plain to my mind that the foremost breeders not only of swine, but of the beef breeds of cattle, and the mutton breeds of sheep alike, are far on the wrong road,

and to return to the point at which they diverged from the right would carry them back to the very point where their work of improvement began. In other words, to assert that this hog, with its long legs, slim body, and, worst of all, its extremely sharp nose, so similar in type to the common scrub, is the ideal for the production of the best quality of meat at the least possible cost is indeed revolutionizing, and when we read that Prof. Curtis and Secretary Furness are their champions over the so-called improved breeds, we can but feel that their teachings are inconsistent with the workings of the institutions with which they are connected, institutions which are expected to exert a healthful influence for the betterment of the improved breeds of live stock.

These men are striking at the very principles in breeding that have produced the types of animals that have added so much wealth to their respective states. For years I have argued in favor of and am still firm in the faith of the final victory of the lean meat or bacon hog, or, for that matter, the final victory, as well of that class of beef cattle, as well as mutton sheep that open with a larger percentage of lean meat and less fat. While I agree with Prof. Curtis in this, I differ from him materially in the type of the animal that will best produce the desired end. Who would expect the long, narrow-faced, long-legged, slim-bodied cow or sheep to be the superior of those of a more compact flesh-carrying type? Then, why apply this teaching in regard to hogs? I fear Prof. Curtis has fallen into the old foggy idea that all fleshy animals are necessarily too fat. Nothing could be more erroneous. I have seen Berkshire sows, when weaning their litters, and as thin as they could well be made, carrying as much flesh as a common hog would well fattened, and this flesh would, of course, be all lean meat.

The Berkshire hog, with his short, broad meaty nose, well-dished face, heavy jowls, smooth shoulders, deep sides, wide, deep hams, long, broad level back, and, adding to all this, great feeding qualities or the aptitude to take on flesh common to this breed. I think has the strongest, as well as the oldest, claims to be the greatest lean meat or bacon hog. Packers in the main for a great many years have reiterated this claim, and they are, of course, unprejudiced judges.

Had I not been firm at all times in this belief, and further, that the Berkshires are the healthiest and most easily hog raised. I never would have spent the many years that I have in my efforts to still further improve this grand old breed. I have seen the best specimens of the different breeds at our largest annual shows for a number of years, and I have seen the Berkshire almost invariably excel in size at all ages. This was emphatically true of the great show at the Columbian Exposition at Chicago in 1893, when all breeds, even to the Tamworth, were out with their best specimens the skill of man could produce, claiming public attention. Even in the pig classes under six months, no other breed equaled the Berkshire for size and ripeness for the butcher. If the market calls for light hogs, as Prof. Curtis says, all that is necessary is to kill them young and stop them from growing at the size desired.

A few more words in regard to type. A long leg, and, worst of all, a long, slim nose, is not only objectionable to an intelligent judge for the reason of what it indicates, namely, a slim body and a thin covering of flesh over the entire body, consequently poor feeding qualities. On the other hand, the broad, meaty nose and heavy jowls of the Berkshire are not so much admired for the amount of flesh on the same, but by reason also of what they indicate, namely, a thick covering of flesh over the entire body and good feeding qualities. The well rounded, well-projected brisket of the ideal Shorthorn cow is not admired alone for the weight it adds to the carcass, but for what it indicates throughout the body. (1)

"Nor'-W. Farm."

ON PIG AS PORK.

Pork is a meat which can only be cooked as joints in one way, and that is by roasting, or rather baking, for the oven has taken the place of the jack. Probably everyone has read or heard of Charles Lamb's "Essay on Roast Sucking-pig". His enthusiastic lip-smacking was for the sucking-pig. Crackling was to him perfection. He was generous, and could give everything away that was fish, flesh, or fowl, except pig. He made his stand on pig. But sucking-pigs are rarely cooked nowadays, and if Eli came back to this mundane world he would probably have to be content with a roast leg or chine.

When pig-killing therefore, means bacon and ham to the average country household the harder must be tolerably clear, or only provided with poultry, to which its ceteras will in some way or other be acceptable. A fat pig looks very big in the yard, but it looks much bigger to a housewife who confronts it as a carcass hanging in some outhouse for the first time. She is somewhat reassured by being told that is all for bacon, and that the legs are the hams. But next day it is cut up. She goes into her cellar and stands aghast. Not only are there bacon and hams upstairs, but there's as much more pig here! "What in the world am I to do with all this meat?" she says.

She begins to sort it with fastidious fingers, but gradually enters with zest into an anatomy lesson. She must go upstairs to convince herself the bacon is still there, and that these chins and spare-ribs are only its framework. Chins, spare-ribs, pork-pieces, scraps for sausages, joints of pork, petticoes, the head, the ears, the tail—food for a month without more variation than can be conjured out of the modes of cooking. Pieces for roasting, pieces for frying, pieces for salting, joints, pies, sausages, brawn—all must be reduced to order and put into train for keeping or cooking. And those huge masses of fat are the leaf, and the leaf makes lard, and embedded in them, when she begins to cut them up, she finds the kidneys. Then there are the liver and the heart, which must be used perfectly fresh.

A very delicious breakfast dish can be made from brawn and liver, but as the brawn has to be in salt for two or three weeks, and the liver must be

fresh, the same pig won't do for both. It is therefore best to buy two or three pounds of liver when your brawn is ready. Boil all together and mince it, or mince the liver only, as you prefer, season with pepper and salt, and mix all thoroughly. Then put it into a roasting mould filled to the brim and solid, and press it under a heavy weight. When you take it out of the mould next day it will be a compact circular dish, from which you will carve in rounds. The only disadvantage which I have ever heard of this dish possessing is that it is too popular, and so very extravagant.

Brawn can, however, be made equally nice by a very different method. When the head has been boiled take off the meat in nice pieces, free from skin, and skin the tongue. Half-a-dozen pot moulds should be ready by having been thoroughly dried in the oven. In these place the meat lightly with judicious mingling of fat and slices of tongue and seasoning of pepper and salt, with a dust now and then of finely-powdered sage if liked. Reduce some of the liquor in which it was boiled by skimming off all fat and boiling quickly until it will jelly. Then fill up the moulds with this, and leave them to set. When turned out, the dish will be as pretty as it is also tasty.

The petticoes, or, as some people call them simply, feet, also make a nice breakfast dish. They should be split and rubbed with salt, and left on a dish for two or three weeks. Then boil them slowly until all the flesh is perfectly tender and would slip from the bones. Pour over them a good white or soubise sauce, with the onions very finely chopped, and send to table very hot. The first boiling should be done the day before they are required, so that they are thoroughly cooked before being warmed for the meal. Garnish with bits of curled bacon and parsley.

The heart makes a nice little dish, if stuffed with forcemeat and sent to table in thick brown gravy. The kidneys can either be stewed or fried with bacon, or cooked and finely minced, added to some sausage meat, heated through, and dished up on buttered toast, with mashed potatoes round it if for supper.

The sausage meat will be made from all the small bits, minced by being put through the machine, and seasoned with sage, pepper, and salt. Skins are rarely used now for home-made sausages. The meat is mixed with a nice proportion of breadcrumbs, rolled into balls, or, better still, cakes, which being flatter are more likely to be thoroughly cooked by the time they are browned and sent to table on a crisp, well-buttered toast, or, if preferred, like rissoles, with gravy.

Before cooking the chins or spare-ribs, which will keep a long time if rubbed with a little salt now and then, rub them further with finely-crumbled sage, and leave a sprinkling on them also. Charles Lamb appealed against onions with his sucking-pig, but allowed that "whole hogs might be steeped in shallots or stuffed out with plantations of the rank and guilty garlic." The onions must be finely chopped and seasoned with sage, pepper, and salt, and dished up alternately with heaps of apple sauce, unless, as sometimes preferred, the chine is not to be contaminated by garlic for the sake of some

members of the party. Then it is best to send in the apple sauce in a sauce-tureen, and the onions neatly levelled on a small flat dish, and scored in diamonds by a knife. Pour good brown gravy round the joint, and, if it be a chine, remember to serve some of the dainty crackling with the meat.

JULIET.

THE BERKSHIRE A BACON HOG.

EDS. COUNTRY GENTLEMAN—The strictures on my communication, made by a Canadian correspondent and referred to in the clipping from the Michigan Farmer in your issue of June 3d, may, I think, usefully be answered by a few words more in defence of the Berkshire as one of the most profitable of the swine species. There are two sides to every question, and in regard to pigs, this applies distinctly. There may be a better animal for bacon than the Berkshire, but surely there is none that will make the best kind of meat for less cost. We used to hear a good deal about the graziers, as the English call the grass-eating pigs—the grassers, as we call them—but none stands more preëminently at the front of the row than the Berkshire, which, given a good clover pasture and the waste milk of the dairy, will make meat for one cent and a half a pound, as I have proved in a small and large way.

I once fed eighty, half Berkshires and half Chester Whites, pastured them on clover, and gave the lot all the waste milk of fifteen cows during the summer, finishing on potatoes and small corn ears boiled together and fed in the form of thick mush, when a little warm only, and the lot, weighed on the cars, dressed 24,000 lb. The Berkshires averaged 340 lb. and the others 260 lb., all having been fed alike, and averaging the same ages through the lot. The total cost of feeding the lot, not counting anything for labor, was a little over one cent and a half a pound net. This estimate was on the basis of the actual cost of everything fed.

In the dressing, the superiority of the Berkshire as to light offal and excellence of the meat was very conspicuous. In the meat of two, one of each kind kept for home use, the streaky meat of the Berkshire being especially prominent. Doubtless the Berkshire of twenty years ago has been somewhat deteriorated by the use of the Neapolitan blood then in vogue, the crossing having lessened the fleshiness of the then more broadsided Berkshire, and plumped this animal more than may have been desirable. Certainly it improved the smoothness and the softness of the form and coat, and refined the head; but the head of a pig for bacon is worth consideration for the good meat on it, and in the Berkshire it is streaked with tender lean, and has a good thickness of meat on it, which all together makes it a very desirable addition to the profit of this very profitable animal, for home use especially.

I do not think the Berkshire has been improved by the mixture with the Tamworth breed as a bacon pig. The six-months-old Berkshire I have always thought to be the very acme of excellence for its meat and of profit for its feeding qualities, which have surpassed all other breeds I have fed or bred. For the dairy there is no other pig so good, as with milk and clover the pigs are

always ready for market at from 150 to 180 lb., without any attempt to fatten them with corn; and then to my mind the meat is the finest bacon made for home use, being thin and well streaked with solid fat and tender lean, and bringing—as I have at times made of the bellies—20 cents a pound when dry and smoked. The loins are not surpassed for roasting pieces, or for salting for boiling; while the hams and shoulders are unapproached for profitable use, having plenty of tender lean, not too much fat, and smaller bone (thank the Neapolitan for this, anyhow) than any other pig in existence. The greatest recommendation, however, is the fact that Berkshire pigs may be kept growing and fit for the knife every day in the year, on the cheapest feed, while for southern farmers its black skin is a most important point, as it never sun-scalds.

HENRY STEWART.

The Horse.

THE CARLOVINGIAN OR NORMAN HORSE.

The Frankish (not French) knights of the ninth century were heavy men, heavily armed with steel weapons and encased in steel armor, and therefore needed a war-horse of muscle, bone, speed, (1) weight and bottom. Indeed, such a horse was a necessity in order to cope with the Saracens who were light men, and who, when mounted on their hot-blooded horses of Arabia and Barbary, could ride fifty miles and dash into battle without a stop. So the Franks encouraged the feeding of strong, heavy horses.

The Asiatic grays were in Lombardy (northern Italy), European blacks were in the Netherlands, the bays were numerous in South France. These last were of Arabian and Barbary stock, but none of the above races were pure. In a few years these three races were fused together into a breed which realized the ideal of the Frankish knight. This breeding was first begun during the reign of Charlemagne who conquered the greater part of Europe after the downfall of the Roman Empire, and the horse produced was known as the Carolingian. Flanders, west Germany and Gaul (France) were all engaged in breeding him. This great war-horse of the tenth and eleventh centuries is the direct ancestor of all our Norman breeds of to-day, and others descending from them, including the French-Canadian.

He was about seventeen hands high, had a short thick head, was wide between the eyes which were full and expressive. He had heavy jaws, short pointed ears; thick, short, arched neck and long and heavy mane and tail. His shoulders were strong and sloping, combining speed with power; barrel round and well ribbed up and his chest was wide and deep. Great girth, broad hips, deep quarters, steep rump, mighty muscles, large bones, leg short from knee and hock to fetlock, tendons large and distinct, pasterns short and straight, and feet broad, solid and hairy were all characteristic points of this great horse. After the reign of Charlemagne he became known as the Norman horse, from

the fact that he was employed by William the Conqueror for cavalry purposes, and indeed became "the" horse of the Norman people who so long were the ruling power in Europe.

In the system of inter-breeding which produced the Norman horse, the gray and black races, but especially the gray, entered largely into his composition. In 732 A. D., after a seven days fight, Charles Martel defeated the Moors, who had invaded France with their splendid Barbary Cavalry. Many of these hot-blooded bays were left in Gaul and their descendants formed an important factor in infusing mettle and speed into the Carolingian.

This was one of the first battles in which the European princes were convinced of the fact that they needed better horses. A few years later, Charlemagne constructed his great mediæval empire from the fragments of Rome, and commenced propagating horses upon sound and fixed principles. Between 800 and 814 A. D., the foundation of the Norman horse was laid. This breeding was continued through the Carolingian dynasty until the year 987. The best animals were produced in Belgium, Flanders, and northern France. During the time of William the Conqueror, they were also bred largely in England.

The Norman may justly be considered the most intelligent, the quickest and the most spirited large horse that ever existed. In the eleventh century he helped to defeat an army of Moslem cavalry where the odds were three to one; he also helped to take Jerusalem. Although there are no direct records left us, probably some hot-blooded animals were brought to France from the Orient, during these crusade wars. Spanish blood was also introduced into France in the eleventh century; this was originally Barbary stock.

The Norman horse was bred for war until the year 1600. He was then bred more extensively for agricultural purposes, and hence became slower. (1) When France introduced the post-coaches he was found to be too heavy and slow, so the lighter Brittany blood (in reality a variety of Norman with an extra dash of hot blood) was introduced. This blood, in addition to that of the two Arab Stallions, Godolphin and Gallopoll, imported into England, 1620, reduced the weight and increased the speed of the Norman, and produced that great branch of the Norman family, the Percheron. After the age of post coaches, the market demanded a heavier horse again, and La Perche (a province of France) opened her doors to all heavy mares; hence, at the present time, it is impossible to find a pure Percheron, strictly speaking, even in La Perche.

The heavy draft-horse of Boulogne, the Boulonnais, represents, perhaps more nearly than any other branch of the Norman stock, the true Carolingian: from which, in fact, all the large draft horses of the world are partly descended. The draft horses of Normandy proper (the province) are mostly blacks and grays; they are simply a branch of the Boulonnais.

The large Bretons are about the same as the Boulonnais, but Brittany is chiefly noted for its smaller coach horses which, as before stated, when crossed with the Boulonnais produced the

(1) The knight in his panoply weighed at least 28 stone: 392 lbs. How could a horse carry that weight and be fast? —Ed.

Percheron. Pictures of the true original Percheron strongly resemble in shape and carriage the French Canadian of the past.

The method of raising horses in France has developed a few breeds not locally identified, but identified with the whole country. There are no distinct local races in France. The colt is born in one province, sold when a few months old into another province, kept there a year or two and resold, to be taken to another part of the country. In this way the horse has passed through several hands before he is ready for work.

After glancing at the history of this great Norman breed of horses, noting the careful fusing of heavy European grays and blacks with the hot blood of Arabia and Barbary, the centuries of careful breeding for special excellence in war, coaching and agriculture; we can understand why it is that, wherever this blood is found, in French breeds of to-day or in the trotting horse of America, (through the old French Canadian) there we find speed, strength, or endurance, or all three quantities combined.

CHAS. S. MOORE, B. S. A.

Stanbridge East, Quebec.

June 9, 1897.

THE MARE AT FOALING TIME

(From England Ag. Gazette).

Much of the success that should attend horse-breeding depends upon the care and attention bestowed upon the mare towards and at foaling-time, as then not only are her own health and safety at stake, but the welfare of her progeny is also a matter for serious consideration. It is, therefore, necessary that extra precautions be adopted, and intelligent observation maintained, in order that mare and foal may pass through this critical period in the most satisfactory manner. Certainly it is true that in very many instances pregnant mares receive but little notice beyond usual, and are worked and exposed to all kinds of unfavorable treatment. This is especially the case with animals belonging to poor people, and especially farmers in a small way of business, who exact labor from their mares almost up to the day of foaling, and set them to work again a few days after that event has taken place. But this treatment is not always unaccompanied by accidents of a grave description in which sometimes the foal, sometimes the mare, and not unfrequently both, suffer disaster. And it is no less true that common-bred animals are less predisposed to accidents at this time than those which are better-bred; high breeding bringing in its train more liability to the accidents incidental to pregnancy and parturition, and, therefore, in foal; for I have known instances in which animals have exhibited one or two signs which their owners or attendants have accepted as evidence of pregnancy, and, consequently, have nursed the mares for months, in the expectation of eventually seeing an addition to the equine family, but at least had to confess to having made a mistake. This is not pleasant, and an endeavor should therefore be made to make certain of the existence of pregnancy. In the great majority of cases this cannot be satisfactorily

(1) But surely not fast horses!—Ed.

Special Notices.

Salt on the Farm.

The limited use of Salt for fertilisation is a proof that its action in the soil is not fully understood.

A provider of plant food.

It has been proved by experiments that the solvent powers of Salt in solution are twenty times greater than those of rainwater for breaking up the soil and setting its constituents free and available. Salt may therefore be described as a powerful chemical agent for providing and preparing soluble food for plants from the materials present in the soil. This is a most important consideration when we remember that in all soils there are about two-thirds lying dormant, and only one third in an active condition. Being a "disintegrator," Salt makes stubborn soils easier to work if applied just before the land is broken up. In all cases Salt hastens weathering, and keeps the soil soft in frosty weather.

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Salt not only absorbs moisture from the atmosphere, but retains such moisture in the soil, thus compensating for a deficiency of rain.

A Purifier and Cleanser.

Salt purifies and cleans the land by decomposing all inert matter, neutralising sourness, and assisting in the circulation of stagnant water.

Montreal Exposition.

Messrs. J. H. Connor & Son, the extensive manufacturers of washing-machines, clothes-wringers, wheel-arrows and other wooden ware intend making a large exhibit at the Montreal Exhibition and wish to see all interested in the Washing-Machinery business, as they are desirous of establishing agencies all over the Province of Quebec, and as they have facilities for turning out work unexcelled in Canada at the lowest prices; we would advise our subscribers to see their representatives at the Montreal Exposition.

Canada's Great Victorian-Era Exposition and Industrial Fair.

We have received a copy of the Prize List for the great Victorian-Era Exposition and Industrial Fair, which is to be held at Toronto, from the 30th August to the 11th September next. It promises to exceed in magnitude and attractiveness all previous exhibitions held in Canada. Among the many special features to be provided will be a duplicate of the principal features of the great Jubilee procession in London, England, on the 22nd of June, all the uniforms, costumes and properties being brought from England for the purpose at an enormous cost. Anyone desiring a copy of the Prize List can procure one by dropping a post card to the Manager, Mr. H. J. Hill, Toronto.

SUCCESS WITH PIGS.

At a recent Convention at St. Mary's, Ont., it was said by an experienced breeder, Mr. T. Louis, of Wisconsin, that pigs should grow from birth until sold. It is certain that not one-half the pigs in Canada are thus kept growing.

The best way to secure healthy, vigorous pigs and rapid growth is to begin by feeding Herbageum to the stock from which you breed, then when the little fellows arrive they will be much more vigorous in every respect, and there will be an ample supply of better milk for them. Continue the Herbageum right along in the feed, and when they begin to eat with the mother they will get the benefit direct, in addition to the best of milk. When weaned, mix Herbageum in their daily rations in the proportion of a teaspoonful twice a day for each pig, as they increase in size the quantity may be slightly increased. The result will be more than satisfactory. There will be neither stunting in growth nor trouble with weakness in back or legs, and there will be freedom from scurf with a fine velvety coat and a very rapid formation of sweet, solid meat, so that at from five to six months old better weights will be obtained than ordinarily at eight months without Herbageum. It is important to remember that pigs fed Herbageum will weigh from 15 per cent. to 20 per cent. more than appearance indicates, and that they should always be sold by actual weight. This information is received from many who have tested it. On this point Mr. W. S. Bond, of Lloydstown, Ont., says, "During 1896 I fed two pigs Herbageum, and they weighed 20 per cent., or one-fifth more than the butcher's estimate, and the meat was very firm, fine and sweet."

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The languid eye, the pallid cheek, the emaciated form are met alas! too often among our sex. Why? Because a large proportion of the women of to-day suffer from female weakness.

DR. CODERRE'S ... RED PILLS -FOR- PALE AND WEAK WOMEN

Are beyond doubt the greatest blessing that science has ever produced for alleviating complaints of this nature. Thousands are daily testifying to their superior worth in being restored to vigorous womanhood.

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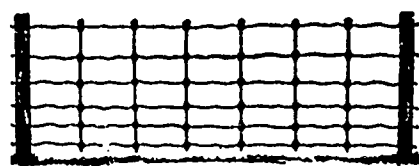
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Improved Yorkshires and Suffolks for sale at prices to suit the times. Extra fine stock ready for shipment with registered Pedigrees.
James H. Lloyd,
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Farms for Sale.

WANTED: A Farm 1000 to 5000 acres, or a large Island, must be on the St. Lawrence river.
H. M. SIMPSON, 163 Hutchison St., Montreal.

FOR SALE—Cote St. Luc, near Montreal, Farm 120 acres (of Estate late Eustache Prudhomme). Good land, convenient to City, close to the flourishing suburb Montreal West.
H. M. SIMPSON, 163 Hutchison St., Montreal.

FOR SALE—54 arpents of choice garden land with very fine orchard, close to the city, suitable for two or three tenants for market gardens and raising poultry.
H. M. SIMPSON, 163 Hutchison St., Montreal.

FOR SALE—Farm at Waterville, P. Q., 115 acres, good house, barns, stables, etc., fine apple orchard and good sugar bush. One of the best farms in the county of Compton. Terms very reasonable.
H. M. SIMPSON, 163 Hutchison St., Montreal.

FOR SALE—Choice farms in the vicinity of Montreal, and will soon be in the market as building lots.
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FOR SALE—Richmond, P. Q., large farm of 320 acres. Good buildings, orchards and garden. Moderate price.
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FOR SALE—Small farm of 65 acres at Sherrington, 35 cleared; fine land for early vegetables.
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Canada's best the Chester White Swine. First prizes and diplomas beautiful pigs for sale.
R. & J. MacLEAY,
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CALVES WORTH HAVING.

At Tweed, Ont., on May 30th, 1894, Mr. R. Robinson said, "Mr. Samuel Coulter, to whom I furnished Herbageum, fed it to a Holstein calf until within a day or two of six months old, when it was exhibited at the Tweed Agricultural Show, and there turned the scale at a little over 800 pounds." One of our travellers, on June 20th, 1896, mentioned the above to Jas. McBride, Esq., of Kinglelake, Ont. He replied, "I can easily believe that report, for I fed Herbageum to two Durham calves, one of them a heifer. When within one day of six months old she weighed 748 lbs.; the other was eleven days younger and weighed 730 lbs."

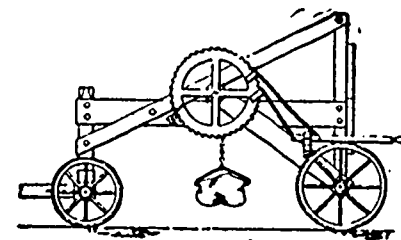
Another sample is from Messrs. McCarron Bros., grocers, of Walla'sburg, Ont., and who also raise thoroughbred cattle. Under date of August 20, 1896, they say, "We fed Herbageum to a Durham calf till it was three months old, when it weighed 476 lbs." And Mr. C. E. Wilkinson, of Essex Centre, Ont., on August 10, 1896, said, "A customer of mine, Mr. Wm. Sisson, fed a calf with skim milk, a little chop and Herbageum; at five months old he sold it for \$20. Send for a pamphlet and mention this paper."

AYRSHIRES FOR SALE.

A few Registered Cows, Heifers and Young Bulls fit for service, of Golden Guinea Stock, at reasonable prices. Copy of Pedigree, Terms and Particulars sent on application. Address:

ROBERT ROBERTSON,
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LEMIRE STONE & STUMP LIFTER



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Lifting and carrying stones at will, so you can make with them fences from 4 to 5 feet high. When buying this strong and durable machine, you can make your fence with big stones instead of buying spike wire for fences. You will clear your land for the mowers and reapers. To lift a stone you make the lever work and the hooks will hold it when lifting. You can lower it in the same manner or make it fall by touching a ring fixed in the wheel. You can lift, remove and put into fence a stone in 10 minutes. Agricultural Societies should buy it. Farmers if they like may join in club to buy it. Price moderate. For all particulars address to

A. LEMIRE, Proprietor, Wotton.

Or at the Plessisville Foundry, Somerset.

BROOKHILL AYRSHIRES. — Just one young bull fit for service left. A hands one animal. Orders now taken for bull and heifer calves from deep milkers and sired by Uncle Sam or Taout River 1894. Prices to suit the times.

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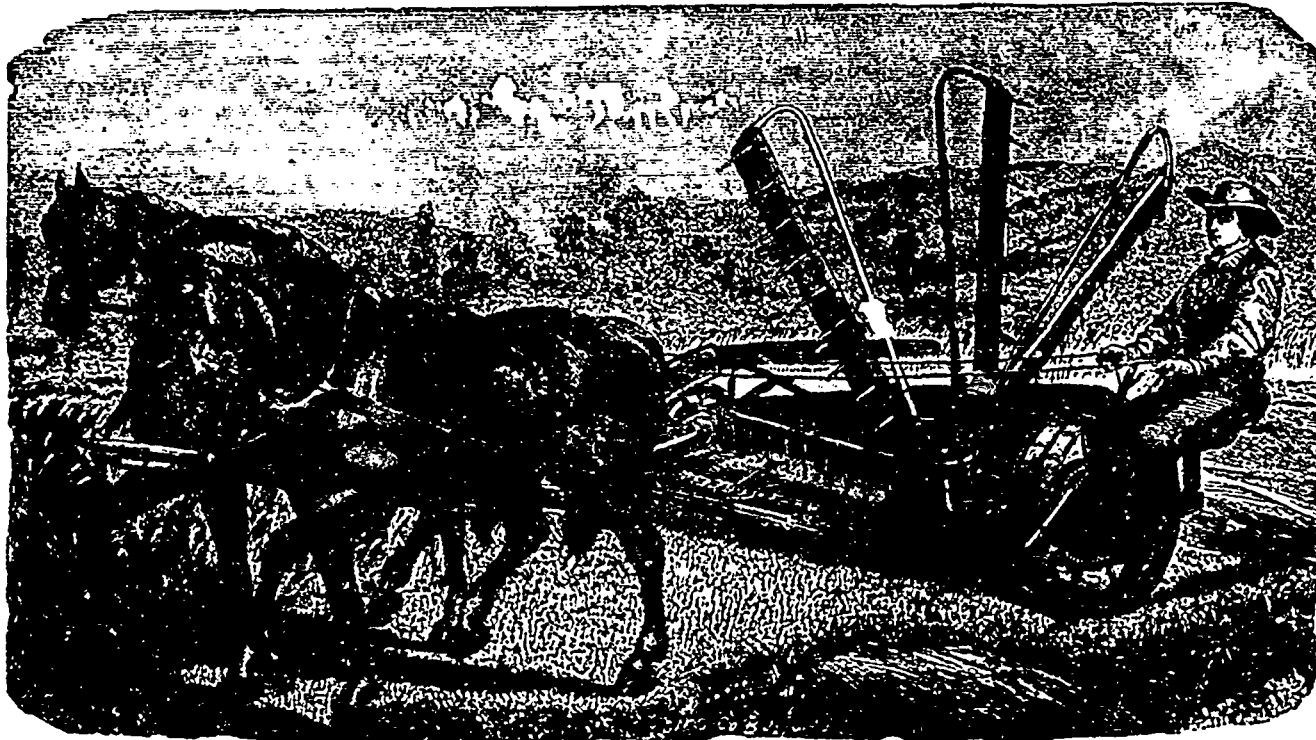
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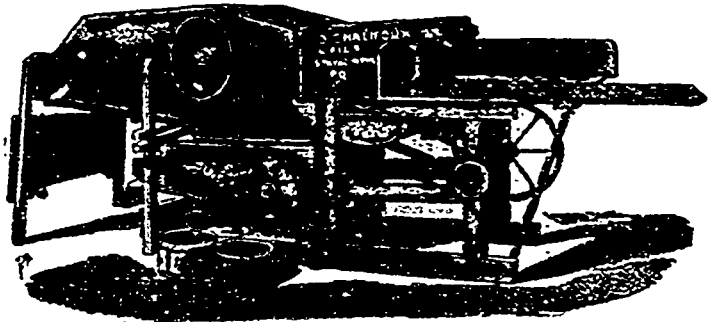
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